



**Structure and Detailed Syllabus  
of the Undergraduate Course (B.Sc.) in Geography under CBCS  
Department of Geography  
Presidency University**



**PRESIDENCY UNIVERSITY**  
KOLKATA



**Department of Geography  
(Faculty of Natural and Mathematical Sciences)  
Presidency University  
Hindoo College (1817-1855), Presidency College (1855-2010)  
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**Semester-wise Modules of the Undergraduate Course in Geography (Major) under CBCS  
Department of Geography, Presidency University, Kolkata**

Semester	Course Type				
	Core Course	Discipline Specific Elective (DSE) (4)	Generic Elective (GE) (4)	Skill Enhancement Course (SEC) (2)	Ability Enhancement Compulsory Course (AECC) (2)
First	Geotectonics and Geomorphology		Geography of Tourism		(English / Hindi / MIL / Communication) / Environmental Science
	Cartographic Techniques and Computations				
Second	Human Geography		Regional Development		(English / Hindi / MIL / Communication) / Environmental Science
	Thematic Cartography and Surveying				
Third	Climatology		Climate Change: Adaptation and Vulnerability	Geographical Information Systems	
	Statistical Methods in Geography				
	Regional Geography of India				
Fourth	Economic Geography		Sustainable Development	Research Methods	
	Environmental Geography				
	Nature and Natural Disasters				
Fifth	Regional Planning and Development	Hydrology and Oceanography			
	Remote Sensing	Agricultural Geography			
Sixth	Evolution of Geographical Thought	Soil Geography			
	Fieldwork	Social and Political Geography			

**Academic Session:** Each Semester shall contain at least 16 Teaching Weeks

Odd Semesters: Semesters One and Three - July to December

Even Semesters: Semesters Two and Four - January to June

## Credit Allocation and Marks Distribution for the Undergraduate Course in Geography (Major) under CBCS

### Department of Geography, Presidency University, Kolkata

Semester	Course Type	Paper Code	Course Name	Credits				Marks			
				Theory	Practical	Tutorial	Total	Theory	Practical	Tutorial	Total
First	Core Course	GEOG01C1	Geotectonics and Geomorphology	4	2		6	70	30		100
First	Core Course	GEOG01C2	Cartographic Techniques and Computations	4	2		6	70	30		100
First	Generic Elective	GEOG01GE1	Geography of Tourism	4	2		6	70	30		100
First	Ability Enhancement Compulsory Course		(English / Hindi / MIL / Communication) / Environmental Science	4			4	100			100
Second	Core Course	GEOG02C3	Human Geography	5		1	6	80		20	100
Second	Core Course	GEOG02C4	Thematic Cartography and Surveying	4	2		6	70	30		100
Second	Generic Elective	GEOG02GE2	Regional Development	4	2		6	70	30		100
Second	Ability Enhancement Compulsory Course		(English / MIL / Communication) / Environmental Science	4			4	100			100
Third	Core Course	GEOG03C5	Climatology	4	2		6	70	30		100
Third	Core Course	GEOG03C6	Statistical Methods in Geography	4	2		6	70	30		100
Third	Core Course	GEOG03C7	Regional Geography of India	5		1	6	80		20	100
Third	Generic Elective	GEOG03GE3	Climate Change: Adaptation and Vulnerability	4	2		6	70	30		100
Third	Skill Enhancement Course	GEOG03SEC1	Geographical Information Systems	4			4	100			100
Fourth	Core Course	GEOG04C8	Economic Geography	4	2		6	70	30		100
Fourth	Core Course	GEOG04C9	Environmental Geography	4	2		6	70	30		100
Fourth	Core Course	GEOG04C10	Nature and Natural Disasters	4	2		6	70	30		100
Fourth	Generic Elective	GEOG04GE4	Sustainable Development	4	2		6	70	30		100
Fourth	Skill Enhancement Course	GEOG04SEC2	Research Methods	4			4	100			100
Fifth	Core Course	GEOG05C11	Regional Planning and Development	4	2		6	70	30		100
Fifth	Core Course	GEOG05C12	Remote Sensing	4	2		6	70	30		100
Fifth	Discipline Specific Elective	GEOG05DSE1	Hydrology and Oceanography	4	2		6	70	30		100
Fifth	Discipline Specific Elective	GEOG05DSE2	Agricultural Geography	4	2		6	70	30		100
Sixth	Core Course	GEOG06C13	Evolution of Geographical Thought	5		1	6	80		20	100
Sixth	Core Course	GEOG06C14	Fieldwork	4	2		6	70	30		100
Sixth	Discipline Specific Elective	GEOG06DSE3	Soil Geography	4	2		6	70	30		100
Sixth	Discipline Specific Elective	GEOG06DSE4	Social and Political Geography	4	2		6	70	30		100
			Totals:	107	38	3	148	1970	570	60	2600

**DEPARTMENT OF GEOGRAPHY**  
**PRESIDENCY UNIVERSITY**

**Detailed Syllabus for First Semester of Geography (Major) Undergraduate Course**

**Course Name:** Geotectonics and Geomorphology

**Course Type:** Core Course

**Course Code:** GEOG01C1

**Credits:** 6

**Total Marks:** 100

**Module Evaluation:**

**Question Pattern -**

**Internal Assessment -**

**GEOG01C1 (Theory) [Credits: 4 Marks: 70]**

**Unit 1: Geotectonics**

- 1.1 Earth's tectonic, structural and biological evolution through geological timescales [2]
- 1.2 Earth's interior from seismic measurements and tomography; Isostatic models of Airy and Pratt - adjustments and anomalies [5]
- 1.3 Plate Tectonics: Wegener and Holmes, evidences from sea-floor spreading and palaeomagnetism; Plate interactions - Himalayas, Andes, Mid-Atlantic Ridge, East African Rift, Hawaiian Chain, San Andreas; Neotectonics evidences [10]
- 1.4 Folds, Faults and Tilts - origin, classifications, topography and drainage [5]

**Unit 2: Geomorphology**

- 2.1 Fundamental Concepts: Thornbury, Brunnsden and others; Geomorphic timescales and landscape hierarchy; Geomorphic Systems - classification, thresholds and feedbacks; Morphogenetic regions of Peltier and Budel [4]
- 2.2 Weathering processes: latitudinal variations in processes, rates and landforms; Supergene ores, placers and laterites [4]
- 2.3 Mass movement: types and rates, landslide causation and mitigation [5]
- 2.4 Models of landscape evolution: Davis, Penck and Hack; Slope models of Dalrymple, King and Young [5]
- 2.5 Fluvial forms and processes: channel hydraulics and sediment entrainment; Base-level and Rejuvenation; Graded streams and Lane equation; Channel adjustments to tectonic, climatic and eustatic changes [10]
- 2.6 Aeolian processes: desert and coastal dune systems and loess; Combating dune advancement [4]
- 2.7 Coastal environments: cliffs, shore platforms and beach morphologies; Wave forms, longshore drift and rip current; Coastal erosion and near-shore reclamation; Sea-level rise threats [4]
- 2.8 Glacial and periglacial environments: landforms; Glacial mass balance and movement; Pleistocene glaciation and world landforms; Climate change and glaciers [4]
- 2.9 Anthropogenic geomorphology: roles of humans in landform development: Szabo's classification [2]

**GEOG01C1 (Practical) [Credits: 2 Marks: 30]**

**Unit 1: Basic Geological Exercises**

- 1.1 Mineral and rock properties, formation and identification of megascopic and microscopic specimens; Bowen's Reaction Series; Rocks and landforms - basalt, granite, limestone; Pebble shape measurement with slide callipers: Zinnig's classification [32]
- 1.2 Measurement of dip, strike and slopes with clinometer; Basic stratigraphic principles of outcrops [16]
- 1.3 Landform-process interpretations from Google Earth and historical changes; Rosgen Channel Classification [8]
- 1.4 Plotting seismic events and volcanic eruptions using USGS data in Google Earth, MS-Excel and custom software [8]

**Suggested Readings: *Geotectonics and Geomorphology***

1. Bierman, P.R. and Montgomery D.R. (2014): *Key Concepts in Geomorphology*, WH Freeman
2. Billings, M.P. (1971): *Structural Geology*, Pearson
3. Bird, E. (2008): *Coastal Geomorphology: An Introduction*, John Wiley & Sons, Chichester
4. Bloom, A.L. (2001): *Geomorphology: A Systematic Analysis of Late Cenozoic Landforms*, Prentice-Hall of India, New Delhi.
5. Charlton, R. (2008): *Fundamentals of Fluvial Geomorphology*, Routledge, London
6. Chorley, R., Schumm, S. and Sugden, D.E. (1994): *Geomorphology*, Methuen, London
7. Chorley, R.J. and Kennedy, B.A. (1971): *Physical Geography: A Systems Approach*, Prentice Hall, Upper Saddle River, New Jersey
8. Condie, K.C. (2003): *Plate Tectonics and Crustal Evolution*, Butterworth-Heinemann, Oxford, Burlington
9. Cooke, R., Warren, A. and Goudie, A. (1993): *Desert Geomorphology*, UCL Press Limited, London
10. Duff, D. (1993): *Holmes' Principles of Physical Geology*, Stanley Thornes, Cheltenham
11. Faniran, A. and Jeje, L.K. (1983): *Humid Tropical Geomorphology*, Longman, London
12. Frisch, W., Meschede, M. and Blakey, R.C. (2011): *Plate Tectonics: Continental Drift and Mountain Building*. Springer, Berlin.
13. Garde, R.J. (2006): *River Morphology*, New Age International Publishers, New Delhi
14. Gerrard, A.J. (1988): *Rocks and Landforms*, Unwin Hyman, London
15. Goudie, A.S. (ed.) (2004): *Encyclopaedia of Geomorphology*, vol. 1 & 2, Routledge.
16. Goudie, A.S. and Viles, H.A. (2016): *Geomorphology in the Anthropocene*, Cambridge University Press, Cambridge
17. Gutierrez, M. (2013): *Geomorphology*, CRC Press, Boca Raton, Florida
18. Hamblin, W.K. and Christiansen, E. (2003): *Earth's Dynamic Systems*, Prentice Hall, Upper Saddle River, New Jersey
19. Huggett, R.J. (2011): *Fundamentals of Geomorphology*, Routledge, New York
20. Kale V.S. and Gupta A. (2001): *Introduction to Geomorphology*, Orient Longman, Hyderabad.
21. Keary, P., Klepeis, K.A. and Vine, F.J. (2011): *Global Tectonics*, 3rd ed, Wiley-India.
22. Lindholm R. (1987): *A Practical Approach to Sedimentology*, Springer.
23. Migon, P. (2010): *Geomorphological Landscapes of the World*, Springer, Dordrecht
24. Morisawa, M. (1968): *Streams: Their Dynamics and Morphology*, McGraw-Hill
25. Mussett, A.E., Khan, M.A. and Button, S. (2000): *Looking into the Earth: An Introduction to Geological Geophysics*, CUP, Cambridge
26. Ollier, C.D. (1981): *Tectonics and Landforms*, Longman Group Ltd., London
27. Ollier, C.D. (1984): *Weathering*, Longman, London
28. Park, R.G. (1997): *Foundations of Structural Geology*, Chapman and Hall, London
29. Pearl, R.M. 1955): *How to know the Minerals and Rocks*, McGraw-Hill, New York
30. Prothero, D.R. and Dott Jr., R.H. (2009): *Evolution of the Earth*, McGraw Hill, New York
31. Ritter, D.F. (1978): *Process Geomorphology*, Wm C Brown Publishers, Iowa
32. Rosgen, D. (1996): *Applied River Morphology*, Wildland Hydrology, Fort Collins, Colorado
33. Scheffers, A.M., May S.M. and Kelletat, D.H. (2015): *Landforms of the World with Google Earth*, Springer
34. Scott, K.M. and Pain C.F. (2009): *Regolith Science*, CSIRO, Victoria
35. Selby, M.J., (2005), *Earth's Changing Surface*, Indian Edition, Oxford University, Press, Oxford
36. Sen, A.K. (1995): *Laboratory Manual of Geology*, Modern Book Agency (P) Ltd., Kolkata
37. Summerfield, M.J. (2003): *Global Geomorphology: An Introduction to the Study of landforms*, Longman.
38. Szabo, J., David, L. and Loczy, D. (eds.) (2010): *Anthropogenic Geomorphology: A Guide to Man-Made Landforms*, Springer
39. Thomas, M.F. (1994): *Geomorphology in the Tropics: A study of weathering and denudation in low latitudes*, Wiley, Chichester
40. Thorn, C. (1988): *Introduction to Theoretical Geomorphology*, Unwin Hyman, Boston
41. Thornbury, W.D. (1969): *Principles of Geomorphology*, 2nd ed, Wiley-India / CBS
42. Van der Pluijm, B.A. and Marshak, S. (2003): *Earth Structure*, W.W. Norton & Company, New York
43. Young, A. (1972): *Slopes*, Oliver and Boyd, Edinburgh

**DEPARTMENT OF GEOGRAPHY**  
**PRESIDENCY UNIVERSITY**

**Detailed Syllabus for First Semester of Geography (Major) Undergraduate Course**

**Course Name:** Cartographic Techniques and Computations **Course Type:** Core Course

**Course Code:** GEOG01C2 **Credits:** 6

**Total Marks:** 100

**Course Evaluation:**

**Question Pattern -**

**Internal Assessment -**

**GEOG01C2 (Theory) [Credits: 4 Marks: 70]**

**Unit 1: Map Projections**

- |     |  |      |
|-----|--|------|
| 1.1 | Coordinate systems: Polar and rectangular; Concept of generating globe, geoid and oblate spheroid                  | [2]  |
| 1.2 | Bearing: Magnetic and true, whole-circle and reduced; Grids: angular and linear measurement methods                | [4]  |
| 1.3 | Map projections: Classification, properties, deformations and uses   | [8]  |
| 1.4 | Basic concepts: parallels, meridians, great circles, scale factor, orthodrome, loxodrome and geodesic              | [2]  |
| 1.5 | Principles, Theories, Construction and Properties of select Map Projections:                                       | [14] |
|     | Polar Zenithal Case (Gnomonic, Stereographic, Orthographic)  |      |
|     | Conical Case (Simple Conical Projection with one Standard Parallel, Bonne's, Polyconic, International, Sinusoidal) |      |
|     | Cylindrical Case (Equal Area, Orthomorphic, Mercator, Gall)  |      |
|     | Special Case (Molleweide); Combining projections and noting distortions using simple programs                      |      |
| 1.6 | Concept, construction and significance of Universal Transverse Mercator projection                                 | [4]  |

**Unit 2: Basic Mathematics for Cartography**

- |     |  |     |
|-----|--|-----|
| 2.1 | Basic Algebra: Sets and Venn Diagrams; Progression and Series; Functions, Graphs and Equations   | [4] |
| 2.2 | Vector and Matrix Algebra: notations and computations; Minor and Co-factor Determinants, Matrix Inverse, Solving simultaneous equations using Matrix Inverse and Cramer's Rule | [8] |
| 2.3 | Logarithms and Indices: Laws of Logarithm - solving equations and finding solution by experiments  | [6] |
| 2.4 | Fundamentals of Trigonometry: Trigonometric Ratios and Identities; Sum and difference of angles; Properties of Triangles   | [8] |
| 2.5 | Calculus: Differentiation of basic functions; Integration - basic relationships, area and volume   | [4] |

**GEOG01C2 (Practical) [Credits: 2 Marks: 30]**

**Unit 1: Scales and Topographical Maps**

- |     |   |      |
|-----|---|------|
| 1.1 | Graphical construction of scales: linear, comparative, diagonal and vernier   | [12] |
| 1.2 | Survey of India Topographical Map Analysis:   | [48] |
|     | Reference scheme of Everest and Open Series Maps, Map margin information  |      |
|     | Construction and interpretation of relief profiles (serial, superimposed, projected and composite)  |      |
|     | Demarcating broad physiographic zones, drainage, geomorphic, settlement and transport attributes  |      |
|     | Preparation of Relative Relief (Smith), Slope (Wentworth), Stream Frequency and Drainage Density (Horton); Ruggedness and Dissection Index maps |      |
|     | Drainage basin delineation, stream ordering (Strahler) and Horton's Laws; Long Profiles and Basin Hypsometry                                    |      |
|     | Correlation between physical and cultural features using transect chart   |      |

**Suggested Readings: Cartographic Techniques and Computations**

1. Breach, M. (2011): *Fundamental Maths for Engineering and Science*, Palgrave Macmillan, New York
2. Deetz, C.H. and Adams, O.S. (1944): *Elements of Map Projection*, US Coast & Geodetic Survey, Washington D.C., Sp. Pub. No. 68
3. Gupta K.K. and Tyagi, V. C., 1992: *Working with Map*, Survey of India, DST, New Delhi.
4. Hinks, A.R. (1942): *Map Projections*
5. Kellaway G.P. (1953): *Map Projections*. Methuen, London
6. Kennedy, M., Kopp, S. 2001. *Understanding Map Projections*, Esri Press.
7. Kimerling, A.J., Buckley, A.R., Muehrcke, P.C., Muehrcke, J.O. 2011. *Map Use: Reading, Analysis, Interpretation*, 7th ed, Esri Press.
8. Mainwaring, J. (1942): *An Introduction to the Study of Map Projection*.
9. Monkhouse, F.J., Wilkinson, H.R. 1971. *Maps and Diagrams: Their Compilation and Construction*, Alphaneumera-Kolkata.
10. Pearson II, F. 1990. *Map Projections: Theory and Applications*, 2nd ed, CRC Press.
11. Riley, K. and Hobson, M. (2011): *Foundation Mathematics for the Physical Sciences*, Cambridge University Press, Cambridge
12. Robinson, A.H. (1949): *An Analytical Approach to Map Projections*, Annals of the Association of American Geographers, vol. 41
13. Robinson, A.H., Morrison, J.L., Phillip, C.M., Kimerling, A.J., Guphill, S.C. 1995. *Elements of Cartography*, 6th ed, Wiley.
14. Roy, P. and Sarkar, A. (1981): *Some Selected Map Projections for India: Their Relative Efficiencies*, Geographical Review of India, vol. 43
15. Saha, P.K. and Basu, P. (2009): *Advanced Practical Geography*, Books and Allied (P) Ltd., Kolkata
16. Sarkar, A. (2008): *Practical Geography: A Systematic Approach*, Orient BlackSwan, Kolkata
17. Sen, P.K. 1989. *Geomorphological Analysis of Drainage Basin: An Introduction to Morphometric and Hydrological Parameters*, University of Burdwan.
18. Singh, R.L. and Singh, P.B. (2009): *Elements of Practical Geography*, Kalyani Publishers, New Delhi
19. Steers J.A. (1974): *An Introduction to the Study of Map Projections*, Hodder Arnold.
20. Stewart, J. (2012): *Calculus: Early Transcendentals*, Cengage Learning, Belmont, California
21. Tobler, W.R. (1962): *A Classification of Map Projections*, Annals of the Association of American Geographers, vol. 33
22. Vaidyanadhan, R., Subbarao, K.V. 2014. *Landforms of India from Topomaps and Images*, Geological Society of India
23. Yang, X, (2009): *Introduction to Mathematics for Earth Scientists*, Dunedin Academic Press, London



## DEPARTMENT OF GEOGRAPHY PRESIDENCY UNIVERSITY

### Detailed Syllabus for First Semester of Geography (Major) Undergraduate Course

**Module Name:** Geography of Tourism

**Module Type:** Generic Elective

**Paper Code:** GEOG01GE1

**Credits:** 6

**Total Marks:** 100

**Module Evaluation:**

**Question Pattern -**

**Internal Assessment -**

#### **GEOG01GE1 (Theory) [Credits: 4 Marks: 70]**

1. Scope and Nature: Concepts and Issues, Tourism, Recreation and Leisure Inter-Relations; Geographical Parameters of Tourism after Robinson [6]
2. Infrastructure and support system - accommodation and supplementary accommodation; other facilities and amenities [8]
3. Types of Tourism: Ecotourism, Cultural Tourism, Adventure Tourism, Medical Tourism, Pilgrimage and Religious Tourism, Rural Tourism, Urban Tourism, Social Tourism; MICE as a Tourism product [24]
4. Impact of tourism: physical, economic and social and perceptible positive and negative impacts; Tourism-Climate interface and impacts of climate change on destinations [10]
5. Role of foreign capital and impact of globalization on tourism [4]
6. Tourism in India: National Tourism Policy 1983, 2002 [4]
7. Recent Trends of Tourism: Sustainable Tourism, Slow Tourism, Gender embodiments [8]

#### **GEOG01GE1 (Practical) [Credits: 2 Marks: 30]**

1. Spatial pattern of tourism: Spatial affinity [14]
2. Tourism perception survey: Application of Likert Scale [20]
3. Tourism in India: Tourism Infrastructure; Case Studies of Himalaya, Desert and Coastal Areas [30]

#### **Suggested Readings: *Geography of Tourism***

1. Beeton, S. (2006): Community Development through Tourism, Landlinks Press
2. Buckley, R. (2009): Ecotourism: Principles and Practices, CABI
3. Butler, R. and Hinch, T. (2007): Tourism and Indigenous Peoples, Taylor and Francis
4. Cooper, C. and Hall, C.M. (2008): Contemporary Tourism: An International Approach, Butterworth-Heinemann
5. Dwyer, L., Gill, A. and Seetaram, N. (2012): Handbook of Research Methods in Tourism: Quantitative and Qualitative Approaches, Edward Elgar
6. Hall, C.M. (2011): Fieldwork in Tourism: Methods, Issues and Reflections, Routledge
7. Hall, C.M. and Page, S.J. (2014): The Geography of Tourism and Recreation: Environment, Place and Space. Taylor & Francis
8. Jafari, J. (2003): Encyclopedia of Tourism, Routledge
9. Department of Tourism (2002): National Tourism Policy, Ministry of Tourism and Culture, Govt. of India
10. Newsome, D., Dowling, R.K. and Moore, S.A. (2005): Wildlife Tourism, Channel View Publications
11. Pearce, D.G. and Butler, R. (1999): Contemporary Issues in Tourism Development, Routledge
12. Robinson, P., Heitmann, S. and Dieke, P.U.C. (2011): Research Themes for Tourism, CABI
13. Suresh, K.T. (1994): Tourism Policy of India: An Exploratory Study, Equations, Bangalore
14. Sharma, K.K. (2004): Tourism and Regional Development, Sarup & Sons
15. Sharma, K.K. (2005): Tourism and Development, Sarup & Sons
16. Spirou, C. (2011): Urban Tourism and Urban Change: Cities in a Global Economy, Taylor and Francis
17. Tribe, J. (2009): Philosophical Issues in Tourism. Channel View Publications
18. Wearing, S. and Neil, J. (2013): Ecotourism, Taylor and Francis
19. Williams, S. (2009): Tourism Geography: A New Synthesis, Taylor & Francis

**DEPARTMENT OF GEOGRAPHY**  
**PRESIDENCY UNIVERSITY**

**Detailed Syllabus for Second Semester of Geography (Major) Undergraduate Course**

**Course Name:** Human Geography

**Course Type:** Core Course

**Course Code:** GEOG02C3

**Credits:** 6

**Total Marks:** 100

**Course Evaluation:**

**Question Pattern -**

**Internal Assessment -**

**GEOG02C3 (Theory) [Credits: 5 Marks: 80]**

**Unit 1: Introduction to Human Geography**

- |     |  |     |
|-----|--|-----|
| 1.1 | Nature, scope and recent trends; Approaches of Human Geography; From Human Geography to Humanistic Geography | [6] |
| 1.2 | Race and Ethnic Groups: concept, origin, diffusion and distribution  | [6] |
| 1.3 | Language: origin, diffusion and distribution   | [6] |
| 1.4 | Man-environment relationship: Environmental determinism and possibilism                                      | [6] |

**Unit 2: Population and Migration**

- |     |  |     |
|-----|--|-----|
| 2.1 | Concepts: Population Geography and Demography, Age-Sex Composition, Fertility, Mortality | [6] |
| 2.2 | Theories of Population Growth: Malthus, Demographic Transition                           | [5] |
| 2.3 | Determinants and patterns of population growth and distribution                          | [4] |
| 2.4 | Migration: Types, causes and consequences  | [5] |
| 2.5 | Theories of Migration: Lee and Ravenstein  | [5] |

**Unit 3: Geography of Rural Settlements**

- |     |   |     |
|-----|---|-----|
| 3.1 | Site and situation; Types and patterns of rural settlements; Rural house types in India by geographical regions | [5] |
| 3.2 | Morphology and segregation of rural settlements (Indian context)  | [4] |
| 3.3 | Hierarchy of rural settlements: Central Place Theory  | [5] |

**Unit 4: Geography of Urban Settlements**

- |     |  |     |
|-----|--|-----|
| 4.1 | Origin and growth of urban settlements; Classification of urban settlements (C.D. Harris and Nelson)                           | [6] |
| 4.2 | Concepts of Metropolis, Megalopolis, Connurbation, Primacy; Morphology of cities (Burgess, Hoyt, Harris-Ullman, Alonso Models) | [6] |
| 4.3 | Third World Urbanisation: issues and challenges  | [5] |

**GEOG02C3 (Tutorial) [Credits: 1 Marks: 20]**

**Unit I: Presentation and Review**

- |     |   |      |
|-----|---|------|
| 1.1 | Literature review, book review, written assignment submission, and presentation on various topics | [32] |
|-----|---|------|

