

# **SYLLABUS FOR M. SC. COURSE IN GEOGRAPHY**

**REVISED IN 2018: EFFECTIVE FROM THE  
ACADEMIC SESSION 2018-2019**



**DEPARTMENT OF GEOGRAPHY**  
**PANSKURA BANAMALI COLLEGE (AUTONOMOUS)**

**DIVISION OF MARKS**  
**Total marks: 1100 (Core) + 100 (Elective)**

<b>For Internal Students</b>				<b>Elective</b>
<b>Semesters</b>	<b>Theoretical</b>	<b>Practical</b>	<b>Total</b>	<b>Total</b>
Semester- I	200	100	300	-
Semester- II	150	100	250	50
Semester- III	150	100	250	50
Semester- IV	200	100	300	-
<b>Total</b>	<b>700</b>	<b>400</b>	<b>1100</b>	<b>100</b>

**STRUCTURE OF SYLLABUS**  
**SEMESTER-I (Duration: July –December)**

Type	Paper	Unit	Marks				Credit	Total Class Hours
			End-term Exam.	Internal Exam.	Unit Total	Paper Total		
THEORETICAL	GEO-101	Unit-1:Geotectonics	2	5	25	50	4	60hours
		Unit-2:Geomorphology	2	5	25			
	GEO-102	Unit-3:Oceanography	2	5	25	50	4	60hours
		Unit-4:Hydrology	2	5	25			
	GEO-103	Unit-5:Climatology	2	5	25	50	4	60hours
		Unit-6:Soil And Agricultural Geography	2 0	5	25			
	GEO-104	Unit-7:Environmentand Ecology	2	5	25	50	4	60hours
		Unit-8: Landscape and Ecology	2	5	25			
PRACTICAL	GEO-105	Unit-9:Hydrological Techniques	2 5	-	25	50	4	60hours
		Unit-10: Soil and Environmental Analysis Techniques	2 5	-	25			
	GEO-106	Unit-11: Basic Statistics in Geography	2 5	-	25	50	4	60hours
		Unit-12:PrinciplesofRemoteSensing and Aerial Photography	2 5	-	25			

**SYLLABUS**  
**SEMESTER-I (300 MARKS)**  
THEORETICAL COURSES (200 Marks)  
PRACTICAL COURSES (100 MARKS)

**PAPER GEO-101: GEOTECTONICS AND GEOMORPHOLOGY (Marks 50)**

**Course Outcomes:**

After the completion of course, the students will have ability to: i) understand the beginning of the universe and its evolution. ii) They can learn the methods and techniques of geological dating, iii) understand the plate dynamics of the earth and the resultant events like mountain building, earthquake and volcanism. iv) know the key geomorphological concepts like base level, profile of equilibrium etc. v) understand the key geomorphological events like weathering and mass wasting and the resultant landforms. vi) They can apply their knowledge in different environmental management project.

**GEO-101 (U-1): GEOTECTONICS**

*Full Marks-25 (End term Examination-20 and Internal Assessment-5)*

*Pattern of setting questions: **Group-A (Long Answer Type):** Two questions, each of 8 marks (without division), will be set for answering anyone. **Group-B (Semi-long Answer Type):** Four questions, each of 4 marks (without division), will be set for answering any two. **Group-C (Short Answer Type):** Four questions, each of 2 marks (without division), will be set for answering any two.*

1.1 Origin and evolution of Universe.

1.2 Relative and absolute dating: principles and techniques.

1.3 Origin of earth's magnetic field, paleomagnetism, geomagnetic polarity reversal and paleomagnetic time scale, paleomagnetic polar wandering curve and reconstruction of plate tectonic motions.

1.4 Mechanism of plate dynamics. Application of plate tectonic theory in explaining orogenesis, volcanism, earthquake

1.5 Neo-tectonics and its worldwide evidences.

**Reading list of books**

- Holmes, Arthur (1978): Holmes Principles of Physical Geology, Francis & Taylor.
- Bloom, Arthur L., 2003. Geomorphology – A systematic analysis of Late Cenozoic Landforms, 3rd Edn.
- Chorley, R., Schumm, S. and Sugden, D.E. 1994. Geomorphology, Methuen, London: 605p.
- Cook and Doorncamp. 1988. Geomorphology in Environment Management, London
- Kale, V.S. and Gupta, A. 2001. Introduction to Geomorphology, Orient Longman Ltd., Hyderabad: 274p.
- Keary, P. and Vine, M. 1997. Global Tectonics, 2nd edition, Blackwell Scientific Publications, Oxford: 302p.
- Lowrie, W. (2007): Fundamentals of Geophysics, Cambridge University Press.
- Ollier, C.D. 1981: Tectonic Geomorphology, Longman Scientific & Technical, London:
- Summerfield, M.A. (Editor) 1991. Global Geomorphology : An Introduction to the Study of Landforms,
- John Wiley and Sons Ltd., New York: 560p.
- Valdiya, K.S. 1998. Dynamic Himalaya, University Press (India) Ltd., Hyderabad: 178p

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## GEO-101 (U-2): GEOMORPHOLOGY

*Full Marks-25 (End term Examination-20 and Internal Assessment-5)*

*Pattern of setting questions: **Group-A (Long Answer Type):** Two questions, each of 8 marks (without division), will be set for answering any one. **Group-B (Semi-long Answer Type):** Four questions, each of 4 marks (without division), will be set for answering any two. **Group-C (Short Answer Type):** Four Questions, each of 2 marks (without division), will be set for answering any two.*

- 2.1 Concepts in geomorphology: historical and functional approaches, uniformitarianism and catastrophism, base level, grade and profile of equilibrium.
- 2.2 Weathering: factors, processes and landforms. Mass-wasting: safety factor, and resultant landforms.
- 2.3 Slope Evolution process-form relationship on slope elements, theories of Wood, Davis, Penck, King, Young and Savigear. Dynamic metastability in slope evolution.
- 2.4 Fluvial processes and forms: threshold energy for entrainment and transport, channel form and patterns, flood plains, alluvial fan, terraces and delta.
- 2.5 Applied geomorphology in planning, hydrology and economic geology. Geomorphology in Hazard Management (flood, landslide and subsidence)

### Reading book list

- Bloom, Arthur L., (2003): Geomorphology – A systematic analysis of Late Cenozoic Landforms, 3rd Edn.
- Brutsaert, W. (2005): Hydrology: An Introduction, Cambridge University Press, Cambridge.
- Chorley, R., Schumm, S. and Sugden, D.E. (1994): Geomorphology, Methuen, London: 605p.
- Coch, N.K., (1994): Geohazards: Natural and... , Prentice-Hall, Englewood Cliffs
- Cook and Doorncamp. (1988): Geomorphology in Environment Management, London
- Faniran, A. and Jeje, L.K. (1983): Humid Tropical Geomorphology, Longman, London:
- Goudie, A. (Ed) (1990): Geomorphological Techniques, 2nd edition, Allen Unwin Crows Nest (Australia).
- Huggett, R. (2006): Fundamentals of Geomorphology, Routledge, London.
- Kale, V.S. and Gupta, A. 2001. Introduction to Geomorphology, Orient Longman Ltd., Hyderabad: 274p.
- Knighton, D. 1998 : Fluvial Forms and Processes: A New Perspective, Arnold, London: 385p.
- Lal, D. S., 2003. Oceanography, 3rd Edn. 288p.
- Morisawa, M. (editor) 1994. Geomorphology and Natural Hazards, Elsevier, Amsterdam: 355p.
- Morisawa, M. 1985. Rivers, Longman, London: 222p
- Murthy, K.S. 1998. Watershed Management in India, 3rd edition, Wiley Eastern Ltd. / New Age International Ltd., New Delhi: 198p
- Newson, M. 1992. Land Water and Development, River Basin Systems and their Sustainable Management, Routledge, London: 350p.
- Ollier, C.D. 1981: Tectonic Geomorphology, Longman Scientific & Technical, London:
- Paul, R.P. (2006): Invitation to Oceanography, 4th Edition, Jones and Bartlett pub.
- Pethick, J. 1984. An Introduction to Coastal Geomorphology, Edward Arnold, London: 259 p.
- Pirazzola, P.A. (1996): Sea Level Changes: The Last 20000 years, Wiley, New York
- Pugh, D. (2004): Changing Sea Level: Effect of Tides, Weather and Climates, Cambridge University Press, Cambridge

- Ritter, D.F., Kochel, R.C. and Miller, J.R. (2006): Process Geomorphology, 4th Edition, Waveland Press, N.Y.
- Selby, M.J. 1985. An Introduction to Geomorphology, Clarendon, Oxford: 607p.
- Sharma, H.S. 1987. Tropical Geomorphology : A Morphogenetic Study of Rajasthan, South Asia Books, Jaipur: 124p.
- Singh, S. (2008): Oceanography, Prayag Pustakalaya, Allahabad
- Smith, K. (2004): Environmental Hazards, Assessing Risk and reducing Disaster, 4th Edition, Routledge, London.
- Starkel, L. and Basu, S. 2000 Rains, Landslides and Floods in the Darjeeling Himalaya, Indian National Science academy, New Delhi: 168p.
- Sverdrup, K.A and et. All (2005): The World's Oceans, McGrawHill, New York.
- Thomas, D.S.G. (Editor) (2008): Arid Zone Geomorphology: Process, Form and Change in Drylands, 2<sup>nd</sup> Edition, Wiley, Chichester.
- Thornbury, W.D. (1969): Principles of Geomorphology, Wiley Eastern Limited, New Delhi: 594 p
- Tinkler, 1985. A Short History of Geomorphology, Croom Helm Ltd., Beckenham: 315p

## **PAPER-GEO-102: OCEANOGRAPHY AND HYDROLOGY (Marks-50)**

### **Course Outcomes**

After the completion of course, the students will have ability to: i) understand the different physical and ecological zones of the ocean, their physical and chemical properties, ocean wave, tides and their origin. ii) understand the ocean composition, different oceanic landforms and features like lagoons, salt marsh, mangroves, coral reef etc. iii) They also understand the dynamics of the ocean, beach character, dunes, barriers ocean properties and laws. iv) Students may understand the hydrological cycle water potentiality, rainfall, surface runoff and their measurement techniques including the idea of ground water.

### **GEO-102 (U-3): OCEANOGRAPHY**

*Full Marks-25 (End term Examination-20 and Internal Assessment-5)*

*Pattern of setting questions: **Group-A (Long Answer Type):** Two questions, each of 8 marks (without division), will be set for answering any one. **Group-B (Semi-long Answer Type):** Four questions, each of 4 marks (without division), will be set for answering any two. **Group-C (Short Answer Type):** Four questions, each of 2 marks (without division), will be set for answering any two.*

3.1 Marine Environment and Processes: Major sub divisions of the marine environment, winds and ocean circulation, waves in the ocean, origin of the tides and tidal characteristics.

3.2 Physical and chemical structure of oceans: Water masses and their properties. Sediment in the Sea.

3.3 Coastal Habitats: Estuaries, lagoons, salt marshes, mangroves swamps, coral reefs-origin, circulation, sedimentation and ecology.

3.4 The Dynamic Shoreline: Coastal water movement, circulation in the surf zone, beaches, beach profiles, sand budgets, coastal dunes, barrieris land, tidal inlets, cliffed coasts, deltas, Storm effects. Human impact on the coastline

3.5 The Ocean's Resources: Law of the sea, law of the sea treaty, exclusive economic zones, mineral resource-oil and natural gas, gas hydrates, sand and gravel, mangrove nodules, Cobalt-rich oceanic crusts, phosphate deposits, living resources

## Reading book list

- Boaden (et al.) (1982): Introduction to Coastal Ecology, Blackie.
  - Garrison, T.S. (2007): Oceanography: An Introduction to Marine Science, 6th Edition, BrooksCole, Chicago
  - Levinton, J.S. (1982): Marine Ecology, PrenticeHall.
  - Pinet, P.R. (2006): Invitation to Oceanography, Jones & Bartlett.
  - Sverdrup, K.A.; Duxbury, A.C. and Duxbury, A.B. (2005): The world Oceans, McGrawhill.
  - Thorson, G. (1971): Life in the Sea, World University Library, New York.
  - Vatal, and Sharma (1972): Oceanography for Geographers, Chaitanya publishing house, Allahabad.
  - Wirthmann, A. (2000): Geomorphology of the Tropics, Translated by Busche, D. Springer-Verlag, Berlin: 225p.
  - Woodroffe, C. D. (2003): Coasts: Form Processes and Evolution, Cambridge University Press, Cambridge.
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## GEO-102 (U-4): HYDROLOGY

*FullMarks-25(EndtermExamination-20andInternalAssessment-5)*

*Patternofsettingquestions: **Group-A (LongAnswerType):**Twoquestions,eachof8marks(without division),willbesetforansweringanyone.**Group-B (Semi-longAnswerType):** Four questions,eachof4 marks(without division), will be set for answering any two.**Group-C(ShortAnswerType):** Four questions,eachof 2marks (withoutdivision), will besetforansweringanytwo.*

4.1 Hydrological systems, estimating water potential, water budgeting at watershed level.  
Hydrologic frequency analysis (Gumbel's equation and log probability law)

4.2 Precipitation estimates: point rainfall analysis, area-depth curve, theissen network and isohyetal method for estimating rainfall volumes.

4.3 Infiltration and evapotranspiration: soil-vegetation complex and infiltration estimates.  
Methods of estimating evapotranspiration

4.4 Runoff estimate using curve number, stream discharge estimates byarea-velocitymethod.  
Ground water: storage structure, flow, recharge and discharge.

4.5 Hydrograph sand rating curve: Time dimensions of hydrographs: concept of unit hydrograph and rating curves and their significance. Flood & Drought as Hydrological Hazards

## Reading book list

- Bedinent, P.B.et.al. (2008): Hydrology and Floodplain Management, Prentice Hall,Upper Saddle River, NJ07458.
- Biswas,A.K. (1972): History of Hydrology, North Holland Pub.Cc. Amsterdam.
- Boca Raton, F.L Viessman and Lewis (1996): Introduction to Hydrology, Harper Collins, NewYork.
- Chow V.T., Maidment , D. R. and Mays, L.W. (1988): Applied Hydrology, Mc Graw Hill, Newyork.
- Dingman, SL. (2002): Physical Hydrology, 2nd Edition, Prientice Hall, EnglewoodCliffs
- Hyot, W.G. and W. Langbain (1955): Floods, Prentice Hall University Press, Princeton.
- Keith, D. and Mays,L.W. (2004): Ground water hydrology, 3rd Edition, Wiley, Chichester.
- Kintede-Levario, H. (2007): Design for Water: Rain Water Harvesting, Storm Water Catchment and Alternate Water Reuse, New society publishers, Gabriola Island.

- Mays, L.W. (1996): Water Resources Handbook, Mc Graw Hill, Newyork.
  - Murthy, K.S. (1998): Watershed Management in India, 3rd edition, Wiely Eastern Ltd. / New Age International Ltd., New Delhi: 198p.
  - Pethick, J. (1984): An Introduction to Coastal Geomorphology, Edward Arnold, London: 259
  - Singh, V.P. and D.K. Frevest (2006): Watershed Models, CRC Press,
  - Todd, D.K. (2004): Groundwater Hydrology, 3re Edition, Wiley, Chichester
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## **PAPER - GEO-103:**

### **CLIMATOLOGY, SOIL AND AGRICULTURAL GEOGRAPHY (Marks-50)**

#### **Course Outcomes**

After the completion of course, the students will have ability to: i) understand the nature and subject matter of climatology and its several key ideas like cyclone, hazards, thunderstorm, wind blow system etc. ii) classify the different climatic zones of the world, air circulation process and temperature variation. iii) understand the reason of climate change and global warring and its impact on climate and weather. iv) describe the different soil features and their properties and the impact on agriculture practice. v) understand the cropping pattern, mechanization of agriculture and institution's role on Indian agriculture.

#### **GEO-103 (U-5): CLIMATOLOGY**

*Full Marks-25 (End term Examination-20 and Internal Assessment-5)*

*Pattern of setting questions: Group-A (Long Answer Type): Two questions, each of 8 marks (without division), will be set for answering any one. Group-B (Semi-long Answer Type): Four questions, each of 4 marks (without division), will be set for answering any two. Group-C (Short Answer Type): Four questions, each of 2 marks (without division), will be set for answering any two.*

5.1 Nature and Scope of Climatology and its relationship with Meteorology, climatological systems operating in different space and timescale: thunderstorm, tropical cyclone and associated hazards, jet Stream, planetary wind systems.

5.2 The General Circulation: GCM, Tropical circulation-mechanism of Indian monsoon, Walker circulation and ENSO phenomena, Temperate Circulation.

5.3 The Climatic Zones of the world with special reference to tropical climates: wet, wet and dry, savanna, desert and highland.

5.4 Sea surface temperature and its climatic significance; Maritime influence on coastal weather: Seasonal changes and storm events

5.5 Climatic changes through geological periods- evidences and possible causes; Global Warming-Natural and anthropogenic causes and probable consequences

#### **Reading book list**

- Barry, R.G. and Chorley, R.T. (1992): Atmosphere, Weather and Climate, 6th edition, Routledge, London: 392p.
- Critchfield, H.J. (1983): General Climatology, 4th edition, Prentice Hall India Ltd., New Delhi: 453p.
- Das, P.K. (1995): Monsoons, 2nd edition, National Book Trust, New Delhi: 347p.
- Lal, D.S. (1993): Climatology, 3rd edition, Chaitanya Pub. House, New Delhi: 412p.