**Suggested Readings: Human Geography**

1. Ahmad, A. (1999): *Social Geography*, Rawat Publications, Jaipur and New Delhi
2. Anderson, K. (2006): *Race and Crises of Human Development*, Routledge, London and New Delhi
3. Beaujeu- Garnier, J. (1966): *Geography of Population*, Longman, London
4. Bhende, A.A. and Kanetkar, T. (1978): *Principles of Population Studies*, Himalayan Publishing House, Mumbai
5. Carter, H. (1975): *The Study of Urban Geography*, Edward Arnold, London
6. Casino, V.J.D., Jr., (2009): *Social Geography: A Critical Introduction*, Wiley-Blackwell, Chichester
7. Chandna, R.C. 2016. *Geography of Population: Concepts, Determinants and Patterns*, Kalyani Publishers.
8. Clarke, J.I. (1972): *Population Geography*, Pergamon Press, Oxford
9. Daniel, P. and Hopkins, M. (1989): *A Geography of Settlement*, Oliver and Boyd, Essex
10. Dubey. S.C. (1991): *Indian Society*, National Book Trust, New Delhi
11. Eyles, J. (ed.) (1986): *Social Geography in International Perspective*, Rowman and Littlefield, New Jersey and Los Angeles
12. Forde, C.D. (1934): *Habitat, Economy and Society*, Methuen and Company, London
13. Fouberg, E.H., Murphy, A.B., de Blij H.J. 2015. *Human Geography: People, Place, and Culture*, 11th ed, Wiley.
14. Ghosh, S. (1998): *Settlement Geography*, Orient Longman Ltd. , Kolkata
15. Gould, W.T.S. 2015. *Population and Development*, Routledge.
16. Gregory, D. and Larry, J. (eds.) (1985): *Social Relations and Spatial Structures*, MacMillan, London
17. Gregory, D., Johnston, R., Pratt, G., Watts.,Whatmore, S. (Eds) 2009. *The Dictionary of Human Geography*, 5th ed, Wiley.
18. Hammett, C. (eds.) (1996): *Social Geography: A Reader*, Arnold, London
19. Hudson, F.S. (1977): *A Geography of Settlements*, Macdonald & Evans Ltd., Plymouth
20. Hussain, M. 2016. *Human Geography* (New Edition), Rawat Publishers, Jaipur.
21. Jackson, P. and Susan, J.S. (1984): *Exploring Social Geography*, George Allen and Unwin, Boston and Sydney
22. Johnson, J.H. (1977): *Urban Geography - An Introductory Analysis*, Pergamon press, Oxford
23. Johnston, R.J. (1984): *Urban Geography*, Penguin, London
24. Jones, E. (ed.) (1975): *Readings in Social Geography*, Oxford University Press, London
25. Jones, H.R., (2000): *Population Geography*, Paul Chapman, London
26. Knox, P.L., Marston, S.A. 2014. *Human Geography: Places and Regions in Global Context*, 6th ed, Pearson Education Limited.
27. Knox, P.L., McCarthy, L.M. 2011. *Urbanization: An Introduction to Urban Geography*, 3rd ed, Pearson Educctuion Ltd.
28. Mandal, R.B. (2001): *Introduction to Rural Settlements*, Concept Publishing Company, New Delhi
29. Mandal, R.B. 2001. *Urban Geography*, 2nd ed, Concept Publishing Company.
30. Norton, W. 2014. *Human Geography*, 8th ed, Oxford University Press.
31. Pacione, M. (2009) : *Urban Geography : A Global Perspective*, Routledge
32. Ramachandran, R. (2010): *Urbanisation and Urban Systems of India*, Oxford University Press, New Delhi
33. Short, R.J. 2017. *Human Geography: A Short Introduction*, 2nd ed, Oxford University Press
34. Singh, R.Y. (1994): *Geography of Settlement*, Rawat Publications, Jaipur
35. Trewartha, G.T. (1969): *A Geography of Population - World Patterns*, John Wiley, New York
36. Trewartha, G.T. (1972): *The Less Developed Realms - A Population Geography*, McGraw Hill, New York
37. Valentine, G. (2001): *Social Geographies: Space and Society*, Prentice Hall, Harlow, U.K.
38. Verma, L.N. (2006): *Urban Geography*, Rawat Publications, Jaipur
39. Woods, R. (1997): *Theoretical Population Geography*, Longman, London
40. Zacharia, E. and Sinha, V.C. (1986): *Elements of Demography*, Allied Publishers Pvt. Ltd., New Delhi
41. Zelinsky, W. (1966): *A Prologue to Population Geography*, Prentice Hall India, New Delhi

**DEPARTMENT OF GEOGRAPHY**  
**PRESIDENCY UNIVERSITY**

**Detailed Syllabus for Second Semester of Geography (Major) Undergraduate Course**

**Course Name:** Thematic Cartography and Surveying

**Course Type:** Core Course

**Course Code:** GEOG02C4

**Credits:** 6

**Total Marks:** 100

**Course Evaluation:**

**Question Pattern -**

**Internal Assessment -**

**GEOG02C4 (Theory) [Credits: 4 Marks: 70]**

**Unit 1: Surveying Techniques**

- |     |   |      |
|-----|---|------|
| 1.1 | Open and closed traverse survey using a Prismatic Compass with corrections  | [10] |
| 1.2 | Profile line survey and Radial Contouring using a Dumpy Level   | [4]  |
| 1.3 | Determination of heights of objects with accessible and inaccessible base by Transit Theodolite - different cases | [10] |
| 1.4 | Distance measurements with a laser distance measure   | [2]  |
| 1.5 | Mensuration math formulae and applications  | [2]  |

**Unit 2: Thematic Mapping**

- |     |  |     |
|-----|--|-----|
| 2.1 | Principal national agencies producing thematic maps in India: NATMO, GSI, NBSS & LUP, INHD and their Map Symbols   | [2] |
| 2.2 | Diagrammatic representation of data:<br>Data representation by different graphs and charts (manual and using Microsoft Office Excel)                       | [4] |
|     | Data representation by Maps: Proportional squares, pie diagrams with proportional circles, Dot and Sphere  | [4] |
|     | Choropleth and Isopleth maps, chorochromatic and choroschematic maps   | [4] |
| 2.4 | Preparing Socio-economic maps; Questionnaire Schedule Preparation for assessment and perception study  | [6] |
| 2.5 | Measures of Spatial Distribution: Nearest Neighbour Analysis and Joint Count Statistics, Rank-Size Rule (Zipf, Berry), Gravity and Potential Models        | [8] |
| 2.6 | Combinational Analysis: Dominant Distinctive Function, Weaver's Method of Crop Combination and Rafiullah's Method of Critical Combination, Ternary Diagram | [8] |

**GEOG02C4 (Practical) [Credits: 2 Marks: 30]**

**Unit 1: Mapping Landscapes**

- |     |   |      |
|-----|---|------|
| 1.1 | Interpretation of geological maps with different lithologies, structures and discontinuities<br>Drawing of cross sections and mapping horizontal, vertical, unclinal, folded and faulted structures | [12] |
|     | Determining strike and dip attributes, bed succession and thickness   | [12] |
|     | Correlating topography with geologic structures   | [8]  |
| 1.2 | Study of one G.S.I. Quadrangle map  | [12] |
| 1.3 | Geomorphological map symbols and map preparation  | [12] |
| 1.4 | Land use and land cover map preparation (using mouza maps and Google Earth)   | [8]  |

**Suggested Readings: *Thematic Cartography and Surveying***

1. Alvi, Z. (1995): *Statistical Geography: Methods and Applications*, Rawat Publications, Jaipur
2. Anson R. and Ormelling F. J., 1994: International Cartographic Association: Basic Cartographic Vol. Pregmen Press.
3. Arora, K.R. (2010): *Surveying (Volumes I & II)*, Standard Book House, New Delhi
4. Basak, N.N. 2017. *Surveying and Levelling*, 2nd ed, McGraw Hill Education.
5. Basu, R. and Bhaduri, S. eds., (2007): *Contemporary Issues and Techniques in Geography*, Progressive Publishers, Kolkata
6. Bennison, G.M. (1990): *An Introduction to Geological Structures and Maps*, Edward Arnold, London
7. Bolton. T. 2009 (reprint). *Geological Maps: Their Solution and Interpretation*, Cambridge University Press.
8. Ebdon, D. (1977): *Statistics in Geography: A Practical Approach*, Blackwell Publishers
9. Gopi, S. (2005): *Global Positioning System: Principles and Applications*, Tata McGraw-Hill Education, New Delhi
10. Kulkarni, S.V. and Kanetkar, T.R. (1965): *Surveying and Levelling (Volumes I & II)*, A.V.G. Prakashan, New Delhi
11. Lisle, R.J. (2004): *Geological Structures and Maps: A Practical Guide*, Butterworth-Heinemann, Amsterdam
12. Mahmood, A. (1977): *Statistical Methods in Geographical Studies*, Rajesh Publications, New Delhi
13. Mishra R.P. and Ramesh, A., 1989: *Fundamentals of Cartography*, Concept, New Delhi.
14. Monkhouse, F.J. and Williamson, R.H. (1963): *Maps and Diagrams: Their Compilation and Construction*, Methuen, London
15. Pal, S. K. (1998): *Statistics For Geoscientists Techniques and Applications*, Concept Publishing Company, New Delhi
16. Rhind D. W. and Taylor D. R. F., (eds.), 1989: *Cartography: Past, Present and Future*, Elsevier, International Cartographic Association.
17. Saha, P.K. and Basu, P. (2009): *Advanced Practical Geography*, Books and Allied (P) Ltd., Kolkata
18. Sarkar, A. (2008): *Practical Geography: A Systematic Approach*, Orient BlackSwan, Kolkata
19. Sarkar, A. (2013): *Quantitative Geography: Techniques and Presentations*, Orient BlackSwan, New Delhi
20. Singh, R.L. and Singh, P.B. (2009): *Elements of Practical Geography*, Kalyani Publishers, New Delhi
21. Subramanian, R. 2012. *Surveying and Levelling*, 2nd ed, Oxford University Press

## DEPARTMENT OF GEOGRAPHY PRESIDENCY UNIVERSITY

### Detailed Syllabus for Second Semester of Geography (Major) Undergraduate Course

**Module Name:** Regional Development

**Module Type:** Generic Elective

**Paper Code:** GEOG02GE2

**Credits:** 6

**Total Marks:** 100

**Module Evaluation:**

**Question Pattern -**

**Internal Assessment -**

#### **GEOG02GE2 (Theory) [Credits: 4 Marks: 70]**

1. Definition, Types and Evolution of Region; Need for Regional Planning [6]
2. Planning Region; Characteristics of an Ideal Planning Region; Delineation of planning region; Regionalization of India for Planning (Agro Ecological Zones) [10]
3. Strategies/Models for Regional Development: Core-Periphery and Growth Pole Models [6]
4. Growth Centre Model in Indian context; Village Cluster [6]
5. Problem Regions and Regional Planning: Backward Regions and Regional Plans- Special Area Development Plans in India; DVC-The Success Story and the Failures [12]
6. Regional Imbalance; Development and regional disparities in India since Independence: Disparities in agricultural and industrial development [12]
7. Recent Policies for Rural and Urban Development in India-NREGA, JNNURM, PURA, AMRUT [12]

#### **GEOG02GE2 (Practical) [Credits: 2 Marks: 30]**

1. Delineation of agricultural regions according to given criteria using Weavers/Rafiullah method [20]
2. Measures of Spatial Interaction: Gravity and Potential Models [12]
3. Measurement of inequality: Lorenz curve and location quotient [12]
4. Human Development Index; Choice, Normalization and Aggregation of Parameters [20]

#### **Suggested Readings: *Regional Development***

1. Abdul Kalam, A.P J. and S. P. Singh, 2011: *Target 3 Billion; PURA: Innovative Solutions towards Sustainable Development*, Penguin Books, Delhi.
2. Chand, M., Puri, V.K. (2000): *Regional Planning In India*, Allied Publishers Ltd.
3. Chandana, R.C. (2016): *Regional Planning and Development*, 6th ed., Kalyani Publishers.
4. Freeman, T.W. (1974): *Geography and Planning*, Hutchinson University Library, London
5. Glasson, J. and Marshall, T. (2007): *Regional Planning*, Taylor & Francis
6. Glasson, J. (2017): *Contemporary Issues in Regional Planning*, Routledge
7. Gore, C. (2011): *Regions in Question: Space, Development Theory, and Regional Policy*, Routledge.
8. Husain, M. (2014): *Geography of India*, Tata McGraw-Hill Education, New Delhi
9. Mahmood, A. (1977): *Statistical Methods in Geographical Studies*, Rajesh Publications, New Delhi.
10. Misra, R.P. (1992): *Regional Planning: Concepts, Techniques, Policies and Case Studies*, Concept Publishing.
11. Raychaudhuri, J. (2001): *An Introduction to Development and Regional Planning: With Special Reference to India*, Orient Blackswan
12. Sen, A. (2000): *Development as Freedom*, Random House.
13. Sivaramakrishnan, K.C. and A. Kumdu and B.N. Singh (2011): *Oxford Handbook of Urbanization in India*, Oxford University Press.

**DEPARTMENT OF GEOGRAPHY**  
**PRESIDENCY UNIVERSITY**

**Detailed Syllabus for Third Semester of Geography (Major) Undergraduate Course**

**Course Name:** Climatology

**Course Type:** Core Course

**Course Code:** GEOG03C5

**Credits:** 6

**Total Marks:** 100

**Course Evaluation:**

**Question Pattern -**

**Internal Assessment –**

**GEOG03C5 (Theory) [Credits: 4 Marks: 70]**

**UNIT 1: Atmospheric Composition, Structure and Energetics**

- |     |  |     |
|-----|--|-----|
| 1.1 | Atmospheric Composition - Variation with Altitude, Latitude and Season; Constant and Variable gases; Vertical structure of the atmosphere; Temperature Inversion | [3] |
| 1.2 | Mechanism of energy transfers: Conduction, convection and radiation; Nature of radiation; Radiation laws   | [6] |
| 1.3 | Atmosphere-Solar radiation interactions: reflection, scattering, absorption, transmission  | [6] |
| 1.4 | Planetary Radiation balance; Latitudinal heat balance; Greenhouse effect   | [4] |

**UNIT 2: Atmospheric Moisture**

- |     |   |     |
|-----|---|-----|
| 2.1 | Evaporation, Measures and measurements of atmospheric humidity; Vapour pressure and saturation                  | [3] |
| 2.2 | Adiabatic temperature changes; Stability and Instability; near-surface condensation - dew, mist, fog and clouds | [5] |
| 2.3 | Lifting processes: orographic, frontal, convergence and convective  | [3] |
| 2.4 | Precipitation: Types and mechanisms   | [4] |

**UNIT 3: Atmospheric Pressure and Winds**

- |     |  |     |
|-----|--|-----|
| 3.1 | Laws governing air motion and resulting flow patterns          | [6] |
| 3.2 | Planetary Winds, General Circulation, Jet Streams              | [6] |
| 3.3 | Zonal circulations: Tropical, Mid latitudes and High latitudes | [6] |

**UNIT 4: Atmosphere-Ocean Interactions and Climatic Classification**

- |     |  |  |
|-----|--|--|
| 4.1 | Walker circulation and ENSO  |  |
| 4.2 | Monsoon - Origins and Mechanisms   |  |
| 4.3 | Classification of world climates (Koppen and Thornthwaite); Genetic Classification using air masses (Oliver) |  |

**GEOG03C5 (Practical) [Credits: 2            Marks: 30]**

**UNIT 1: Climate Data Analysis**

- |     |   |  |
|-----|---|--|
| 1.1 | Preparation of Station model and interpretation of synoptic chart   |  |
| 1.2 | Preparation of climatological diagrams including hythergraph, hysteograph, climographs, ergograph, ombrothermic, water-balance, rainfall dispersion and relative temperature diagrams |  |

**Suggested Readings: *Climatology***

1. Ackerman, S.A. and Knox, J.A. (2012): *Meteorology: Understanding the Atmosphere*, Jones & Bartlett Learning, London
2. Ahrens, C.D. (2012): *Essentials of Meteorology: An Invitation to the Atmosphere*, Cengage Learning, Boston
3. Ahrens, C.D., Jackson, P.L., Jackson, C.E.J. and Jackson, C.E.O. (2012): *Meteorology Today: An Introduction to Weather, Climate and the Environment*, Cengage Learning, Boston
4. Atkinson, B. W. (Ed.) (1981): *Dynamical Meteorology: An Introductory Selection*, Methuen, London
5. Barry, R.G. and Chorley, R.J. (2003): *Atmosphere, Weather and Climate*, Routledge, London
6. Basu, R. and Bhaduri, S. eds., (2007): *Contemporary Issues and Techniques in Geography*, Progressive Publishers, Kolkata
7. Brockwell, P.J. and Davis, R.A. (2016): *Time Series and Forecasting*, Springer
8. Byers, H. R. (1974): *General Meteorology*, McGraw-Hill Book Company, New York
9. Chandrasekar, A. (2010): *Basics of Atmospheric Science*, PHI Learning Pvt. Ltd., New Delhi
10. Critchfield, H. J. 1983. *General Climatology*. Prentice Hall India Ltd (2010 Reprint).
11. Houghton, J. (2002): *Physics of Atmosphere*, Cambridge University Press, Cambridge
12. Lutgens, F.K., Tarbuck, E.J. 1998. *The Atmosphere : An Introduction to Meteorology*, 9th Ed, Prentice-Hall Inc.
13. Mcllveen, R. (2010): *Fundamentals of Weather and Climate*, Oxford University Press, Oxford
14. Oliver, J.E. (1993): *Climatology: An Atmospheric Science*, Pearson Education India, New Delhi
15. Oliver, J.E., Hidore J.J. 2002. *Climatology: An Atmospheric Science*, Pearson Education India
16. Rayner, J.N. (2001): *Dynamic Climatology - Basis in Mathematics and Physics*, Blackwell Publishers Ltd., Oxford
17. Rohli, R.V. and Vega, A.J. (2013): *Climatology*, Jones and Bartlett Publishers, Massachusetts
18. Saha, P.K. and Basu, P. (2009): *Advanced Practical Geography*, Books and Allied (P) Ltd., Kolkata
19. Sarkar, A. (2008): *Practical Geography: A Systematic Approach*, Orient BlackSwan, Kolkata
20. Thompson, R. D. (1998): *Atmospheric Pressures and Systems*, Routledge, London
21. Trewartha G. T. and Horne L. H., 1980: *An Introduction to Climate*, McGraw-Hill
22. Wallace, J.M. and Hobbs, P.V. (1977): *Atmospheric Science:- An Introductory Survey*, Academic Press, New York



**DEPARTMENT OF GEOGRAPHY**  
**PRESIDENCY UNIVERSITY**

**Detailed Syllabus for Third Semester of Geography (Major) Undergraduate Course**

**Course Name:** Statistical Methods in Geography

**Course Type:** Core Course

**Course Code:** GEOG03C6

**Credits:** 6

**Total Marks:** 100

**Course Evaluation:**

**Question Pattern -**

**Internal Assessment -**

**GEOG03C6 (Theory) [Credits: 4 Marks: 70]**

**Unit I: Descriptive Statistics**

- 1.1 Preparation of Table; Frequency Distribution - graphical description [2]
- 1.2 Frequencies (Quartiles, Quintiles, Deciles, Percentiles), Cross Tabulation, Central Tendency (Mean, Median and Mode, Centro-graphic Techniques, Dispersion (Mean Deviation, Quartile Deviation and Standard Deviation, Variance and Coefficient of Variation) [10]
- 1.3 Description of Shape -Skewness, Kurtosis, Moments [5]

**Unit II: Probability and Sampling**

- 2.1 Counting rules: Permutation and Combination [2]
- 2.2 Sample Spaces and Events; Union, Intersection and Compliments of Events; Rules and Types of Probability (Addition, Conditional, Compound and Absolute Probability, Multiplicative Rule, Independence); Decision Table and Tree; Theorem of Total Probability - Bayes' Theorem [10]
- 2.3 Probability Distributions - Discrete and Continuous; Probability Mass Function and Probability Density Function; Theoretical Distributions: Normal, Binomial, Poisson and Multinomial [10]
- 2.4 Population and sample; Sampling strategies, sampling distributions; Sampling estimates for large and small samples tests involving means and proportions [5]
- 2.5 Hypothesis Testing: Reasoning of tests of significance; Procedure for one sample parametric tests [10]

**Unit III: Correlation, Regression and Time Series Analysis**

- 3.1 Rank Correlation, Product Moment Correlation [3]
- 3.2 Simple Regression, Residuals from regression [3]
- 3.3 Simple curvilinear regression; Introduction to multi-variate analysis [2]
- 3.4 Time Series processes; smoothing time series; Time series components [2]

**GEOG03C6 (Practical) [Credits: 2 Marks: 30]**

**Unit I: Practical Exercises**

- 1.1 Problems based on the topics outlined above [64]

**Suggested Readings: *Statistical Methods in Geography***

1. Acevedo, M.F. 2012. *Data Analysis and Statistics for Geography*, Environmental Science and Engineering, CRC Press.
2. Berry B. J. L. and Marble D. F. (eds.): *Spatial Analysis – A Reader in Geography*.
3. Ebdon, D. (1985): *Statistics in Geography: A Practical Approach*, John Wiley & Sons, New York
4. Fotheringham, A.S., Brunson, C. and Charlton, M. (2007): *Quantitative Geography: Perspectives on Spatial Data Analysis*, SAGE Publications India Pvt. Ltd., New Delhi
5. Griffith, D.A. and Amrhein, C.G. (1997): *Multivariate Statistical Analysis for Geographers*, Prentice Hall, New Jersey
6. Hammond P. and McCullagh P. S., 1978: *Quantitative Techniques in Geography: An Introduction*, Oxford University Press.
7. Harris, R. and Jarvis, C. (2011): *Statistics for Geography and Environmental Science*, Prentice Hall, London
8. Johnston, R.J. (1978): *Multivariate Statistical Analysis in Geography: A Primer on the General Linear Model*, Longman, Harlow
9. Joseph, Jr. F.H., Black, C.W., Babin, B.J., Anderson, R.E. and Tatham, R.L. (2011): *Multivariate Data Analysis*, Pearson Prentice Hall, New Delhi
10. Khan, N. (1998): *Quantitative Methods in Geographical Research*, Concept Publishing Company, New Delhi
11. King L. S., 1969: *Statistical Analysis in Geography*, Prentice-Hall.
12. Mahmood A., 1977: *Statistical Methods in Geographical Studies*, Concept.
13. McGrew Jr., J.C., Lembo Jr., A.J., Monroe, C.B. 2014. *An Introduction to Statistical Problem Solving in Geography*, Waveland Press.
14. Pal S. K., 1998: *Statistics for Geoscientists*, Tata McGraw Hill, New Delhi.
15. Piegorisch. W.W. and Bailer, A.J. (2005): *Analyzing Environmental Data*, John Wiley & Sons, Chichester
16. Rogerson, P.A. (2010): *Statistical Methods for Geography: A Student's Guide*, SAGE Publications Ltd., London
17. Sarkar, A. (2013): *Quantitative Geography: Techniques and Presentations*, Orient BlackSwan, New Delhi
18. Sarkar, A. 2015. *Practical Geography: A Systematic Approach*, 3rd ed, Orient Blackswan
19. Silk J., 1979: *Statistical Concepts in Geography*, Allen and Unwin, London.
20. Spiegel M. R.: *Statistics*, Schaum's Outline Series.
21. Walford, N. (2011): *Practical Statistics for Geographers and Earth Scientists*, John Wiley & Sons, New York
22. Yeats M., 1974: *An Introduction to Quantitative Analysis in Human Geography*, McGraw Hill, New York.

**DEPARTMENT OF GEOGRAPHY**  
**PRESIDENCY UNIVERSITY**

**Detailed Syllabus for Third Semester of Geography (Major) Undergraduate Course**

**Course Name:** Regional Geography of India

**Course Type:** Core Course

**Course Code:** GEOG03C7

**Credits:** 6

**Total Marks:** 100

**Module Evaluation:**

**Question Pattern -**

**Internal Assessment -**

**GEOG03C7 (Theory) [Credits: 5 Marks: 80]**

**Unit I: Physical Setup**

- 1.1 Physiographic Divisions: Great Himalayas, Great Plains and Peninsular Region [12]
- 1.2 Drainage: Nature of Himalayan and Peninsular Drainage Systems; Theories of extra-peninsular drainage evolution: Pascoe and Pilgrim; River Regimes [6]
- 1.3 Principal climatic characteristics, Mechanism of the Indian monsoon, India's climatic classification (Koppen); Soils: distribution, types and characteristics of major soil groups. Natural Vegetation Classification (Champion) [12]

**Unit II: Population and Social Aspects**

- 2.1 Population distribution, growth and structure [6]
- 2.2 Caste groups, Language and Dialect groups, Religious composition, Literacy [6]

**Unit III: Economic Aspects**

- 3.1 Distribution and utilization of iron ore, coal and petroleum [4]
- 3.2 Agricultural production and distribution of rice and wheat, Green Revolution in India [4]
- 3.3 Problems and prospects of cotton textile industry; Trends and development of Iron and Steel Industry [4]
- 3.4 Regional and Local Development Programmes: MGNREGA, IAY and PMGSY (Rural), JNNURM and NIUS (Urban) [4]

**Unit IV: West Bengal**

- 4.1 Physical perspectives: Physiographic divisions, forest and water resources [4]
- 4.2 Economic Setup: Agriculture, mining, and industry [3]
- 4.3 Population: Growth, distribution and human development [3]
- 4.4 Regional Issues: North Bengal, Ganga Delta and Rarh Bengal [12]

**GEOG03C7 (Tutorial) [Credits: 1 Marks: 20]**

**Unit I: Presentation and Review**

- 1.1 Literature review, book review, written assignment submission, and presentation on various topics [32]

**Suggested Readings: *Regional Geography of India***

1. Agarwal, A. and Narain, S. (1991): *Third Citizen's Report - State of India's Environment [SOE-3]: Floods, Floodplains and Environmental Myths*, Centre for Science and Environment, New Delhi
2. Bandyopadhyay, S., Kar, N.S., Das, S., Sen, J. 2014. River system and water resources of West Bengal: A Review. In: Vaidyanadhan, R. (Ed) *Rejuvenation of Surface Water Resources of India: Potential, Problems and Prospects*, Geological Society of India Special Publication.
3. Bhushan, C., Hazra, M.Z. and Banerjee, S. (2007): *Sixth Citizen's Report - State of India's Environment [SOE-6]: Rich Lands Poor People: Is 'Sustainable Mining Possible?*, Centre for Science and Environment, New Delhi
4. Deshpande, C.D. (1992): *India: A Regional Interpretation*, Northern Book Centre, New Delhi
5. Dhara, M.K., Basu, S.K., Bandyopadhyay, R.K., Roy, B., Pal, A.K. (Eds.) 1999. *Geology and Mineral Resources of the States of India, Part-1: West Bengal*. Geological Survey of India Miscellaneous Publication.
6. Ghurey, G.S. 1963. *The Scheduled Tribes of India*, 1980 reprint, Transaction Books.
7. Husain, M. (2014): *Geography of India*, Tata McGraw-Hill Education, New Delhi
8. Johnson, B.L.C. (Ed) 2001. *Geographical Dictionary of India*, Vision Books.
9. Kale, V.S. (2014): *Landscapes and Landforms of India*, Springer
10. Khullar, D.R. (2011): *India: A Comprehensive Geography*, Kalyani Publishers, New Delhi
11. Krishnan, M.S. (1949): *Geology of India and Burma*, The Madras Law Journal Press, Chennai
12. Mamoria, C.B. (1995): *Economic and Commercial Geography of India*, Shiv Lal Agarwal & Co., Agra
13. Mandal, H., Mukherjee, S., Datta, A. 2002. *India: An Illustrated Atlas of Tribal World*, Anthropological Survey of India.
14. Pal, S.K. (1998): *Physical Geography of India*, Sangam Books Ltd., New Delhi
15. Pathak, C.R. 2003. *Spatial Structure and Processes of Development in India*, Regional Science Association-Kolkata.
16. Sharma, T.C. 2012. *Economic Geography of India*, Rawat Publications.
17. Singh, J. 2003. *India-A Comprehensive & Systematic Geography*, Gyanodaya Prakashan.
18. Singh, J. and Dhillon, S.S. (2004): *Agricultural Geography*, Tata McGrawHill Education, New Delhi
19. Singh, R.L. (1993): *India: A Regional Geography*, UBS Publishers Distributors, New Delhi
20. Spate, O.H.K., Learmonth, A.T.A. 1967. *India and Pakistan: A General and Regional Geography*, Methuen.
21. Tirtha, R. (2002): *Geography of India*, Rawat Publications, Jaipur
22. Tiwari, R.C. 2007. *Geography of India*, PrayagPustakBhawan.
23. Valdiya, K.S. (2010): *The Making of India - Geodynamic Evolution*, Macmillan Publishers India Ltd., New Delhi
24. Valdiya, K.S. (2013): *Environmental Geology: Indian Context*, Tata McGraw-Hill, New Delhi
25. Wadia, D.N. (1919): *Geology of India*, Macmillan & Co. Ltd., London

**DEPARTMENT OF GEOGRAPHY**  
**PRESIDENCY UNIVERSITY**

**Detailed Syllabus for Third Semester of Geography (Major) Undergraduate Course**

**Module Name:** Climate Change: Vulnerability and Adaptation **Module Type:** Generic Elective

**Paper Code:** GEOG03GE3 **Credits:** 6

**Total Marks:** 100

**Module Evaluation:**

**Question Pattern -**

**Internal Assessment -**

**GEOG03GE3 (Theory) [Credits: 4 Marks: 70]**

1. Science of Climate Change: Understanding climate change- Climate system and Earth's energy balance, climate variability and climate change; Evolution of climate and environmental thinking- scientization, politicization and securitization [10]
2. Evidences in favour of climate change; Challenges in confirming climate change [3]
3. Theories of climate change; Green House Gases and Global Warming; Global Climatic Assessment- IPCC [5]
4. Climate Change, Vulnerability and Risk: Physical, Economic and Social Vulnerabilities and measured indices [5]
5. Impact of Climate Change: Agriculture and Water; Flora and Fauna; Human Health [5]
6. Adaptation and Mitigation: Global Initiatives- United Nations Framework Convention on Climate Change, Kyoto Protocol, International Carbon Action Partnership, Muslim Seven Year Action Plan on Climate Change [10]
7. Adaptation and Mitigation: Initiatives in South Asia- ASEAN Agreement on Transboundary Haze Pollution, Asia-Pacific Partnership on Clean Development and Climate [10]
8. India's National Action Plan on Climate Change; Regional and Local Institutions (Urban Local Bodies, Panchayats) [8]
9. Contrasting ways of thinking climate change, Key points of disagreement about climate change [8]

**GEOG03GE3 (Practical) [Credits: 2 Marks: 30]**

1. Power Point Presentations on five selected topics related to possible consequences of climate change [32]
2. Analysis of Paleoclimatic data [16]
3. Mapping of disaster vulnerability [16]

**Suggested Readings: *Climate Change: Vulnerability and Adaptation***

1. *Historical Perspectives on Climate Change*, James Rodger Fleming, Oxford University Press, 2005
2. *Climate Change: A Multidisciplinary Approach*; William James Burroughs, Cambridge University Press, 2007
3. *Climate Change: A Very Short Introduction*; Mark Maslin, , 2014
4. *Global Warming: A Very Short Introduction*; Mark Maslin, Edition 2, Oxford University Press, Oxford, 2008
5. *Climate Change: Causes, Effects, and Solutions*, John T. Hardy, John Wiley & Sons, 2003
6. *Climate Change: Past, Present, and Future*; Marie-Antoinette Mélières, Chloé Maréchal, ohn Wiley & Sons, 2015
7. *Climate Change Science: An Analysis of Some Key Questions*; National Research Council, Division on Earth and Life Studies, Committee on the Science of Climate Change; National Academies Press, 2001
8. *Global Warming*; John Houghton, Cambridge University Press, 2015
9. *Climate Change: A Wicked Problem: Complexity and Uncertainty at the Intersection of Science, Economics, Politics, and Human Behavior*; Frank P. Incropera, Cambridge University Press, 2015
10. *The Science and Politics of Global Climate Change: A Guide to the Debate*; Andrew E. Dessler, Edward A. Parson, Cambridge University Press, 2006
11. *Why We Disagree about Climate Change: Understanding Controversy, Inaction and Opportunity*; Mike Hulme, Cambridge University Press, 2009
12. *The Discovery of Global Warming*; Spencer R. Weart, Harvard University Press, 2008

**DEPARTMENT OF GEOGRAPHY**  
**PRESIDENCY UNIVERSITY**

**Detailed Syllabus for Third Semester of Geography (Major) Undergraduate Course**

**Module Name:** Geographical Information Systems

**Module Type:** Skill Enhancement Course

**Paper Code:** GEOG03SEC1

**Credits:** 4

**Total Marks:** 100

**Module Evaluation:**

**Question Pattern -**

**Internal Assessment -**

**GEOG03SEC1 [Credits: 4 Marks: 100]**

1. Geographical Information System (GIS): Definition and Components [4]
2. Global Positioning System (GPS) - Principles and Uses; Hand-held GPS/DGPS [8]
3. GIS Data Structures: Types (Spatial and Non-spatial), Raster and Vector Data Structure [8]
4. GIS Data Analysis: Input; Geo-Referencing; Editing, Output and Query; Overlays [4]
5. Application of GIS: Land Use Mapping; Urban Sprawl Analysis; Forests Monitoring [12]
6. Application of Digital Elevation Models for hydrological application and terrain analysis [12]

**Practical Record:** A project file consisting of 5 exercises on using any GIS Software on above mentioned themes [16]

**Suggested Readings: *Geographical Information Systems***

1. Albretcht, J. (2007): *Key Concepts & Techniques in GIS*, SAGE Publications Ltd., London
2. Bhatta, B. 2011. *Global Navigation Satellite Systems: Insights into GPS, GLONASS, Galileo, Compass and Others*, CRC Press.
3. Bolstad, P. 2016. *GIS Fundamentals: A First Text on Geographic Information Systems*, 5th ed, XanEdu Publishing
4. Brewer, C.A. 2015. *Designing Better Maps: A Guide for GIS Users*, 2nd ed, Esri Press
5. Burroughs, P.A. and McDonnell, R.A. (1998): *Principles of Geographic Information Systems*, Oxford University Press, New York
6. Clark, K.C. (2010): *Getting Started with Geographic Information Systems*, Prentice Hall, Upper Saddle River, New Jersey
7. de Smith, M., Longley, P., Goodchild, M. 2011. *Geospatial Analysis: A Comprehensive Guide*. 3rd ed, The Winchelsea Press.
8. Fazal, S. (2008): *GIS Basics*, New Age International (P) Limited, Publishers, New Delhi
9. Harvey, F. 2015. *A Primer of GIS: Fundamental Geographic and Cartographic Concepts*, 2nd ed, The Guilford Press.
10. Heywood, D.I., Cornelius, S. and Carver, S. (2006): *An Introduction to Geographical Information Systems*, Prentice Hall, Upper Saddle River, New Jersey
11. Longley, P.A., Goodchild, M., Maguire, D.J. Rhind, D.W. (2010): *Geographic Information Systems and Science*, Wiley, New York
12. Sarkar, A. 2015. *Practical Geography: A Systematic Approach*. 2nd ed, Orient Black Swan Private Ltd.
13. Shekhar, S. and Xiong, H. (eds.) (2008): *Encyclopaedia of GIS*, Springer, New York
14. Tomlin, C.D. (1990): *Geographic Information Systems and Cartographic Modeling*, Prentice-Hall, Englewood Cliffs, NJ

**DEPARTMENT OF GEOGRAPHY**  
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**Detailed Syllabus for Fourth Semester of Geography (Major) Undergraduate Course**

**Course Name:** Economic Geography

**Course Type:** Core Course

**Course Code:** GEOG04C8

**Credits:** 6

**Total Marks:** 100

**Course Evaluation:**

**Question Pattern -**

**Internal Assessment -**

**GEOG04C8 (Theory) [Credits: 4 Marks: 70]**

**Unit 1: Basic Concepts**

- 1.1 Geographical approach to Economy- space, place and scale; Economy- concept, assumptions; Economic processes- Development and globalization; Concepts in Economic Geography: Goods and services, production, exchange and consumption, economic man, Economic distance and transport costs [18]
- 1.2 Capitalist Economy- features and contradictions; Capitalism, commodities and consumers; Commodity Chain: spatial structure, buyer-driven & producer-driven, institutional framework [6]
- 1.3 Technological changes and their geographical impacts; Economic agglomeration- bases and typology [4]
- 1.4 Nature in Economic Thought: Commodification, ownership, stewardship and marketing of the Nature [4]
- 1.5 New Economic Geography: tenets of Political Economy [4]

**Unit 2: Economic Theories**

- 2.1 Factors Affecting location of Economic Activity with special reference to Agriculture (Von Thunen's Theory), and Industry (Weber's Theory) [4]
- 2.2 Theories of Losch, Walter Isard and Gunnar Myrdal, Smith and Palander [10]

**Unit 3: Global Economic Entities**

- 3.1 Transnational Economic Activities- Forms of organization; Strategies of labour control in global economy and strategies of labour to control global economy [4]
- 3.2 Consumption process: Significance of consumption in Economy, Mass consumption Vs. Fordist Consumption; Changing pattern of retailing; Spaces of Consumption- Store, Street, Mall and Theme Parks [6]
- 3.3 International agreements and trade blocs: WTO and OPEC [4]

**GEOG04C8 (Practical) [Credits: 2 Marks: 30]**

**Unit 1: Spatiality of economic activity**

- 1.1 Application of GIS in economic space analysis and representation of human identity [16]
- 1.2 Application of 'Minimum Requirements Method' for the pattern analysis of industrial concentration in a particular area/region [14]
- 1.3 Qualitative methods in regional programme evaluation: Application of the story-based approach [14]
- 1.4 Linear programming: use of economic data [20]

**Suggested Readings: *Economic Geography***

1. Alexander J. W., 1963: *Economic Geography*, Prentice-Hall Inc., Englewood Cliffs, New Jersey
2. Aoyama, Y., Murphy, J., and Hanson, S. (2010) *Key Concepts in Economic Geography*, London: Sage
3. Bagchi-Sen S. and Smith H. L., 2006: *Economic Geography: Past, Present and Future*, Taylor and Francis.
4. Barnes, T., Peck, J., Sheppard, E. and Tickell, A. (Eds) (2003) *Reading Economic Geography*, London: Wiley-Blackwell
5. Berry, B.J.L., Conklin, E.C. and Ray, M.D. (1976): *The Geography of Economic Systems*, Prentice Hall, New Jersey
6. Boniface, B.G. and Cooper, C. (2005): *Worldwide Destinations: The Geography of Travel and Tourism*, Butterworth-Heinemann
7. Bradford, M.G. and Kent, W.A. (1977): *Human Geography, Theories and Applications*, Oxford University Press, Oxford
8. Butler, R. (eds.) (2006): *The tourism area life cycle: application and modifications Volume-1*, Channel View Publications, U.K.
9. Clark, G., Gertler, M. and Feldman, M.(eds) (2003) *The Oxford Handbook of Economic Geography*, Oxford University Press
10. Coe, N., Kelly, P., and Yeung, H. (2007) *Economic Geography: A Contemporary Introduction*, London: John Wiley & Sons
11. Combes P., Mayer T. and Thisse J. F., 2008: *Economic Geography: The Integration of Regions and Nations*, Princeton University
12. Courtney, P. (1965): *Plantation Agriculture*, G. Bell and Sons, London
13. Durand L., 1961: *Economic Geography*, Crowell
14. Fujita M., Krugman P. and Venebles A.J. (2001): *The Spatial Economy: Cities, Regions and International Trade*. MIT Press
15. Guha, J.L. and Chattaraj, P.R. (1989): *A New Approach to Economic Geography: A Study of Resources*, World Press Ltd., Kolkata
16. Hartshorn, T.A. and Alexander, J.W. (1988): *Economic Geography*, Prentice Hall India, New Delhi
17. Hodder B. W. and Lee Roger, 1974: *Economic Geography*, Taylor and Francis.
18. Hudson, R., (2005) *Economic Geographies: Circuits, Flows and Spaces*, London: Sage
19. Jones, C.F. and Darkenwald, G.G. (1954): *Economic Geography*, Macmillan, New York
20. Karlsson, C., Andersson, M., & Norman, T. (2015). *Handbook of Research Methods and Applications in Economic Geography*. Cheltenham, UK: Edward Elgar Publishing, Incorporated.
21. Leong. G.C. and Morgan, G.C. (1975): *Human and Economic Geography*, Oxford University Press, Hong Kong
22. Leyshon, A., Lee, R., McDowell, L and Sunley, P. (eds) (2011) *The Sage Handbook of Economic Geography*, London: Sage
23. Miller, E. (1962): *A Geography of Manufacturing*, Prentice Hall, Englewood Cliff, New Jersey
24. Morgan, W.B. and Munton, R.J.C. (1971): *Agricultural Geography*, Methuen, London
25. Paterson, J.H. (1976): *Land, Work and Resources - An Introduction to Economic Geography*, Edward Arnold , London
26. Picard P.M. and Toulemonde E. (2002): *Firms Agglomerations and Unions*, Centre for Economic Policy Research
27. Simmons, I.G. (1981): *The Ecology of Natural Resources*, ELBS/ Edward Arnold, London
28. Singh, J. (1974): *An Agricultural Atlas of India: A Geographical Analysis*, Vishal Publications, Kurukshetra
29. Smith, D.N. (1971): *Industrial Location - An Economical Geographical Analysis*, John Wiley, New York
30. Thomas, R.S. and Corbin, P.B. (1968): *Geography of Economic Activity*, McGraw Hill, New York
31. Wearing, S. and Neil, J. (1999): *Ecotourism: Impacts, Potentials and Possibilities*, Butterworth-Heinemann, Oxford
32. Wheeler, J.O., Muller, P.O., Thrall, G.I., Fik, T.J. 1998. *Economic Geography*, 3rd ed, Wiley
33. Willington D. E., 2008: *Economic Geography*, Husband Press
34. Wood, A., Roberts, A. 2010. *Economic Geography: Places, Networks and Flows*, Routledge



**DEPARTMENT OF GEOGRAPHY**  
**PRESIDENCY UNIVERSITY**

**Detailed Syllabus for Fourth Semester of Geography (Major) Undergraduate Course**

**Course Name:** Environmental Geography

**Course Type:** Core Course

**Course Code:** GEOG04C9

**Credits:** 6

**Total Marks:** 100

**Module Evaluation:**

**Question Pattern -**

**Internal Assessment -**

**GEOG04C9 (Theory) [Credits: 4 Marks: 70]**

**Unit 1: Basics of the environment**

- 1.1 Human-Environment Relationships: Historical Processes (Speciation, diversification, abundance and extinction; Dispersal- mechanisms of range expansion, Barriers and Corridors); Adaptation in different Biomes (Tropical and Temperate Forests and Grasslands) [12]
- 1.2 Ecosystem: Concept, structure and organisation (Components, Trophic Structure, Food Chain and Food Web, Keystone Species, Ecological Pyramids); Functions (Energy Flow, Biogeochemical Cycles, Gross and Net Productivity) [12]
- 1.3 Classification of Plants (Plantae) and Animals (Animalia) [4]
- 1.4 Ecosystem Processes (Plant Community Dynamics: Competition, Predation, Mutualism, Symbiosis; Causes, Stages and Types of Plant Succession, Climax Communities: Climatic, Edaphic and Biotic; Adaptation Strategies of Hydrophytes, Xerophytes and Halophytes); Ecosystem Types - Terrestrial and Aquatic [12]

**Unit 2: Biogeographical Pattern and Processes:**

- 2.1 Agents of Biogeographical Pattern: The Geographic Template - Climate, Substrate and Terrain [8]
- 2.2 Ecological controls - Physical limiting factors and Habitat; Niche and life forms; Relationships: Niche and geographic range, and distribution and abundance [10]
- 2.3 Concepts, Significance and Types of Biodiversity [24]

**GEOG04C9 (Practical) [Credits: 2 Marks: 30]**

**Unit 1: Practical Exercises**

- 1.1 Methods of studying Plant Communities: Species density, frequency, abundance, cover, association index and index of similarity; Delineation of ecosystem boundaries
- 1.2 Biodiversity mapping using Indices

**Suggested Readings: *Environmental Geography***

1. Chandna R. C., (2002): Environmental Geography, Kalyani, Ludhiana.
2. Chapman, J.L. and Reiss, M.J. (1992): Ecology Principles and Applications, Cambridge University Press, Cambridge
3. Cox, B., Moore, P.D., Ladle, R. 2016. Biogeography: An Ecological and Evolutionary Approach, 9th ed, Wiley-Blackwell.
4. Cunningham W. P. and Cunningham M. A., (2004): Principals of EnvironmentalScience:
5. Dash, M.C., 2001. Fundamental of Ecology, 2nd edition, Tata McGrawHill, New Delhi
6. Gilpin.A ( 1994) Environmental Impact Assessment: Cutting Edge for the 21st Century, Cambridge University Press,
7. Goudie A., (2001): The Nature of the Environment, Blackwell, Oxford.
8. Hugget, R. J. (2004): Fundamentals of Biogeography, Routledge, London
9. Kendeigh, S.C. (1975): *Ecology with Special Reference to Man and Animals*, Prentice Hall, New York
10. Kormondy, E.J. (1991): Concepts of Ecology, Prentice Hall India, New Delhi
11. Krauskopf, K.B. (2007): Fundamentals of Physical Science, Read Books, Vancouver
12. Lomolino, M.V., Riddle, B.R., Whittaker, R.J. 2016. Biogeography, 5th ed, Oxford University Press.
13. MacDonald, G.2001. Biogeography: Introduction to Space, Time, and Life, Wiley
14. Miller G. T., (2004): Environmental Science: Working with the Earth, Thomson BrooksCole, Singapore.
15. MoEF, (2006): National Environmental Policy-2006, Ministry of Environment andForests, Government of India.
16. Nebel, J.B. (1981): Environmental Science, Prentice Hall, New York
17. Odum, E. P. et al, (2005): Fundamentals of Ecology, Ceneage Learning India.
18. Sharma, P.D. 2011. Ecology and Environment, Rastogi Publications.
19. Simmons, I.G. (1980): Bio-geographical Processes, George Allen and Unwin, London
20. Singh S., 1997: Environmental Geography, Prayag Pustak Bhawan. Allahabad.
21. Singh, M., Singh, R.B. and Hassan, M.I. (Eds.) (2014) Climate change and biodiversity: Proceedings of IGU Rohtak Conference, Volume 1. Advances in Geographical and Environmental Studies, Springer
22. Singh, R.B. (1998) Ecological Techniques and Approaches to Vulnerable Environment, New Delhi, Oxford & IBH Pub.
23. Singh, R.B. (Eds.) (2009) Biogeography and Biodiversity. Rawat Publication, Jaipur
24. Singh, R.B. and Hietala, R. (Eds.) (2014) Livelihood security in Northwestern Himalaya: Case studies from changing socio-economic environments in Himachal Pradesh, India. Advances in Geographical and Environmental Studies, Springer
25. UNEP, 2007: Global Environment Outlook: GEO4: Environment For Development, United Nations Environment Programme.
26. Watts, D. (1971): Principles of Biogeography: An Introduction to Functional Mechanisms of Ecosystems, McGraw Hill, London

**DEPARTMENT OF GEOGRAPHY**  
**PRESIDENCY UNIVERSITY**

**Detailed Syllabus for Fourth Semester of Geography (Major) Undergraduate Course**

**Course Name:** Nature and Natural Disasters

**Course Type:** Core Course

**Course Code:** GEOG04C10

**Credits:** 6

**Total Marks:** 100

**Course Evaluation:**

**Question Pattern -**

**Internal Assessment -**

**GEOG04C10 (Theory) [Credits: 4 Marks: 70]**

**Unit 1: Physical concepts and laws governing Nature**

- 1.1 Motion in one dimension: description and equations; Motion under gravity; Universal Law of Gravitation; Mass, weight and pressure; Circular motion; Simple Harmonic Motion [6]
- 1.2 Work: moment, couple, torque; Energy - potential and kinetic; Power; Stress, strain, deformation and elasticity; Hydrostatic balance, Buoyancy and Flotation; Viscosity [6]
- 1.3 Waves: Properties, types and propagation [4]
- 1.4 Atomic structure; Chemical measures - atomic number, atomic mass, molecular weight, Avogadro's number and mole; Periodic Table; Chemical bonding; Radioactivity and Half-life; Acids, bases and salts; Chemical reactions [6]
- 1.5 Dating techniques; Isotopes, Chemical groupings of elements in the Periodic Table; Numerical problems on chemical measurements [6]
- 1.6 Kinetic Theory of gases and gas laws; Change of state - latent heat; Heat flow and heat capacity; Laws of Thermodynamics and related concepts; Adiabatic process [6]

**Unit 2: Natural Hazards and Disasters**

- 2.1 Hazards- concept, classification, and relationships with disaster and human vulnerability [4]
- 2.2 Disaster Management: Hazard assessment, Hazard resistant design, Prediction and warning, Community preparedness, Training and awareness, Landuse planning, Aid and Insurance [6]
- 2.3 Mid-latitude Cyclone: Structure and life cycle; Polar front theory; Frontogenesis and Frontolysis [4]
- 2.3 Tropical Cyclones: Formation, decay, cross section; naming tropical storms; Disastrous effects of storm surge and flooding; Saffir-Simpson scale of cyclone intensity [4]
- 2.4 Causes of soil acidity and liming of acid soils; Buffering capacity; Causes and effects of soil alkalinity; Reclamation of saline soils [4]
- 2.5 Soil Degradation: Mechanisms and factors of soil erosion; Soil Fertility Decline: Plant nutrients and their sources; Roles of NPK in plant's growth; Processes of soil nutrient loss [4]
- 2.6 Biodiversity: Threats and conservation; Geodiversity: Concept and conservation [4]