- Linacre, E. and Geerts, B. (1997): *Climates and Weather Explained*, Routledge, London: 464p.
  - Lutgens, F.K. and Tarbuck, E.J. (1998 ): *The Atmosphere: An Introduction to Meteorology*, 7th edition, Prentice-Hall
  - Moran, J.M. and Morgan, M.D. (1997) : *Meteorology: The Atmosphere and the Science of Weather*, 5<sup>th</sup> edition, Prentice-Hall Inc., Upper Saddle River: 530p.
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## **GEO-103 (U-6): SOIL AND AGRICULTURAL GEOGRAPHY**

*FullMarks-25(EndtermExamination-20andInternalAssessment-5)*

*Patternofsettingquestions:Group-A(LongAnswerType): Twoquestions,eachof8marks (without division), will besetforansweringanyone.Group-B(Semi-longAnswerType): Four questions, each of4 marks (withoutdivision), will be set for answering any two. Group-C (ShortAnswerType): Four questions,each of 2marks (withoutdivision), will besetforansweringanytwo.*

6.1 Variation in physico-chemical properties of soil with climate and dominance of local factors: organic matter content, pH clay content, clay mineralogy, soil colour, calcium carbonate and soluble salt content.

6.2 Bio-functions and degradation of Soil; Soil organic matter, Soil organisms and Micro-organisms and their relation with soil fertility; Soil degradation and pollution: causes, processes and consequences; Preventive, ameliorative and conservation measures

6.3 Approaches in agricultural geography: agricultural systems (ecological or near-ecological systems). Approaches to study agricultural geography, Jonnason's the oryon agricultural landuse

6.4 Determinants of agricultural pattern: physical and institutional, precision farming, use of modern technology

6.5 Issues and policies in modern Agriculture: Impact of green revolution, food security GM Crops, food security, agricultural policies and their implication.

### **Reading book list**

- Hussain, Majid (2003): *Agricultural Geography*, Anmol Publications Pvt Ltd, India.
- Grig, B, David (1995): *An Introduction to Agricultural Geography*, Routledge,
- Gautam, Alka (2012): *Agricultural Geography*, Sharda Pustak Bhawan, Allahabad.
- Singh, J. S and Dhillon, S. S. (2004): *Agricultural Geography*, Tata McGraw-Hill Education.
- Shiva, Vandana (1991): *The Violence of Green Revolution: Third World Agriculture, Ecology and Politics*, Zed Books.
- Joshi, V. Mahesh (1999): *Green revolution and its impacts*. New Apcon, New Delhi.
- Kamath M.G. (2000): *A dictionary of Indian agriculture*, Allied Publishers New Delhi.
- Jha D N (2001): *Agriculture and Regional Planning*, Mittal Publications New Delhi.
- Deininger Dina and Umali Maguire Charles (2006): *Agriculture in liberalizing economics: changing roles for governments*, World Bank Washington.
- Rao C H Hanumantha (2005): *Agriculture, food security, poverty, and environment: essays on post-reform India*, Oxford University Press New Delhi.
- Report: Asian Development Bank (2010): *Agriculture, food security, and rural development*, Oxford University Press New Delhi.
- Bhatia B.M. (2008): *Indian agriculture: a policy perspective*, Sage Publications India New Delhi.



- Agrawal A.N (2005): Indian agriculture: problems, progress and prospects, Vani Educational Books New Delhi

## **PAPER-GEO-104:**

### **GEOGRAPHY OF ENVIRONMENT AND ECOLOGY (Marks-50)**

#### **Course Outcomes**

After the completion of course, the students will have ability to: i) understand the idea of ecology and ecosystem and its elements, functions, energy flow, food chain, trophic levels and ecological stability, ii) be able to explain the energy flow in the ecosystem, chemical cycles, and different ecosystems of the world. iii) understand the concept of landscape ecology, its structure, functions and characteristics. iv) analysis the human modification, landscape management through GIS mapping.

#### **GEO-104 (U-7): ENVIRONMENT AND ECOLOGY**

*Full Marks-25 (End term Examination-20 and Internal Assessment-5)*

*Pattern of setting questions: Group-A (Long Answer Type): Two questions, each of 8 marks (without division), will be set for answering any one. Group-B (Semi-long Answer Type): Four questions, each of 4 marks (without division), will be set for answering any two. Group-C (Short Answer Type): Four questions, each of 2 marks (without division), will be set for answering any two.*

7.1 Concept of Environment, major elements of environment, functioning of environmental systems, role of biotic and abiotic elements.

7.2 Ecosystem: structure, function and processes, patterns of energy flow

7.3 Biogeochemical cycles (Nitrogen, Carbon, Phosphorus), ecosystem metabolism, ecosystem process (photosynthesis and respiration), trophic levels (food web and chain) decomposition, ecosystem stability.

7.4 Terrestrial ecosystems: Forest, Grassland and Agriculture

7.5 Biodiversity: Genetic, species, community and ecosystem diversity; biodiversity uses, threats to biodiversity, biodiversity conservation.

#### **Reading book list**

- Alexander, D. (1993): Natural Disasters, Research Press, New Delhi: 619p.
- Allaby, M. (1996): Basics of Environmental Science, Routledge, London: 297p.
- Chapman J.L. and Reiss, M.J. (1993): Ecology: Principles and Applications, Cambridge University Press.
- Chapman, D. (1994): Natural Hazards, Oxford University Press, Melbourne: 174p.
- Choudhuri, A.B. (2007): Endangered Wetland.
- Elsom, D.M. (1992): Atmospheric Pollution: A Global Problem, 2nd edn, Blackwell Pub. Co., London: 422p.
- Farmer, A. (1997): Managing Environmental Pollution, Routledge, London: 246p.
- Marsh, W.M. and Grossa, J.M. (1996): Environmental Geography: Science, Land use and Earth Systems, John Wiley & Sons.

- Park, C. (1998): The Environment: Principles and Applications, Routledge, London:
- Pickering, K. and Owen, L.A. (1997) : An Introduction to Global Environmental Issues, 2nd edition, Routledge, London.
- Prabhakar, V.R. (1998): Social and Community Forestry, Indian Pub. Distrb., New Delhi: 224p.
- Roberts, N. (editor) (1994): The Changing Global Environment, 3rd edition, Blackwell Pub. Co., London: 531 p.
- Nick Middleton: The Global casino:an introduction to environmental issues, Arnold ,A member of the Hodder Headline Group LONDON Distributed in the United State of America by Oxford University Press Inc., New York.
- Robert M. May and Angela R. McLean(2007): Theoretical Ecology: Principles and Applications, Oxford University Press
- Barry cox; Peter Dale Moore (2010): Biogeography an ecological and evolutionary approach, Hoboken, NJ: Wiley

## **GEO-104 (U-8): LANDSCAPE AND ECOLOGY**

*Full Marks- 25 (End term Examination- 20 and Internal Assessment- 5)*

*Pattern of setting questions: **Group- A (Long Answer Type):** Two questions, each of **8 marks** (without division), will be set for answering any one. **Group- B (Semi-long Answer Type):** Four questions, each of **4 marks** (without division), will be set for answering any two. **Group- C (Short Answer Type):** Four questions, each of **2 marks** (without division), will be set for answering any two.*

- 8.1. Landscape: Definition, concept, nature and role, ecological description of landscape
- 8.2. Structure of Landscape: Patches (shape, size, nature and boundary), corridors (type, network, matrix) and mosaics, habitat arrangement measuring metrics (Shanon Diversity Index and Simpson Diversity Index).
- 8.3. Landscape Dynamics: Energy flow, species movement, nutrient movement.
- 8.4. Anthropogenic Modification: Consequences of deforestation and exploitation of targeted species; Forest conservation, Social forestry and Participatory Management of Forest.
- 8.5. Landscape management and planning: Role of keystone species, conservation of fragmented habitats, sustainable landscape, and role of Traditional Ecological Knowledge (TEK) in conserving landscape. Role of GIS in landscape planning.

## **PRACTICALCOURSES**

**(100 Marks)**

### **PAPER - GEO-105: MAPPING TECHNIQUES IN PHYSICAL GEOGRAPHY**

**(50Marks)**

#### **Course Outcomes**

After the completion of course, the students will have ability to understand hydrological techniques for run-off and evapotranspiration estimation) know the different properties of soil and estimation) field visit for soil profile mapping and estimation of soil parameters, iv) prepare ecological micro zonation

## **GEO-105 (U-9): Hydrological Techniques**

*Full Marks-25 Pattern of Setting Questions: Three compulsory questions bearing marks 7, 7 and 6 respectively, will be set covering the whole unit. 5 marks will be allotted for Laboratory Note Book and Viva-voce.*

- 9.1 Point rainfall analysis, area-depth curves, Thiessen network and Isohyetal methods to determine rainfall volumes.
- 9.2 Estimating infiltration using infiltrometer and other field techniques. Drawing infiltration curve
- 9.3 Evaporation estimation: Use of evaporation pan and empirical equations using climatic data.
- 9.4 Runoff and discharge estimation: Curve Number methods for estimating runoff: area-Velocity method for discharge estimate
- 9.5 Construction of unit-hydrograph and rating curves.

## **Reading book list**

- Bedient, P.B. et al. (2008): Hydrology and Floodplain Management, Prentice Hall, Upper Saddle River, NJ 07458.
- Biswas, A.K. (1972): History of Hydrology, North Holland Pub. Co. Amsterdam.
- Boca Raton, F.L. Viessman and Lewis (1996): Introduction to Hydrology, Harper Collins, New York.
- Chow V.T., Maidment, D.R. and Mays, L.W. (1988): Applied Hydrology, Mc Graw Hill, New York.
- Dingman, S.L. (2002): Physical Hydrology, 2nd Edition, Prentice Hall, Englewood Cliffs
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- Hyet, W.G. and W. Langbain (1955): Floods, Prentice Hall University Press, Princeton.
- Keith, D. and Mays, L.W. (2004): Ground water hydrology, 3rd Edition, Wiley, Chichester.
- Kintede-Levario, H. (2007): Design for Water: Rain Water Harvesting, Storm Water Catchment and Alternate Water Reuse, New society publishers, Gabriola Island.
- Mays, L.W. (1996): Water Resources Handbook, Mc Graw Hill, New York.
- Murthy, K.S. (1998): Watershed Management in India, 3rd edition, Wiley Eastern Ltd. / New Age International Ltd., New Delhi: 198p.
- Pethick, J. (1984): An Introduction to Coastal Geomorphology, Edward Arnold, London: 259 p
- Singh, V.P. and D.K. Frevest (2006): Watershed Models, CRC Press,
- Todd, D.K. (2004): Groundwater Hydrology, 3rd Edition, Wiley, Chichester

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## **GEO-105 (U-10): Soil and Environmental Analysis Techniques**

*Full Marks-25 Pattern of Setting Questions: Three compulsory questions bearing marks 7, 7 and 6 respectively, will be set covering the whole unit. 5 marks will be allotted for Laboratory Note Book and Viva-voce.*

- 10.1 Estimation and mapping of soil properties: texture, structure, moisture, colour, pH, organic matter, NPK, soil profile mapping.
- 10.2 Estimation of Water Properties: BOD, COD, Dissolved Oxygen, pH, suspended solid, turbidity and electric conductivity
- 10.3 Ecological Micro-Zonation Mapping.

10.4 Vegetation density mapping

10.5 Association between soil parameters, vegetation types and density

### **Reading book list**

- William J. Sutherland (2006): Ecological Census Techniques Edited by Cambridge 2nd edition
- Lagacherie Philippe, McBratney Alex and Voltz Marc (2006): Digital Soil Mapping :An Introductory Perspective, Elsevier
- Scull, P.; J. Franklin, O.A. Chadwick & D. McArthur (June 2003). Predictive soil mapping – a review. Progress in Physical Geography, Sage Publications.
- Monkhouse, F.J. 1971: Maps and Diagrams, Methuen, London
- Singh, R.L. and Singh, R.P.B. 1992: Elements of practical Geography.
- Robinson, A.H., Morrison, J.L., Muehrcke, P.C., Kimerling, A.J. and Guptill, S.C. 1995: Elements of Cartography, John Wiley and Sons, New York.
- Basu, R. and Bhaduri, S. ed, 2007: Contemporary Issues and Techniques in Geography, Progressive Publishers, Kolkata.
- Gupta, K. K. and Tyagi, V. C. (1992): Working with maps, Survey of India Publication, Dehradun

### **PAPER-GEO-106: BASIC STATISTICS IN GEOGRAPHY AND PRINCIPLES OF AERIAL PHOTOGRAPHY AND REMOTE SENSING (Marks-50)**

#### **Course Outcomes**

After the completion of course, the students will have ability to: i) know the basic statistics and measurement in geography, ii) basic principles of remote sensing and aerial photograph knowledge about the hypothesis testing and sampling strategies, iv) understand the process of physical and cultural features and its interpretation

#### **GEO-106 (U-11): BASIC STATISTICS IN GEOGRAPHY**

*Full Marks-25 Pattern of Setting Questions: Three compulsory questions bearing marks 7, 7 and 6 respectively, will be set covering the whole unit. 5 marks will be allotted for Laboratory Note Book and Viva-voce.*

11.1 Measurement in Geography: Nominal, ordinal, interval and ratio measurement.

11.2 Concept of covariance, correlation and regression: Bi-variate analysis- linear, exponential, Product moment correlation, Spearman's Rank correlation, correlation matrix, partial correlation, residuals - mapping of residuals.

11.3 Probability distribution: addition and Law of multiplication, concept of probability distributions (binomial distributions, normal probability distribution), properties of normal curve.

11.4 Hypothesis testing: Formulation, Rejection rule, one and two tailed tests, significance level, degrees of freedom type-I and type-II errors, Standard Error. Different types of significance test for various purposes. Chi-square test, student's t- test

11.5 Sampling techniques for geographical analysis.

#### **Reading book list**

- Alvi, Z. (1995): *Statistical Geography: Methods and Applications*, Rawat Publication, New Delhi
- John, C. D. (2002): *Statistics and Data Analysis in Geology*; John Wiley & Sons.
- Mehmood, A (1977): *Statistical methods in Geographical studies*, Rajesh Pub. New Delhi
- Pal, S.K. (1999): *Statistics for Geoscientists*, Concept publishing Company, New Delhi: 423p.
- Sarkar, A. (2006): *Practical Geography; A systematic approach*, Orient Longman Ltd, Hyderabad,
- Silk, J. (1979): *Statistical techniques in Geography*, George Allen and Unwin, London: 276p.
- Swan, A.R.H.; Sandilands, M. and McCabe, P. (1995): *Introduction to Geological Data Analysis*, Blackwell. 446p.
- Walford, P. (1995): *Geographical Data Analysis*, John Wiley and Sons Inc., New York: 446p.

## **GEO-106(U-12):**

### **PRINCIPLES OF REMOTE SENSING AND AERIAL PHOTOGRAPHY**

*Full Marks-25 Pattern of Setting Questions: Three compulsory questions bearing marks 7, 7 and 6 respectively, will be set covering the whole unit. 5 marks will be allotted for Laboratory Note Book and Viva-voce.*

12.1 Physics of Remote Sensing: Electro Magnetic Radiation (EMR), Radiation laws (wavelength-frequency-energy relationship of EMR numerical problems).

12.2. Satellite System: Keplers's Laws, Major-Semi-major axis, eccentricity, velocity (Numerical Problems). Details of some important satellites - Resourcesat-2 and INSAT-3DR

12.3. Satellite Sensors: Concept of IFOV, resolution and determination of pixel size, referencing Scheme of satellite system (path/row calculation), Details of some important Sensors - Landsat 8 OLI and TIRS, Sentinel-2 and LISS-IV sensors

12.4. Basics of Aerial Photograph: Concept of Aerial Photo film, Basics geometry of aerial photograph determination of scale and height, Distortions, Image parallax, Relief displacement.

12.5. Stereoscopy and Aerial Photo Interpretation: Stereoscopy, Pseudo copy, mapping of Physical and Cultural features with the Air photo interpretation keys: shape, size, pattern, tone, texture, shadow, site and associations.

### **Reading book list**

- Allison, L.J., Schnapf, A. (1983): *Meteorological satellites*: In Colwell, R.N. (ed.) *Manual of Remote Sensing*.
- Campbell, J.B. (1996): *Introduction to Remote Sensing*, 2<sup>nd</sup> edition, Taylor & Francis, London: 622p. Chaisman, N. (1992): *Exploring Geographical Information Systems*, John Wiley and Sons Inc., New York: 198p.
- Colwell, R.N. (ed.) *Manual of Remote Sensing* (2<sup>nd</sup> edn). American Society of Photogrammetry, Falls Church,

- Curran, P.J. (1988): *Principles of Remote Sensing*, ELBSE dn. Longman Group UKL td.
- Guha, P.K. (2003): *Remote Sensing for the Beginner*, Affiliated East-West Press Pvt. Ltd., NewDelhi
- George, J. (2003): *Fundamental Remote Sensing*, Universities Press, New Delhi.
- John R Jensen (2006): *Remote Sensing of the Environment: An Earth Resource Perspective*, Pearson Education Delhi
- Lillesand, T.M. and Kiefer, R.W. (2003): *Remote Sensing and Image Interpretation*, 5th edition, John Wiley and Sons, NewYork.
- Narayan LRA (2000): *Remote Sensing and its applications*, Universities Press Hyderabad Rajan, M.S. (1995): *Spacetoday*, 2<sup>nd</sup> edition, National Book Trust, New Delhi, 344p.
- Slater, P.N. (1983): *Photographic Systems for Remote Sensing*, Singapore Science Center. Slater, P.N. (1983): *Photographic Systems for Remote Sensing*, Virginia,

### SEMESTER-II (Duration: January –June)

Type	Course	Unit	Ma				Credit	Total Class Hours
			End-term	Internal Exam.	Unit Total	Paper Total		
THEORETICAL	GEO-201	Unit-13:EnvironmentalGeography	2	5	25	5	4	60hours
		Unit-14:RegionalGeographyofIndia	2	5	25	0		
	GEO-202	Unit-15:Population and Development Geography	2	5	25	5	4	60hours
		Unit-16: Regional Approach in Geography	2	5	25	0		
	GEO-203	Unit-17:Settlement Geography	2	5	25	5	4	60hours
		Unit-18: Social and Political Geography	2	5	25	0		

(THEORY)	GEO-204 ELECTIVE PAPER	<b>Unit-19:Essentials of Physical Geography</b>	20	5	25	50	4	60 hours
		<b>Unit-20:Essentials of Human Geography</b>	20	5	25			
PRACTICAL	GEO-205	Unit-21:Thematic Mapping in Physical Geography	25	-	25	50	4	60hours
		Unit- 22:Thematic Mapping in Human Geography	25	-	25			
	GEO-206	Unit- 23: Computer Application in Geographical Data Analysis	25	-	25	50	4	60hours
		Unit-24: Applications of Remote Sensing and Geographic Information System	25	-	25			

## **Semester-II (300 Marks)**

### **THEORETICAL COURSES (200 Marks)**

#### **PAPER-GEO-201: ENVIRONMENTAL AND REGIONAL GEOGRAPHY OF INDIA** (Marks 50)

##### **Course Outcome:**

From this course student can define the domain of environmental aspect. They can manage the waste water in different processes. Students can understand the reasons of air pollution, water pollution and noise pollution; they can measure the intensity of pollutions and also can be known how the problems can be managed. From this course they can learn the geomorphic features, evolution and character of Darjeeling Himalaya, Rajasthan desert and Indian rivers. They can also understand the evolution of Ganga and Godavari delta and the tectonic movement and dynamics of Andaman Nicobar Islands.