**GEOG04C10 (Practical) [Credits: 2 Marks: 30]**

**Unit 1: Analysis of Earth Materials and Climatic Data**

- 1.1 Grain Size Analysis through sieving: computation of indices, Phi scale plots, graphical representation on probability graph and determination of graphic mean, skewness and kurtosis [20]
- 1.2 Soil Organic Matter (using kit) [10]
- 1.3 Climatological Time Series Analysis: Analysis of Trend - Smoothing Techniques (Moving Average and Least Square) and detrending; Analysis of Seasonality - Seasonal average of detrended data, Deseasonalization, Seasonally adjusted Series [34]

**Suggested Readings: *Nature and Natural Disasters***

1. Ahrens, C.D. (2012): *Essentials of Meteorology: An Invitation to the Atmosphere*, Cengage Learning, Boston
2. Alexander, D. (1993): *Natural Disasters*, ULC Press Ltd, London
3. Beiser, A. (1974): *Schaum's Outline Series: Theories and Problems of Physical Science*, McGraw Hill, New York
4. Bishop, V. (2001): *Hazards and Response*, Collins Educaional, London
5. Chapman J.L., Reiz, M.J. 1993. *Ecology: Principle and Applications*, Cambridge University Press.
6. Chatfield, C. (1995): *The Analysis of Time Series: An Introduction*, Chapman & Hall, Boca Raton
7. Collins, L.R. and Scheind, T.D. (2000): *Disaster Management and Preparedness*, Taylor and Francis
8. Cox, B., Moore, P.D., Ladle, R. 2016. *Biogeography: An Ecological and Evolutionary Approach*, 9th ed, Wiley-Blackwell.
9. Daji, J.A. (1970): *A Textbook of Soil Science*, Asia Publishing House, London
10. Dilley, M. (2005): *Natural Disaster Hotspots- A Global Risk Analysis*, World Bank Publication, Washington, D.C.
11. Edwards, B. (2005): *Natural Hazards*, Cambridge University Press, UK
12. Gerrard, J. (2000): *Fundamentals of Soils (Routledge Fundamentals of Physical Geography Series)*, Routledge, London
13. Gray, M. (2004): *Geodiversity: valuing and conserving abiotic nature*. John Wiley & Sons, Chichester.
14. Hyndman, D. and Hyndman, D. (2016): *Natural Hazards and Disasters*, Cenagage Learning, Boston
15. Kale, V.S. (2017): *Atlas of Geomorphosites in India*, Indian Institute of Geomorphologists, Allahabad
16. Kormondy, E.J. (1991): *Concepts of Ecology*, Prentice Hall India, New Delhi
17. Krauskopf, K.B. (2007): *Fundamentals of Physical Science*, Read Books, Vancouver
18. Lutgens, F.K., Tarbuck, E.J. 1998. *The Atmosphere : An Introduction to Meteorology*, 9th Ed, Prentice-Hall Inc.
19. Mason, G.W., Griffen, D.T., Merrill, J.J. and Thorne, J.M. (1997): *Physical Science Concepts*, Brigham Young University Press, Provo
20. NDMA (2009): *National Policy on Disaster Management*, NDMA, New Delhi
21. Odum, E. P. et al, 2005: *Fundamentals of Ecology*, Ceneage Learning India.
22. Plaster, E.J. (2009): *Soil Science and Management*, Cengage Learning, Boston
23. Rohli, R.V. and Vega, A.J. (2013): *Climatology*, Jones and Bartlett Publishers, Massachusetts
24. Rosen, J. and Gothand,L.Q.(2010): *Encyclopaedia of Physical Science*, Infobase Publishing, New York
25. Sarkar, D. (2003): *Fundamentals and Applications of Pedology*, Kalyani Publishers, New Delhi
26. Sehgal, J. (1996): *Pedology: Concepts and Applications*, Kalyani Publishers, New Delhi
27. Sharma, R.K. & Sharma, G. (eds.) (2005): *Natural Disaster*, APH Publishing Corporation, New Delhi
28. Shi, P. and Kesperon, R. (Eds.) (2015): *World Atlas of Natural Disaster Risk*, Springer, Berlin
29. Shipman, J.T., Wilson, J.D. and Higgins, C.A. (2013): *An Introduction to Physical Science*, Brooks/Cole - Cengage Learning, Boston
30. Smith, K. (2011): *Natural Hazards*, Routledge, London
31. Thompson, R. D. (1998): *Atmospheric Pressures and Systems*, Routledge, London
32. Tillery, B.W. (2014): *Physical Science*, McGraw Hill, New York
33. Wisner, B., Blaikie, P., Cannon, T. and Davis, I. (2004): *At Risk- Natural Hazards, People's Vulnerability and Disasters*, Routledge, NY

## DEPARTMENT OF GEOGRAPHY PRESIDENCY UNIVERSITY

### Detailed Syllabus for Fourth Semester of Geography (Major) Undergraduate Course

**Module Name:** Sustainable Development

**Module Type:** Generic Elective

**Paper Code:** GEOG04GE4

**Credits:** 6

**Total Marks:** 100

**Module Evaluation:**

**Question Pattern -**

**Internal Assessment -**

#### **GEOG04GE4 (Theory) [Credits: 4 Marks: 70]**

- |   |     |
|---|-----|
| 1. Sustainable Development: concept and historical perspectives       | [6] |
| 2. Goals and Strategies of Sustainable Development                    | [6] |
| 3. Sustainable Development Yardsticks: Measuring Progress and Success | [8] |
| 4. Utilisation of non-conventional energy sources                     | [7] |
| 5. Environmental Sustainability and Environmental Ethics              | [6] |
| 6. Sustainable utilisation of resources: land, water and forests      | [4] |
| 7. Sustainable agriculture and Food Security                          | [4] |
| 8. Sustainable approaches to urban water management                   | [8] |
| 9. Issues of Sustainability and Tourism                               | [7] |
| 10. Sustainable Smart Cities and Good Governance                      | [8] |

#### **GEOG04GE4 (Practical) [Credits: 2 Marks: 30]**

- |  |      |
|--|------|
| 1. Literature review, written assignment submission and presentation on various topics | [24] |
| 2. Measuring Ecological Footprint as an indicator of sustainability                    | [20] |
| 3. Sustainable urban water management exercises  | [20] |

#### **Suggested Readings: Sustainable Development**

1. Birch, E.L. and Wachter, S.M. (eds.) (2008): *Growing Greener Cities: Urban Sustainability in the 21st Century*, Univ. of Penn. Press
2. Blewett, J. (ed.) (2008): *Understanding Sustainable Development*, Routledge
3. Brundtland Commission (1987): *Our Common Future*, Oxford University Press
4. Chambers, N., Craig, S. and Wackernagel M. (2004): *Sharing Nature's Interest*, Earthscan Publications Ltd., London
5. Dalal-Clayton, B. and Bass, S. (2002): *Sustainable Development Strategies: A Resource Book*, Routledge
6. Dressner, S. (2002): *The Principles of Sustainability*, Earthscan Publications Ltd., London
7. Elliott, L. (2004): *Global Politics of the Environment*, Palgrave MacMillan, New York
8. Hulse, J.H. (2007): *Sustainable Development at Risk: Ignoring the Past*, Foundation Books
9. Knight, B., Chigudu, H. and Tandon R. (2002): *Reviving Democracy: Citizens at the Heart of Governance*, Earthscan Publications
10. Leach, M. (2015): *Gender Equality and Sustainable Development*, Routledge
11. McGranahan, G. (et al). (2001): *The Citizens at Risk: From Urban Sanitation to Sustainable Cities*, Earthscan Publications
12. Meyers R.A. (2009): *Encyclopaedia of Complexities and Systems Science*. Vol. 1, Springer
13. Millstone, E. and Lang T. (2003): *The Atlas of Food*, Earthscan Publications Ltd., London
14. Mollinga, P., Dixit, A. and Athukorala K. (ed) (2006): *Integrated Water Resources Management*, Sage, New Delhi
15. OECD and UNDP (2002): *Sustainable Development Strategies: A Resource Book*
16. Rogers P. (2007): *An Introduction to Sustainable Development*, Earthscan Publications
17. Sachs, J. (2015): *The Age of Sustainable Development*, Columbia University Press
18. Ukaga, O., Maser, C. and Reichenbach, M. (2010): *Sustainable Development: Principles, Frameworks and Case Studies*, CRC Press
19. Soubbotina, T.P. (2004): *Beyond Economic Growth: An Introduction to Sustainable Development*, World Bank
20. Jacquet, P., Pachauri, R.K. and Tubiana, L. (2010): *CITIES: steering towards sustainability*, TERI Press

DEPARTMENT OF GEOGRAPHY  
PRESIDENCY UNIVERSITY

Detailed Syllabus for Fourth Semester of Geography (Major) Undergraduate Course

Module Name: Research Methods

Module Type: Skill Enhancement Course

Paper Code: GEOG04SEC2

Credits: 4

Total Marks: 100

Module Evaluation:

Question Pattern -

Internal Assessment -

GEOG04SEC2 (Theory) [Credits: 4 Marks: 100]

**Unit 1: Soil Sample Analysis**

- |  |      |
|--|------|
| 1.1 Sample Collection Methods and Techniques                 | [12] |
| 1.2 Determination of N, P, K Status in collected Soil Sample | [12] |

**Unit 2: Water Quality Analysis**

- |  |      |
|--|------|
| 2.1 Water Sample Collection Methods and Techniques   | [10] |
| 2.2 Determination of pH, DO, TDS, Turbidity, Salinity, Conductivity, Iron, Hardness of collected samples | [16] |
| 2.3 Water Quality Analysis and Mapping   | [14] |

**Practical Record:** A project work consisting of 5 exercises on using analytical methods mentioned above.

**Suggested Readings: *Research Methods***

1. Rowell, D.L. (1995): *Soil Science- Methods and Applications*; Longman Scientific & Technical, UK
2. United States Bureau of Plant Industry, Soils, and Agricultural Engineering (1951): *Soil Survey Manual, United States Dept. of Agriculture Handbook No. 18*, U.S. Government Printing Office, New York
3. McKenzie, N.J., Grundy, M.J., Webster, R. and Ringrose-Voase, A.J. (2008): *Guidelines for Surveying Soil and Land Resources*; CSIRO Publishing, Melbourne
4. Burt, R. (ed.) (2004): *Soil Survey Laboratory Methods Manual: Soil Survey Investigations Report No. 42 Version 4.0*, USDA, USA
5. Fresenius, W., Quentin, K. E., and Schneider, W. (Eds.) (1988): *Water Analysis – A Practical Guide to Physico-Chemical, Chemical and Microbiological Water Examination and Quality Assurance*; Springer-Verlag, Berlin.
6. Ahuja, S. (2015): *Monitoring Water Quality- Pollution Assessment, Analysis, and Remediation*; Elsevier, UK

**DEPARTMENT OF GEOGRAPHY**  
**PRESIDENCY UNIVERSITY**

**Detailed Syllabus for Fifth Semester of Geography (Major) Undergraduate Course**

**Course Name:** Regional Planning and Development

**Course Type:** Core Course

**Course Code:** GEOG05C11

**Credits:** 6

**Total Marks:** 100

**Course Evaluation:**

**Question Pattern -**

**Internal Assessment -**

**GEOG05C11 (Theory) [Credits: 4 Marks: 70]**

**Unit 1: Regions and Regional Planning**

- 1.1 Concept of regions, Types of regions and their delineation [4]
- 1.2 Types of planning, principles and objectives of regional planning [4]
- 1.3 Characteristics and Delineation of Planning Region [4]

**Unit 2: Regional Planning in India**

- 2.1 Need for regional planning in India [2]
- 2.2 Delineation of Planning Region in India [3]
- 2.3 Agro Ecological Zones in India [3]
- 2.4 Multi-level planning in India [3]
- 2.5 Urban regions in India: Census definitions; Changing connotations [3]
- 2.6 Hierarchy of urban systems, city types, metropolitan areas, urban agglomerates [3]

**Unit 3: Regional Development**

- 3.1 Development: Meaning, growth versus development [2]
- 3.2 Stages of Economic Development: Rostow and Marx [4]
- 3.3 Indicators of development: Economic, social and environmental, Human development [2]
- 3.4 Concept of underdevelopment; efficiency-equity debate [3]

**Unit 4: Theories and models for regional development**

- 4.1 Growth pole model (Perroux, Myrdal and Hirschman) [6]
- 4.2 Core Periphery Model (Friedman) and Growth Foci Concept in Indian Context [4]

**UNIT 5. Regional development in India**

- 5.1 Regional disparity and diversity in India [3]
- 5.2 Overview of Planning in India [3]
- 5.3 Backward Regions and Regional Plans - Special Area Development Plans in India [4]
- 5.4 DVC - The Success Story and the Failures; NITI Aayog [4]

**Paper Type:** GEOG05C11 (Practical) [Credits: 2 Marks: 30]

**Unit 1: Tools and techniques of regional planning**

- 1.1: Cluster analysis, calculation of HDI, GDI and HPI, Lorenz curve, and location quotient [32]
- 1.2: Extraction of transport network of a region from satellite images and analysis using indices [32]

**Suggested Readings: *Regional Planning and Development***

1. Berry, B.J.L. and Horton, F.F. (1970): *Geographic Perspectives on Urban Systems*. Prentice Hall, New Jersey.
2. Bhat L.S. (1972): *Regional Planning In India*, Statistical Publishing Society
3. Blij H. J. De 1971: *Geography: Regions and Concepts*, John Wiley and Sons.
4. Chand ,M and Puri V.K. ( 1983) : *Regional planning In India* , allied publishers , New Delhi
5. Claval, P.I. 1998: *An Introduction to Regional Geography*, Blackwell Publishers, Oxford and Massachusetts
6. Dickinson, R.E. (1947): *City, Region and Regionalism*, Oxford University Press
7. Dickinson, R.E. (1964): *City and Region*, Rutledge, London.
8. Friedmann J. and Alonso W. (1975): *Regional Policy - Readings in Theory and Applications*, MIT Press, Massachusetts
9. Gore C. G., 1984: *Regions in Question: Space, Development Theory and Regional Policy*, Methuen, London
10. Gore C. G., Köhler G., Reich U-P. and Ziesemer T., 1996: *Questioning Development; Essays on the Theory, Policies and Practice of Development Intervention*, Metropolis- Verlag, Marburg
11. Hall, P. (1992): *Urban and Regional Planning*, Routledge, London
12. Haynes J., 2008: *Development Studies*, Polity Short Introduction Series
13. Johnson E. A. J., 1970: *The Organization of Space in Developing Countries*, MIT Press, Massachusetts
14. Kulshetra ,S.K,( 2012) : *Urban and Regional Planning in India : A hand book for Professional Practitioners* , Sage Publication , New Delhi
15. Kundu, A. (1992): *Urban Development Urban Research in India*, Khanna Publ. New Delhi
16. Misra , R.P, Sundaram K.V, PrakashRao , VLS( 1974): *Regional Development Planning in India* , Vikas Publication , New Delhi
17. Misra, R.P (1992): *Regional Planning: Concepts , techniques , Policies and Case Studies* , Concept , New Delhi
18. N.A.T.M.O. *Regional Planning*, IGU Publication
19. Peet R., 1999: *Theories of Development*, The Guilford Press, New York
20. UNDP 2001-04: *Human Development Report*, Oxford University Press
21. World Bank 2001-05: *World Development Report*, Oxford University Press, New Delhi



**DEPARTMENT OF GEOGRAPHY**  
**PRESIDENCY UNIVERSITY**

**Detailed Syllabus for Fifth Semester of Geography (Major) Undergraduate Course**

**Course Name:** Remote Sensing

**Course Type:** Core Course

**Paper Code:** GEOG05C12

**Credits:** 6

**Total Marks:** 100

**Course Evaluation:**

**Question Pattern -**

**Internal Assessment -**

**GEOG05C12 (Theory) [Credits: 4      Marks: 70]**

**Unit 1: Basic Concepts**

- |  |      |
|--|------|
| 1.1 Remote Sensing: Definition and Development; Platforms and Types; Photogrammetry  | [8]  |
| 1.2 Concepts of spheroid, ellipsoid and projection systems. Significance of WGS 84 and UTM   | [10] |
| 1.3 Satellite Remote Sensing: Principles, EMR Interaction with Atmosphere and Earth Surface; Satellites (Landsat and IRS); Sensors | [14] |

**Unit 2: Image Analysis**

- |   |      |
|---|------|
| 2.1 Image Processing (Digital and Manual): Pre-processing (Radiometric and Geometric Correction); Enhancement (Filtering); Vegetation Indices: NDVI, EVI, Classification (Supervised and Un-supervised) | [6]  |
| 2.2 Band Math: Addition, Subtraction, Ratio, Simple Model Building  | [6]  |
| 2.3 Application of Remote Sensing: Land Use Land Cover; Accuracy Assessment; Change Detection   | [20] |

**GEOG05C12 (Practical) [Credits: 2    Marks: 30]**

**Unit 1: Practical Exercises**

- |   |      |
|---|------|
| 1.1 Different exercises on digital image processing, image analysis and classification and information extraction | [64] |
|---|------|

**Suggested Readings: Remote Sensing**

- Bhatta, B. 2011. Remote Sensing and GIS, 2nd ed, Oxford Univ. Press.
- Campbell, J.B. and Wynne, R.H. (2011): *Introduction to Remote Sensing*, The Guilford Press, New York
- Jensen, J.R. (006): *Remote Sensing of the Environment: An Earth Resource Perspective*, Prentice Hall, New Jersey
- Joseph, G. and Jegannathan, C. 2018. Fundamentals of Remote Sensing, 3rd ed, Universities Press.
- Lillesand, T.M., Kiefer, R.W. and Chipman, J.W. (2008): *Remote Sensing and Image Interpretation*, John Wiley & Sons, New York
- Nag P. and Kudra, M., 1998: Digital Remote Sensing, Concept, New Delhi.
- Rees W. G., 2001: Physical Principles of Remote Sensing, Cambridge University Press.
- Sabins, F.F. (2008): *Remote Sensing: Principles and Interpretation*, Waveland Press Inc., Illinois
- Sahu, K.C. (2007): *Textbook of Remote Sensing and Geographical Information Systems*, Atlantic Publishers, New Delhi
- Sarkar, A. (2015) Practical geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi
- Wolf P. R. and Dewitt B. A., 2000: Elements of Photogrammetry: With Applications in GIS, McGraw- Hill

**DEPARTMENT OF GEOGRAPHY**  
**PRESIDENCY UNIVERSITY**

**Detailed Syllabus for Fifth Semester of Geography (Major) Undergraduate Course**

**Module Name:** Hydrology and Oceanography

**Module Type:** Discipline Specific Elective

**Paper Code:** GEOG05DSE1

**Credits:** 6

**Total Marks:** 100

**Module Evaluation:**

**Question Pattern -**

**Internal Assessment -**

**GEOG05DSE1 (Theory) [Credits: 4 Marks: 70]**

**Unit 1: Hydrology**

- |  |     |
|--|-----|
| 1.1 Hydrological Cycle: Global and basin; Water Budget                                       | [6] |
| 1.2 Precipitation: Intensity-Duration-Frequency Relationships                                | [8] |
| 1.3 Measuring Interception, Evaporation, Evapotranspiration, Infiltration, Throughflow       | [6] |
| 1.4 Hydrological parameters: measurement of river discharge                                  | [4] |
| 1.5 Floods: Frequency Analysis and Droughts: Types & Indices                                 | [4] |
| 1.6 Groundwater: Types of subsurface water, Types of aquifers, Groundwater Flow: Darcy's Law | [4] |

**Unit 2: Oceanography**

- |  |      |
|--|------|
| 2.1 Evolution and Structure of Ocean Floor topography: Atlantic, Pacific and Indian Ocean  | [6]  |
| 2.2 Sea level rises, Deep Water Circulation, Waves, Currents and Tides - Characteristics and mechanism   | [18] |
| 2.3 Properties of Ocean Water: Physical and Chemical (Salinity, Temperature, Density, Chloride, Sodium, Sulphur, Magnesium, Calcium and Potassium) | [10] |
| 2.4 Coral Reefs, Volcanic Island: Types and Theories of Origin   | [4]  |
| 2.5 Marine sediment Deposits, Mineral composition and Significance of Ocean Resource potentiality  | [4]  |

**GEOG05DSE1 (Practical) [Credits: 2 Marks: 30]**

**Unit 1: Hydrological analysis**

- |   |      |
|---|------|
| 1.1 Baseflow separation in a hydrograph             | [12] |
| 1.2 Computation of unit hydrograph and rating curve | [10] |
| 1.3 NRCS CN method for estimating runoff            | [10] |

**Unit 2: Oceanic attributes**

- |   |      |
|---|------|
| 2.1 Computation of T/S Diagram and interpretation         | [14] |
| 2.2 Tidal data analysis and Presentation (Temporal Scale) | [18] |

**Suggested Readings: *Hydrology and Oceanography***

1. Andrew. D. Ward and Stanley, Trimble (2004): *Environmental Hydrology*, 2nd edition, Lewis Publishers, CRC Press.
2. Anikouchine W. A. and Sternberg R. W., 1973: *The World Oceans: An Introduction to Oceanography*, Prentice-Hall.
3. Basu, S.K. (2003) (ed): *Handbook of Oceanography*, Global Vision, Delhi
4. Chow, V.T., Maidment, D.R. and Mays, L.W. (1988): *Applied Hydrology*, McGraw Hill, New York
1. Davis, R.A. (1972): *Principles of Oceanography*, Addison-Wesley Publishing Co., Reading, Massachusetts
5. Davis, R.J.A. (1986): *Oceanography - An Introduction of the Marine Environment*, Win C. Brown, Iowa
6. Day, T. (2006): *Oceans*, Chelsea House, New York
7. Dingman, S.L. 2015. *Physical Hydrology*, 3rd ed, Macmillan Publishing Co.
8. Erickson, J. 2003: *Marine Geology: Exploring the New Frontiers of the Ocean*, Facts on File, Inc., New York
9. Fitts, C.R. 2002. *Groundwater Science*, Elsevier.
10. Garrison, T. (2009): *Essentials of Oceanography*, Brooks/Cole, Belmont, California
11. Garrison, T. 2016. *Oceanography: An Invitation to Marine Science*, 9th ed, Cengage Learning.
12. Gross M.G. (1982): *Oceanography*, Prentice Hall, Upper Saddle River, New Jersey
13. Ilyin, A.V. (2003): *Evolution of the Ocean Floor Morphostructure - Actualistic Model*, in Evans, I.S., Dikau, R. Tokunaga, E., Ohmori, H. and Hirano, M. (eds.) *Concepts and Modelling in Geomorphology: International Perspectives*, Terrapub, Tokyo, pp. 43-59
14. Karanth, K.R., 1988: *Ground Water: Exploration, Assessment and Development*, Tata- McGraw Hill, New Delhi.
15. Kershaw S., 2000: *Oceanography: An Earth Science Perspective*, Stanley Thornes, And UK.
16. King, C.A. (1962): *Oceanography for Geographers*, Edward Arnold, New York
17. Meinzer, O.E. (1949): *Hydrology*, Dover Publications, Mineola, New York
18. Pinet, P.R. 2014. *Invitation to Oceanography*. 7th ed, Jones and Barlett Publishers.
19. Pinneker, E.V. 2010. *General Hydrogeology*, Cambridge University Press.
20. Pugh, D., Woodworth, P. 2014. *Sea-Level Science: Understanding Tides, Surges, Tsunamis and Mean Sea-Level Changes*, Cambridge
21. Raghunath, H.M. 2006. *Hydrology: Principles, Analysis, Design*, 3rd ed, New Age International Publishers.
22. Ramaswamy, C. (1985): *Review of floods in India during the past 75 years: A Perspective*. Indian National Science Academy
23. Rao, K.L., 1982: *India's Water Wealth* 2nd edition, Orient Longman, Delhi,
24. Reddy, P.J.R. 2014. *A Textbook of Hydrology*, University of Science Press.
25. Robert, C.M. (2009): *Global Sedimentology of the Ocean: An Interplay between Geodynamics and the Palaeoenvironment*, Elsevier
26. Sharma, R.C. and Vatal, M. (1962): *Oceanography for Geographers*, Chaitanya Publishing House, Allahabad
27. Singh, M., Singh, R.B. and Hassan, M.I. (Eds.) (2014) *Landscape ecology and water management*. Proceedings of IGU Rohtak Conference, Volume 2. *Advances in Geographical and Environmental Studies*, Springer
28. Singh, Vijay P. (1995): *Environmental Hydrology*. Kluwer Academic Publications, the Netherlands.
29. Subramanya, K. 2013. *Engineering Hydrology*, McGraw Hill Education.
30. Sverdrup, K.A., Armrest, E.V. 2010. *An Introduction to the World Oceans*, 10th ed, McGraw Hill.
31. Thorpe, S.A., Steele, J.H., Turekian, K.K. (eds.) (2009): *Elements of Physical Oceanography*, Academic Press, London
32. Thurman, H.V. (1985): *Introductory Oceanography*, Bell and Howell Co., London
33. Todd, D.K., Larry, W.M. 2004. *Groundwater Hydrology*, John Wiley & Sons.
34. Viessman Jr., W. and Lewis, G.L. (2008): *Introduction to Hydrology*, Prentice Hall, Upper Saddle River, New Jersey
35. Ward, A.D., Trimble, S.W., Burckhard, S.R., Lyon, J.G. 2016. *Environmental Hydrology*, 3rd ed, CRC Press.
36. Weisberg, J. and Howard, P. (1974): *Introductory Oceanography*, McGraw Hill, Kogakusha, Tokyo
37. Weyl, P.K. (1970): *Oceanography: An Introduction of the Marine Environment*, John Wiley and Sons Ltd., London
38. Wisler, C.O. and Brater, E.F. (1956) (ed.): *Hydrology*, John Wiley and Sons, New York

Detailed Syllabus for Fifth Semester of Geography (Major) Undergraduate Course

**Module Name:** Agricultural Geography

**Module Type:** Discipline Specific Elective

**Paper Code:** GEOG05DSE2

**Credits:** 6

**Total Marks:** 100

**Module Evaluation:**

**Question Pattern -**

**Internal Assessment -**

**GEOG05DSE2 (Theory) [Credits: 4 Marks: 70]**

**Unit 1: Introduction to Agricultural Geography**

- 1.1 Definition, scope and development of Agricultural Geography [4]
- 1.2 Approaches to the study of Agricultural Geography: Regional and Systematic, Population and Productivity [4]
- 1.3 Contribution of the Agricultural Sector in economy and employment [4]

**Unit 2: Factors affecting Agriculture and Land Use**

- 2.1 Factors determining Agricultural Performance: Physical, Technological and Institutional [4]
- 2.2 Land use categories and regional variation in land use pattern [4]
- 2.3 Size of land holdings: advantages and disadvantages [4]
- 2.4 Land capability classification and land use planning [4]

**Unit 3: Agricultural Regionalization and Dimensions of Agricultural Development**

- 3.1 Agricultural Regionalisation: Concept, scope and techniques of delineation [4]
- 3.2 Dimensions of Agricultural Development: Productivity, Diversification, Commercialisation and Contract Farming [4]
- 3.3 Concept of cropping pattern, crop concentration, crop combination, crop rotation [4]
- 3.4 Measures of agricultural efficiency and regional disparity [4]

**Unit 4: Agricultural Revolution and Irrigation Development in India**

- 4.1 Agricultural Revolution in India – Green, White, Blue, Pink [6]
- 4.2 Population and food availability-surplus and deficit situation [4]
- 4.3 Role of irrigation in Indian Agriculture [6]
- 4.4 Problems of agriculture with special reference to India [4]

**GEOG05DSE2 (Practical) [Credits: 2 Marks: 30]**

**Unit 1: Practical Exercises**

- 1.1 Preparation of crop-combination map by combinatorial analysis (Weaver's and Rafiullah's method) [20]
- 1.2 Determination of crop-diversification (Jasbir Singh, Bhatia and Gibb's-Martin index) [20]
- 1.3 Determination of crop-productivity (Yang, Stamp, Eneydi, Shafi, Singh methods) [20]
- 1.4 Laboratory notebook & viva-voce [4]

**Suggested Readings: *Agricultural Geography***

1. Basu, D.N., and Guha, G.S., 1996: Agro-Climatic Regional Planning in India, Vol. I & II, Concept Publication, New Delhi.
2. Bryant, C.R., Johnston, T.R, 1992: Agriculture in the City Countryside, Belhaven Press, London.
3. Burger, A., 1994: Agriculture of the World, Aldershot, Avebury.
4. De, N.K., Jana, N.C. 1997: The Land: Multifaceted Appraisal and Management, Sribhumi Publishing.
5. Gautam, A. 2016: Agricultural Geography, ShardhaPustakBhawan.
6. Grigg, D.B., 1984: Introduction to Agricultural Geography, Hutchinson, London.
7. Ilbery B. W., 1985: Agricultural Geography: A Social and Economic Analysis, Oxford University Press.
8. Mohammad, N., 1992: New Dimension in Agriculture Geography, Vol. I to VIII, Concept Pub., New Delhi.
9. Roling, N.G., and Wageruters, M.A.E.,(ed.) 1998: Facilitating Sustainable Agriculture, Cambridge University Press, Cambridge.
10. Shafi, M., 2006: Agricultural Geography, Doring Kindersley India Pvt. Ltd., New Delhi
11. Singh, J., and Dhillon, S.S., 1984: Agricultural Geography, Tata McGraw Hill, New Delhi.
12. Tarrant J. R., 1973: Agricultural Geography, David and Charles, Devon.

**Detailed Syllabus for Sixth Semester of Geography (Major) Undergraduate Course**

**Course Name:** Evolution of Geographical Thought

**Course Type:** Core Course

**Course Code:** GEOG06C13

**Credits:** 6

**Total Marks:** 100

**Module Evaluation:**

Question Pattern -

Internal Assessment -

**GEOG06C13 (Theory) [Credits: 5 Marks: 80]**

**Unit 1: Introduction to Geographical Thought: Early development phase**

- 1.1 Pre-Modern: Early Origins of Geographical Thinking with reference to the Classical and Medieval Philosophies. (Greek, Roman and Arab Philosophers; Age of exploration and discoveries) [16]

**Unit 2: Establishment of Geography: Modern phase**

- 2.1 Modern: Evolution of Geographical Thinking and Disciplinary Trends in Germany, France, Britain, United States of America [24]

**Unit 3: Evolving Geographical Thought: Dialogues and debates**

- 3.1 Debates: Environmental Determinism and Possibilism, Systematic and Regional, Ideographic and Nomenothetic [12]

**Unit 4: Towards a maturing Geography from World War - II to present time**

- 4.1 Trends: Quantitative Revolution and its Impact, Behaviouralism, Systems Approach, Radicalism, Feminism; Structuralism; Towards Post Modernism: Changing Concept of Space in Geography, Future of Geography [20]
- 4.2 Paradigms in Geography [8]

**GEOG06C13 (Tutorial) [Credits: 1 Marks: 20]**

**Unit I: Presentation and Review**

- 1.1 Literature review, book review, written assignment submission, and presentation on various topics [32]

**Suggested Readings: *Evolution of Geographical Thought***

1. Arentsen M., Stam R. and Thuijss R., 2000: Post-modern Approaches to Space, ebook.
2. Bhat, L.S. (2009) Geography in India (Selected Themes). Pearson
3. Bonnett A., 2008: What is Geography? Sage.
4. Dikshit R. D., 1997: Geographical Thought: A Contextual History of Ideas, Prentice– Hall India.
5. Hartshorn R., 1959: Perspectives of Nature of Geography, Rand MacNally and Co.
6. Holt-Jensen A., 2011: Geography: History and Its Concepts: A Students Guide, SAGE.
7. Johnston R. J., (Ed.): Dictionary of Human Geography, Routledge.
8. Johnston R. J., 1997: Geography and Geographers, Anglo-American Human Geography since 1945, Arnold, London.
9. Kapur A., 2001: Indian Geography Voice of Concern, Concept Publications.
10. Martin Geoffrey J., 2005: All Possible Worlds: A History of Geographical Ideas, Oxford.
11. Soja, Edward 1989. Post-modern Geographies, Verso, London. Reprinted 1997: Rawat Publ., Jaipur, and New Delhi.

**Detailed Syllabus for Sixth Semester of Geography (Major) Undergraduate Course**

**Course Name:** Fieldwork

**Course Type:** Core Course

**Paper Code:** GEOG06C14

**Credits:** 6

**Total Marks:** 100

**Course Evaluation:**

**GEOG06C14 (Field Survey) [Credits: 4 Marks: 70]**

**A Field Survey** shall involve "Identification, Mapping and Interpretation of Salient Features of the Habitat, Economy and Society of the Local Inhabitants" [64]

Measurement and mapping of slope using Clinometer / Dumpy Level / Abney Level or other instruments

Measurement and mapping of geomorphic and geographical features with GPS and other relevant instruments

Acquisition and mapping of landuse pattern by 'plot-to-plot' survey using cadastral map or of a municipal ward

Acquisition and mapping of socio-economic data by 'door-to-door' household enumeration using questionnaire

Identifying the relations between and among the attributes / components of : habitat, economy and society

Pages containing illustrations (sketches, graphs, diagrams, maps, photographs, etc) = 25 (maximum)

Documentation and generation of the field report with the following arrangement : preface, introduction, objectives, methodology, data acquisition, data analysis, data display and interpretation, analysis and conclusion, appendix (of data), and bibliography / references

Word Limit = 8000 (maximum) excluding Tables and Appendix (Computer typed, Line Spacing = 1½, Arial / Times New Roman / Helvetica /Calibri / Trebuchent 10 / 11)

**GEOG06C14 (Field Report) [Credits: 2 Marks: 30]**

**A Field Report** to be prepared and submitted individually by each student, based on actual Field Survey of an area, done jointly or in groups with other students under the supervision of one or more Prof-in-Charge, Field Study [64]

Presentation, Group Discussion and Viva on the prepared Field Report as stated above

**Suggested Readings: Fieldwork**

1. Saha, P.K. and Basu, P. (2009): *Advanced Practical Geography*, Books and Allied (P) Ltd., Kolkata
2. Sarkar, A. (2008): *Practical Geography: A Systematic Approach*, Orient BlackSwan, Kolkata

**Detailed Syllabus for Sixth Semester of Geography (Major) Undergraduate Course**

**Module Name:** Soil Geography

**Module Type:** Discipline Specific Elective

**Paper Code:** GEOG06DSE3

**Credits:** 6

**Total Marks:** 100

**Module Evaluation:**

**Question Pattern -**

**Internal Assessment -**

**GEOG06DSE3 (Theory) [Credits: 4 Marks: 70]**

**Unit 1: Soil and Soil Properties**

- |     |  |     |
|-----|--|-----|
| 1.1 | Concept and definition of soil; Components   | [2] |
| 1.2 | Soil Profile: Regolith, weathering profile; Ideal soil profile: Master horizons and sub-horizons, style of designation, solum  | [5] |
| 1.3 | Units: Pedon, polypedon, soilscape, soil continuum, soil mapping unit  | [4] |
| 1.4 | Soil Morphology: Colour; Texture; Structure; Bulk Density; Porosity; Consistence   | [8] |
| 1.5 | Soil Mineralogy: Types of clay minerals; crystal structure, properties and occurrences of oxides and silicates   | [5] |
| 1.6 | Soil Organisms: Types; Roles in nitrogen fixation, nitrification, denitrification and ammonification   | [4] |
| 1.7 | Soil Organic Matter: Sources, composition, decomposition of soluble and insoluble substances; Humus; Clay-humus complex; Properties of soil colloids; Cation Exchange; Base Saturation | [5] |
| 1.8 | Soil Water: Modes of occurrence; Forces on soil water; Soil water retention; Soil water movement   | [4] |
| 1.9 | Soil pH: Definition and development of soil pH; Effects on nutrient availability   | [4] |

**Unit 2: Soil Forming Factors and Processes**

- |     |   |     |
|-----|---|-----|
| 2.1 | Jenny's factorial model of soil genesis: Parent material, relief, biotic, climate and time factors  | [4] |
| 2.2 | Pedogenic Processes: Simonson's process-system model; Fundamental processes – Eluviations and Illuviation   | [4] |
| 2.3 | Specific processes of horizon differentiation: Calcification-decalcification; Podzolization; Laterization; Latosolization; Gleization; Lessivage; Pedoturbation; Paludization; Melanization | [4] |
| 2.4 | Typical soil profile development: Podzol; Laterite and Chernozem  | [6] |

**Unit 3: Soil Classification**

- |     |  |     |
|-----|--|-----|
| 3.1 | 1938 Soil Classification System; System of Soil Taxonomy – diagnostic horizons, soil moisture and temperature regimes; Soil names and formative elements; USDA Seventh Approximation | [5] |
|-----|--|-----|

**GEOG06DSE3 (Practical) [Credits: 2 Marks: 30]**

**Unit 1: Soil Analysis**

- |     |  |      |
|-----|--|------|
| 1.1 | Plotting of soil texture in ternary diagram          | [24] |
| 1.2 | Determination of soil colour in Munsell colour chart | [20] |
| 1.3 | Determination of Soil pH                             | [20] |



**Suggested Readings: *Soil Geography***

1. Birkeland, P.W. (1999): *Soils and Geomorphology*, Oxford University Press, Oxford
2. Boul, S.W., Hole, F.D. and McCracken, R.J. (1993): *Soil Genesis and Classification*, Affiliated East-West Press, New Delhi
3. Breibart, R. (1988): *Soil Testing Procedures for Soil Survey: Part 2 - Laboratory Procedure Manual*. FAO, UNDP.
4. Burt, R. (ed.) (2004): *Soil Survey Laboratory Methods Manual: Soil Survey Investigations Report No. 42 Version 4.0*, USDA, USA
5. Daji, J.A. (1970): *A Textbook of Soil Science*, Asia Publishing House, London
6. Fullen, M.A. and Catt, J.A. (2004): *Soil Management - Problems and Solutions*; Routledge, London
7. Gerrard, A.J. (1992): *Soil Geomorphology*, Chapman & Hall, London
8. Gerrard, J. (2000): *Fundamentals of Soils (Routledge Fundamentals of Physical Geography Series)*, Routledge, London
9. Huang, P.M., Li, Y. and Sumner, M.E. (2011): *Handbook of Soil Sciences: Properties and Processes*; CRC Press, New York
10. McKenzie, N.J., Grundy, M.J., Webster, R. and Ringrose-Voase, A.J. (2008): *Guidelines for Surveying Soil and Land Resources*; CSIRO Publishing, Melbourne
11. Nayak, D.C., Sarkar, D. and Velayutham, M. (2001): *Soil Series of West Bengal (Technical Bulletin)*; NBSS&LUP (ICAR), Govt. of India, Kolkata
12. Park, S. (1997): *Modelling Soil-landform Continuum on a Three-dimensional Hillslope*, University of Oxford, UK
13. Plaster, E.J. (2009): *Soil Science and Management*, Cengage Learning, Boston
14. Rowell, D.L. (1995): *Soil Science- Methods and Applications*; Longman Scientific & Technical, UK
15. Sarkar, D. (2003): *Fundamentals and Applications of Pedology*, Kalyani Publishers, New Delhi
16. Schaetzl, R. and Anderson, S. (2005): *Soils - Genesis and Geomorphology*, Cambridge University Press, New York
17. Sehgal, J. (1996): *Pedology - Concepts and Application*; Kalyani Publishers, New Delhi
18. United States Bureau of Plant Industry, Soils, and Agricultural Engineering (1951): *Soil Survey Manual, United States Dept. of Agriculture Handbook No. 18*, U.S. Government Printing Office, New York

**Detailed Syllabus for Sixth Semester of Geography (Major) Undergraduate Course**

**Module Name:** Social and Political Geography

**Module Type:** Discipline Specific Elective

**Paper Code:** GEOG06DSE4

**Credits:** 6

**Total Marks:** 100

**Module Evaluation:**

**Question Pattern -**

**Internal Assessment -**

**GEOG06DSE4 (Theory) [Credits: 4 Marks: 70]**

**Unit 1: Social Geography**

- 1.1 Relevance of Social Geographic relevance: Peopling Process of India and Indian Society; Technology and Occupational Changes; Migration and Diaspora [8]
- 1.2 Social Categories: Caste, Class, Language, Religion, Race, Gender and their spatial distribution [8]
- 1.3 Geographies of Welfare and Wellbeing: Concept and Components - Healthcare, Housing, Education and Empowerment [8]
- 1.4 Social Geographies of Inclusion and Exclusion, Slums, Gated Communities, Communal Conflicts and Crime [8]

**Unit 2: Political Geography**

- 2.1 State, Nation and Nation State: Frontiers, Boundaries, Territory and Sovereignty, Concept of Nation State; Concept of geopolitics and theories (Heartland and Rimland) [16]
- 2.2 Electoral Geography - Geography of Voting, Geographic Influences on voting pattern, Geography of Representation, Gerrymandering [16]

**GEOG06DSE4 (Practical) [Credits: 2 Marks: 30]**

**Unit 1: Practical learning**

- 1.1 Analysis of access, infrastructure, and availability of healthcare, housing and educational facilities using data for India [22]
- 1.2 Analysis of political issues pertaining to election, displacement, SEZ, disputes arising from water and natural resource using secondary data [22]
- 1.3 Literature review, book review, written assignment submission, and presentation on various topics on social and political geography [20]

**Suggested Readings: *Social and Political Geography***

1. Agnew J., 2002: *Making Political Geography*, Arnold.
2. Agnew J., Mitchell K. and Toal G., 2003: *A Companion to Political Geography*, Blackwell.
3. Ahmed A., 1999: *Social Geography*, Rawat Publications.
4. Casino V. J. D., Jr., 2009) *Social Geography: A Critical Introduction*, Wiley Blackwell.
5. Cater J. and Jones T., 2000: *Social Geography: An Introduction to Contemporary Issues*, HodderArnold.
6. Cox K. R., Low M. and Robinson J., 2008: *The Sage Handbook of Political Geography*, SagePublications.
7. Cox K., 2002: *Political Geography: Territory, State and Society*, Wiley-Blackwell
8. Gallaher C., et al, 2009: *Key Concepts in Political Geography*, Sage Publications.
9. Glassner M., 1993: *Political Geography*, Wiley.
10. Holt L., 2011: *Geographies of Children, Youth and Families: An International Perspective*, Taylor & Francis.
11. Jones M., 2004: *An Introduction to Political Geography: Space, Place and Politics*, Routledge.
12. Panelli R., 2004: *Social Geographies: From Difference to Action*, Sage.
13. Painter J. and Jeffrey A., 2009: *Political Geography*, Sage Publications
14. Rachel P., Burke M., Fuller D., Gough J., Macfarlane R. and Mowl G., 2001: *Introducing SocialGeographies*, Oxford University Press.
15. Smith D. M., 1977: *Human geography: A Welfare Approach*, Edward Arnold, London.
16. Smith D. M., 1994: *Geography and Social Justice*, Blackwell, Oxford.
17. Smith S. J., Pain R., Marston S. A., Jones J. P., 2009: *The SAGE Handbook of Social Geographies*, Sage Publications.
18. Sopher, David (1980): *An Exploration of India*, Cornell University Press, Ithasa
19. Taylor P. and Flint C., 2000: *Political Geography*, Pearson Education.
20. Valentine G., 2001: *Social Geographies: Space and Society*, Prentice Hall.

**Structure and Detailed Syllabus  
of the Postgraduate Course (M.Sc.) in Geography  
Department of Geography  
Presidency University**



**(w.e.f. Academic Session 2019 - 2020)**



**Department of Geography  
(Faculty of Natural Sciences and Mathematics),  
Presidency University,  
Hindoo College (1817-1855), Presidency College (1855-2010)  
86/1, College Street, Kolkata - 700 073  
West Bengal, India**

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<i>Techniques in Environmental Geography (Elective Stream I: Core Physical Geography)</i>	30
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<i>Regional Geomorphic Entities (Elective Stream I: Core Physical Geography)</i>	38
<i>Geography of Development and Political Economy (Elective Stream II: Core Human Geography)</i>	40
<i>Sediment in the Fluvial System (Special Paper for Elective Stream I: Option A - River Science)</i>	42
<i>Assessing Landscape and Water Quality (Special Paper for Elective Stream I: Option B - Physical Basis of Landscape Management)</i>	43
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<i>Social Well-Being and Community Development with special reference to India (Elective Stream II: Option B - Geographies of Development)</i>	47
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<i>Integrated Landscape and Water Management (Special Paper for Elective Stream I: Option B - Physical Basis of Landscape Management)</i>	51
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## Semester-wise Course Structure and Module Composition

Semester	Papers	No. of Modules	Credit	Marks	Total Marks
Semester - I	Theory	3	12	150	250
	Practical	2	8	100	
Semester - II	Theory	3	12	150	250
	Practical	2	8	100	
Semester - III	Theory	2	8	100	250
	Practical	3	12	150	
Semester - IV	Theory	3	12	150	250
	Practical	2	8	100	
<b>Total</b>	<b>Theory</b>	<b>11</b>	<b>44</b>	<b>550</b>	<b>1000</b>
	<b>Practical</b>	<b>9</b>	<b>36</b>	<b>450</b>	

Course Credits denote the number of teaching hours allocated to the Module / week during the course of the Semester

**Academic Session:** Each Semester shall contain at least 16 Teaching Weeks

Odd Semesters: Semesters One and Three - July to December; Even Semesters: Semesters Two and Four - January to June

**Semester: First      Year: First**

Paper Type	Paper Name	Paper Code	Credits
Theory	Geotectonics and Geomorphology	GEOG 0701	4
Theory	Social Geography and Population Geography	GEOG 0702	4
Theory	Environment and Land Use	GEOG 0703	4
Practical	Research Methodology and Survey Techniques	GEOG 0791	4
Practical	Approaches to Modelling and Qualitative Data Analysis	GEOG 0792	4

**Semester : Second      Year : First**

Paper Type	Paper Name	Paper Code	Credits
Theory	Climatology and Oceanography	GEOG 0801	4
Theory	Regional Planning and Geography of Trade and Transport	GEOG 0802	4
Theory	Philosophy of Geography and Geopolitical Issues	GEOG 0803	4
Practical	Advanced Analytical Techniques	GEOG 0891	4
Practical	Advanced Geoinformatics	GEOG 0892	4

**Semester : Third      Year : Second**

Paper Type	Paper Name	Paper Code	Credits
Theory	Geo-environmental Issues <i>(Elective Stream I: Core Physical Geography)</i>	GEOG 0901A	4
Theory	Contemporary Social Issues in India <i>(Elective Stream II: Core Human Geography)</i>	GEOG 0901B	4
Theory	Streamflow Behaviour and Morphology <i>(Special Paper for Elective Stream I: Option A - River Science)</i>	GEOG 0902A1	4
Theory	Geomorphology and Hydrology of Landscapes <i>(Special Paper for Elective Stream I: Option B - Physical Basis of Landscape Management)</i>	GEOG 0902A2	4
Theory	Concepts and Theories of Regional Development and Urbanisation <i>(Special Paper for Elective Stream II: Option A - Regional Development and Urban Studies)</i>	GEOG 0902B1	4
Theory	Geographies of Tourism and Development Issues <i>(Special Paper for Elective Stream II: Option B - Geographies of Development)</i>	GEOG 0902B2	4
Practical	Techniques in Environmental Geography <i>(Elective Stream I: Core Physical Geography)</i>	GEOG 0991A	4
Practical	Techniques in Human Geography <i>(Elective Stream II: Core Human Geography)</i>	GEOG 0991B	4
Practical	Techniques in River Science <i>(Special Paper for Elective Stream I: Option A - River Science)</i>	GEOG 0992A1	4
Practical	Techniques in Physical Landscape Analysis and Management <i>(Special Paper for Elective Stream I: Option B - Physical Basis of Landscape Management)</i>	GEOG 0992A2	4
Practical	Techniques in Regional and Urban Analysis <i>(Special Paper for Elective Stream II: Option A - Regional Development and Urban Studies)</i>	GEOG 0992B1	4
Practical	Methods in Developmental Geographies <i>(Special Paper for Elective Stream II: Option B - Geographies of Development)</i>	GEOG 0992B2	4
Dissertation	Dissertation Methods	GEOG 0993	4

**Semester : Fourth      Year : Second**

Paper Type	Paper Name	Paper Code	Credits
Theory	Regional Geomorphic Entities <i>(Elective Stream I: Core Physical Geography)</i>	GEOG 1001A	4
Theory	Geography of Development and Political Economy <i>(Elective Stream II: Core Human Geography)</i>	GEOG 1001B	4
Theory	Sediment in the Fluvial System <i>(Special Paper for Elective Stream I: Option A - River Science)</i>	GEOG 1002A1	4
Theory	Assessing Landscape and Water Quality <i>(Special Paper for Elective Stream I: Option B - Physical Basis of Landscape Management)</i>	GEOG 1002A2	4
Theory	Sustainable Urban Development <i>(Special Paper for Elective Stream II: Option A - Regional Development and Urban Studies)</i>	GEOG 1002B1	4
Theory	Social Well-Being and Community Development with special reference to India <i>(Special Paper for Elective Stream II: Option B - Geographies of Development)</i>	GEOG 1002B2	4
Theory	Riverine Landscape Components and Management <i>(Special Paper for Elective Stream I: Option A - River Science)</i>	GEOG 1003A1	4
Theory	Integrated Landscape and Water Management <i>(Special Paper for Elective Stream I: Option B - Physical Basis of Landscape Management)</i>	GEOG 1003A2	4
Theory	Urban Governance, Infrastructure and Development <i>(Special Paper for Elective Stream II: Option A - Regional Development and Urban Studies)</i>	GEOG 1003B1	4
Theory	Agricultural Geography <i>(Special Paper for Elective Stream II: Option B - Geographies of Development)</i>	GEOG 1003B2	4
Practical	Fieldwork Project	GEOG 1091	4
Dissertation	Dissertation Project	GEOG 1092	4

**DEPARTMENT OF GEOGRAPHY**  
**PRESIDENCY UNIVERSITY**

**Detailed Syllabus for First Semester of the Postgraduate Course in Geography**

**Module Name:** *Geotectonics and Geomorphology*

**Paper Type:** Theory

**Paper Code:** GEOG 0701

**Total Marks:** 50 (Semester Examination- 35 and Internal Assessment - 15)

**Credit:** 4 Credit Hours / week (4 x 16 teaching weeks = 64 credit hours per semester)

Figures in [ ] indicate number of credit hours allocated for the topic

**Module Evaluation: Semester Examination (35 marks):** Written examination of 2 hours duration will be held at semester end.