#### **GEO 201 (U-13): ENVIRONMENTAL GEOGRAPHY**

*Full Marks-25 (Endterm Examination-20 and Internal Assessment-5)*

*Pattern of setting questions: **Group-A (Long Answer Type):** Two questions, each of 8 marks (without division), will be set for answering any one. **Group-B (Semi-long Answer Type):** Four questions, each of 4 marks (without division), will be set for answering any two. **Group-C (Short Answer Type):** Four questions, each of 2 marks (without division), will be set for answering any two.*

13.1. Definition and Domain of Environment aspect, Waste water treatment: Primary, Secondary and Tertiary treatment; Disposal in Indian cities

13.2. Sludge treatment; Solid (Municipal) waste management, Hazardous waste management in India.

13.3. Air pollution; Air sampling and measurement, Air pollution control technologies.

13.4. Noise Pollution; Measurement of noise, Biophysical impacts, Mitigation Technologies

13.5. Arsenic Pollution; Spatial distribution, Impacts, Mitigation with special reference to West Bengal

##### **Reference list**

- Farmer, A. (1997): Managing Environmental Pollution, Routledge, London: 246p.
- Ghosh, S.K. (2007): Environmental Act in India,
- Joshi, A. (2008): Global Environmental Agreements: Insight and Implication, Eastern Book Corporation

- Marsh, W.M. and Grossa, J.M. (1996): Environmental Geography: Science, Landuse and Earth Systems, John Wiley & Sons.
- Maryk, Theodore (1996): Major Environmental Issues Facing 21st Century, Prentice Hall
- Park, C. (1998): The Environment: Principles and Applications, Routledge, London:
- Pickering, K. and Owen, L.A. (1997) : An Introduction to Global Environmental Issues, 2nd edition, Routledge, London.
- Prabhakar, V.R. (1998): Social and Community Forestry, Indian Pub. Distrb., New Delhi: 224p.
- Roberts, N. (editor) (1994): The Changing Global Environment, 3rd edition, Blackwell Pub. Co., London: 531 p.
- Santra, S.C. (2001): Environmental Science; New Central Book Agency, Kolkata.

## **GEO 201 (U-14): REGIONAL GEOGRAPHY OF INDIA**

*FullMarks-25(EndtermExamination-20andInternalAssessment-5)*

*Patternofsettingquestions:Group-A(LongAnswerType): Twoquestions,eachof8marks(without division),willbesetforansweringanyone.Group-B(Semi-longAnswerType):Fourquestions,eachof4 marks(withoutdivision),will be set for answeringany two. Group-C (ShortAnswerType): Four questions,eachof2marks(withoutdivision),willbesetforansweringanytwo.*

14.1 Geomorphology of Darjeeling Himalaya and Terai Region of West Bengal

14.2 Drainage system of peninsular and extra-peninsular region.

14.3 Geomorphology and soil-landform assemblages of Chhotanagpur Plateau, Geomorphology of Rajasthan desert with special reference to Marusthali

14.4 Form, process and evolution of Ganga and Godavari delta.

14.5 Tectonics and Geomorphology of the Islands of Andaman and Nicobar, Laksha-Minikoi and Amindivi

### **Reading Book list**

- Ahmad, Enayat. (1972): Coastal geomorphology of India; Orient Longman.
- Biswas, A. (1987): Laterites and lateritoids, Explorations in the tropics: V.S. Datye et. al., Prof. K.R.Dikshit felicitation Committee, Pune, PP.137-140.
- Mukhopadhyay, S.C: Geomorphology Of The Subarnarekha Basin: The Chota Nagpur Plateau (eastern India, the University of Burdwan,
- Rawat, T. (2008): Environment of the Himalayas, Eastern Book Corporation
- Sehgal, J and Blum, W.E. et al. (1998): Red and Lateritic Soils, Oxford and IBH pub.
- Sharma, Hari Shanker. (1982): Perspectives in Geomorphology; Concept.
- Sharma, H. S. (1991): Indian Geomorphology, Concept Publishing Company.
- Starkel, L. and Basu, S. 2000 Rains, Landslides and Floods in the Darjeeling Himalaya, Indian National Science academy, New Delhi: 168p

### **PAPERGEO-202:**

**POPULATION & DEVELOPMENT AND REGIONAL APPROACH IN GEOGRAPHY**  
**(Marks-50)**

### **Course Outcome:**



From this course students can understand the pollution growth, resource relationship and their sustainable development. They will know the different theories of population growth, migration and its types, pattern and consequences. They also are able to calculate HDI and GDI. Students can understand the concept of region in geography and its types, hierarchy and system of development. They will know the different formal and functional regions of India and also understand the planning region and its importance for development.

## **GEO 202 (U-15): POPULATION AND DEVELOPMENT GEOGRAPHY**

*Full Marks-25 (End term Examination-20 and Internal Assessment-5)*

*Pattern of setting questions: **Group-A (Long Answer Type):** Two questions, each of 8 marks (without division), will be set for answering any one. **Group-B (Semi-long Answer Type):** Four questions, each of 4 marks (without division), will be set for answering any two. **Group-C (Short Answer Type):** Four questions, each of 2 marks (without division), will be set for answering any two.*

15.1 Population growth: Link to economic development, resource scarcity, food security and sustainable development. Concept of logistic and exponential growth

15.2 Population and development integration with special reference to India

15.3 Theories and approaches of population growth and regulation: Malthus, Marx and Neo-Malthusianism

15.4 Migration: Concept of social mobility, concept, types, patterns, theories (Ravenstein, Lee, Louis and Zelinsky), consequences.

15.5 The fate of Millennium development goals, Human development and gender issues: HDI, GDI, GEM-concept, measures and criticism, disparities

### **Reading book list**

- Deshpande, Ashwini. (2007): Globalization and Development: A Handbook Of New Perspectives; Oxford University Press, N Delhi.
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[http://www.vidyasagar.ac.in/Downloads/ShowPdf.aspx?file=/pg\\_syllabus/geography.pdf](http://www.vidyasagar.ac.in/Downloads/ShowPdf.aspx?file=/pg_syllabus/geography.pdf)
- Jeaw and Sen, A. (2002): India: Development and Participation, Oxford University Press
- Gould, W. T. S. (2009): Population and Development (Series - Routledge Perspectives on Development); Taylor & Francis.
- Nag, Prithvish; Kumar, Chandra Shekhar and Sengupta, Smita. (2001): Environment, Population and Development; Concept Publishing Company.
- Ranjan, Alok. (1999): Population And Development: The Indian Perspective; Universal Publishers.
- Shandilya, T. K. (1995): Population Problem and Development; Deep & Deep Publications.
- Srivastava, A. K. (2004): Population Development, Environment and Health; Aph Publishing Corporations.
- Sroaff, Meera. (2004): Population and Sustainable Development; Adhyayan Publishers and Distributors.
- Youngs, G (2001); Globalization, Communication and Technology, Cambridge
- Parr-S, F and Kumar, A.K (2005): Readings in Human Development, Oxford University Press, New Delhi

- Morris, a (1998): Geography and Development, University College London Press, London
- 

## **GEO 202 (U-16): REGIONAL APPROACH IN GEOGRAPHY**

*FullMarks-25(EndtermExamination-20andInternalAssessment-5)*

*Patternofsettingquestions:Group-A(LongAnswerType): Twoquestions,eachof8marks(without division),willbesetforansweringanyone.Group-B(Semi-longAnswerType):Fourquestions,eachof4 marks(withoutdivision),will be set for answeringany two. Group-C (ShortAnswerType): Four questions,eachof2marks(withoutdivision),willbesetforansweringanytwo.*

16.1 Regional concept in geography: concept, typology, hierarchy, methods of regional delineation and regional system

16.2 Contribution of Ratzel, Hartshorne, Schaefer and Vidal de laBlache to the development of regional concept. The character of regional geography, Space: the fundamental stuff of geography (Geography in history or historical geography)

16.3 Formal regions: Natural, Agro-climatic, socio-cultural regions with special reference to India

16.4 Functional region: City region, industrial region with special reference to India

16.5 Planning regions in India: Conceptual framework, purpose, types and delineation, planning of problem regions: Tribal, coastal, drought prone area, flood prone area.

## **PAPER GEO-203: CONEPTS IN SETTLEMENT GEOGRAPHY, SOCIAL AND POLITICALGEOGRAPHY (Marks-50)**

### **Course Outcome:**

From this course students can understand the concept and types of settlement. They will know the forms, pattern and characteristics of rural and urban settlement. They are able to illustrates the different models of urban morphology and also able to explain the rank size rule, city primacy and central place concept in urban centres. Students can understand the concept of sociopolitical geography and its scope or subject matter. They can explain the processes of voting pattern, voting politics, and the geopolitical theories of political geography. They will know the states formation and federalism of India, water dispute and economic blocks of the world.

## **GEO 203 (U-17): SETTLEMENT GEOGRAPHY**

*FullMarks-25(EndtermExamination-20andInternalAssessment-5)*

*Patternofsettingquestions:Group-A(LongAnswerType): Twoquestions,eachof8marks(without division),willbesetforansweringanyone.Group-B(Semi-longAnswerType):Fourquestions,eachof4 marks(withoutdivision),will be set for answeringany two. Group-C (ShortAnswerType): Four questions,eachof2marks(withoutdivision),willbesetforansweringanytwo.*

17.1 Concept and evolution of settlement: Rural and Urban

17.2 Urban Settlements: Census categories, Metropolitan concept, City-region and Conurbation, Urban governance.

17.3 Rural Settlements: Site and situation, nature and characteristics, Types and patterns of rural settlement  
Classification of rural settlements, Morphology of rural settlement in the Indian context  
17.4 Concepts of urban morphology. Classical models - Burgess, Homer-Hoyt, Harris and Ullman  
17.5 Settlement Hierarchy: Primate City, Rank-Size Rule, Central Place Theory; Settlement  
Classification: Harris and Nelson

### Reading book list

- Brian, K.R (1996): Landscapes of Settlements: Prehistory to the Present, Routledge, London
- De Blij H.J. (1995): The Earth: An Introduction to its Physical and Human Geography, John Wiley and Sons Inc., New
- De Blij H.J. (1996): Human Geography: Culture, Society and Space, John Wiley and Sons Inc., New York: 531 p.
- Ghosh, S. (1998): Introduction to Settlement Geography, Orient Longman Ltd., Calcutta: 158p.
- Hudson, F.S. (1970): Geography of Settlements, Macdonald and Evans Ltd., Plymouth
- Hussain, M. (1994): Human Geography, Rawat Pub. Co., New Delhi: 485p.
- Misra, H.N. (ed) (1987): Contributions to Indian Geography, Volume 9: Rural Geography, Heritage Pub., New Delhi.
- Racine, J. (ed) : Calcutta 1981, Concept Pub. Co., New Delhi.
- Rodwin (2006): Shelter, Settlement and Development, Rawat Pub.
- Singh, R. Y. (1994): Geography of Settlements, Rawat Pub. Co., New Delhi: 335p.
- Singh, R.L. et. al. (ed) (1976): Geographic Dimensions of Rural Settlements, National Geographical Society of India, Varanasi.
- Ramachandram, R. (1999): Urbanization and urban systems in India, Oxford University Press, New Delhi
- Verma, L (2009): Urban Geography, Rawat publication, Jaipur
- Roy Chaudhuri, J. (2001): An Introduction to Development and Regional Planning-with special reference to India Orient Blackshawn, Hyderabad

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## GEO 203 (U-18): SOCIAL and POLITICAL GEOGRAPHY

*Full Marks-25 (End term Examination-20 and Internal Assessment-5)*

*Pattern of setting questions: Group-A (Long Answer Type): Two questions, each of 8 marks (without division), will be set for answering any one. Group-B (Semi-long Answer Type): Four questions, each of 4 marks (without division), will be set for answering any two. Group-C (Short Answer Type): Four questions, each of 2 marks (without division), will be set for answering any two.*

18.1 Political Geography: Scope, Content and Evolution of Political Geography, Relation with other branches of Social Sciences

18.2 Scope of electoral geography, Global strategic views- Heartland and Rimland the theories and their significance in present international politics. Geopolitical significance of core-periphery theory

18.3 Geography and federalism; Reorganization of Indian states since independence, Partition of India and its consequences

18.4 International and interstate water disputes in India.

18.5 Political and economic blocs; Geopolitics in the context of globalization, colonialism and post colonialism.

## Reading book list

- Adhirari, S. (2004): Political Geography, Rawat Pub. Jaipur.
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  - [http://www.vidyasagar.ac.in/Downloads/ShowPdf.aspx?file=/pg\\_syllabus/geography.pdf](http://www.vidyasagar.ac.in/Downloads/ShowPdf.aspx?file=/pg_syllabus/geography.pdf)
  - Alexander, L.M. (1963): The World Political Pattern, Rand McNally, Chicago.
  - Alland, A. (1972): The Human Imperatives, Atheneum, New York.
  - Bergman, E. (1975): Modern Political Geography, WMC Brown Co. Pub. Iowa.
  - Dikshit R. D. (1975): Political Geography - A contemporary perspective, Tata McGraw Hill Pub. Company, New Delhi
  - Dwivedi, R.L.(1990): Fundamental of political Geography, Chaitanya publishing House, Allahabad.
  - Goblet, Y.M. (1955): Political Geography and the World Map, George Philip and sons Ltd.
  - Hartshorne, T.A and Alexander , J.W. (1988): Economic Geography (3rd Edition), Prentice Hall of India Pvt. Ltd.
  - Jackson, WAD (1964): Politics and Geographic Relationship, Prentice Hall.
  - Taylor, P.J. (1985): Political Geography, World Economy, Nation, State & Locality, Longman, Landon.
  - Weigest, H. (1957): Principles of Political Geography, Appleton century, Crasts Inc. New York
- 

## ELECTIVE PAPERS

### PAPER-GEO-204: RESOURCE AND ITS MANAGEMENT AND EARTH SYSTEM SCIENCE (Marks-50)

#### Course Outcome:

From this course students can understand the origin of the earth and its internal structure. They will know different slope evolution model and the atmospheric structure, layers and characteristics including the oceanic physical and chemical features. Students can understand the idea of human geography and its content. They will know the population growth, migration, human settlement and social cultural integration under human geography.

### GEO 204 (U-19): ESSENTIALS OF PHYSICAL GEOGRAPHY

*FullMarks-25(EndtermExamination-20andInternalAssessment-5)*

*Patternofsettingquestions:Group-A(LongAnswerType): Twoquestions,eachof8marks(without division),willbesetforansweringanyone. Group-B(Semi-longAnswerType):Fourquestions,eachof4 marks(withoutdivision),will beset for answeringany two. Group-C (ShortAnswerType): Four questions,eachof2marks(withoutdivision),willbesetforansweringanytwo.*

19.1 Origin of earth and tectonic theory

19.2 Internal structure of the earth, earthquakeand volcanism

19.3 Slope analysis: W M Davis and W Penck; concept of equilibrium

19.4 Composition and layering of atmosphere and atmospheric processes

19.5 Oceans; temperature, salinity distribution and tide.

## **GEO 204 (U-20): ESSENTIALS OF HUMAN GEOGRAPHY**

*Full Marks-25 (Endterm Examination-20 and Internal Assessment-5)*

*Pattern of setting questions: Group-A (Long Answer Type): Two questions, each of 8 marks (without division), will be set for answering any one. Group-B (Semi-long Answer Type): Four questions, each of 4 marks (without division), will be set for answering any two. Group-C (Short Answer Type): Four questions, each of 2 marks (without division), will be set for answering any two.*

20.1 Human geography: scope, content, present relevance and inter disciplinary Approach

20.2 Population: Growth, distribution and migration in India and world perspective

20.3 Human settlement: Factors, site and situation of rural and urban settlement; Problems of urbanization

20.4 Human development: indicators, measurement and development policies.

20.5 Human social, cultural changes and social problems in India; livelihood security.

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## **PRACTICAL COURSES (100 Marks)**

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### **COURSE NO. GEO-205: THEMATIC MAPPING IN PHYSICAL AND HUMAN GEOGRAPHY (Marks-50)**

#### **Course Outcome:**

From this course students can measure the different morphometric features and their significance in geomorphology. They can be able to analysis the soil texture, sedimentary facies and its evolution and characteristics. Students can also be able to measure the different social development indices like HDI, GDI, and Human Poverty Index including the perception analysis of the social indicators.