**Question Pattern:** Four Long-answer type questions each of 10 marks (may be split into two parts, one carrying 2 marks at most) will be set for answering any two and five semi-long answer type questions, each of 5 marks will be set for answering any three.

**Internal Assessment (15 marks):** Mode of Internal Assessment (through viva-voce / class presentation / group discussion / written examination / assignment or any other method) will be notified for chosen topic(s) during the Course.

**Unit I: Geotectonics and Landforms**

- 1.1 Global Topography and Hypsography [1]
- 1.2 Tectonic and Structural Landforms: Hierarchies and Varieties; Case studies of significant geologic provinces and plate margins [3]
- 1.3 Triple-Plate Junctions: Types and Stability, Plate Geometry and Movements, Surface Expressions [3]
- 1.4 Tectonic Geomorphology: Principles, Geomorphic Markers, Rates of Uplift and Erosion, Isostatic Relations [3]
- 1.5 Neotectonics and Landscape response: Active tectonics models and riverine and coastal systems; Sedimentation and Tectonics [3]
- 1.6 Linkages between Climate Change and Tectonics; Idea of Snowball Earth [3]

**Unit II: Geomorphology: Concepts and Processes**

- 2.1 Spatial and temporal scales in geomorphological studies; Present research frontiers and Geomorphology in the Anthropocene [3]
- 2.2 Field and Laboratory experiments in Geomorphology: Design, relevance and scaling [2]
- 2.3 Systems Approach in Geomorphology: Feedback Mechanisms, Ideas of Equilibrium, Threshold, Sensitivity, Ergodicity and Hysteresis [4]
- 2.4 River metamorphosis: Concepts, mechanisms and planform changes; Geomorphology of large floods [3]
- 2.5 Geochronology: Concepts; Absolute and Relative Dating of Landscapes and Events; Ascertaining landscape evolutionary histories [4]

**Unit III: Geomorphological Regions and Regimes**

- 3.1 Mountain Geomorphology: Mountain System evolution and rates of erosion, Mass movements and GLOFs, Himalayan case studies [3]
- 3.2 Proglacial and Paraglacial Landscapes: Denudation processes and landforms [3]
- 3.3 Karst and Lateritic Landscapes in Tropical Humid Environments: formation, evolution, human modifications [4]
- 3.4 Global erosion rates, sediment yields, regime and morphologies of Tropical Rivers; Brahmaputra and Subarnarekha case studies [3]
- 3.5 Sediment fluxes in coastal environments and estuaries; Beach morphology; Bioturbation, bio-tidal accretion, storm surge effects [3]

**Unit IV: Applied Geomorphology**

- 4.1 Applied Geomorphology: Principles and Purpose; Anthropogenic Geomorphology: Processes, landforms and land transformations [2]
- 4.2 Geoinformatics in Geomorphology: Utility of satellite images, Digital Elevation Models and advanced surveying methods [3]
- 4.3 Principles of River Restoration: Hard and Soft Techniques; Riparian quality and stream health evaluation [3]
- 4.4 Habitat Dynamics in lotic ecosystems: Rapid Habitat Assessment Methods; Understanding Stress, Habitat Gain/Loss and Extents [3]
- 4.5 Geomorphological processes in urban environments: runoff and channelisation concepts, geotechnical engineering principles [3]
- 4.6 Geodiversity: Basic concepts and measurements, Geoheritage and Geoconservation [2]



**Suggested Readings:**

1. Anderson, R.S. and Anderson, S.P. (2010): *Geomorphology: The Mechanics and Chemistry of Landscapes*, CUP, Cambridge
2. Bierman, P.R., Montgomery, D.R. (2014): *Key Concepts in Geomorphology*. W.H. Freeman and Co.
3. Bishop, M.P. (2013.): Remote sensing and GI Science in geomorphology: introduction and overview. In: Shroder, J. (Editor in Chief), Bishop, M.P. (Ed.), *Treatise on Geomorphology*. Academic Press, San Diego, CA, vol. 3
4. Bloom, A.L. (2002): *Geomorphology: A Systematic Analysis of Late Cenozoic Landforms*, Prentice Hall, Upper Saddle River, NJ
5. Butler, D.R., Hupp, C.R. (2013): The role of biota in geomorphology: Ecogeomorphology. In: Shroder, J. (Editor in chief), Butler, D.R., Hupp, C.R. (Eds.), *Treatise on Geomorphology*. Academic Press, San Diego, CA, vol.12
6. Chorley, R.J. and Kennedy, B.A. (1971): *Physical Geography: A Systems Approach*, Prentice Hall, Upper Saddle River, New Jersey
7. Condie, K.C. (2003): *Plate Tectonics and Crustal Evolution*, Butterworth-Heinemann, Oxford, Burlington
8. Cooke, R.U., Doornkamp, J.C. (1990): *Geomorphology in environmental management. A New Introduction*, Clarendon, Oxford.
9. Darby, S., Sear D. (eds.) (2008): *River Restoration: Managing the Uncertainty in Restoring Physical Habitat*. John Wiley & Sons, Ltd
10. DWAF: Department Of Water Affairs and Forestry (2009): *Rapid Habitat Assessment Model Manual*. Report no RDM/Nat/00/CON/0707. Authors: Louw, D., Kleynhans, C.J. Submitted by Water for Africa
11. Faniran, A. and Jeje, L.K. (1983): *Humid Tropical Geomorphology*, Longman, London
12. Firsch, W., Meschede, M. and Blakey, R. (2011): *Plate Tectonics, Continental Drift and Mountain Building*, Springer-Verlag, Berlin
13. Goudie, A.S. (1990): *Geomorphological Techniques*, Unwin Hyman, London
14. Goudie, A.S. (ed.) (2004): *Encyclopaedia of Geomorphology*, Routledge, London
15. Goudie, A.S. and Viles, H. (2010): *Landscapes and Geomorphology: A Very Short Introduction*, Oxford University Press, Oxford
16. Gray, M. (2013): *Geodiversity: Valuing and Conserving Abiotic Nature*. Wiley-Blackwell
17. Gregory K.J., Goudie A.S. (eds.) (2011); *The SAGE Handbook of Geomorphology*
18. Gutierrez, M. (2013): *Geomorphology*, CRC Press, Boca Ranton, Florida
19. Hamblin, W.K. and Christiansen, E. (2003): *Earth's Dynamic Systems*, Prentice Hall, Upper Saddle River, New Jersey
20. Huggett, R.J. (2011): *Fundamentals of Geomorphology*, Routledge, New York
21. Kale, V.S. and Gupta, A. (2001): *Introduction to Geomorphology*, Orient Longman, Kolkata
22. Keary, P. and Vine, M. (1997): *Global Tectonics*, Blackwell Scientific Publications, Oxford
23. Leopold, L. B., Wolman, M. G. and Miller, J. P. (1964): *Fluvial Processes in Geomorphology*, W.H. Freeman, San Francisco
24. Ollier, C.D. (1981): *Tectonics and Landforms*, Longman Group Ltd., London
25. Owen, L.A. (2013): Tectonic geomorphology: a perspective. In: Shroder, J. (Editor in Chief), Owen, L.A. (Ed.), *Treatise on Geomorphology*. Academic Press, San Diego, CA, vol. 5
26. Owens, P.N. and Slaymaker, O. (2004) *Mountain Geomorphology*, Routledge
27. Reynard, E, Brilha, J. (2017): *Geoheritage: Assessment, Protection, and Management*. Elsevier
28. Richards, K. (1982): *Rivers: Form and processes in alluvial channels*, Methuen, London
29. Sack, D., Orme, A.R. (2013): Introduction to the foundations of geomorphology. In: Shroder, J. (Editor in Chief), Orme, A.R., Sack, D. (Eds.), *Treatise on Geomorphology*. Academic Press, San Diego, CA, vol. 1
30. Schumm, S.A. (1977): *Fluvial Systems*, Wiley, New York
31. Selby, M.J. (1985): *Earth's Changing Surface: An Introduction to Geomorphology*, Clarendon Press, Oxford
32. Small, R.J. (1978): *The Study of Landforms: A Textbook of Geomorphology*, Cambridge University Press, Cambridge
33. Summerfield, M.A. (1991): *Global Geomorphology: An Introduction to the Study of Landforms*, Longman, London
34. Summerfield, M.A. (ed.) (2000): *Geomorphology and Global Tectonics*, Wiley, Chichester
35. Thomas, M.F. (1994): *Geomorphology in the Tropics: A study of weathering and denudation in low latitudes*, Wiley, Chichester
36. Thorn, C. (1988): *Introduction to Theoretical Geomorphology*, Unwin Hyman, Boston
37. Young, A. (1972): *Slopes*, Oliver and Boyd, Edinburgh

**DEPARTMENT OF GEOGRAPHY**  
**PRESIDENCY UNIVERSITY**

**Detailed Syllabus for First Semester of the Postgraduate Course in Geography**

**Module Name:** *Social Geography and Population Geography*

**Paper Type:** Theory

**Paper Code:** GEOG 0702

**Total Marks:** 50 (Semester Examination - 35 and Internal Assessment - 15)

**Credit:** 4 Credit Hours / week (4 x 16 teaching weeks = 64 credit hours per semester)

Figures in [ ] indicate number of credit hours allocated for the topic

**Module Evaluation: Semester Examination (35 marks):** Written examination of 2 hours duration will be held at semester end.

**Question Pattern:** Four Long-answer type questions each of 10 marks (may be split into two parts, one carrying 2 marks at most) will be set for answering any two and five semi-long answer type questions, each of 5 marks will be set for answering any three.

**Internal Assessment (15 marks):** Mode of Internal Assessment (through viva-voce / class presentation / group discussion / written examination / assignment or any other method) will be notified for chosen topic(s) during the Course.

**Unit I: Elements of Indian Society**

1.1 Concept of Caste, Class and Ethnicity in India

Depiction in the Ancient Texts of India- Varna and Jati- Patron Client Relationship, Caste in Colonial Period, Post Independent Caste Identity, Scheduled Caste and Backward Caste, Spatial Distribution of various castes in India [6]

Concept of Class and Ethnicity [2]

1.2 Religion and Tribal Identity

Concept of Religion: Major religions- World and India, Minority population and issues of communalism [4]

Tribes concept, spatial distribution in India, Tribes in India: Concept and spatial distribution; Tribal Society and Identity [4]

**Unit II: Geography of Social Space: Indian Context**

2.1 Social disintegration and spatial segmentation in India- examples from rural and urban areas [4]

2.2 Social Justice: Concept, Constitutional Provisions, Social Security [4]

2.3 Social problems in India- Social exclusion, backwardness and deprivation of SC, ST population [4]

2.4 Socio-spatial inequality in Education and Health [4]

**Unit III: Population in India**

3.1 Ageing of population; Occupational structure: Census, NSSO; Types of workers: regular, salaried, self-employed, casual; Determinants of workforce [4]

3.2 Impact of migration on population change and economy of source area and destination [2]

3.3 Population problems with special reference to India: Food, housing, unemployment and poverty [4]

3.4 Population policies: Pre-independence, Post-independence, National Population Policy (NPP) 2000 [4]

**Unit IV: Morbidity and Mortality**

4.1 Need and importance of the study of Morbidity and Mortality; Measures of Morbidity; Interrelationships between measures of morbidity, Incidence and prevalence rates [6]

4.2 Direct and indirect techniques of standardization of mortality rates; Measures of infant mortality (IMR)- Neo-natal (early and late) and post-Neonatal mortality; Importance of Infant mortality in population and health [6]

4.3 Basic concept of a life table; Brief history of life tables: Anatomy of life table; Types and forms of life tables; Application of life table in demographic analysis [6]

**Suggested Readings: Social Geography**

1. Ahmad, A. (1999): *Social Geography*, Rawat Publications, Jaipur and New Delhi
2. Anderson, K. (2006): *Race and Crises of Human Development*, Routledge, London and New Delhi
3. Beteille, A. (1983): *Equality and Inequality*, Oxford University Press, New Delhi
4. Brewer, J.D. (2000): *Ethnography*, Open University Press, Buckingham, Philadelphia
5. Casino, V.J.D., Jr., (2009): *Social Geography: A Critical Introduction*, Wiley-Blackwell, Chichester
6. Coates, B.E., Johnston, R.J. and Knox, P.L. (1977): *Geography and Inequality*, Oxford University Press, Oxford and London
7. Dubey, S.C. (1991): *Indian Society*, National Book Trust, New Delhi
8. Eyles, J. (ed.) (1986): *Social Geography in International Perspective*, Rowman and Littlefield, New Jersey and Los Angeles
9. Forde, C.D. (1934): *Habitat, Economy and Society*, Methuen and Company, London
10. Gore, M.S. (1985): *Social Aspects of Development*, Rawat Publications, Jaipur
11. Gregory, D. and Larry, J. (eds.) (1985): *Social Relations and Spatial Structures*, MacMillan, London
12. Hammett, C. (eds.) (1996): *Social Geography: A Reader*, Arnold, London
13. Haq, M. (2000): *Reflections on Human Development*, Oxford University Press, New Delhi
14. Jackson, P. and Susan, J.S. (1984): *Exploring Social Geography*, George Allen and Unwin, Boston and Sydney
15. Jones, E. (ed.) (1975): *Readings in Social Geography*, Oxford University Press, London
16. Mishra, R.P., Sundram, K.U. and Prakash Rao, V.V.S. (1974): *Regional Development Planning in India*, Vikas Publishing, Delhi
17. Norton, W. (2006): *Cultural Geography: Environments, Landscapes, Identities, Inequalities*, Oxford University Press, Toronto
18. Planning Commission, Government of India (1981): *Report on Development of Tribal Areas*, New Delhi
19. Sahlin, M.D. (1968): *Tribesmen*, Prentice Hall, Upper Saddle River, New Jersey
20. Sharma, K.L. (1980): *Essays on Social Stratification*, Rawat Publications, Jaipur and New Delhi
21. Smith, D. (1977): *Geography: A Welfare Approach*, Edward Arnold, London
22. Sopher, D. (1980): *An Exploration of India: Geographical Perspectives on Society and Culture*, Cornell University Press, Ithaca, New York
23. Subba R.B. (1958): *Personality of India: Pre- and Proto- Historic Foundation of India and Pakistan*, M.S. University Baroda, Vadodara
24. Valentine, G. (2001): *Social Geographies: Space and Society*, Prentice Hall, Harlow, U.K.

**Suggested Readings: Population Geography**

1. Administrative Staff College of India, A comparative assessment of the Burden of Disease in selected states: Methodology, results, policy and program intervention. Research Paper No. 2.
2. Bhende, Asha and Tara Kanitkar, Principles of Population Studies, Himalaya Publishing House, Bombay (Chapter 7).
3. Coale, Ansley J. and Paul, Demney, Regional Model Life Tables and Stable Populations, Academic Press, New York.
4. Government of India, National Child Survival and Safe Motherhood Program, Ministry of Health and Family Welfare, New Delhi.
5. Jagger, C. Health Expectancy calculation by the Sullivan Method: A Practical Guide, NUPRI, Research Paper Series No. 68.
6. Murray C. J. L. and A.D. Lopez, Global and regional cause -of-death patterns in 1990, Bulletin of the WHO, 72(3): 447-480.
7. Murray C. J. L., J. A. Salomon, C. D. Mathers and A. D. Lopez, Summary Measures of Population Health: Concepts, Ethics, Measurement and Applications. WHO, Geneva.
8. Murray, C. J. L., B. D. Ferguson, A. D. Lopez, M. Guillot, J. A. Salomon and O. Ahmad, Modified logit life table system: Principles, empirical validation and application, Population Studies 57 (2): 1-18.
9. United Nations, Health and Mortality Issues of Global Concern, Proceeding of the Symposium on Health and Mortality, Brussels, 19-22 November 1997.

**DEPARTMENT OF GEOGRAPHY**  
**PRESIDENCY UNIVERSITY**

**Detailed Syllabus for First Semester of the Postgraduate Course in Geography**

**Module Name:** *Environment and Land Use*

**Paper Type:** Theory

**Paper Code:** GEOG 0703

**Total Marks:** 50 (Semester Examination - 35 and Internal Assessment - 15)

**Credit:** 4 Credit Hours / week (4 x 16 teaching weeks = 64 credit hours per semester)

Figures in [ ] indicate number of credit hours allocated for the topic

**Module Evaluation: Semester Examination (35 marks):** Written examination of 2 hours duration will be held at semester end.

**Question Pattern:** Four Long-answer type questions each of 10 marks (may be split into two parts, one carrying 2 marks at most) will be set for answering any two and five semi-long answer type questions, each of 5 marks will be set for answering any three.

**Internal Assessment (15 marks):** Mode of Internal Assessment (through viva-voce / class presentation / group discussion / written examination / assignment or any other method) will be notified for chosen topic(s) during the Course.

**Unit I: Environmental Issues in Geography**

- |   |     |
|---|-----|
| 1.1 Man-Land relationships; Ecological balance; Restoring damaged ecosystems    | [4] |
| 1.2 Social Vulnerability and Environmental Change; Environmental Justice        | [5] |
| 1.3 Alternative views on Climate Change   | [3] |
| 1.4 Big dams versus small dams  | [3] |
| 1.5 Lentic Ecosystems: Characteristics and Habitats                             | [3] |
| 1.6 International and Inter-State Water Dispute in Indian subcontinent          | [4] |
| 1.7 Municipal Solid Waste: Disposal Recovery and Management                     | [5] |
| 1.8 Plastic and Micro-plastic Pollution: Threats to Aquatic Ecosystems          | [2] |
| 1.9 Documentary Analysis: The Inconvenient Truth, Before the Flood, Ice on Fire | [3] |

**Unit II: Land Use**

- |   |     |
|---|-----|
| 2.1 Land: Concept, attributes of land; Land Capability Classification (USDA); Land as a Common Resource; Land as the basis of ecology and society | [4] |
| 2.2 Approaches to land use studies; Multi-temporal land use/land cover change detection; Analysis of change dynamics                              | [6] |
| 2.3 Impact of land use/land cover change on groundwater recharge; GIS-based soil erosion assessment and digital soil mapping                      | [6] |
| 2.4 Impact of land use on soil resource; Irrigation and soil degradation  | [4] |
| 2.5 Land use change; Global food production and food security   | [6] |
| 2.6 Impact of urbanisation and infrastructural development on land and soil   | [6] |

**Suggested Readings: Environment and Land Use**

- Bell, M.M. (2012): *An Invitation To Environmental Sociology*, Sage, New Delhi
- Botkin, D.B., and Keller, E.A. (2013): *Environmental Science*, Wiley, New Delhi
- Elliott, L. (2004): *The Global Politics of the Environment*, Palgrave Macmillan, New York
- Forman, R.T.T. (1995): *Land Mosaics: The Ecology of Landscapes and Region*, Cambridge University Press, Cambridge
- Jana, N.C. and De, N.K. (1997): *The Land- Multifaceted Appraisal and Management*, Sribhumi Publishing Company, Kolkata
- Mather, A.S. (1986): *Land use*, Wiley.
- Mollinga, P.P., Dixit, A. and Athukorala, K. (eds.) (2006): *Integrated Water Resources Management : Global Theory, Emerging Practice and Local Needs*, Sage, New Delhi
- Turner, M.G. (2011): *Landscape Heterogeneity and Disturbance*, Springer, London
- Turner, M.G., Gardner, R.H. and O'Neill, R.V. (2001): *Landscape Ecology in Theory and Practice: Pattern and Process*, Springer Science & Business Media, New York
- Vink, A.P.A. (1983): *Landscape Ecology and Land Use*, Longman, London and New York
- Wright, R.T. and Boorse, D.F. (2011): *Environmental Science: Toward A Sustainable Future*, PHI Learning Private Limited, New Delhi

## DEPARTMENT OF GEOGRAPHY PRESIDENCY UNIVERSITY

### Detailed Syllabus for First Semester of the Postgraduate Course in Geography

**Module Name:** *Research Methodology and Survey Techniques*

**Paper Type:** Practical

**Paper Code:** GEOG 0791

**Total Marks:** 50

**Credit:** 6 Credit Hours / week (6 x 16 teaching weeks = 96 credit hours per semester)

Figures in [ ] indicate number of credit hours allocated to that particular topic per teaching week

**Module Evaluation:** Continuous Evaluation throughout the Semester

#### Unit I: Fundamentals of Research

- 1.1 Nature of Science: description, causality, prediction and explanation; Nature of natural and behavioural systems; Nature of Geographical enquiries- Physical and Human; Deterministic and non-deterministic approaches [7]
- 1.2 Theorizing our World- ontology, epistemology, research paradigms, methods and methodology; Types of logical reasoning- Inductive, Deductive and Abductive [6]
- 1.3 Nature and objectives of research; Research Types: descriptive-analytical, pure-applied, conceptual-empirical, qualitative-quantitative [5]

#### Unit II: Research Process

- 2.1 Steps in Research process [3]
- 2.2 Needs and objectives of Literature Review; Conducting literature survey- searching literature, reviewing selected literature, developing theoretical and conceptual frameworks, Reporting literature review [6]
- 2.3 Citation methods- foot note, text note, end note, bibliography, annotated bibliography and citation rules [6]
- 2.4 Research Problems- meaning, importance and sources; selecting, defining, stating and evaluating a research problem; Selection of research objectives; Exercises on writing introduction of a research article [6]
- 2.5 Hypothesis: Definition, sources, roles and types of hypothesis; Tests of hypothesis with small and large samples; Type I and Type II Errors in testing hypotheses [6]
- 2.6 Research Strategies: Case studies, Experiments, Ethnography, Phenomenology, Grounded Theory, Action Research [6]
- 2.7 Data Collection Methods: Questionnaire, Interview, Focus Group, Participant Observation; Sampling- Concept, principles, factors affecting inferences drawn from a sample; Types of sampling- random and probability sampling designs, systematic sampling; Sample size calculation [10]

#### Unit III: Reading a Scientific Research Paper

- 3.1 Introduction Section: Background, Hypothesis/Research Question, Premise, Logic, Novelty [5]
- 3.2 Material and Method Section: Research Design, Data/Materials used, Sampling Strategy, Techniques used [6]
- 3.3 Result Section: Coherence, Reliability and validity of data; Important observations [5]
- 3.4 Discussion Section: Interpretation of results and main conclusions [5]

#### Unit IV: Surveying Methods

- 4.1 Fundamentals of TS survey and Terrain Mapping with DEM and TIN generation [7]
- 4.2 DGPS Survey techniques [7]

#### Suggested Readings: *Research Methodology and Survey Techniques*

1. Clifford, N., Cope, M., Gillespie, T., & French, S. (Eds.). (2016). *Key methods in Geography*. Sage.
2. Gomez, B., & Jones III, J. P. (Eds.). (2010). *Research methods in geography: A critical introduction* (Vol. 6). John Wiley & Sons.
3. Hegde, D. S. (Ed.). (2015). *Essays on research methodology*. Springer.
4. Kleiner, S. (1993). *The logic of discovery: A theory of the rationality of scientific research*. Springer Science & Business Media.
5. Kumar, R. (2019). *Research methodology: A step-by-step guide for beginners*. Sage Publications Limited.
6. Locharoenrat, K. (2017). *Research Methodologies for Beginners*. Pan Stanford.
7. Mellenbergh, G. J., & Adèr, H. J. (Eds.). (1999). *Research Methodology in the Life, Behavioural and Social Sciences*. Sage.
8. Pruzan, P. (2016). *Research methodology: the aims, practices and ethics of science*. Springer.
9. Singh, Y. K. (2006). *Fundamental of research methodology and statistics*. New Age International.
10. Yeong, F. M. (2014). *How to Read and Critique a Scientific Research Article: Notes to Guide Students Reading Primary Literature (with Teaching Tips for Faculty Members)*. World Scientific Publishing Company.