### **GEO 205 (U-21): THEMATIC MAPPING IN PHYSICAL GEOGRAPHY**

*Full Marks-25*

*Pattern of Setting Questions: Three compulsory questions bearing marks 7, 7 and 6 respectively, will be set covering the whole unit. 5 marks will be allotted for Laboratory Note Book and Viva-voce.*

21.1 Identification and measurements of fluvial landforms: Meandering, Bars and Braiding Pattern (BI)

21.2. Morphometric Analysis of Fluvial Landscape: Testing the Laws of Morphometry (Laws of Length, Area, Slope and Allometric Growth), Drainage Density, Sinuosity Index as a Measure of Stream Pattern

21.3 Field measurements and interpretation: Cross Profiles, Calculation of Discharge, Velocity (by

Current meter)

21.4 Texture analysis of sediment samples using standard techniques, statistical representation

21.5 Sedimentary environmental facies analysis.

### **Reading book list**

- Basu, R. and Bhaduri, S. (2007): Contemporary Issues and Techniques in Geography, Progressive Pub.
- Dent., D.B (1993): Cartography: Thematic map design, Sea Brown Publishers
- Misra, R.P and Ramesh, A (1989): Fundamental of Cartography, Concept, Delhi
- Monkhouse F.J. and Wilkinson, H.R. (1971): Maps and Diagrams: Their Compilation and Construction, B.I. Publications Private Limited, New Delhi: 527p.
- Nag, P and Dutta, G.K (1992): Thematic Cartography and Remote Sensing, Concept
- Robinson, A.H., Sale, R.D., Morrison, J. (1984) : Elements of Cartography, Wiley, New York:
- Wilford, J,N (2000): The Map Makers, A.A. Knopf
- Dent, B. D. (1985): Principles of Thematic Map Design; Addison WESLEY Pub. Co.
- Mahmood, A. (1997): Statistical Methods in Geographical Studies; Rajesh Publication.
- Misra, R. P. and Ramesh, A. (1969): Fundamentals of Cartography; Prasaranga, University of Mysore.
- Monkhouse F.J. and Wilkinson, H.R. (1971): Maps and Diagrams: Their Compilation and Construction,
- B.I. Publications Private Limited, New Delhi: 527p.
- Robinson, A.H., Sale, R.D., Morrison, J. (1984): Elements of Cartography, Wiley, New York.

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## **GEO 205 (U-22): THEMATIC MAPPING IN HUMAN GEOGRAPHY**

*FullMarks-25*

*Pattern of Setting Questions: Three compulsory questions bearing marks 7, 7 and 6 respectively, will be set covering the whole unit. 5 marks will be allotted for Laboratory Note Book and Viva-voce.*

22.1 Estimation and Mapping of Social Well-being, HDI, GDI

22.2 Estimation of Human Poverty Index for Indian States

22.3 Mapping of social vulnerability using published data of District Statistical Handbook

22.4 Social area analysis: Identification, mapping and interpretation

22.5 Perception analysis of social issues in Indian perspective using Likart scale

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## **PAPER-GEO-206: COMPUTER APPLICATIONS IN GEOGRAPHICAL DATA ANALYSIS AND REMOTE SENSING & GEOGRAPHIC INFORMATION SYSTEM** **(Marks 50)**

**Course Outcome:**

From this course student can understand the data and the algorithms, basic logic in computer application. They can able to execute the different statistical techniques like Rank, Central tendency, deviation etc in excel or SPSS. Student can able to geo-reference of any map. They can prepare false colour images, classify and interpreted different satellite images with different GIS analysis techniques

## **GEO 206(U-23):**

### **COMPUTER APPLICATION IN GEOGRAPHICAL DATA ANALYSIS**

#### FullMarks-25

Pattern of Setting Questions: Three compulsory questions bearing marks 7, 7 and 6 respectively, will be set covering the whole unit. 5 marks will be allotted for Laboratory Note Book and Viva-voce.

23.1 Representation of data; Numbering Systems; Binary Arithmetic; Basic Logic Gates; Boolean Logic and Reduction Techniques

23.2 Computation, Storing and Formatting Spread sheets: Computation of Rank, Mean, Median, Mode, Standard Deviation, Moving Averages, Sample Variation; Selection of technique and interpretation using MS-Excel and SPSS Environment

23.3 Regression, correlation, curve fitting, multivariate analysis.

23.4 Array: Types, operations and application using MS-Excel

23.5 Internet Surfing-generations of data and extraction of information for power-point presentation, Manipulation and editing of graphic files.

#### **Reading book list**

- Bartee, Thomas C. (1977): Digital Computer Fundamental; McGraw Hill.
- Blissmer (1996): Working with MS Word; Houghton Mifflin Co.
- Chauhan, S.; Chauhan, A. and Gupta, K. (2006): Fundamental of Computer; Firewall Media.
- Flake, L.J.; McClintock, C.E. and Turner, S. (1989): Fundamental of Computer Education; Wordsworth Pub. Co.
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- Johnson, Steve (2007): Microsoft Power Point 2007; Pearson Paravia Bruno.
- Leon, A .and Leon, M.(1999): Introduction to Computer, USB Publishers' Distributors Ltd.
- Leon, A. and Leon, M.( 1999): A beginners Guide to Computers, lean Vikas
- Malvino, A.P. and Leach, D.P. (1981): Digital Principles and Appications; Tata McGraw Hill.
- Mano, Moris M. and Kime, Charles R. (2004): Logic and Computer Design Fundamental; Prentice Hall.
- Rajaraman, V. ( 2003): Fundamentals of Computer, Prentice Hall Publisher
- Rajaraman, V. (2008): Computer Primer; Prentice Hall of India Pvt. Ltd.
- Sarkar, A. and Gupta, S.K (2002) Elements of computer Science, S Chand and Company, New Delhi
- Shepard, Aaron (2007): Perfect Pages; Shepard Publications.
- Tyson, Herbert L. (2007): Microsoft Word 2007 bible; John Wiley.

- Walkenbach, John (2007): Excel 2007 Bible; John Wiley.

## **GEO 206 (U-24): APPLICATIONS OF REMOTE SENSING&GEOGRAPHIC INFORMATION SYSTEM**

*FullMarks-25*

*PatternofSettingQuestions:Three compulsory questions bearing marks 7,7 and 6 respectively, will be set covering the whole unit. 5 marks will be allotted for Laboratory Note Book and Viva-voce.*

24.1 Geo-referencing of maps and satellite images.

24.2 Preparation of different types of FCC. Image enhancement, Band rationing, Density slicing

24.3 Supervised and Unsupervised Classification Techniques, generation of signature statistics and signature reparability reports. Generation of NDVI

24.4 GIS: RS, GIS and GNSS.

24.5 Map layers: Overlay analysis, buffering and map composition

### **Reading book list**

- Allison, L.J., Schnapf, A. (1983): Meteorological satellites: In Colwell, R.N.(ed.) Manual of Remote Sensing (2nd edn).
- Avery, T.E., and G.L. Berlin, (1992): Fundamental of remote sensing and air photo interpretation, 5th ed, Macmillan, New York,
- Billingsley, F.C. (1983): Data Processing and Reprocessing: In Colwell, R.N.(ed.) Manual of Remote Sensing (2nd edn).
- Bukata, R.P., et al., (1995): Optical Properties And Remote Sensing Of Inland And Coastal Waters, CRC press, New York,
- Campbell, J .B. (1996): Introduction to Remote Sensing, 2nd edition, Taylor & Francis, London: 622p. Canada Center for Remote Sensing, Remote Sensing Tutorial
- Cracknell, A.P., and L.W.B. Hayes, (1991): Introduction to Remote Sensing, Taylor and Francis, Washington.
- Downloaded from Vidyasagar University by 42.105.2.193 on 18 June 2022 : 12:26:11; Copyright : Vidyasagar University
- [http://www.vidyasagar.ac.in/Downloads/ShowPdf.aspx?file=/pg\\_syllabus/geography.pdf](http://www.vidyasagar.ac.in/Downloads/ShowPdf.aspx?file=/pg_syllabus/geography.pdf)24
- Curran, P.J. (1980): Multispectral remote sensing of vegetation amount, Progress in Physical Geography
- Curran, P.J. (1988): Principles of Remote Sensing, ELBS Edn. Longman Group UK Ltd.
- Guha, P.K. (2003): Remote Sensing for the Beginner, Affiliated East-West Press Pvt. Ltd., New Delhi
- Joseph, George, (2003): Fundamental of Remote Sensing, University Press (India) Pvt. Ltd, Orient Longman Pvt. Ltd., Hyderabad, India
- Lillesand, T.M. and Kieffer, R.W., 2003. Remote Sensing and Image Interpretation, 5th Edition. Wiley, NY.
- Marcolongo, B. And Mantorani, F. (1997): Photo geology: Remote Sensing Application in Earth Science, Oxford and IBH Pub. Pvt. Ltd., New Delhi: 195p.
- Rajan, M.S. (1995): Space today, 2nd edition, National Book Trust, New Delhi, 344p.



- Sabins, F.F., (1997): Remote Sensing: Principles and Applications, 3rd edition, W.H. Freeman & Company, New York: 494p

**STRUCTURE OF SYLLABUS**  
SEMESTER-III (Duration: July - December)

Type	Paper	Unit	Marks				Credit	Total Class Hours
			End-term Exam.	Internal Exam.	Unit Total	Paper Total		
<b>THEORETICAL</b>	GEO-301	Unit-25: Economic Zones and Development Programmes In India	20	5	25	50	4	60hours
		Unit-26: Geography of Globalization	20	5	25			
	GEO-302	Unit-27: Environmental Ethics and Regulations	20	5	25	50	4	60hours
		Unit-28: Transport Geography	20	5	25			
	GEO-303 <b>Special Paper</b>	Unit-29: Coastal Processes <b>Or</b> Unit- 29: Urban Geography <b>Or</b> Unit- 29: Physical Basis of Remote Sensing and Satellite System	20	5	25	50	4	60hours
		Unit- 30: Coastal Environments: Focus on Indian Regions	20	5	25			

		<b>Or</b> Unit- 30: Regional Geography <b>Or</b> Unit- 30: Photogrammetry, Aerial Photo and Digital Map						
	GEO-304 <i><u>Elective</u></i> <i><u>paper</u></i>	<i>Unit- 31: Emerging Issues in Environmental Geography</i>	20	5	25	50	4	60hours
		<i>Unit- 32: Geography of Hazards and Disaster Management</i>	20	5	25			
<b>PRACTICAL</b>	GEO-305	Unit- 33: Map Transformation and Geodesy	25	-	25	50	4	60hours
		Unit- 34: Spatial Analysis in Geography	25	-	25			
	GEO-306	Unit- 35: Research Methodology	25	-	25	50	4	60hours
		Unit- 36: Research Exercise in Geography	25	-	25			

**Semester-III (300Marks)**  
**THEORETICAL COURSES (200Marks)**

**GEO-301: ECONOMIC ZONES & DEVELOPMENT PROGRAMMES IN INDIA AND GEOGRAPHY OF GLOBALIZATION**

(Marks-50)

**Course Outcomes:**

After the completion of course, the students will have ability to: i) know the world economic geography in the era of globalization, ii) understand different rural and urban development program like poverty alleviation, transport and industrial development, iii) know the cultural transformation and future global challenge

**GEO-301(U-25): ECONOMIC ZONES AND DEVELOPMENT PROGRAMMES IN INDIA**

*Full Marks-25 (End term Examination-20 and Internal Assessment-5)*

*Pattern of setting questions: Group-A (Long Answer Type): Two questions, each of 8 marks (without division), will be set for answering any one. Group-B (Semi-long Answer Type): Four questions, each of 4 marks (without division), will be set for answering any two. Group-C (Short Answer Type): Four questions, each of 2 marks (without division), will be set for answering any two.*

25.1 Concepts of Special Economic Zone (SEZ), Exclusive Economic Zone (EEZ), Export Processing Zone (EPZ), industrial complex and industrial hub.

25.2 Economic Development Programmes: Rural and urban poverty alleviation programmes-National Rural Employment Guarantee Act, Jawahar Rozgar Yojana, Sampoorna Grameen Rozgar Yojana, Jawaharlal Nehru National Urban Renewal Mission; Infrastructural development programmes - Indira Avas Yojana.

25.3 Transport Development Programmes: Golden Quadrilateral, Pradhan Mantri Gram Sadak Yojana, National Freight Corridor. Bharat Nirman Programmes

25.4 Industrial Development Programmes: Food Processing, Information Technology, Tourism industry.

25.5 Development of activities: Growth, characteristics and relative importance of Tertiary, Quaternary, Quinary activities.

**Reading book list**

- Churchel, R. R. and Lowe, A.D (1999): The Law of the Sea, Manchester University Press
- Doshi, K (2007): Treaties on Special Economic Zone, Snow White Publication
- Dutt, R. and Sundaram.K.P.M . (2007): Indian Economy, S. Chand and Com Ltd, Ramnagar, New Delhi
- Gupta, K.R (2008): Special Economic Zones: Issues, Law and Procedure, Atlantic Publisher
- Nilekani, Nandan (2009): Imagining India- The Idea of a Renewed Nation, Penguin Press
- India, 2009: Publication Division, Ministry of Information Broadcasting, Govt. of India
- Singh, B D.(1992): Planning for Rural Development and Poverty Alleviation, Mittal Pub.
- Menon, N and Nigom, A (2007): Power and the Contestation: India since 1989, Zed Books
- Smith, R.W (1986): Exclusive Economic Claims: An Analysis and Primary Documents, Martinus Nijhoff Publisher

**GEO-301 (U-26): GEOGRAPHY OF GLOBALIZATION**

*Full Marks-25 (End term Examination-20 and Internal Assessment 5)*

*Pattern of setting questions: Group-A (Long Answer Type): Two questions, each of 8 marks (without division), will be set for answering any one. Group-B (Semi-long Answer Type): Four questions, each of 4 marks (without division), will be set for answering any two. Group-C (Short Answer Type): Four questions, each of 2 marks (without division), will be set for answering any two.*

26.1. Transformed Geography: Concept of Liberalization, Privatization and Globalization (LPG), rise of the globalization, conflicts of globalization, and concept of glocalisation.

26.2. Globalization and Economic Geography: Economic geography in the era of Globalization; Changes and recent trends, Impact of globalization on agriculture, industry and trade.

26.3. World economic order: Economic booms and crisis.

26.4. Globalization and cultural changes: Globalization and cultural transformations.

26.5. Assessing the future of globalization and global challenges: Inequality, development and globalization, environment, sustainability and globalization.

### **Reading book list**

- Appaduria, A. (2001): Globalization, Duke University Press
- Cofman, E and Youngs, G (1996): Globalization: Theory and Practice, Continuum International Publishing Group.
- Dasgupta, Biplab (2005): Globalization- India's Adjustment Experience; SAGE, New Delhi.
- Haggett, P. (2001): Geography: A Global synthesis, Prentice Hall
- Mackinnon, D. and Cumbess, A. (2007): An Introduction to Economic Geography: Globalization, Uneven development and, Prentice Hall
- Mc Cann (Eds) (2004): From Local to the Global, Rawat Publishers
- Tomlinson, J (1999): Globalization and Culture, Cambridge Polity press
- Vertova, G. (2006): The changing economic geography of Globalization, Routledge
- W. Murray (2006): Geographies of Development, Routledge Publication
- Youngs, G. (2001): Globalization, Communication and Technology, Cambridge.
- Goldin, I and Reinert, K (2012) : Globalization for Development, Oxford University Press, New York
- Potter, R.B and Binns, Tony (Eds) (2001); Globalization and Development, Pearson Education Limited, Harlow

### **PAPER-GEO-302: ENVIRONMENTAL ETHICS AND REGULATIONS AND TRANSPORT GEOGRAPHY** (Marks-50)

#### **Course Outcomes:**

After the completion of course, the students will have ability to: i) know the concept of environment ethics and philosophy, ii) understand global environment problems and environmental planning in India, iii) understand transport systems and planning for public transportation

### **GEO-302 (U-27): ENVIRONMENTAL ETHICS AND REGULATIONS**

*Full Marks-25 (End term Examination-20 and Internal Assessment 5)*

*Pattern of setting questions: Group-A (Long Answer Type): Two questions, each of 8 marks (without division), will be set for answering any one. Group-B (Semi-long Answer Type): Four questions, each of 4 marks (without division), will be set for answering any two. Group-C (Short Answer Type): Four questions, each of 2 marks (without division), will be set for answering any two.*

27.1 Environmental ethics and education; Concept and development of environmental philosophy, Ecocentrism and Anthropocentrism, the land ethic (Aldo Leopold), Gaia concept, Eco-feminism. Formal and non-formal environmental education, Tbilisi conference, environmental awareness

- 27.2 Ethics, culture and conservation of environment: Landscape ecology and ethno-ecology, environmental stewardship.
- 27.3 Environmental Impact Assessment (EIA), Environmental Management Planning (EMP), Environmental Performance Assessment (EPA)
- 27.4 Global Environmental Issues: Stockholm Conference, the Earth Summits, Inter- Governmental Panel for Climate Change (IPCC).
- 27.5 Environmental Laws in India: Wildlife Act, Forest Acts, Environmental Protection Act, National Environmental Tribunal Act.

### Reading book list

- Farmer, A. (1997): Managing Environmental Pollution, Routledge, London: 246p.
- Ghosh, S.K. (2007): Environmental Act in India,
- Joshi, A. (2008): Global Environmental Agreements: Insight and Implication, Eastern Book Corporation
- Marsh, W.M. and Grossa, J.M. (1996): Environmental Geography: Science, Landuse and Earth Systems, John Wiley & Sons.
- Maryk, Theodore (1996): Major Environmental Issues Facing 21<sup>st</sup> Century, Prentice Hall
- Park, C. (1998): The Environment: Principles and Applications, Routledge, London:
- Pickering, K. and Owen, L.A.(1997) : An Introduction to Global Environmental Issues, 2nd edition, Routledge, London.
- Prabhakar, V.R. (1998): Social and Community Forestry, Indian Pub. Distrb., New Delhi: 224p.
- Roberts, N. (editor) (1994): The Changing Global Environment, 3rd edition, Blackwell Pub. Co., London: 531 p.
- Santra, S.C. (2001): Environmental Science; New Central Book Agency, Kolkata.

## GEO-302 (U-28): TRANSPORT GEOGRAPHY

*FullMarks-25(EndtermExamination-20andInternalAssessment 5)*

*Patternofsettingquestions: Group-A(LongAnswerType): Twoquestions,eachof8marks(without division),willbesetforansweringanyone. Group-B(Semi-longAnswerType): Fourquestions,eachof4 marks(withoutdivision),will be set for answeringany two. Group-C (ShortAnswerType): Four questions,eachof2marks(withoutdivision),willbesetforansweringanytwo.*

- 28.1 Concept of distance, Transportation and space, space-time relation through transportation, Transport network analysis, Centrality, Accessibility, Connectivity and Rationality. Transport Models (Gravity Models, Linear Programming Model, Traffic Congestion Model).
- 28.2 Transport cost, Principles of transport cost fixation, comparative cost advantage.
- 28.3 Planning for public transport, desired characteristics, modes and optimal pricing, services, ownership and regulation.
- 28.4 Transport Policy: Problem oriented planning, and objective-led approach; Infrastructure, Management, Information, Pricing and landuse components; National transport policy (National highways, railways and waterways)
- 28.5 Communication Technology-roles in reducing transport demand.

### Reading book list

- Adler, H.A (1987): Economic Appraisal of Transport Project, John Hapkins Press. Washington.
- Dasgupta, A.K. and Pearee, D.W. (1972); Cost Benefit analysis, theory and practice; Mac Millan, London.
- Flaesly CAO (2006): Transport Planning and Traffic Engineering, Butterworth- Heinemann
- Gwillian, K.M. (Ed.) (1993): Transport Policy and Global Warming, European Conference of Ministers of Transport, Paris.
- Lays M.G. (1993): Wags of the World, Primarera Press, Sydwen
- Pearce D.W. and Markyanda, A. (1989): Environmental policy Benefits, Manetany valuation OECD.
- While, P. (1986): Public Transport Planning, Management and operation, Hatechinson, London.

**PAPER-GEO-303: SPECIAL PAPERS (MARKS-50)**  
**(Option-1: COASTAL MANAGEMENT)**

**Course Outcomes:**

After the completion of course, the students will have ability to: i) specialised in different field with in-depth study and its significance, ii) understand urban system in metropolitan areas and different urban issues, iii) know the principles of remote sensing and aerial photograph

**GEO-303 (U-29): COASTAL PROCESSES**

*FullMarks-25(EndtermExamination-20andInternalAssessment5)*

*Patternofsettingquestions:Group-A(LongAnswerType): Twoquestions,eachof8marks(without division),willbesetforansweringanyone.Group-B(Semi-longAnswerType):Fourquestions,eachof4 marks(withoutdivision),will be set for answeringany two. Group-C (ShortAnswerType): Four questions,eachof2marks(withoutdivision),willbesetforansweringanytwo.*

31.1 Definition of coastal zone, relevance of coastal study, classification of coast- Beach stage model.

31.2 Wave hydrodynamics; wave modification near coast with special reference to attenuation, breaker types, energy dissipation during breaking wave.

31.3 Tide; diurnal and semi-diurnal, rotating and progressive tide, concept of live storage, tidal Environment with special reference to estuary.

31.4 Coastal current; intensity of long shore component and its implications, cell circulation.

31.5 Macro land forms with special reference to beaches and dunes; micro and biogenic forms.

**Reading book list**

- Carter, R.W.G (1988): Coastal Environments: An Introduction to the Physical, Ecological and Cultural Systems of Coastlines, Academic Press, London
- Dayer K.R. (1979): Estuary Hydrography, and Sedimentation, Cambridge Univ. Press, Cambridge.
- Devis R.A. (ed) (1978): Coastal Sedimentary Environmental; Springer-Verlag, New York.
- Harikawa , K. (1978): Coastal Engineering, Univ of Tokyo Press, Tokyo.
- Inman, D.L. (1960): Shore Processes, Encyclopedia of Science & Technology, Mc Graw Hill, New York.
- Knight, B. and Philip, A. (1979): Estuarine and coastal Land reclamation and water storage, Saxon House.
- Laussn, E and Lato, I.(ed): Chemistry and Biochemistry of estuaries, Wiley, New York.
- Pethick, J. (2000): An Introduction to coastal Geomorphology, Arnold, London.
- Stanley, D.J. and Suist D.J.P.(ed)(1976): Marine Sediment Transport and environmental management;Wiley, NewYork.

- Wagret,P. (1968): Polderlands, Methuen, London.

## **GEO-303 (U-30): COASTAL ENVIRONMENTS: FOCUS ON INDIAN REGIONS**

*FullMarks-25(EndtermExamination-20andInternalAssessment-5)*

*Patternofsettingquestions:Group-A(LongAnswerType): Twoquestions,eachof8marks(without division),willbesetforansweringanyone.Group-B(Semi-longAnswerType):Fourquestions,eachof4 marks(withoutdivision),will be set for answeringany two. Group-C (ShortAnswerType): Four questions,eachof2marks(withoutdivision),willbesetforansweringanytwo.*

32.1 Tide dominated coastal environment: (Estuaries of India, estuary morphology, estuary hydrodynamics); wave dominated coastal environments: (The shore face, beaches, barriers and human activity) - Indian experiences.

32.2 Morpho dynamic behavior of coastal systems (Modification of coastal features in temporal and spatial scales with feedback mechanisms).

32.3 Carbonate platforms and beach rocks (Andaman and Nicobar Islands).

32.4 Coastal erosion problems (West Bengal, Orissa coasts), land reclamations and associated problems (Sundarbans coastal tract)

32.5 Techniques for assessing coastal hazards areas (Hazard zonation along the coasts)

### **Reading book list**

- Carter, R.W.G (1988): Coastal Environments: An Introduction to the Physical, Ecological and Cultural Systems of Coastlines, Academic Press, London
- Dayer K.R. (1979): Estuary Hydrography, and Sedimentation, Cambridge Univ. Press, Cambridge.
- Devis R.A. (ed) (1978): Coastal Sedimentary Environmental; Springer-Verlag, New York.
- Harikawa , K. (1978): Coastal Engineering, Univ Of Tokyo Press, Tokyo.
- Inman, D.L. (1960): Shore Processes, Encyclopedia of Science & Technology, Mc Graw Hill, New York.
- Knight, B. and Philip, A. (1979): Estuarine and coastal Land reclamation and water storage, Saxon House.
- Laussn, E and Lato, I.(ed): Chemistry and Biochemistry of estuaries, Wiley, New York.
- Pethick, J. (2000): An Introduction to coastal Geomorphology, Arnold, London.
- Stanley, D.J. and Suist D.J.P.(ed)(1976): Marine Sediment Transport and environmental management;Wiley, NewYork.
- Wagret,P. (1968): Polderlands, Methuen, London.

## **(OPTION-2: URBAN AND REGIONAL PLANNING)**

### **GEO-303 (U-29): URBAN GEOGRAPHY**

*FullMarks-25(EndtermExamination-20andInternalAssessment5)*

*Patternofsettingquestions:Group-A(LongAnswerType): Twoquestions,eachof8marks(without division),willbesetforansweringanyone.Group-B(Semi-longAnswerType):Fourquestions,eachof4 marks(withoutdivision),will beset for answeringany two. Group-C (ShortAnswerType): Four questions,eachof2marks(withoutdivision),willbesetforansweringanytwo.*

31.1 Development of urban geography as a systematic discipline: Scope, content and recent trends. Origin and Evolution of Towns in India and World

Urban sociology: classic and modern statements (Max Weber, Robert Park and Louis Wirth).

31.2 Concept and definitions of urban system: Urban, urbanization, urbanism, urban ecology and pathology, national urban system. Trend of Urbanization in India

31.3 Theories of Urban Morphological Growth, Theory Functional Classification of Towns -Basic & Non Basic functions, Quantitative and Qualitative Classification of Towns.

31.4 Cities and suburbs: Functional Zones-C.B.D, Urban System Analysis Rank-Size Rule, City Primacy, Umland, Suburbs- urban sprawl, smart growth, exurbs, the new cities and gated communities.

31.5 Urban Issues - Landuse, Transport, Water, Sanitation, Drainage and Sewage, Slums and congestion, Pollution and health, Urban poverty, Crime and homelessness, New towns movement, Urban Livability and Sustainable urban development.

### **Reading book list**

- Carter, H. (2002): Urban Geography, 4<sup>th</sup> edition Arnold-Heinemann, New Delhi: 434p.
- De Blij, H.J. and Muller, P.O. (1997): Geography: Realms Regions and Concepts, 8th edition, John Wiley and Sons Ltd., New York: 569p.
- Dickinson, J., Gould, B., Clarke, C., Mather, S., Prothero, M., Siddle, D., Smith, C. and Thomas-Hope, E. (1996): A Geography of the Third World, 2nd edition, Routledge, London: 334p.
- Dickinson, R.E. (1968): City and Region: A Geographical Interpretation, Routledge and Kegan Paul Ltd. London.
- Ghosh, S. (1998): Introduction to Settlement Geography, Orient Longman Ltd., Calcutta: 158p.
- Gore, Charles (1984). : Region in question, Routledge Publisher.
- Hudson, F.S. (1970): Geography of Settlements, Macdonald and Evans Ltd., Plymouth:
- Knox, P. (1982): Urban Social Geography, Longman Scientific and Technical, Harlow.
- Pacione, M. (2007): Urban Geography, Routledge,
- Ramachandran R. (1989): Urbanisation and Urban Systems in India, Oxford University Press, New Delhi.
- Singh, R.L. (editor) (1971): India: A Regional Geography, National Geographical Society of India / UBS Pub. Distributors Ltd., New Delhi: 992p.
- Singh, R.L. et. al. (ed) (1976): Geographic Dimensions of Rural Settlements, National Geographical Society of India, Varanasi.
- Spate, O.H.K. and Learmonth, A. T.A. (1967): India and Pakistan, 3rd edition, Munshiram Monoharlal Pub. Pvt. Ltd., New Delhi: 877p.
- Tewari, V. Weinston, J. and Prakash Rao, V.L.S. (1986): Indian Cities: Ecological Perspectives, Concept Pub. Co., New Delhi.

### **GEO-303 (U-30): REGIONAL GEOGRAPHY**

*Full Marks-25 (Endterm Examination-20 and Internal Assessment 5)*

*Pattern of setting questions: Group-A (Long Answer Type): Two questions, each of 8 marks (without division), will be set for answering any one. Group-B (Semi-long Answer Type): Four questions, each of 4 marks (without division), will be set for answering any two. Group-C (Short Answer Type): Four questions, each of 2 marks (without division), will be set for answering any two.*



- 32.1 Concept of Region and Regional Development. Regional Development Models/Theories (Spatial, Non-Spatial Models, Strategies for Development)
- 32.2 Regional Development Strategies: Growth pole and Growth centers. Theories of Regional Growth and Location; Perroux, Myrdal, Hirschman, Boudville
- 32.3 Regional imbalance and disparity in India. Planning Regions of India, Problem and Prospects of Regional development
- 32.4 Social Dimensions of Regional Development. Decentralized Planning with Emphasis on Districts Planning in India, Delineation of Planning Region, Multi-Purpose River valley Development in India, Tribal Area Development in West Bengal
- 32.5 Role of agriculture in regional development. Regional plans for agricultural development in India. Industrial development and industrial regionalization in India, Linkages between Agriculture and industry

### Reading book list

- Ahuja, R (1999): Social Problem in India, Rawat, Jaypur
- Carter, H. (1981): Urban Geography, 3rd edition Arnold-Heinemann, New Delhi: 434p.
- Herbert, D. (1977): Urban Geography- A social Perspectives, David and Charles, London
- Herbert, D. and Johnston, R.J. (1979): Geography and Urban Environment, John Wiley, New York
- Kleniewski, N. (2005): Cities and Society, Blackwell,
- Linder, C (2006): Urban Space and Cityscapes, Pergamon Press
- Pacione, M. (2007): Urban Geography, Routledge,
- Palen, J (1992): The Urban World, McGraw Hill, New York
- Sovani, N.V. (1964): The Analysis of Over Urbanization: Economic Development and Cultural Change,
- Macionis, J.J and Parrillo, V.N (2010): Cities and Urban life, Pearson Education, New Jersey

### **(OPTION-3: REMOTE SENSING AND GEOGRAPHIC INFORMATION SYSTEM)**

#### **GEO-303 (U-29): PHYSICAL BASIS OF REMOTE SENSING AND SATELLITE SYSTEM**

*Full Marks-25 (End term Examination-20 and Internal Assessment-5)*

*Patterns of setting questions: Group-A (Long Answer Type): Two questions, each of 8 marks (without division), will be set for answering any one. Group-B (Semi-long Answer Type): Four questions, each of 4 marks (without division), will be set for answering any two. Group-C (Short Answer Type): Four questions, each of 2 marks (without division), will be set for answering any two.*

- 31.1 Concept and scope of Remote Sensing: Definitions, Process and Characteristics of Remote Sensing System, Advantages and limitations. Concept of Electromagnetic Radiation (EMR): Wavelength-Frequency-energy relationship of EMR, EMR Spectrum and its properties, EMR Wavelength regions and their applications.
- 31.2 Atmospheric windows, Energy Interaction in the atmosphere: Scattering, absorption, transmission, Atmospheric windows. Energy Interactions with Earth Surface Features: Spectral Reflectance Curve, Concept of signatures
- 31.3 Principles of Satellite movements, orbits and trajectory. Types of satellites, Characteristics and uses of different satellites (IRS series, LANDSAT series, SPOT series, CARTOSAT series, IKONOS Series, QUICKBIRD series, INSAT series, NOAA, OCEANSAT)
- 31.4 Satellite Platforms and Sensors: Types of platform for civilian applications, advantages,

Disadvantages and characteristics of various satellite platforms, Physical principles and Characteristics of various satellite sensor, sensor selection parameters, resolution  
31.5 Remote Sensing Data: Data acquisition and reception, Data Products, Storage and dissemination.

### Reading book list

- Campbell, J .B. (1996): Introduction to Remote Sensing, 2nd edition, Taylor & Francis, London; 622p.
- Cracknell, A.P., and L.W.B.Hayes, (1991): Introduction to Remote Sensing, Taylor and Francis, Washington, DC.
- Curran, P.J. (1980): Multispectral remote sensing of vegetation amount, Progress in Physical Geography
- Guha, P.K. (2003): Remote Sensing for the Beginner, Affiliated East-West Press Pvt. Ltd., New Delhi
- Joseph, George, (2003): Fundamental of Remote Sensing, Orient Longman Pvt. Ltd.
- Lillesand, T.M. and Kieffer, R.W. (2003): Remote Sensing and Image Interpretation, 5<sup>th</sup> Edition, Wiley, New York
- Marcolongo, B. And Mantorani, F. (1997): Remote Sensing Application in Earth Science, Oxford and Rajan, M.S. (1995): Space Today, 2nd edition, National Book Trust, New Delhi, 344p.
- Sabins, F.F. (1997): Remote Sensing: Principles and Applications, 3rd edition, W.H. Freeman & Company, New York:

### GEO-303(U-30): PHOTOGRAMMETRY, AERIAL PHOTO AND DIGITAL MAP

*Full Marks-25 (End term Examination-20 and Internal Assessment-5)*

*Pattern of setting questions: Group-A (Long Answer Type): Two questions, each of 8 marks (without division), will be set for answering any one. Group-B (Semi-long Answer Type): Four questions, each of 4 marks (without division), will be set for answering any two. Group-C (Short Answer Type): Four questions, each of 2 marks (without division), will be set for answering any two.*

32.1 Basics of Aerial Photograph: Types of aerial photographs, Geometry of single Aerial Photograph, Photographic overlap, flight planning, Scale, Lens Distortions, Relief Distortions and Tilt distortions. Image displacement and parallax

32.2 Aerial Photographic Film: Film density and Characteristics Curve, Colour Infrared Films, Film Resolution, Filters. Classification of Aerial Film Cameras, Digital cameras Components of aerial Cameras, Camera Calibration, Photogrammetric Applications and Products

32.3 Photogrammetry: Development of Photogrammetry, Classification, processes And Limitations of photogrammetry.

32.4 Stereo photogrammetry: Conditions for Stereo vision, Stereoscopes, Stereoscopic parallax, Parallax Bar, Floating mark, stereoscopic measurements, Use of Parallax bar in height Measurement, Parallax Formula Stereoscopic 3D viewing, Image parallax, Rectification, Ortho rectification.