**DEPARTMENT OF GEOGRAPHY**  
**PRESIDENCY UNIVERSITY**

**Detailed Syllabus for First Semester of the Postgraduate Course in Geography**

**Module Name:** *Approaches to Modelling and Qualitative Data Analysis*

**Paper Type:** Practical

**Paper Code:** GEOG 0792

**Total Marks:** 50

**Credit:** 6 Credit Hours / week (6 x 16 teaching weeks = 96 credit hours per semester)

Figures in [ ] indicate number of credit hours allocated to that particular topic per teaching week

**Module Evaluation:** Continuous Evaluation throughout the Semester

**Unit I: Fundamentals of Models and Modelling**

- |   |      |
|---|------|
| 1.1 Concept of model: Nature of environmental systems; Types of model   | [4]  |
| 1.2 Purpose of modelling; Model structure and formulation   | [5]  |
| 1.3 Describing problems with mathematical formalism   | [7]  |
| 1.4 Introduction to numerical methods- Ordinary Differential Equations, Partial Differential Equations, Polynomial Approximations, Finite Differences and Finite elements | [10] |
| 1.5 Model parameterization and calibration; Model evaluation methods - Graphical analysis, Quantitative analysis of accuracy, Sensitivity analysis, Uncertainty analysis  | [7]  |
| 1.6 Case Studies of environmental models: Soil and Hydrology- experimental models, Erosion and transport models   | [8]  |

**Unit II: Modelling Temporal Data**

- |   |     |
|---|-----|
| 2.1 Analysis of Temporal Data: Markov Chains- Concept, transitions frequency matrix, transition probability matrix, testing the transition frequency matrix | [6] |
| 2.2 Series of events: Testing for randomness, trend, uniformity and pattern   | [4] |
| 2.3 Noise reduction: Smoothing, windows and filters   | [4] |
| 2.4 Detection of Cycles: Autocorrelation; Fourier Analysis  | [6] |
| 2.5 Principles of ARIMA modelling   | [7] |

**Unit III: Handling Qualitative Data**

- |   |     |
|---|-----|
| 3.1 Designing a project for qualitative data analysis using a qualitative analytic software | [6] |
| 3.2 Creating documents and document attributes for qualitative analysis                     | [6] |
| 3.3 Setting up a coding system and coding text for qualitative analysis                     | [8] |
| 3.4 Modelling the conceptual framework using qualitative analytic software                  | [8] |

**Suggested Readings:** *Approaches to Modelling and Qualitative Analysis*

1. Auerbach, C.F. and Silverstein, L.B. (2003): *Qualitative Data: An Introduction to Coding and Analysis*, New York University Press
2. Bar-Yam, Y. (2000): *Dynamics of Complex Systems*, Perseus Books, Reading
3. Bazeley, P. (2007): *Qualitative Data Analysis with NVivo*, SAGE Publications, London
4. Chatfield, C. (1995): *The Analysis of Time Series: An Introduction*, Chapman & Hall, Boca Raton
5. Gibbs, G. (2002): *Qualitative Data Analysis: Explorations with NVivo*, Open University, London
6. Guermond, Y. (ed.) (2008): *The Modeling Process in Geography: From Determinism to Complexity*, John Wiley & Sons, London
7. Rapoport, A. (1983): *Mathematical Models in Social and Behavioral Sciences*, John Wiley & Sons, New York
8. Richards, L. (1999): *Using NVIVO in Qualitative Research*, SAGE Publications, London
9. Sanders, L. (ed.) (2007): *Models in Spatial Analysis*, ISTE Ltd., London
10. Smith, J. and Smith, P. (2011): *Environmental Modelling: An Introduction*, Oxford University Press, Delhi
11. Strauss, A.L. (1987): *Qualitative Analysis fo Social Scientists*, Cambridge University Press, Cambridge
12. Swan, A.R.H., Sandilands, M. and McCabe, P. (1995): *Introduction to Geological Data Analysis*, Blackwell Science Ltd., Oxford
13. Wainwright, J. and Mulligan, M. (Eds.) (2004): *Environmental Modelling: Finding Simplicity in Complexity*, Wiley & Sons Ltd., Chichester
14. Wilson, A.G. and Kirkby, M.J. (1980): *Mathematics for Geographers and Planners*, Oxford University Press, Oxford

## DEPARTMENT OF GEOGRAPHY

### PRESIDENCY UNIVERSITY

#### Detailed Syllabus for Second Semester of the Postgraduate Course in Geography

**Module Name:** *Climatology and Oceanography*

**Paper Type:** Theory

**Paper Code:** GEOG 0801

**Total Marks:** 50 (Semester Examination - 35 and Internal Assessment - 15)

**Credit:** 4 Credit Hours / week (4 x 16 teaching weeks = 64 credit hours per semester)

Figures in [ ] indicate number of credit hours allocated for the topic

**Module Evaluation: Semester Examination (35 marks):** Written examination of 2 hours duration will be held at semester end.

**Question Pattern:** Four Long-answer type questions each of 10 marks (may be split into two parts, one carrying 2 marks at most) will be set for answering any two and five semi-long answer type questions, each of 5 marks will be set for answering any three.

**Internal Assessment (15 marks):** Mode of Internal Assessment (through viva-voce / class presentation / group discussion / written examination / assignment or any other method) will be notified for chosen topic(s) during the Course.

#### Unit I: Atmospheric Thermodynamics and Dynamics

- 1.1 Atmospheric Thermodynamics: Equations of state for ideal gases, Specific Gas Constant; First Law of Thermodynamics- Work, Internal Energy, Entropy, Specific Heat Capacity [2]
- 1.2 Adiabatic Processes, Equations of state of moist air and latent heat [2]
- 1.3 Hydrostatic equilibrium: Hydrostatic equation, variation of pressure with height, geopotential; Hydrodynamic stability [2]
- 1.4 Entropy and Second Law of Thermodynamics, Carnot Cycle and Clausius-Clapeyron equation [2]
- 1.5 Electrical fields in Thunderstorms, Theories of Thunderstorm Electrification [2]
- 1.6 Basic equations and fundamental forces: Pressure, Gravity, Centripetal and Coriolis forces, Continuity Scale Analysis, Inertia Flow, Geostrophic and Gradient Winds, Thermal Wind, Divergence and Vertical Motion; Rossby, Richardson, Reynold and Froude Numbers; Circulation, Vorticity and Divergence [6]

#### Unit II: Monsoon Climatology and Climate Change

- 2.1 Genesis of Indian Monsoon and the causes of its variability [3]
- 2.2 Classification, sources, origin and modifications of air masses [4]
- 2.3 Urban Microclimate with special reference to tropical cities [3]
- 2.4 Global Climate Change: Climatic records; Evidences of past climatic changes; Causes - Natural and Anthropogenic; Feedback mechanism; Possible impacts; Reaction, prevention, mitigation and adaptations [4]
- 2.5 Forecast of local weather [2]

#### Unit III: Physical Oceanography

- 3.1 Evolution of Ocean Floor Morphostructure: Actualistic Model [3]
- 3.2 Upper Ocean Structure and Processes [4]
- 3.3 Vorticity, Deep Ocean Circulation and Ocean Waves [3]
- 3.4 Langmuir Currents and Thermohaline Circulation, Instability and Ocean Heat Budget [4]
- 3.5 Ocean Current Temperature and its relation with El-Nino [3]
- 3.6 Tides: generating forces, types, theories and effects [3]

#### Unit IV: Marine Resources and Coastal Management

- 4.1 Pelagic and Benthic Communities of the Ocean [4]
- 4.2 Marine Resources: Types, extraction methods and economic significance [4]
- 4.3 Marine and Coastal Area Management Policies: EEZ, CRZ, ICZM [4]

**Suggested Readings: Climatology**

1. Ackerman, S.A. and Knox, J.A. (2012): *Meteorology: Understanding the Atmosphere*, Jones & Bartlett Learning, London
2. Atkinson, B. W. (Ed.) (1981): *Dynamical Meteorology: An Introductory Selection*, Methuen, London
3. Barry, R.G. and Chorley, R.J. (2003): *Atmosphere, Weather and Climate*, Routledge, London
4. Byers, H. R. (1974): *General Meteorology*, McGraw-Hill Book Company, New York
5. Chandrasekar, A. (2010): *Basics of Atmospheric Science*, PHI Learning Pvt. Ltd., New Delhi
6. Houghton, J. (2002): *Physics of Atmosphere*, Cambridge University Press, Cambridge
7. Mclveen, R. (2010): *Fundamentals of Weather and Climate*, Oxford University Press, Oxford
8. Rayner, J.N. (2001): *Dynamic Climatology - Basis in Mathematics and Physics*, Blackwell Publishers Ltd., Oxford
9. Rohli, R.V. and Vega, A. J. (2012): *Climatology*, Jones & Bartlett Learning, London
10. Thompson, R. D. (1998): *Atmospheric Pressures and Systems*, Routledge, London
11. Uman, M. A. (1984): *Lightning*, Dover-Publications, New York
12. Wallace, J.M. and Hobbs, P.V. (1977): *Atmospheric Science:- An Introductory Survey*, Academic Press, New York

**Suggested Readings: Oceanography**

1. Davis, R.J.A. (1986): *Oceanography - An Introduction of the Marine Environment*, Win C. Brown, Iowa
2. Day, T. (2006): *Oceans*, Chelsea House, New York
3. Erickson, J. 2003): *Marine Geology: Exploring the New Frontiers of the Ocean*, Facts on File, Inc., New York
4. Garrison, T. (2009): *Essentials of Oceanography*, Brooks/Cole, Belmont, California
5. Ilyin, A.V. (2003): *Evolution of the Ocean Floor Morphostructure - Actualistic Model*, in Evans, I.S., Dikau, R. Tokunaga, E., Ohmori, H. and Hirano, M. (eds.) *Concepts and Modelling in Geomorphology: International Perspectives*, Terrapub, Tokyo, pp. 43-59
6. King, C.A.(1962): *Oceanography for Geographers*, Edward Arnold, New York
7. Pinet, P.R. (2009): *Invitation to Oceanography*, Jones and Bartlett Publishers, Sudbury, Massachusetts
8. Robert, C.M. (2009): *Global Sedimentology of the Ocean: An Interplay between Geodynamics and the Palaeoenvironment*, Elsevier, Amsterdam
9. Stahler, A.N. and Stahler A.N.(1997): *Geography and Man's Environment*, John Wiley and Sons, New York
10. Thorpe, S.A., Steele, J.H., Turekian, K.K. (eds.) (2009): *Elements of Physical Oceanography*, Academic Press, London
11. Thurnman, H.V.(1978): *Introduction to Oceanography*, Charles E. Merrill Pub. Co., London
12. Weyl, P.K. (1970): *Oceanography: An Introduction of the Marine Environment*, John Wiley and Sons Ltd., London



**DEPARTMENT OF GEOGRAPHY**  
**PRESIDENCY UNIVERSITY**

**Detailed Syllabus for Second Semester of the Postgraduate Course in Geography**

**Module Name:** *Regional Planning and Geography of Trade and Transport*

**Paper Type:** Theory

**Paper Code:** GEOG 0802

**Total Marks: 50** (Semester Examination - 35 and Internal Assessment - 15)

**Credit:** 4 Credit Hours / week (4 x 16 teaching weeks = 64 credit hours per semester)

Figures in [ ] indicate number of credit hours allocated for the topic

**Module Evaluation: Semester Examination (35 marks):** Written examination of 2 hours duration will be held at semester end.

**Question Pattern:** Four Long-answer type questions each of 10 marks (may be split into two parts, one carrying 2 marks at most) will be set for answering any two and five semi-long answer type questions, each of 5 marks will be set for answering any three.

**Internal Assessment (15 marks):** Mode of Internal Assessment (through viva-voce / class presentation / group discussion / written examination / assignment or any other method) will be notified for chosen topic(s) during the Course.

**Unit I: Concept of Region**

- 1.1 Approaches to regional studies: ecological, economic and socio-cultural [2]
- 1.2 Regional hierarchy (micro, meso and macro); region of isolation (cul de sac); backward region [2]
- 1.3 Regional delineation: Physical and economic (Chatterjee, Nath, Bhat, Sdasyuk and Sengupta). [6]
- 1.4 Techniques in regional analysis: Regional Multiplier; Input-output, export based model [3]

**Unit II: Planning in India**

- 2.1 Balanced and unbalanced growth in India; Centralized and Decentralized Regional Planning Process [3]
- 2.2 Impact of New Economic Policies on regional inequality in India: Location of new regional economic activities [4]
- 2.3 Economic issues of rural development: Differentiating economic growth and economic development, rural jobs and income sources [4]
- 2.4 Metropolitan region: Concept of city region and delineation techniques, Case Study of NCR [4]
- 2.5 Regional Planning in WestBengal: Rural (Panchayati Raj) and Metropolitan Planning [4]

**Unit III: Geography of Transport and Trade**

- 3.1 Geography of Transportation and its significance [2]
- 3.2 Modes of transport and Comparative cost advantages [4]
- 3.3 Environment and transport: positive and negative dimensions [2]
- 3.4 Transport Network Analysis: Topology, Graph Theory; Accessibility and Connectivity- Network and nodal connectivity (Inter-regional and Intra-regional) [6]
- 3.5 Models of transport: Spatial interaction model, Traffic analysis and congestion model, Urban Transport problems [8]
- 3.6 GATT, WTO and TRIPS: Functions and relevance [6]
- 3.7 World Trade Blocs; Global Conflict on Energy Resources [4]

**Suggested Readings: *Regional Planning and Geography of Trade and Transport***

1. Acharyya, J. (2015): FDI and Regional Disparity in India, *Journal of Public Administration*, 62 (4), pp. 1336-1349
2. Black, W. R. (2003): *Transportation: A Geographical Analysis*, Guilford Press, New York
3. Chand, M. and Puri, V.K. (1983): *Regional Planning in India*, Allied Publishers, New Delhi
4. Chandna, R. C. (2005). *Regional Planning and Development*, Kalyani Publishers, Kolkata.
5. Claval, P. (1998). *An Introduction to Regional Geography*. Blackwell Publishers, USA
6. Dubey, K. N. (1991): Public Policy, Structural Inequality and Regional Disparities in India, *Journal of Public Administration*, 37 (2), pp. 199-207
7. Hensher, D.A. (2004): *Handbook of Transport Geography and Spatial Systems*, Volume 5 of *Handbooks in Transport*, Elsevier, Oxford
8. Hoyle, B.S., and Knowles, R.D. (eds.) (1992): *Modern Transport Geography*, Belhaven Press, London
9. Raychaudhuri, J. (2001): *An Introduction to Development and Regional Planning: With Special Reference to India*, Orient Blackswan, New Delhi
10. *Regional Imbalances and Role of Planning in India* ([http://www.jrdp.in/currentissue/2\\_2\\_persp.pdf](http://www.jrdp.in/currentissue/2_2_persp.pdf))
11. Rodrigue, J.P., Comtois, C. and Slack, B. (2006): *The Geography of Transport Systems*, Routledge, London, New York
12. Sanga, P. and Shaban, A. (2017): Regional Divergence and Inequalities in India, *Economic and Political weekly*, 52 (1), pp. 102-110.
13. Sanyal, B. M. (2001). *India: Decentralized Planning; Themes and Issues*. Concept Publishing Company, New Delhi
14. Saxena, H. M. (2005): *Transport Geography*, Rawat Publication, New Delhi
15. *The Town and Country Planning Act, India* (<http://faolex.fao.org/docs/pdf/jam71240.pdf>)
16. White, H.P. and Senior, M.L. (1983): *Transport Geography*, Longman, Hong Kong

**DEPARTMENT OF GEOGRAPHY**  
**PRESIDENCY UNIVERSITY**

**Detailed Syllabus for Second Semester of the Postgraduate Course in Geography**

**Module Name:** *Philosophy of Geography and Geopolitical Issues*

**Paper Type:** Theory

**Paper Code:** GEOG 0803

**Total Marks: 50** (Semester Examination - 35 and Internal Assessment - 15)

**Credit:** 4 Credit Hours / week (4 x 16 teaching weeks = 64 credit hours per semester)

Figures in [ ] indicate number of credit hours allocated for the topic

**Module Evaluation: Semester Examination (35 marks):** Written examination of 2 hours duration will be held at semester end.

**Question Pattern:** Four Long-answer type questions each of 10 marks (may be split into two parts, one carrying 2 marks at most) will be set for answering any two and five semi-long answer type questions, each of 5 marks will be set for answering any three.

**Internal Assessment (15 marks):** Mode of Internal Assessment (through viva-voce / class presentation / group discussion / written examination / assignment or any other method) will be notified for chosen topic(s) during the Course.

**Unit I: Philosophy of Geography**

- 1.1 Positivist, Nomothetic, Post-Positivist Approaches in Geography; Development of Radical/Critical Geography: Laws and models of geographical enquiry [6]
- 1.2 Geography of Inequality and Welfare Geography: Social Inequality, Social Justice and Territorial Justice [4]
- 1.3 Geography of Gender: Feminist Movement, Gender and organization of Geographical space, Patriarchy, Public vs Private space; Different Geographical Traditions: Radical Feminist, Social Feminist, Eco-Feminism [6]
- 1.4 Marxist Geography: Marxist world view of society and economy, Geography after Marx: David Harvey and others; Historical-Geographical Materialism, Production of Space, and Uneven Development [6]
- 1.5 Colonialism, Imperialism and Geography, Post-colonialism and Postcolonial theory, Post-colonialism in geography [5]
- 1.6 Critical Geography: Frankfurt School of Critical Theory, Critical Revolution in Geography, Critical Geographies World View [5]

**Unit II: Geopolitical Issues**

- 2.1 Background of Geopolitics: Geopolitical Theories (Views of Ratzel, Mackinder, Spykeman, Mahan); Tools of Geopolitics (Maps, Propaganda, Perception and Strategy) [6]
- 2.2 Emergence of Geopolitical World Order: Demands of Nation States and First World War; Colonialism and British Geopolitics; German Geopolitics and Expansionism; Naval Politics of Japan and Second World War [8]
- 2.3 Cold and Post Cold War-Contemporary Geopolitics: Warsaw Pact- Soviet Communistic Rule and its Collapse; Resurgence of Right-Wing Politics- American Supremacy and Emergence of Unipolar World; Emergence of Chinese Market Socialism; Neo Left and Geopolitical Conflicts in Latin America [8]
- 2.4 Geopolitics of India and the World: Geopolitics of Insurgency and Terrorism; Global Political and Economic Blocks; India's Relationships with Neighbours; Global Power: India's Aspiration and Challenges [10]

**Suggested Readings:** *Philosophy of Geography and Geopolitical Issues*

1. Agnew, J., (2002): Making Political Geography, Arnold, London
2. Agnew, J., Mitchell, K. and Toal, G. (eds.) (2003): A Companion to Political Geography, Blackwell, Oxford
3. Bowen, M. (1981): Empiricism and Geographical Thought, Cambridge University Press, Cambridge
4. Christopher Layne, The Peace of Illusions: American Grand Strategy from 1940 to the Present (Cornell University Press, 2006)
5. Cohen, S. (1964): Geography and Politics in a World Divided, Random House, New York
6. Cox, K.R., (2002): Political Geography: Territory, State and Society, Wiley-Blackwell, Chichester
7. Cox, K.R., Low, M. and Robinson, J. (2008): The SAGE Handbook of Political Geography, SAGE Publications Ltd., London
8. Cresswell, T. (2013): Geographic Thought- A Critical Introduction. Wiley-Blackwell, Chichester
9. de Blij, H.J. and Glassner, M. (1968): Systematic Political Geography, John Wiley & Sons, New York
10. Dickinson, R.E. (1969): Makers of Modern Geography, Routledge, London
11. Dikshit, R.D. (1987): Political Geography and Geopolitics, Tata McGraw Hill, New Delhi
12. Dikshit, R.D. (2000): Political Geography: A Contemporary Perspective, Prentice-Hall, New Delhi
13. Dikshit, R.D. (2004): Geographical Thought: A Critical History of Ideas, Prentice Hall of India, New Delhi
14. Edward Soja, Postmodern Geographies: The Reassertion of Space in Critical Social Theory (Verso:second edition, 2011)
15. Freeman, T.W. (1961): A Hundred Years of Geography, Gerald Duckworth, London
16. Gallaher, C., Dahlman, C.T., Gilmartin, M., Mountz, A. and Shirlow, P. (2009): Key Concepts in Human Geography: Key Concepts in Political Geography, SAGE Publications Ltd., London
17. Gearoid O Tuathail, Simon Dalby and Paul Routledge, eds. The Geopolitics Reader, second edition (Routledge, 2006)
18. Glassner, M., (1993): Political Geography, John Wiley & Sons, New York
19. Gregory, D. (1978): Ideology, Science and Human, Geography, Hutchinson, London
20. Hartshorn, R. (1959): Perspectives on the Nature of Geography, Rand MacNally and Co., Chicago
21. Hartshorne, R. (1939): The Nature of Geography, Association of American Geographers, Lancaster
22. Harvey, D. (1969): Explanation in Geography, Arnold, London
23. Harvey, D. (1973): Social Justice and the City, Arnold, London
24. Henderson, G., Waterstone, M. (2009): Geographic Thought- A Praxis Perspective, Toutledge, Oxon.
25. Holt-Jenson, A. (2018): Geography- History and Concepts, Fifth Edition (Sage, London)
26. James Scott. The Art of Not Being Governed: An Anarchist Reading of Upland Southeast Asia (Yale University Press, 2010)
27. James, P.E. (1972): All Possible Worlds: A History of Geographical Ideas, The Odyssey Press , Indianapolis
28. Jason Dittmer and Joanne Sharp, eds. Geopolitics: An Introductory Reader (Routledge, 2014)
29. John Agnew, Geopolitics: Re-Visioning World Politics, second edition (Routledge, 2003)
30. Johnston, R., Gregory D., Pratt G., Watts M. and Whatmore, S. (2003): The Dictionary of Human Geography, Blackwell, Oxford
31. Johnston, R.J. (1983): Geography and Geographers, Edward Arnold, London
32. Johnston, R.J. (1985): The Future of Geography, Methuen and Company Ltd., New York
33. Johnston, R.J. and Sidaway, J.D. (2004): Geography and Geographers, Edward Arnold, London
34. Jones, M., (2004): An Introduction to Political Geography: Space, Place and Politics, Routledge, London
35. Klaus Dodds, Geopolitics: A Very Short Introduction (Oxford University Press, 2014)
36. Mark Monmonier, How to Lie with Maps (University of Chicago Press, 2nd edition, 1996)
37. Martin, G. (2005): All Possible Worlds: A History of Geographical Ideas, Oxford University Press, New York
38. Max Boot, Invisible Armies: An Epic History of Guerilla Warfare from Ancient Times to the Present (Liveright, 2013)
39. Painter, J. and Jeffrey, A. (2009): Political Geography, SAGE Publications Ltd., London
40. Paul Virilio, Open Sky (Verso, 2008)
41. Peet, R. (1998): Modern Geographical Thought, Blackwell Publishers Inc., Massachusetts
42. Prescott, J.R.V. (1972): The Political Geography, Methuen, London
43. Saul Bernard Cohen, Geopolitics: The Geography of International Relations (Rowman & Littlefield, 2009)
44. Soja, E. (1989): Post-modern Geographies, Verso Press, London
45. Stuart Elden, "Land, Terrain, Territory," Progress in Human Geography 34/6 (December 2010):799 – 817
46. Stuart Elden, Terror and Territory: The Spatial Extent of Sovereignty (University of Minnesota Press, 2009)
47. Taylor, P. and Flint, C. (2000): Political Geography, Pearson Education, Harlow, Essex
48. Tuan, Y. (1977): Space and Place: The Perspective of Experience, Edward Arnold, London

Detailed Syllabus for Second Semester of the Postgraduate Course in Geography

**Module Name:** *Advanced Analytical Techniques*

**Paper Type:** Practical

**Paper Code:** GEOG 0891

**Total Marks:** 50

**Credit:** 6 Credit Hours / week (6 x 16 teaching weeks = 96 credit hours per semester)

Figures in [ ] indicate number of credit hours allocated to that particular topic per teaching week

**Module Evaluation:** Continuous Evaluation throughout the Semester

**Unit I: Multivariate Data Analysis**

- 1.1 Examining Data: Graphical examination; Missing Data; Outliers; Testing assumptions; Incorporating dummy variables [4]
- 1.2 Multiple Linear Regression; Multiple and partial Correlation coefficients; Stepwise regression; Path Analysis [10]
- 1.3 Eigenvector Methods: Principal Component Analysis, Factor Analysis and Maximum Likelihood Analysis [10]
- 1.4 Interdependence Techniques: Cluster Analysis, Multidimensional Scaling [10]
- 1.5 Classification of Multivariate Data: Statistical and Econometric Techniques- Multiple Discriminant Analysis, Logit and Probit analysis; Non-parametric Techniques- Neural Network Analysis; Parametric Techniques- Analytical Hierarchical Process [12]
- 1.6 Structural Equation Modelling [4]

**Unit II: Spatial Statistics**

- 2.1 Visualization of Spatial Data: Maps for point and areal features [4]
- 2.2 Trend Surface Analysis: First order [4]
- 2.3 Spatial Smoothing Techniques: Locally weighted averages, Non-parametric regression, Empirical Bayes smoothing, Splines, Probability mapping [8]
- 2.4 Surface Estimation: Spatial Autocorrelation- Application of Join-Count Statistics (Computation of Moran's I and Geary's S), Triangulation, Inverse Distance Averaging, 3D splines, Krigging and Variograms, Analysis of Fractal Dimension [12]

**Unit III: Point Pattern Analysis**

- 3.1 Density-based Point Pattern Measures: Quadrat Count Method; Kernel Density Estimation (K means) [6]
- 3.2 Distance-based Point Pattern Measures: Nearest Neighbour Distance; G function; F function; K function; Pair Correlation Function [8]
- 3.3 Assumption of Point Pattern: Monte Carlo Procedure [4]

**Suggested Readings:** *Advanced Analytical Techniques*

1. Doumpos, M. and Zopounidis, C. (2004): *Multicriteria Decision Aid Classification Methods*, Kluwer Academic Publishers, New York
2. Ebdon, D. (1987): *Statistics in Geography*. Wiley.
3. Fotheringham, A.S., Brunson, C. and Charlton, M. (2007): *Quantitative Geography: Perspectives on Spatial Data Analysis*, SAGE Publications India Pvt. Ltd., New Delhi
4. Garson, G.D. (1998): *Neural Networks: An Introductory Guide for Social Scientists*, SAGE Publications, London.
5. Griffith, D.A. and Amrhein, C.G. (1997): *Multivariate Statistical Analysis for Geographers*, Prentice Hall, Upper Saddle River, New Jersey
6. John, B.G. and Pau, J. (2010): *Research Methods in Geography: A Critical Introduction*, John Wiley & Sons, UK
7. Johnston, R.J. (1978): *Multivariate Statistical Analysis in Geography: A Primer on the General Linear Model*, Longman, Harlow
8. Joseph, Jr. F.H., Black, C.W., Babin, B.J., Anderson, R.E. and Tatham, R.L. (2011): *Multivariate Data Analysis*, Pearson Prentice Hall, New Delhi
9. Khan, N. (1998): *Quantitative Methods in Geographical Research*, Concept Publishing Company, New Delhi
10. Ripley, B.D. (2004): *Spatial Statistics*, John Wiley & Sons, N.J
11. Swan, A.R.H., Sandilands, M. and McCabe, P. (1995): *Introduction to Geological Data Analysis*, Blackwell Science Ltd., Oxford
12. Waller, L. A. and Gotway, C.A. (2004): *Applied Spatial Statistics for Public Health Data*, John Wiley & Sons, New Jersey