32.5 Concept of DEM, DSM and DTM, DEM extraction and Ortho image generation. Concept of Image Matching, Automatic DEM generation, Ortho image generation, Digital maps and their characteristics

### Reading book list

- American Society of Photogrammetry (ASP), (1983): Manual Of Remote Sensing, second edition, ASP,

- Fallschurh, VA, Chaisman, N. (1992): Exploring Geographical Information Systems, John Wiley and Sons Inc., New York: 198p.
- Chrisman, N.R. (1997): Exploring Geographic Information Systems; John Wiley and Sons. (Inc).
- Downloaded from Vidyasagar University by 42.105.6.77 on 19 June 2022 : 00:57:48; Copyright : Vidyasagar University
- [http://www.vidyasagar.ac.in/Downloads/ShowPdf.aspx?file=/pg\\_syllabus/geography.pdf35](http://www.vidyasagar.ac.in/Downloads/ShowPdf.aspx?file=/pg_syllabus/geography.pdf35)
- John, R. J. (1998): Introductory Digital Image Processing – A Remote Sensing Perspective, Prentice Hall Series.
- Lillesand, T.M. and Kieffer, R.W. (1979): Remote Sensing and Image Interpretation, 5<sup>th</sup> Edition, Wiley, New York
- Martin, D. (1991): Geographical Information Systems and their Socioeconomic Applications. London, Routledge.
- Robert A. Schowengerdt, (1997): Techniques for Image Processing and Classification in Remote Sensing, Academic Press.
- Ulaby, F.T., Moore, R. K. and Fung, A.K. (1982): Microwave Remote Sensing Active and Passive, Volume II, Radar

## **ELECTIVE PAPER**

### **PAPER- GEO-304: EMERGING ISSUES AND ENVIRONMENTAL HAZARDS AND DISASTER MANAGEMENT IN GEOGRAPHY**

(Marks-50)

#### **Course outcomes**

After the completion of course, the students will have ability to: i) know the global climate change and politics of water, ii) understand the processes of natural and man-made hazards with reference to India , iii) know the international laws and national policy to deal the hazards and disasters

#### **GEO-304 (U-31): Emerging Issues in Environmental Geography**

*FullMarks-25(EndtermExamination-20andInternalAssessment-5)*

*Patternofsettingquestions:Group-A(LongAnswerType):Twoquestions,eachof8marks(without division),willbesetforansweringanyone.Group-B(Semi-longAnswerType):Fourquestions,eachof4 marks(withoutdivision),will be set for answeringany two. Group-C (ShortAnswerType): Four questions,eachof2marks(withoutdivision),willbesetforansweringanytwo.*

29.1 Global climate change, water scarcity and politics of water

29.2 Geographical analysis of environmental degradation and pollution

29.3 Environment and development: Debate and Issues

29.4 Social and Cultural Hazards

29.5 Globalization and Environment

#### **Reading book list**

- Adhikari, S. (1992): Geographical Thought, Chaitanya Pub. House, Allahabad: 272p.
- Bird .J.(1989): Changing Worlds of Geography: A Critical Guide to Concepts and Methods, Oxford University Press
- Chorley, R.J. and Hagget, P. (editors) (1965): Frontiers in Geographical Teaching, OUP, Oxford: 231p.Delhi

- Dikshit, R.D. (editor) (1994): The Art and Science of Geography: Selected Readings, Prentice Hall India Ltd., New Delhi.
- Dunbar, G.S. (editor) (1991): Modern Geography: An Encyclopedi Survey, St. James Press, Chicago: 219p.
- Gregory D. and Walford, R. (editors) (1988): Horizons in Human Geography, Macmillan, London: 390p.
- Hussain, M. (1995): Evolution of Geographical thought, 3rd edition, Rawat Pub. Co., New Delhi: 432p.
- Johnston, R.J (1997): Geography and Geographer: Anglo American Human Geography, Arnold pub.
- Johnston, R. J. (ed.) (2006): Dictionary of Human Geography, Blackwell.
- Messy, D. and Allen, J. (editors) (1984): Geography Matters: A Reader, Cambridge University Press, Cambridge: 204p.
- Stoddart, D.R. (1986): On Geography and its History, Basil Blackwell, Oxford: 236p.

## **GEO-304 (U-32): Geography of Hazards and Disaster Management**

*FullMarks-25(EndtermExamination-20andInternalAssessment-5)*

*Patternofsettingquestions:Group-A(LongAnswerType): Twoquestions,eachof8marks(without division),willbesetforansweringanyone.Group-B(Semi-longAnswerType):Fourquestions,eachof4 marks(withoutdivision),will be set for answeringany two. Group-C (ShortAnswerType): Four questions,eachof2marks(withoutdivision),willbesetforansweringanytwo.*

- 30.1 Concepts and techniques for analysis of risk, hazard, disaster, vulnerabilities and resilience.
- 30.2 Cyclone and storm surges, thunderstorms and lighting, earthquake, tsunami wave and landslide hazards.
- 30.3 Natural hazard and disaster management in India, Agricultural drought hazard and the national experience
- 30.4 International Disaster Response Laws Rules (IDRL)
- 30.5 National policy and appraisal of hazard

## **PRACTICAL COURSES**

**(100 Marks)**

### **PAPER-GEO-305: MAP TRANSFORMATION & GEODESY AND SPATIAL ANALYSIS IN GEOGRAPHY**

**(Marks-50)**

#### **Course Outcomes:**

After the completion of course, the students will have ability to: i) know the basics of map transformation and co-ordinate systems, ii) understand the use and construction of different types of map projection, iii) know the transport network analysis

## **GEO-305 (U-33): MAP TRANSFORMATION ANDG EODESY**

*FullMarks-25*

*PatternofSettingQuestions:Threecompulsoryquestionsbearingmarks7,7and6respectively,willbe setcoveringthewholeunit.5markswillbeallottedforLaboratoryNoteBookandViva-voce.*

- 33.1 Map transformation: Scale factor; distortion types; systems of map projections; principles of choosing Map projection; importance of map projection in GIS.

- 33.2 Principle, construction, properties and uses of following map projections: a) Conformal Projections- Mercator's Projection; Transverse Mercator Projection and Lambert's Conformal Conic (LCC) Projection.
- 33.3 Principle, construction, properties and uses of following map projections b) Equal Area Projection- Mollweide's Projection. c) Conical Projection-Simple Conical Projection with Two Standard Parallels.
- 33.4 Geodesy: Scope and application; concept of Geoid, reference ellipsoid and spheroid-WGS 84, Everest Spheroid.
- 33.5 Coordinate Systems: Cartesian, Rectangular, Spherical, Curvilinear, Spherical, UTM Grid System.

### Reading book list

- Kraak, M.J. and Ormeling, F. (2004): Cartography- Visualization of Geospatial Data; Pearson Education, Singapore.
- Maling, D.H. (1973): Co-ordinate systems on Map Projection; George Philip and Sons Ltd, London
- Raisz, E. (1962): Principles of cartography; Mc Graw Hill, NY.
- Richards, P. and Adler, R.K. (1974): Map Projections, North Holland Publishing Company, New Delhi.
- Robinson, A.H., Sale, R.D., Morrison, J. (1984): Elements of Cartography, Wiley, New York:
- Roy, P. (1988): An Analytical Study of Map Projections, Volume 1, Kolkata.
- Sarkar, A. (1997): Practical Geography: A Systematic Approach, Orient Longman Ltd., Hyderabad:
- Steers, J.A. (1965): An Introduction to Map Projections, 14th ion, University of London Press, London: UNIT-34: Spatial Analysis in Geography

### GEO-305 (U-34): SPATIAL ANALYSIS IN GEOGRAPHY

#### FullMarks-25

PatternofSettingQuestions:Threecompulsoryquestionsbearingmarks7,7and6respectively,willbe setcoveringthewholeunit.5markswillbeallottedforLaboratoryNoteBookandViva-voce.

- 34.1 Transport network analysis: Centrality Indices, Shortest path analysis (Transport and allocation problems), Detour and spread.
- 34.2 Distance Matrix (Aggregate Travel Distance).
- 34.3 Point spatial distribution analysis: Uniformity, randomness and compactness.
- 34.4 Analysis of Directional Data; Rose diagram, Dominant Direction, Mean direction.
- 34.5 Analysis of Shape: Measures based on axial ratios, perimeters to areas, areas to axial length.

### Reading book list

- Clark, C.D. and Wilson, C.(1994): Spatial Analysis of Lineaments: Computer and Geosciences, V.20.No. 7/8,p. 1237-1258.
- Cliff, A.D. and J.K.Ord (1981): Spatial Processes: Models and Applications. London, Pion Ltd.
- Getis, A. and B. Boots (1978): Models of Spatial Processes: An Approach to the study of Point, Line and Area Patterns. Cambridge, Cambridge University Press.
- John, J.C.(2002):Statistics and data nalysis in Geology, Singapore, JohnWiley & Sons(Asia).
- Watson, D.F. (1992): Contouring: A Guide to the Analysis and Display of Spatial Data, Oxford, Pergamon Press.
- Watson, G.S. (1970): Orientation Statistics in the Earth Sciences, Bull.Geol. Inst.Uppsala, V.2. No. 9, p.73-89.
- Watson, G.S. (1983): Statistics on Spheres, New York, John Wiley & Sons

**PAPER- GEO-306: RESEARCH METHODOLOGY AND  
RESEARCH EXERCISE IN GEOGRAPHY**  
**(Marks-50)**

**Course Outcomes:**

After the completion of course, the students will have ability to: i) know the concept of research ethics and paradigm shift in geographical research, ii) understand the framework of research writing and methods of data collection, iii) prepare field report of research exercise

**GEO-306(U-35): RESEARCH METHODOLOGY**

*FullMarks-25*

*PatternofSettingQuestions:Threecompulsoryquestionsbearingmarks7,7and6respectively,willbe setcoveringthewholeunit.5markswillbeallottedforLaboratoryNoteBookandViva-voce.*

35.1 Research ethics and paradigm shift of research methodology in Geography

35.2 Need for research, basic research types

35.3 Identification of research problems, development of theoretical background- literature review, research gap and research question and specification of the objectives of study; hypothesis building, Frame work of research writing.

35.4 Methods of data collection-primary and secondary; Preparation of questionnaire and survey schedule and their differences, research ethics.

35.5 Methods of writing notes, style of referencing, bibliography and appendices, abstract and Synopsis writing.

**Reading book list**

- Compton,R.R. (1985): Geology in the Field, John Wiley and Sons.
- Gardiner, V. and Dacombe,R.(1983):Geomorphological Field Manual,George Allen and Unwin, London
- Ghosh,B.N.(1982): Scientific Methods and Social Research,Starling Publishers Private Ltd. New Delhi.
- Goudie, A.(1981): Geomorphological Techniques, George Allen and Unwin, London
- Kothari, R.C (2004): Research Methodology,New Age International Publishers, New Delhi.
- Mishra,H.N(1998): Research Methodology in Geography, Rawat Publication.
- Ramachandran,P.(1971): Training in Research Methodology in Social Sciences in India, ICSSR, New Delhi
- Shama,B.A.V. et al (1983): Research Methods in Social Sciences, Chaitanya Publishing House, Allahabad.
- Sjoberg g. and Nett (2002): Methodology of Social Research, Rawat Publication
- Wang, X and Vonhofe, R.A (200&): Research Method in Urban and Regional Planning, Springer
- Young,P.V.(1960): Scientific Social Surveys and Research;3rdEd ,Prentice Hall, New York
- Bordens, K,S and Abbott, B.B (2011): Research Design and Methods, Tata McGraw Hill Edition, New Delhi

**GEO-30 (U-36): RESEARCH EXERCISE IN GEOGRAPHY**

Full Marks-25 (Evaluation of written report-10 and Viva-voce based on Powerpoint presentation-15)

Fieldwork on a specific environmental issue and generation of report (within about 50A4 size pages including 15-20 maps/diagrams/field photographs)

### **Reading book list**

- Alvi, Z. (1995): Statistical Geography: Methods and Applications, Rawat Publication, New Delhi
- Compton, R.R. (1985): Geology in the Field, John Wiley and Sons.
- Gardiner, V. and Dacombe, R. (1983): Geomorphological Field Manual, George Allen and Unwin, London
- Ghosh, B.N. (1982): Scientific Methods and Social Research, Starling Publishers Private Ltd. New Delhi.
- Goudie, A. (1981): Geomorphological Techniques, George Allen and Unwin, London
- John, C.D. (2002): Statistics and Data Analysis in Geology; John Wiley & Sons. Kothari, R.C (2004): Research Methodology, New Age International Publishers, New Delhi.
- Mahmood, A (1977): Statistical methods in Geographical studies, Rajesh Pub. New Delhi
- Mishra, H.N (1998): Research Methodology in Geography, Rawat Publication.
- Pal, S.K. (1999): Statistics for Geoscientists, Concept publishing Company, New Delhi: 423p.
- Ramachandran, P. (1971): Training in Research Methodology in Social Sciences in India, ICSSR, New Delhi
- Shama, B.A.V. et al (1983): Research Methods in Social Sciences, Chaitanya Publishing House, Allahabad.
- Sjobergg and Nett (2002): Methodology of Social Research, Rawat Publication
- Wang, X and Vonhofe, R.a (2007): Research Method in Urban and Regional Planning, Springer
- Young, P.V. (1960): Scientific Social Surveys and Research 3<sup>rd</sup> Ed, Prentice Hall, New York.

**STRUCTURE OF SYLLABUS**  
**SEMESTER-IV (Duration: January - June)**

Type	Paper	Unit	Marks				Credit	Total Class Hours	
			End-term Exam	Internal Exam	Unit Total	Paper Total			
<b>THEORETICAL</b>	GEO-401	Unit- 37: Schools in Geographical Thought	20	5	25	50	4	60hours	
		Unit-38: Contemporary Discourses in Geography	20	5	25				
	GEO-402	Unit-39: Land Resource Management	20	5	25	50	4	60hours	
		Unit- 40: Water Resource Management	20	5	25				
	GEO-403	Unit- 41: Forest Resource Management	20	5	25	50	4	60hours	
		Unit- 42: Biodiversity Management	20	5	25				
	GEO-404 <b>Special Paper</b>	Unit- 43: Coastal Ecology and Hazards or Unit- 43: Urban Planning or Unit- 43: Advanced Remote Sensing	20	5	25	50	4	60hours	
		Unit-44: Coastal Issues and Management or Unit-44: Regional Planning or Unit- 44: Advanced GIS and Applications of Remote Sensing	20	5	25				
	<b>PRACTICAL</b>	GEO-405	Unit- 45: Advanced Quantitative Methods	25	-	25	50	4	60hours
			Unit- 46: Geographic Information System	25	-	25			
GEO-406		Unit- 47: Special Paper based Practical Option-1 (Coastal Management) Option-2 (Urban and Regional Planning) Option-3 (Remote Sensing and GIS)	25	-	25	50	4	60hours	
		Unit- 48: Special Paper Project	25	-	25				



## **SEMESTER- IV (300 MARKS)**

Theoretical Courses (200 Marks) Practical Courses (100 Marks)

### **PAPER- GEO-401: SCHOOLS IN GEOGRAPHICAL THOUGHT AND CONTEMPORARY DISCOURSES IN GEOGRAPHY (Marks- 50)**

#### **Course Outcomes**

After the completion of course, the students will have ability to: i) Distinguish the paradigms in geography discipline through time ii) Understand the geographical thinking in different regions of world iii) Appreciate the past and future trends of world geography in general and Indian geography in particular

#### **GEO-401 (U-37): Schools in Geographical Thought**

*Full Marks-25 (Endterm Examination-20 and Internal Assessment-5)*

*Pattern of setting questions: Group- A (Long Answer Type): Two questions, each of 8 marks (without division), will be set for answering any one. Group-B (Semi-long Answer Type): Four questions, each of 4 marks (without division), will be set for answering any two. Group- C (Short Answer Type): Four questions, each of 2 marks (without division), will be set for answering any two.*

- 37.1 The Field of Geography, Place of Geography in classification of knowledge and other disciplines, Geography as a social science, Physical and Human Geography. Linkages among the sub-disciplines of physical and human geography.
- 37.2 Development of Geography in 19<sup>th</sup> Century: Contribution of German, French, British and American schools of thought.
- 37.3 Conceptual and methodological development in 20<sup>th</sup> Century: changing paradigms, evolution of man-nature relation.
- 37.4 Typology of models and uses: structure component and characters.
- 37.5 Dualism and dichotomies in Geography: Determinism and Possibilism, Systematic and Regional, Aerial differentiation and Spatial organization.

#### **Reading book list**

- Adhikari, S. (1992): Geographical Thought, Chaitanya Pub. House, Allahabad: 272p.
- Chorley, R.J. and Hagget, P. (editors) (1965): Frontiers in Geographical Teaching, OUP, Oxford: 231p. Delhi: 195p.
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- [http://www.vidyasagar.ac.in/Downloads/ShowPdf.aspx?file=/pg\\_syllabus/geography.pdf45](http://www.vidyasagar.ac.in/Downloads/ShowPdf.aspx?file=/pg_syllabus/geography.pdf45)
- Dikshit, R.D. (ed.) (1994): The Art and Science of Geography: Selected Readings, Prentice Hall India Ltd., New
- Dunbar, G.S. (ed.) (1991): Modern Geography: An Encyclopaedic Survey, St. James Press, Chicago: 219p.
- Gregory D. and Walford, R. (editors) (1988): Horizons in Human Geography, Macmillan, London: 390p.
- Hussain, M. (1995): Evolution of Geographical thought, 3rd edition, Rawat Pub. Co., New Delhi: 432p.
- Messy, D. and Allen, J. (editors) (1984): Geography Matters: A Reader, Cambridge University press, Cambridge: 204p.
- Stoddart, D.R. (1986): On Geography and its History, Basil Blackwell, Oxford: 236p.

## **GEO-401 (U-38): Contemporary Discourses in Geography**

*Full Marks- 25 (End term Examination- 20 and Internal Assessment- 5)*

*Pattern of setting questions: Group- A (Long Answer Type): Two questions, each of 8 marks (without division), will be set for answering any one. Group- B (Semi-long Answer Type): Four questions, each of 4 marks (without division), will be set for answering any two. Group- C (Short Answer Type): Four questions, each of 2 marks (without division), will be set for answering any two.*

- 38.1 Pragmatism, Positivism and Quantitative revolution in geography
- 38.2 Development of critical social theories: Humanistic geography, Behaviouralism, Radicalism, Welfare geography, Feminist geography
- 38.3 Structuralism and Post-structuralism, Modernism and Postmodernism.
- 38.4 Concept of space: absolute, relative, material and social space, concept of 3<sup>rd</sup> space in geography, temporal geography, time-space prism
- 38.5 Recent trends in geography.

### **Reading book list**

- Adhikari, S. (1992): Geographical Thought, Chaitanya Pub. House, Allahabad: 272p.
- Bird .J.(1989): Changing Worlds of Geography: A Critical Guide to Concepts and Methods, Oxford University Press
- Chorley, R.J. and Hagget, P. (editors) (1965): Frontiers in Geographical Teaching, OUP, Oxford: 231p. Delhi
- Dikshit, R.D. (editor) (1994): The Art and Science of Geography: Selected Readings, Prentice Hall India Ltd., and New Delhi.
- Dunbar, G.S. (editor) (1991): Modern Geography: An Encyclopedia Survey, St. James Press, Chicago: 219p.
- Gregory D. and Walford, R. (editors) (1988): Horizons in Human Geography, Macmillan, And London: 390p.
- Hussain, M. (1995): Evolution of Geographical thought, 3rd edition, Rawat Pub. Co., New Delhi: 432p.
- Johnston, R.J (1997): Geography and Geographer: Anglo American Human Geography, Arnold pub.
- Johnston, R. J. (ed.) (2006): Dictionary of Human Geography, Blackwell.
- Messy, D. and Allen, J. (editors) (1984): Geography Matters: A Reader, Cambridge University Press, Cambridge: 204p.
- Stoddart, D.R. (1986): On Geography and its History, Basil Blackwell, Oxford: 236p.

## **PAPER- GEO- 402: LAND AND WATER RESOURCE MANAGEMENT (Marks-50)**

### **Course Outcomes**

After the completion of course, the students will have ability to: i) Know the distribution of land and water resource, ii) Understand the problems and management of both the resources iii) Appreciate the application of remote sensing and GIS in land mapping and sustainable management

## **GEO-402 (U-39): Land Resource Management**

*Full Marks-25 (End term Examination-20 and Internal Assessment-5)*

*Pattern of setting questions: Group- A (Long Answer Type): Two questions, each of 8 marks (without division), will be set for answering any one. Group- B (Semi-long Answer Type): Four questions, each of 4 marks (without division), will be set for answering any two. Group- C (Short Answer Type): Four questions, each of 2 marks (without division), will be set for answering any two.*

- 39.1 Land as a resource, Land class systems, land use capability classes.
- 39.2 Land degradation, land conservation and land improvement. Wetland ecology & management.
- 39.3 Land and land use management: Economic, spatial and strategic planning, land conflicts, political negotiations
- 39.4 Fundamental issues of sustainable and resource management in the developing countries.
- 39.5 Land mapping: Application of GIS for land use management, preparation of land bank for space time use.

### Reading book list

- De, N.K and Jana, N.C (1997): The Land: A Multifaceted Appraisal and Management, Sribhumi Publishing Co.
- FAO (1974): A Framework for Land classification; Soil Bulletin No. 32, FAO, Rome.
- FAO (1976): Approach to Land classification; Soil Bulletin No. 22, FAO, Rome.
- Human Resource Development (2008): Issues on Ecosystem and Environment, UNDP.
- Saberwal Vasant K. Rangarajan Mahesh (2003): Battles over nature: science and the politics of conservation, Permanent Black Delhi.
- Singh J S Singh S P Gupta S R (2008): Ecology environment and resource conservation, Anamaya Publishers New Delhi
- Rangarajan Mahesh: Fencing the forest: conservation and ecological change in India's central provinces 1860-1914, Oxford University Press Oxford.
- Desai Mamata (2008): Environmental conservation: management and development: the sustainable approach, acb publications Kolkata.
- Yasmi Yurdi (2010): Conflict over forests and land in Asia Impacts, causes, and management, The Centre for People and Forest, RECOFTC: Website: [www.recoftc.org](http://www.recoftc.org).

### GEO-402 (U-40): Water Resource Management

*Full Marks- 25 (End term Examination- 20 and Internal Assessment- 5)*

*Pattern of setting questions: Group- A (Long Answer Type): Two questions, each of 8 marks (without division), will be set for answering any one. Group-B (Semi-long Answer Type): Four questions, each of 4 marks (without division), will be set for answering any two. Group- C (Short Answer Type): Four questions, each of 2 marks (without division), will be set for answering any two.*

- 40.1 Water Resources: Global distribution, water potential, hydrological cycle and its components.
- 40.2 Classification of water resources. Problems of surface and ground water resource depletion. Use and over-utilization of surface and groundwater
- 40.3 Watershed management: Rain water harvesting and storage, recharging of ground water; role of dams.
- 40.4 Water pollution: Causes and consequences, Water treatment: Industrial, urban sewage treatment, domestic water treatment. Drinking water quality. Threats to surface water resources.
- 40.5 Water ecology and management: Principles and approaches of surface and ground water management, waste water use. Concept of virtual water and water trade.

### Reading book list

- Lautze, J. (Ed.). (2014). Key concepts in water resource management: A review and critical evaluation.
- Mysiak, J., Sullivan, C., Henrikson, H. J., Pahl-Wostl, C., & Bromley, J. (Eds.). (2010). The adaptive water resource management handbook. Earthscan.

- Parker, D. D., & Tsur, Y. (Eds.). (2012). Decentralization and coordination of water resource management (Vol. 10). Springer Science & Business Media.
- Koppen, B. C., Giordano, M., & Butterworth, J. (Eds.). (2007). Community-based water law and water resource management reform in developing countries (Vol. 5). CABI.
- Williams, W. D. (1980). An ecological basis for water resource management. Australian National University Press.
- Ghosh, S. K., Saha, P. D., & Di, M. F. (Eds.). (2020). Recent trends in waste water treatment and water resource management. Springer.
- Grigg, N. S. (2016). Integrated water resource management: an interdisciplinary approach. Springer.
- McNabb, D. E. (2017). Water resource management: Sustainability in an era of climate change. Springer.
- Theodore, L., & Dupont, R. R. (2019). Water Resource Management Issues: Basic Principles and Applications. CRC Press.
- Mandal, R. B. (Ed.). (2006). Water resource management. Concept Publishing Company.
- Goel, P. K. (2006). Water pollution: causes, effects and control. New age international.
- Kumar, A. (Ed.). (2004). Water pollution. APH Publishing.
- Sharma, S. K., & Sanghi, R. (Eds.). (2012). Advances in water treatment and pollution prevention. Springer Science & Business Media.
- Zhu, Q., Gould, J., Li, Y., & Ma, C. (Eds.). (2015). Rainwater harvesting for agriculture and water supply (pp. 3-43). Beijing, China: Science Press.
- Rezaee, Z. (1999). Water resource management. Atlantic Economic Journal, 27(3), 343-352.
- Martinson, B., & Thomas, T. (2007). Roofwater harvesting: a handbook for practitioners. IRC International Water and Sanitation Centre.
- Lo, A. G., & Gould, J. (2015). Rainwater harvesting: global overview. Rainwater harvesting for agriculture and water supply, 213-233.

## **PAPER- GEO- 403**

### **FOREST RESOURCE AND BIODIVERSITY MANAGEMENT**

**(Marks-50)**

#### **Course Outcomes**

After the completion of course, the students will have ability to: i) Know the distribution of forest and biodiversity, ii) Understand the value and ethics of biodiversity iii) Appreciate the participation of people for community forest development

#### **GEO-403 (U-41): Forest Resource Management**

*Full Marks- 25 (End term Examination- 20 and Internal Assessment- 5)*

*Pattern of setting questions: Group- A (Long Answer Type): Two questions, each of 8 marks (without division), will be set for answering anyone. Group- B (Semi-long Answer Type): Four questions, each of 4 marks (without division), will be set for answering any two. Group- C (Short Answer Type): Four questions, each of 2 marks (without division), will be set for answering any two.*

- 41.1 Principles of forest management; Scope and object of forest management, ecosystem management, development of forest management in India. National Forest Policy – 1894, 1952 and 1988.
- 41.2 Forest ecosystem: Concept, stand dynamics-forest succession, competition and tolerance, classification of world's forest vegetation.

- 41.3 Afforestation Programmes and forest conflicts, wildlife and human conflicts. Pastoralists and their dependence on forests. Forests and economic security of tribal
- 41.4 Forest as Common property resource: Common Property Resources (CPRs) and open access resources, tragedy of the commons, sustainable livelihood strategies, eco-tourism and local development.
- 41.5 Forest rights, community participation, Joint Forest Management, global environmental change and resettlement of forest tribals, Forest Dwellers act, 2006, poverty alleviation and forests

### Reading book list

- Buongiorno, J., & Gilles, J. K. (2003). Decision methods for forest resource management. Academic Press.
- Leuschner, W. A. (1984). Introduction to forest resource management. John Wiley & Sons.
- Kangas, A., & Maltamo, M. (Eds.). (2006). Forest inventory: methodology and applications (Vol. 10). Springer Science & Business Media.
- Bettinger, P., Boston, K., Siry, J., & Grebner, D. L. (2016). Forest management and planning. Academic press.
- Von Gadow, K., Pukkala, T., & Tomé, M. (Eds.). (2001). Sustainable forest management (Vol. 1). Springer Science & Business Media.
- Van Dyne, G. (Ed.). (2012). The ecosystem concept in natural resource management. Elsevier.
- Dykstra, D. P. (1984). Mathematical programming for natural resource management. McGraw-Hill Book Company.

### GEO-403 (U-42): Biodiversity Management

*Full Marks- 25 (End term Examination- 20 and Internal Assessment- 5)*

*Pattern of setting questions: Group- A (Long Answer Type): Two questions, each of 8 marks (without division), will be set for answering anyone. Group-B (Semi-long Answer Type): Four questions, each of 4 marks (without division), will be set for answering any two. Group- C (Short Answer Type): Four questions, each of 2 marks (without division), will be set for answering any two.*

- 42.1 Introduction to biodiversity: Concepts, significance and distribution. Biodiversity trends, diversity gradients, methods for monitoring biodiversity trends.
- 42.2 Threats to biodiversity: Major causes, extinction's, vulnerability of species to extinction, Causes and consequences of loss of biodiversity.
- 42.3 Values and ethics of biodiversity; Global patterns of biodiversity, biodiversity hotspots and mega diversity realm; Biogeographic zones in India.
- 42.4 Biodiversity conservation approaches: Local, National and International, In-situ and ex- situ conservation.
- 42.5 Uses of biodiversity: Source of food, medicine, raw material, aesthetic, cultural and ecosystem services, strategies for sustainable exploitation of biodiversity.

### Reading book list

- Howard, P. L. (2003). Women and plants: Gender relations in biodiversity management and conservation. Zed books.
- de Boef, W. S., Subedi, A., Peroni, N., Thijssen, M., & O'Keeffe, E. (Eds.). (2013). Community

Biodiversity Management: Promoting resilience and the conservation of plant genetic resources. Routledge.

- Marselle, M. R., Stadler, J., Korn, H., Irvine, K. N., & Bonn, A. (2019). Biodiversity and health in the face of climate change (p. 481). Springer Nature.
- Hunter, M. L., & Hunter Jr, M. L. (Eds.). (1999). Maintaining biodiversity in forest ecosystems. Cambridge university press.
- Laladhas, K. P., Nilayangode, P., & Oommen, O. V. (Eds.). (2017). Biodiversity for sustainable development. Springer International Publishing.
- Reaka-Kudla, M. L., Wilson, D. E., & Wilson, E. O. (Eds.). (1996). Biodiversity II: understanding and protecting our biological resources. Joseph Henry Press.
- Wilson, E. O. (1988). Biodiversity.
- Le Prestre, P. G. (2017). Introduction: The emergence of biodiversity governance. In Governing global biodiversity (pp. 1-6). Routledge.
- Wittmer, H., & Gundimeda, H. (2012). The economics of ecosystems and biodiversity in local and regional policy and management. Routledge.
- Ahern, J. (1999). Planning for biodiversity: Issues and examples. American Planning Association. Journal of the American Planning Association, 65(3), 335.
- Wilson, E. O. (1989). Threats to biodiversity. Scientific American, 261(3), 108-117.
- Ravensberg-GIS, S. (2018). Threats to Biodiversity. Environment.

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## **GEO -404: SPECIAL PAPERS (50 marks)**

### **Option-1: Coastal Management**

#### **GEO-404 (U-43): Coastal Ecology and Hazards**

*Full Marks- 25 (End term Examination- 20 and Internal Assessment- 5)*

*Pattern of setting questions: Group- A (Long Answer Type): Two questions, each of 8 marks (without division), will be set for answering anyone. Group- B (Semi-long Answer Type): Four questions, each of 4 marks (without division), will be set for answering any two. Group- C (Short Answer Type): Four questions, each of 2 marks (without division), will be set for answering any two.*

- 43.1 Coastal Hazard: Natural vs. Man-made hazard - Hazard and disaster, vulnerability, resilience-coping mechanisms
- 43.2 Dune vegetation: Dune initiating and dune building types, adaptation and reproduction, plant-animal interaction in sand dune.
- 43.3 Coastal studies in India: Estuarine and Mangrove Ecology, Salt Marsh Ecology -Coral Reef Ecology, Human Impacts on the coastal Environment,
- 43.4 Coastal hazards and their management: Sea level change- long- and short-term changes, Storm hazard: role in sediment transfer, effects on open and estuarine coast, management of storm hazard.
- 43.5 Techniques of monitoring coastal processes and land forms. Coastal erosion- causes and effects

#### **Reading book list**

- Bird, E.C.F. (2000): An Introduction to Coastal Geomorphology, John Wiley and Sons Ltd. New York: 340 P.
- Carter, R.W.G (1988): Coastal Environments: An Introduction to the Physical, Ecological and Cultural Systems of Coastlines, Academic Press, London

- Inman, D.L. (1960): Shore Processes, Encyclopedia of Science & Technology, Mc Graw Hill, New York.
- Komar, P.D. (1996): Beach Processes and Sedimentation, Prentice Hall.
- Laussn, E and Lato, I.(ed): Chemistry and Biochemistry of estuaries, Wiley, New York.
- Paul, A.K. (2002): Coastal Geomorphology and Environment, ACB Publication.

## **GEO-404(U-44): Coastal Issues and Management**

*Full Marks- 25 (End term Examination- 20 and Internal Assessment- 5)*

*Pattern of setting questions: Group- A (Long Answer Type): Two questions, each of 8 marks (without division), will be set for answering any one. Group- B (Semi-long Answer Type): Four questions, each of 4 marks (without division), will be set for answering any two. Group- C (Short Answer Type): Four questions, each of 2 marks (without division), will be set for answering any two.*

- 44.1 Coral bleaching: Impact of Global warming, coastal eutrophication and habitat conservation (Coastal lagoons, other coastal wetlands)
- 44.2 Coastal tourism and environment conflicts (Beaches and barrier coasts, mangrove dominated coasts, coral coasts, environmental regulations).
- 44.3 Application of remote sensing and GIS techniques in coastal management (Geomorphological mapping, coastal cell circulation systems, environmental zoning approach, identification and diversity of coastal habitats)
- 44.4 Managing coastal change: Assessment of coastal vulnerability, ecosystem valuation of coast, integrated coastal zone management, coastal regulations); Coastal engineering: Developments in hard structure designs, developments in soft structure designs, new dredging techniques and procedures.
- 44.5 Coastal urbanization and population pressures, Coastal resource management.

### **Read book list**

- Allen, J.R.L (1970): Physical Processes of Sedimentation, Jorge Allen & Unwin, London
- Bird, E.C.F. (1985): Coastline Changes, Wiley.
- Carter, R.W.G (1988): Coastal Environments: An Introduction to the Physical, Ecological and Cultural Systems of Coastlines, Academic Press, London
- Dayer K.R. (1979): Estuary Hydrography, and sedimentation, Cambridge Univ. Press, Cambridge.
- Devis R.A. (ed) (1978): Coastal Sedimentary Environment, Springer Verlag, New York.
- Fitzerled and Davis Jr. (2002): Beaches and Coasts.
- Harikawa , K. (1978): Coastal Engineering, Univ of Tokyo Press, Tokyo.
- Hsalleff, S.K. (2000): Coastal Systems, Routledge.
- Inman, D.L. (1960): Shore Processes, Encyclopedia of Science & Technology, Mc Graw Hill, New York.
- Ivan, V. (2006): Global Coastal Change, Blackwell.
- Kay, R. and Alden, J. (1999): Coastal Planning and Management, E and FN Spon, London
- Komar, P.D. (1996): Beach Processes and Sedimentation. Prentice Hall.
- Laussn, E and Lato, I.(ed): Chemistry and Biochemistry of estuaries, Uniley, New York.
- Paul, A.K. (2002): Coastal Geomorphology and Environment, ACB Publication.
- Paul, A.K. (2005): Tsunami- An Assessment of Disaster in Indian Ocean Nations, ACB Publication.
- Pethick, J. (2000): An Introduction to coastal Geomorphology, Arnold, London.
- Schwartz, M.L (2005): Encyclopedia of Coastal Science, Springer.
- Stanley, D.J. and Suist D.J.P.(ed) (1976): Marine Sediment Transport and environmental management, Wiley, New York.
- Woodroffe, C. D. (2002): The Coast- Form, Process and Development, Cambridge University Press.

## Option- 2: Urban and Regional Planning

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### Course Outcomes

After the completion of course, the students will have ability to: i) Know the changing approach and methods in urban regional planning, ii) Understand the theories of previous planning in present context, iii) Acquainted with modern strategies of Indian Government for sustainable urban and regional development

### **GEO-404 (U-43): Urban Planning**

*Full Marks- 25 (End term Examination- 20 and Internal Assessment- 5)*

*Pattern of setting questions: Group- A (Long Answer Type): Two questions, each of 8 marks (without division), will be set for answering any one. Group- B (Semi-long Answer Type): Four questions, each of 4 marks (without division), will be set for answering any two. Group- C (Short Answer Type): Four questions, each of 2 marks (without division), will be set for answering any two.*

- 43.1 Changing approaches in Urban Geography; Methodology in urban planning studies; Type of urbanized regions: Conurbation, Metropolis, Megalopolitan development.
- 43.2 Urban Hierarchies; Central Place Theory (Christaller and Losch); Peripheral urbanization: Functional areas and Peri-urban areas; Exo-urbanization
- 43.3 Perspectives and Policies of Urban planning and development. Gentrification, Green space and Garden city movement. Sustainable Urban Development and Future of the Cities.
- 43.4 Smart city: concept and definition, features and infrastructure, smart governance and services. Strategic components for development Smart solution. Govt. of India Smart Cities Mission.
- 43.5 National Urbanization Policies and 74th Constitutional Amendment Act - Salient Features.

### **Read book list**

- Bhat, L.S. (1973): Regional Planning in India, Statistical Pub. Society.
- Chand, M. and Puri, V.K. (1988): Regional Planning in India, Vikas, New Delhi
- Chandana, R.C. (2000): Regional Planning and Development, Kalyani Publishers
- Glasson, J. (1974): An Introduction to Regional Planning, Hutchinson, London
- Greed, C (2000): Introducing Planning, Athlone Press, London
- Hall, P. (1974): Urban and Regional Planning, Penguin, London
- Mishra, R.P. (1969): Regional Planning, Concept, Techniques, Policies, The University of Mysore Press.
- Mitra, A. (1971): Levels of Regional Development India, Census of India
- Roy, G.L and Mondal, S. (1993): Gram Panchayat Organization: Effective Management for Rural Development
- Sanyal, B. M (2001): Decentralized Planning- Themes and Issues, Concept.
- Tim, Hall (2006): Urban Geography, Routledge

### **GEO-404 (U-44): Regional Planning**

*Full Marks- 25 (End term Examination- 20 and Internal Assessment- 5)*

*Pattern of setting questions: Group- A (Long Answer Type): Two questions, each of 8 marks (without division), will be set for answering anyone. Group- B (Semi-long Answer Type): Four questions, each of 4 marks (without division), will be set for answering any two. Group- C (Short Answer Type): Four questions, each of 2 marks (without division), will be set for answering any two.*



- 44.1 Basic Principles and Objectives of Regional Planning; Regional Planning and Economic Development, Basic Elements of Rural Development, Growth versus Development and, Approaches to Study of Rural Development
- 44.2 Process of Regional Development; Indicators of regional development; Theories of regional development-Spatial and non-spatial models (Rostow's stages of economic growth). Strategies for India's regional development.
- 44.3 Rural Poverty Scenario in India. Regional Poverty Alleviation Measures. Regional and Rural Development Policies and Programmes in India.
- 44.4 Theories of Rural Development: Marxist School and Gandhian Model. Globalization and Regional Planning. The 73<sup>rd</sup> Constitution Amendment Act and its impact on Rural Development People and Development
- 44.5 Planning: Development Planning for Infrastructure, Education, Housing, and Health in India.

### **Read book list**

- Bhat, L.S. (1973): Regional Planning in India, Statistical Pub. Society.
- Chand, M. and Puri, V.K. (1988): Regional Planning in India, Vikas, New Delhi
- Chandana, R.C. (2000): Regional Planning and Development, Kalyani Publishers
- Glasson, J. (1974): An Introduction to Regional Planning, Hutchinson, London
- Greed, C (2000): Introducing Planning, Athlone Press, London
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- [http://www.vidyasagar.ac.in/Downloads/ShowPdf.aspx?file=/pg\\_syllabus/geography.pdf48](http://www.vidyasagar.ac.in/Downloads/ShowPdf.aspx?file=/pg_syllabus/geography.pdf48)
- Hall, P. (1974): Urban and Regional Planning, Penguin, London
- Mishra, R.P. (1969): Regional Planning, Concept, Techniques, Policies, The University of Mysore Press.
- Mitra, A. (1971): Levels of Regional Development India, Census of India
- Roy, G.L and Mondal, S. (1993): Gram Panchayat Organization: Effective Management for Rural Development
- Sanyal, B. M (2001): Decentralized Planning- Themes and Issues, Concept.
- Tim, Hall (2006): Urban Geography, Routledge.

### **Option-3: Remote Sensing and Geographic Information System**

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## **Course Outcomes**

After the completion of course, the students will have ability to: i) Know the concepts and application of advanced remote sensing, ii) Know the modern trend of GIS and its integration with remote sensing iii) built capability to handle with different data structures and image processing

### **GEO-404 (U-43): Advanced Remote Sensing**

*Full Marks- 25 (End term Examination- 20 and Internal Assessment- 5)*

*Pattern of setting questions: Group- A (Long Answer Type): Two questions, each of 8 marks (without division), will be set for answering anyone. Group-B (Semi-long Answer Type): Four questions, each of 4 marks (without division), will be set for answering any two. Group- C (Short Answer Type): Four questions, each of 2 marks (without division), will be set for answering any two.*

43.1 Thermal Remote Sensing: Concept, Sensors and Utility.

43.2 Microwave Remote Sensing: Concept, Comparison with optical system, advantages and disadvantages, spatial resolution, Real and Synthetic Aperture Radar, Passive Microwave Remote Sensing, Lidar

43.3 Hyper spectral Remote Sensing: Concept, Sensors and utility.

43.4 Visual Image Processing and Digital image interpretation: Elements of Visual image interpretation, generation of thematic maps, information extraction.

43.5 Digital Image Processing: Pre-processing, Image Registration, Image geometric operations, Enhancement, Spatial filtering, Transformation, classification, data compression, spectral pattern recognition, output generation.

### **Reading book list**

- Campbell, J .B. (1996): Introduction to Remote Sensing, 2nd edition, Taylor & Francis, London: 622p.
- Cracknell, A.P. and Hayes, L.W.B. (1991): Introduction to Remote Sensing, Taylor and Francis, Washington.
- Curran, P.J. (1980): Multispectral Remote Sensing of Vegetation Amount, Progress in Physical Geography
- Curran, P.J. (1988): Principles of Remote Sensing, ELBS Edn. Longman Group Ltd. UK
- Guha, P.K. (2003): Remote Sensing for the Beginner, Affiliated East-West Press Pvt. Ltd., New Delhi
- Joseph, George (2003): Fundamental of Remote Sensing, University Press (India) Pvt. Ltd,
- Lillesand, T.M. and Kieffer, R.W. (2003): Remote Sensing and Image Interpretation, 5<sup>th</sup> Edition., Wiley, NY.
- Marcolongo, B. and Mantorani, F. (1997): Photogeology: Remote Sensing Application in Earth Science, Oxford
- Rajan, M.S. (1995): Space today, 2nd edition, National Book Trust, New Delhi, 344p.
- Sabins, F.F. (1997): Remote Sensing: Principles and Applications, 3rd edition, W.H. Freeman & Company, New York:

## **GEO-404 (U-44): Advanced GIS and Applications of Remote Sensing**

*Full Marks-25 (End term Examination-20 and Internal Assessment-5)*

*Pattern of setting questions: Group- A (Long Answer Type): Two questions, each of 8 marks (without division), will be set for answering anyone. Group-B (Semi-long Answer Type): Four questions, each of 4 marks (without division), will be set for answering any two. Group- C (Short Answer Type): Four questions, each of 2 marks (without division), will be set for answering any two.*

- 44.1 Advanced GIS: Spatial data model, Data entry, data analysis, Data models. Data sources, Data captures, attribute data management and Meta data concept.
- 44.2 Data Infrastructure: Spatial Data Infrastructure: NSDI
- 44.3 Modern trend in GIS: Local to Global concept in GIS, Integration of GIS and Multimedia, 3D GIS and Web GIS, Real time GIS, Mobile GIS, Collaborative GIS, concept and application of GPS and GNSS.
- 44.4 Integration of Remote sensing and GIS: Concept and importance of Remote Sensing and GIS integration in Geographical studies
- 44.5 Applications of Remote Sensing and GIS: Land use/land covers mapping, soil and agricultural mapping, geomorphological mapping, watershed mapping.

### **Reading book list**

- A.S.P. (1981): Manual of Photogrammetry; (4th edn). American Society of Photogrammetry, Falls Church, Virginia.
- American society for Photogrammetry and Remote Sensing, Glossary of mapping science, ASPRS, Bethesda, MD, 1994
- Castleman, K.R. (1979): Digital Image Processing. Prentice Hall Inc, New Jersey.
- Chaisman, N. 1992: Exploring Geographical Information Systems, John Wiley and Sons Inc., New York: 198p.
- Foresman, T.W. (ed) (1998): History of GIS, Prentice-Hall, Upper saddle river, NJ,
- Martin, D. (1991): Geographical Information Systems and their Socioeconomic Applications. London, Routledge.
- Masser, Ian and Blakemore, Michael (1991): Handling Geographical Information: Methodology and Potential Application, 3rd ed., Longman Scientific and Technical.
- Robert A. Schowengerdt, (1997): Techniques for Image Processing and Classification in Remote Sensing, Academic Press.
- Ulaby, F.T., Moore, R.K. and Fung, A.K. (1982): Microwave Remote Sensing Active and Passive, Volume II, Radar

### **PRACTICAL (100 Marks)**

#### **GEO-405 Advanced Quantitative Methods and Geographic Information System (50 Marks)**

#### **Course Outcomes**

After the completion of course, the students will have ability to: i) Knowledge about the advance level statistics with multivariate analysis, ii) Understand the basic operation of matrix and determinants, iii) Use of GPS traversing both in manually and computer plotting.

## **GEO-405 (U-45): Advanced Quantitative Methods**

Full Marks- 25

Pattern of Setting Questions: Three compulsory questions bearing marks 7, 7 and 6 respectively, will beset covering the whole unit. 5 marks will be allotted for Laboratory Note Book and Viva-voce.

- 45.1 Analysis of Variance: Objectives; One-way and Two-way ANOVA.
- 45.2 Fitting Second Degree Polynomial curves to bivariate geographical data and testing by ANOVA.
- 45.3 Multiple Regression: Linear multiple regression equation, Multiple and partial correlation coefficient.
- 45.4 Elementary multiple regression modeling techniques: Stepwise variable entry method,
- 45.5 Basic operation of Matrix and Determinants

### **Read book list**

- Aralinghaus, S.L and Griffity, A. (1995): Practical Handbook of Spatial Statistics, CRC Press
- Brien, O.L. (1992): Introducing Quantitative Geography: Measurement, Method and Generalized linear Models, Routledge.
- Clark, W.A.V and Hosking, P.L. (1986): Statistical Methods for Geographers, Wiley and Sons.
- Fotheringham, S. A and Brunson, C and Charlton, M. (2000): Quantitative Geography: Perspectives on Spatial Data Analysis, SAGE.
- Haining, R.P. (2003): Spatial Data Analysis, Cambridge University Press.
- Lindsay, J.N. (1997): Techniques in Human Geography, Routledge
- Pal, S.K. (1998): Statistics for Geo-Scientists: Techniques and Application, Concept.
- Shaw, G. and Wheeler, D. (1985): Statistical Techniques in Geographical Analysis, John Wiley and Sons.

## **GEO-405 (U-46): GEOGRAPHIC INFORMATION SYSTEM**

Full Marks- 25

Pattern of Setting Questions: Three compulsory questions bearing marks 7, 7 and 6 respectively, will beset covering the whole unit. 5 marks will be allotted for Laboratory Note Book and Viva-voce.

- 46.1 Basic Concepts and components in GIS: An overview of the development of the GIS fields, Data Sources; Data acquisition methods
- 46.2 Data structure: Vector and Raster data structures, data storage.
- 46.3 Modern trends in GIS: 3D GIS and Web GIS, Real time GIS, Mobile GIS and application of GIS
- 46.4 Basics of GPS Surveying: Conceptual Framework, Space Segment, Ground Segment, Control Segment, Satellite Triangulation, Pseudo Random Code, DGPS and GNSS
- 46.5 GPS-aided traversing; Manual and Computer plotting for preparation of maps

## Read book list

- Foresman, T.W. (ed) (1998): History of GIS, Prentice-Hall, Upper saddle river, NJ,
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- [http://www.vidyasagar.ac.in/Downloads/ShowPdf.aspx?file=/pg\\_syllabus/geography.pdf49](http://www.vidyasagar.ac.in/Downloads/ShowPdf.aspx?file=/pg_syllabus/geography.pdf49)
- Marcolongo, B. And Mantorani, F. (1997): Photogeology: Remote Sensing Application in Earth Science, Oxford and IBH Pub. Pvt. Ltd., New Delhi: 195p.
- Martin, D. (1991): Geographical Information Systems and their Socioeconomic Applications. London, Routledge.
- Masser, Ian and Blakemore, Michael (1991): Handling Geographical Information: Methodology and Potential Application, 3<sup>rd</sup> ed., Longman Scientific and Technical.
- Robert A. Schowengerdt, (1997): Techniques for Image Processing and Classification in Remote Sensing, Academic Press.

## **Geo-406: Special Paper Based Practical and Field Report (Marks- 50)**

### **Course Outcomes**

After the completion of course, the students will have ability to: i) Know the significance of specialization and its application in various sphere, ii) Know the application of models and theories, iii) Hands-on with different software and models for urban and environmental problems management, iv) Conduct proper field work for the collection of primary data to bring out grassroots realities. v) Make use of proper tools and surveying methods for measurement in context of collection and processing of data. vi) Prepare a report based on field data

### **Unit- 47: Special Paper based Practical (Paper Code - GEO-406(U-47))**

*Full Marks- 25*

*Pattern of Setting Questions: Three compulsory questions bearing marks 7, 7 and 6 respectively, will be set covering the whole unit. 5 marks will be allotted for Laboratory Note Book and Viva-voce.*

#### **Option -1 Coastal Management**

*(Field Measurement techniques and application in coastal geomorphology)*

- 47.1 Understanding beach morphology: Beach profiles; Coarse sediment analysis: size and shape; Fine sediment analysis: size and shape
- 47.2 Measurement of Longshore drift: direction and strength
- 47.3 Physical impact of coastal management: Groyne measurements Rip-rap volume and weight measurements
- 47.4 Human impact of coastal management: Bi-polar analysis Questionnaires Cost-benefit analysis, Shoreline Management Plans
- 47.5 Risk and vulnerability analysis: Data analysis, Risk mapping

#### **Option -2 Urban and Regional Planning**

*(Field Measurement techniques and application in Urban and Regional Planning)*

- 47.1 Method of delimitation of C.B.D and mapping of functional areas of cities
- 47.2 Urban renewal and re-development of towns
- 47.3 Gravity model, Breaking Point Analysis, Population Potentials.
- 47.4 Urban service satisfaction and livability analysis
- 47.5 Delimitation of Planning regions and Agricultural Regions

#### **Option -3 Remote Sensing and GIS**

*(Field Measurement techniques and application in Remote Sensing and Geographic Information System)*

- 47.1 Measurement of stereoscopic parallax and relief displacement. Creation of Digital Elevation Model (DEM)
- 47.2 Application on hydrology: Soil and Water Assessment Tool (SWAT)

- 47.3 Forest Fragmentation Mapping: Application of FRAGSTAT software, Mapping of Forest ecosystem services.
- 47.4 Application of Thermal Remote Sensing for Urban Heat Island mapping
- 47.5 Network analysis and point pattern analysis, Urban amenities and facilities analysis.

#### **Unit- 48: Special Paper Project (Paper Code - GEO-406(U-48))**

*Full Marks- 25 (Field report -15 and Presentation -10)*

##### **Option -1 Coastal Management**

##### **Option -2 Urban and Regional Planning**

##### **Option -3 Remote Sensing and Geographic Information System**

##### **Field Report**

Field work (at least 7 days field work at relevant places as per option).

**Submission of project report in the format** as – Issue / Background information, problem statement, objectives, rationale, methodology, scheme of the study, literature review, analysis of data collected from field both in qualitative and quantitative with proper mapping and references.

Student have to submit hard copy spiral binding - **A4** size paper, **MS** word format, **12** fonts, single side print, **1.5**-line spacing, maximum **50** pages and a soft copy in .pdf and MS Word format.

##### **Presentation of Field Report**

Power Point Presentation of the report containing Issue / Background information, problem statement, objectives, rationale, methodology, scheme of the study, literature review, mapping, major findings and references (within 15 slides)

##### **Read book list**

- Compton, R.R. (1985): Geology in the Field, John Wiley and Sons.
- Gardiner, V. and Dacombe, R. (1983): Geomorphological Field Manual, George Allen and Unwin, London
- Goudie, A. (1981): Geomorphological Techniques, George Allen and Unwin, London
- Kothari, R.C. (2004): Research Methodology, New Age International Publishers, New Delhi.
- Mahmood, A. (1977): Statistical methods in Geographical studies, Rajesh Pub. New Delhi
- Mathur, S.M. (2001): Guide to Field Geology, Prentice Hall, India
- Mishra, H.N. (1998): Research Methodology in Geography, Rawat Publication.
- National Family Health Survey (NFHS-3) 2005-2006, Vol-I and II International Institute for population Science, Mumbai
- Pal, S.K. (1999): Statistics for Geoscientists, Concept publishing Company, New Delhi: 423p.
- Ramachandran, P. (1971): Training in Research Methodology in Social Sciences in India, ICSSR, New Delhi
- Shama, B.A.V. et al (1983): Research Methods in Social Sciences, Chaitanya Publishing House, Allahabad
- Goudie, A. (1981): Geomorphological Techniques, George Allen and Unwin, London

- Mathur,S.M(2001): Guide to Field Geology, Prentice Hall, India
- National Family Health Survey(NFHS-3) 2005-2006, Vol- I and II International Institute for population Science,Mumbai
- Pal, S.K. (1999): Statistics for Geoscientists, Concept publishing Company, New Delhi: 423p.
- Ramachandran, P.(1971):Training in Research Methodology in Social Sciences in India, ICSSR, New Delhi
- Shama,B.A.V. et al (1983): Research Methods in Social Sciences, Chaitanya Publishing House, Allahabad.