**DEPARTMENT OF GEOGRAPHY**  
**PRESIDENCY UNIVERSITY**

**Detailed Syllabus for Second Semester of the Postgraduate Course in Geography**

**Module Name:** *Advanced Geoinformatics*

**Paper Type:** Practical

**Paper Code:** GEOG 0892

**Total Marks:** 50

**Credit:** 6 Credit Hours / week (6 x 16 teaching weeks = 96 credit hours per semester)

Figures in [ ] indicate number of credit hours allocated to that particular topic per teaching week

**Module Evaluation:** Continuous Evaluation throughout the Semester

**Unit I: GNSS and GIS**

- 1.1 Different GNSS Systems in Operation; How a GNSS system works; Sources of error in a GNSS system [4]
- 1.2 Mapping exercise with hand-held GPS, data downloading and visualization, import GPS data in GoogleEarth [6]
- 1.3 Introduction to GIS: Concepts of Projection, datum and spheroid, mean sea level, orthometric height, geoid models; Formats of storing GIS Data [4]
- 1.4 Georeferencing a raster layer with GPS Points and an existing georeferenced layer, defining projection, re-project from one projection to another [4]
- 1.5 Creating Vector layers through on-screen digitisation- Point, Line, Polygon [6]
- 1.6 Creating Attribute Table: Add Fields for different data types, Joining and relating tables, Simple query building [4]
- 1.7 Raster data manipulation: Resampling, Mathematical operations using raster layers [4]
- 1.8 Case Studies: Forest Planning for Sensitive Wildlife Species, Population mapping and modelling , Impact of Sea Level Rise and Storms on Cities, Delineation of Watersheds (any two) [16]

**Unit II: Remote Sensing and Aerial Photo**

- 2.1 Concept of Remote sensing: Remote Sensing Process, Sources of Energy, Advantages and limitations of Remote Sensing [4]
- 2.2 Remote Sensing Platforms and sensor characteristics: Active and Passive Remote Sensing; PAN/Multispectral/Hyperspectral Imaging; Thermal/Microwave/Radar data [6]
- 2.3 Exercise on Visual Image Interpretation [4]
- 2.4 Exercise on Digital Image Processing I: Radiometric correction, Geometric Correction, Image Enhancement (Image Reduction & Magnification and Transect Extraction); Filtering; Image Transformation [12]
- 2.5 Exercise Digital Image Processing II: Classification - Non-parametric, parametric, Feature extraction, training sets- Supervised methods and algorithms, Unsupervised and Hybrid classification [10]
- 2.6 Exercise on Digital Image Processing III: Accuracy Assessment; Interpretation of Error matrix and measurement of map accuracy [8]
- 2.7 Digital Photogrammetry: Non-oriented and oriented DSM, checking the accuracy of DSM, measuring 3D information [4]

**Suggested Readings:** *Advanced Geoinformatics*

1. Albrecth, J. (2007): *Key Concepts & Techniques in GIS*, SAGE Publications Ltd., London
2. Burroughs, P.A. and McDonnell, R.A. (1998): *Principles of Geographic Information Systems*, Oxford University Press, New York
3. Campbell, J.B. and Wynne, R.H. (2011): *Introduction to Remote Sensing*, The Guilford Press, New York
4. Clark, K.C. (2010): *Getting Started with Geographic Information Systems*, Prentice Hall, Upper Saddle River, New Jersey
5. Fazal, S. (2008): *GIS Basics*, New Age International (P) Limited, Publishers, New Delhi
6. Harvey, F. (2008): *A Primer of GIS: Fundamental Geographic and Cartographic Concepts*, The Guilford Press, New York
7. Heywood, D.I., Cornelius, S. and Carver, S. (2006): *An Introduction to Geographical Information Systems*, Prentice Hall, New Jersey
8. Jensen, J.R. (006): *Remote Sensing of the Environment: An Earth Resource Perspective*, Prentice Hall, Upper Saddle River, New Jersey
9. Lillesand, T.A., Keifer, R.W. and Chipman, J.W. (2008): *Remote Sensing and Image Interpretation*, Wiley, New York
10. Longley, P.A., Goodchild, M., Maguire, D.J. Rhind, D.W. (2010): *Geographic Information Systems and Science*, Wiley, New York
11. Sabins, F.F. (2008): *Remote Sensing: Principles and Interpretation*, Waveland Press Inc., Illinois
12. Sahu, K.C. (2007): *Textbook of Remote Sensing and Geographical Information Systems*, Atlantic Publishers, New Delhi
13. Shekhar, S. and Xiong, H. (eds.) (2008): *Encyclopaedia of GIS*, Springer, New York

## DEPARTMENT OF GEOGRAPHY

### PRESIDENCY UNIVERSITY

#### Detailed Syllabus for Third Semester of the Postgraduate Course in Geography

**Module Name:** *Geo-Environmental Issues (Elective Stream I: Core Physical Geography)*

**Paper Type:** Theory

**Paper Code:** GEOG 0901A

**Total Marks:** 50 (Semester Examination - 35 and Internal Assessment - 15)

**Credit:** 4 Credit Hours / week (4 x 16 teaching weeks = 64 credit hours per semester)

Figures in [ ] indicate number of credit hours allocated for the topic

**Module Evaluation: Semester Examination (35 marks):** Written examination of 2 hours duration will be held at semester end.

**Question Pattern:** Four Long-answer type questions each of 10 marks (may be split into two parts, one carrying 2 marks at most) will be set for answering any two and five semi-long answer type questions, each of 5 marks will be set for answering any three.

**Internal Assessment (15 marks):** Mode of Internal Assessment (through viva-voce / class presentation / group discussion / written examination / assignment or any other method) will be notified for chosen topic(s) during the Course.

#### Unit I: Watershed Development and Managing Water Resources

- 1.1 Watershed Development: Basic concepts; Community, institutional and private sector participation; Integrated Watershed Management guidelines, programmes and agencies in India [8]
- 1.2 Water resources management: Evolving agricultural practices and soil conservation norms; Traditional and modern management methods in different environments; Water in the Millennium Ecosystem Assessment Framework; Freshwater Ecosystem Services [8]
- 1.3 Water Quality issues: Water quality parameters and their measurement; Types and sources of water pollution and monitoring agencies; Environmental guidelines for water quality: WHO and BIS [4]
- 1.4 Storm Water and Flood Management: Design of drainage systems; Flood routing and control through embankments, channels and reservoirs; Case studies from Bihar and West Bengal [5]
- 1.5 Managing Drought: Definitions, indices and classification; Drought mapping; India's drought scenario and mitigation frameworks [4]
- 1.6 Waste water reclamation techniques and applications [3]

#### Unit II: Hazards and Disasters: Concepts, Preparedness, Mitigation and Management

- 2.1 Hazard and Disaster: Concepts and Classifications, Frequency and Magnitude [3]
- 2.2 Hazard Exposure: Factors and Consequences; Exposure Evaluation; Hazards of Place analysis and Hazardscape zonation [4]
- 2.3 Social Capacity and Capital; Vulnerability, Resilience and Adaptability: Concepts and Indices; DROP and CDR Frameworks [5]
- 2.4 Hazard monitoring, tracking and modelling; Early warning systems and protocols; UNDRR Sendai Framework [4]
- 2.5 Applications of Geoinformatics and emerging technologies in disaster warning, mitigation and response [3]
- 2.6 Adaptations to multi-hazard scenarios: Seismic events, Tsunamis, Slope instability, Sea-level change; Using the HAZUS Model [6]
- 2.7 Emergency Sanitation/Shelters: Modalities for site selection and construction, Designing evacuation and re-settlement plans [3]
- 2.8 India's National Policy on Disaster Management; NDMA Guidelines; India Disaster Resource Network [4]

#### Suggested Readings: *Geo-Environmental Issues (Elective Stream I: Core Physical Geography)*

1. Alexander, D. (1993): *Natural Disasters*, ULC Press Ltd, London
2. Black, P.E. (1991): *Watershed Hydrology*, Prentice Hall, London
3. Collins, L.R. and Scheind, T.D. (2000): *Disaster Management and Preparedness*, Taylor and Francis
4. Edwards, B. (2005): *Natural Hazards*, Cambridge University Press, UK
5. Michael, A.M. (1992): *Irrigation Engineering*, Vikas Publishing House
6. Murthy, J.V.S. (1994): *Watershed Management in India*, Wiley Eastern, New Delhi
7. Murty, J.V.S. (1998): *Watershed Management*, New Age International, New Delhi
8. NDMA (2009): *National Policy on Disaster Management*, NDMA, New Delhi
9. Purandare, A.P. and Jaiswal, A.K. (1995): *Waterhed Development in India*, National Institute of Rural Development, Hyderabad
10. Sharma, R.K. & Sharma, G. (eds.) (2005): *Natural Disaster*, APH Publishing Corporation, New Delhi
11. Smith, K. (2011): *Natural Hazards*, Routledge, London
12. Vir Singh, R. (2000): *Watershed Planning and Management*, Yash Publishing House, Bikaner

## DEPARTMENT OF GEOGRAPHY

### PRESIDENCY UNIVERSITY

#### Detailed Syllabus for Third Semester of the Postgraduate Course in Geography

**Module Name:** *Contemporary Social Issues in India (Elective Stream II: Core Human Geography)*

**Paper Type:** Theory

**Paper Code:** GEOG 0901B

**Total Marks: 50** (Semester Examination - 35 and Internal Assessment - 15)

**Credit:** 4 Credit Hours / week (4 x 16 teaching weeks = 64 credit hours per semester)

Figures in [ ] indicate number of credit hours allocated for the topic

**Module Evaluation: Semester Examination (35 marks):** Written examination of 2 hours duration will be held at semester end.

**Question Pattern:** Four Long-answer type questions each of 10 marks (may be split into two parts, one carrying 2 marks at most) will be set for answering any two and five semi-long answer type questions, each of 5 marks will be set for answering any three.

**Internal Assessment (15 marks):** Mode of Internal Assessment (through viva-voce / class presentation / group discussion / written examination / assignment or any other method) will be notified for chosen topic(s) during the Course.

#### Unit I: Neo-Liberal Economic Policy

- 1.1 Neoliberalism: Meaning, emergence and historical significance; Neoliberal Economic Policy in India [6]
- 1.2 Growth and Social Inequality in Neoliberal India [5]
- 1.3 Regional Imbalance in India: Emerging spatial economic disparities [5]
- 1.4 Issues of Land Acquisition and SEZ: Land Acquisition Acts in India, SEZ Act, Development and Dispossession debate [6]

#### Unit II: Labour Problems

- 2.1 Agrarian distress: meaning, measures, rural income and employment situation in India [5]
- 2.2 Problems of floating labour in cities: rural labour out-migration, situation of floating labour in Indian cities, problems and solutions [5]
- 2.3 Cities and social justice in contemporary India: The relevance of slum in Indian cities; Slum development policies in India; Eviction of Squatter Settlements and Resettlement Debate [6]
- 2.4 Food Security and Malnutrition: Meaning, dimensions, various measures, relationship; important debate; Prevailing malnutrition situation in India [6]

#### Unit III: Gender and Children Issues

- 3.1 Gender Discrimination: Concept, forms and causes; Crime against Women in India [5]
- 3.2 Women's reproductive health: Meaning, significance, measurement and Indian situation [5]
- 3.3 Women Empowerment: Employment situation, Social-political participation of women [5]
- 3.4 Child Labour in India: Meaning, causes, situation in India [5]

#### Suggested Readings: *Contemporary Social Issues in India (Elective Stream II: Core Human Geography)*

1. Ahmed, W., Peet, R. and Kundu, A. (eds.) (2011): *India's New Economic Policy: A Critical Analysis*, Rawat, New Delhi
2. Banejee-Guha, S. (ed.) (2010): *Accumulation by Dispossession: Transformative Cities in the New Global Order*, Sage, New Delhi
3. Chattopadhyay, A. (2013): *Poverty and Social Exclusion in India: Issues and Challenges*, Rawat Publications, Jaipur
4. Kohli, A. (2012): *Poverty Amid Plenty In The New India*, Cambridge University Press, New York
5. Pattanayak, U. (2008): *The Republic of Hunger and Other Essays*, Merlin Press, London
6. Pattanayak, U. and Moyo, S. (2011): *The Agrarian Question in the Neoliberal Era: Primitive Accumulation and the Peasantry*, Pambazuka Press, Nairobi
7. Pikety, T. Chancel, L (2017) Indian income inequality, 1922-2015: From British Raj to Billionaire Raj?, World Inequality Lab
8. Sen, A. (2000): *Social Exclusion: Concept, Application and Scrutiny*, Social Development Papers No. 1, Office of Environment and Social Development, Asian Development Bank, Manila



**DEPARTMENT OF GEOGRAPHY**  
**PRESIDENCY UNIVERSITY**

**Detailed Syllabus for Third Semester of the Postgraduate Course in Geography**

**Module Name:** *Streamflow Behaviour and Morphology*

*(Special Paper for Elective Stream I: Option A - Fluvial Geomorphology)*

**Paper Type:** Theory

**Paper Code:** GEOG 0902A1

**Total Marks:** 50 (Semester Examination - 35 and Internal Assessment - 15)

**Credit:** 4 Credit Hours / week (4 x 16 teaching weeks = 64 credit hours per semester)

Figures in [ ] indicate number of credit hours allocated for the topic

**Module Evaluation: Semester Examination (35 marks):** Written examination of 2 hours duration will be held at semester end.

**Question Pattern:** Four Long-answer type questions each of 10 marks (may be split into two parts, one carrying 2 marks at most) will be set for answering any two and five semi-long answer type questions, each of 5 marks will be set for answering any three.

**Internal Assessment (15 marks):** Mode of Internal Assessment (through viva-voce / class presentation / group discussion / written examination / assignment or any other method) will be notified for chosen topic(s) during the Course.

**Unit I: Hydraulics of Channel Flow**

- 1.1 Classification of open channel flow, channel geometry (at-station and downstream) [4]
- 1.2 Flow continuity with special reference to St. Venant and Bernoulli equations [4]
- 1.3 Flow resistance: Traditional and physics-based approaches of measurement, Components, Limitations of Manning's Equation [4]
- 1.4 Turbulence in river flows: Definition, Turbulence boundary layers, Bed roughness and turbulence, Large scale morphologies and turbulent flows, flow obstruction [5]
- 1.6 Momentum transfer, velocity distributions and fluid shear stress and resistance [4]
- 1.7 Concept of stream power and specific energy, stream energy, roughness [2]
- 1.8 Numerical modelling in fluvial geomorphology: Reach-scale and Catchment-scale models [5]

**Unit II: Channel Morphology and Pattern**

- 2.1 Bedrock Channels: Controls, River incision processes; Geomorphic implications of knickpoints and potholes [3]
- 2.2 Meander development and morphology models, Classification schemes of meander bends, Depositional sequences in meanders [4]
- 2.3 Multi-thread Channels: Origin and conditions for channel bifurcation and braiding with differences between mountain and lowland environments; Anabranching Channels: controlling factors, types and longevity; Mechanisms of braided and anabranching stream development; Morphodynamics of multi-thread channels and their depositional sequence [4]
- 2.4 Morphologies of Step-Pool and Pool-Riffle sequences: Formation, development and links with channel planform changes, streamflow hydraulics and sediment movement [2]
- 2.5 Nature and Classification of Large Woody Debris, Impact of LWDs on stream morphology and downstream channel hydraulics [2]
- 2.6 Confluence geomorphology: Channel geometry, flow structures, sediment transport, bed morphology and depositional character of river confluences; Tributary-Main Stem interactions and feedbacks at reach and catchment scale; River confluence models [5]
- 2.7 Channel avulsion: Causes, thresholds, processes and stages; Channel avulsion models; Case study of the Kosi River [3]
- 2.8 Channel Classification Schemes: Design and Purpose; Stream and Valley Classification methods after Schumm (1972), Miall (1977), Rosgen (1994) and River Styles (2000) [5]
- 2.9 Channel stability and equilibrium: planform, cross-section and longitudinal profile adjustments; River metamorphosis: Concept and parameters, Schumm's ideas of Complex Response, Models of Planform Alteration and Stability Assessment Schemes; Five/Six Stage Channel Evolution Model and Dimensionless Stability Diagram [5]

**Suggested Readings: *Streamflow Behaviour and Morphology***

1. Bridge, J. and Demico, R. (2008): *Earth Surface Processes, Landforms and Sediment Deposits*, Cambridge University Press
2. Brierley, G.J., Fryirs, K.A. (2006): *Geomorphology and River Management: Applications of the River Styles Framework*. Blackwell.
3. Carbonneau, P.E. and Piegay, H. (2012): *Fluvial Remote Sensing for Science and Management*, Wiley-Blackwell, Chichester
4. Charlton, R. (2007): *Fundamentals of Fluvial Geomorphology*, 2007
5. Chaudhury, M.H. (2008): *Open Channel Flow*, Springer
6. Dingman, S.L. (2009): *Fluvial Hydraulics*. Oxford University Press, Inc.
7. Faniran, A. and Jeje, L. K. (1983): *Humid Tropical Geomorphology*, Longman, London.
8. Fryirs, K.A. and Brierley, G.J. (2012): *Geomorphic Analysis of River Systems: An Approach to Reading the Landscape*, Wiley, New York
9. Garcia, C., Batalla, R.J. (2005): *Catchment Dynamics and River Processes, Volume 7*, In: Book Series: Developments in Earth Surface Processes, Elsevier Science
10. Habersack, H., Piegay, H., Rinaldi, M. (2005): *Gravel Bed Rivers VI: From Process Understanding to River Restoration. Volume 11 in: In: Book Series: Developments in Earth Surface Processes, Elsevier Science*
11. Hickin, E.J. (1995): *River Geomorphology*, Wiley-Blackwell, Chichester
12. Julien, P.Y. (2002): *River Mechanics*. Cambridge University Press
13. Kale, V. S. and Gupta, A. (2001): *Introduction to Geomorphology*, Orient Longman, Calcutta
14. Kondolf, G.M., Piegay, H (2003): *Tools in Fluvial Geomorphology*. John Wiley & Sons, Ltd.
15. Leopold, L. B., Wolman, M. G. and Miller, J. P. (1964): *Fluvial Processes in Geomorphology*, W.H. Freeman, San Francisco
16. Miall, A. (2014): *Fluvial Depositional Systems*, Springer, Switzerland
17. Morisawa, M. (1968): *Streams: Their Dynamics and Morphology*, McGraw-Hill
18. Richards, K. (1982): *Rivers: Form and processes in Alluvial Channels*, Methuen, London.
19. Rosgen, D. (1996): *Applied River Morphology*, Wildland Hydrology, Fort Collins, Colorado
20. Schumm, S. A. (1977): *Fluvial Systems*, Wiley, New York.
21. Sear, D.A., Newson, M.D. and Thorne, C.R. (2003): *Guidebook of Applied Fluvial Geomorphology*, (Tech. Rep. FD1914), DEFRA, London
22. Thomas, M. F. (1994): *Geomorphology in the Tropics: A study of weathering and denudation in low latitudes*, Wiley, Chichester
23. Wohl, E., (2013.): *Treatise on fluvial geomorphology*. In: Shroder, J. (Editor in Chief), Wohl, E. (Ed.), *Treatise on Geomorphology*. Academic Press, San Diego, CA, vol.9.

## DEPARTMENT OF GEOGRAPHY PRESIDENCY UNIVERSITY

### Detailed Syllabus for Third Semester of the Postgraduate Course in Geography

**Module Name:** *Geomorphology and Hydrology of Landscapes*

*(Special Paper for Elective Stream I: Option B - Physical Basis of Landscape Management)*

**Paper Type:** Theory

**Paper Code:** GEOG 0902A2

**Total Marks:** 50 (Semester Examination - 35 and Internal Assessment - 15)

**Credit:** 4 Credit Hours / week (4 x 16 teaching weeks = 64 credit hours per semester)

Figures in [ ] indicate number of credit hours allocated for the topic

**Module Evaluation: Semester Examination (35 marks):** Written examination of 2 hours duration will be held at semester end.

**Question Pattern:** Four Long-answer type questions each of 10 marks (may be split into two parts, one carrying 2 marks at most) will be set for answering any two and five semi-long answer type questions, each of 5 marks will be set for answering any three.

**Internal Assessment (15 marks):** Mode of Internal Assessment (through viva-voce / class presentation / group discussion / written examination / assignment or any other method) will be notified for chosen topic(s) during the Course.

#### Unit I: Geomorphic Processes over Landscapes

- 1.1 Weathering: Weathering Profile; Mechanisms of rock fragmentation; Chemistry of rock transformations- chemical equilibrium, solubility and saturation, chemical weathering reactions and their controls, measurements of chemical weathering, effects on mass loss/gain and rock strength; weathering products; conversion of bedrocks into regolith and saprolite; Assessing weathering intensity [10]
- 1.2 Hillslope forms and processes: Slope elements and Soil Catena; Nine-unit land surface model; Mass balance; Diffusive processes; Hillslope processes- rainsplash, speed of regolith movements; Landslides- forces and their balance at failure, debris flow; Hillslope models [10]
- 1.3 Sediment Transport: Grain entrainment; Modes of transport- saltation, granular splash, mass flux, suspended sediment transport; Riverbed sediment characterization [6]

#### Unit II: Soil Geomorphology

- 2.1 Soil Formation Models: Functional-factorial model, Process-system model, Energy model, Soil evolution model, deterministic chaos and uncertainty concepts [4]
- 2.2 Profile differentiation: Eluviation-Illuviation, Organic matter decomposition, Acidification and base cycling, Leaching and Leucinization, Lessivage, Oxidation-Reduction and Gleization, Ferrolysis, Laterization and Latosolization, Desilication, Three-phase tropical pedogenesis, Rubification, Calcification, Silicification, Salinization-Solonization-Alkalization; Translocation of iron and aluminum, silt and clay; Origin of fragipan and oxic horizon [10]
- 2.3 Landscape Dating Methods: Stratigraphic terminology, principles and geomorphic surfaces; Surface Exposure Dating methods based on- geomorphology and stratigraphy, weathering and weathering rinds, soil development indices, pedogenic mass balance; Chronosequence and chronofunctions; Absolute Methods- OSL, Techniques of Radiocarbon and Radiometric dating [10]

#### Unit III: Water in the Landscape

- 3.1 Soil-Water Relationships: Mass-Volume relationships- porosity, bulk density, void ratio; Soil moisture conditions and plant-available water; Water Potential; Soil Moisture Retention Curve- construction and interpretation; Soil Water flow- Regulatory Forces, Darcy's Law, Basic Equation of water flow in soil, Saturated and Unsaturated Hydraulic Conductivity; Infiltration- Infiltration in dry and wet soils, factors of infiltration, mathematical formulation; Soil-moisture distribution with depth [10]
- 3.2 Landscape-Water Relationships: Water Balance; Modeling groundwater table; Runoff mechanisms and generation of overland flow- modeling approaches [4]

**Suggested Readings: *Geomorphology and Hydrology of Landscapes***

1. Anderson, R.S. and Anderson, S.P. (2010): *Geomorphology: The Mechanics and Chemistry of Landscapes*, Cambridge University Press, Cambridge
2. Birkeland, P. W. (1984). *Soils and geomorphology*. Oxford University Press.
3. Dixon, J. C. (2013). 4.3 Pedogenesis with Respect to Geomorphology.
4. Gerrard, A. J. (1992). *Soil geomorphology*. Springer Science & Business Media.
5. Goude, A. et al. (Eds.) (1990): *Geomorphological Techniques*. Routledge.
6. Higgitt, David L., and E. Mark Lee, eds. *Geomorphological processes and landscape change: Britain in the last 1000 years*. Vol. 69. John Wiley & Sons, 2011.
7. McCarty, L. B., Hubbard, L. R., & Quisenberry, V. L. (2016). *Applied soil physical properties, drainage, and irrigation strategies*. Springer International Publishing.
8. Migoń, P. (2013). 4.8 Weathering Mantles and Long-Term Landform Evolution.
9. Miyazaki, Tsuyoshi (2005). *Water flow in soils*. CRC Press.
10. Pope, G. (2013). Overview of Weathering and Soils Geomorphology. In *Treatise on Geomorphology* (pp. 1-11). Elsevier Inc..
11. Schaetzl, R. J., & Thompson, M. L. (2015). *Soils: Genesis and Geomorphology*. Cambridge University press.
12. Stoffel, M., Marston, R.A., (2013): Mountain and hillslope geomorphology: an introduction. In: Shroder, J. (editor in chief), Marston, R.A., Stoffel, M. (Eds.), *Treatise on Geomorphology*. Academic Press, San Diego, CA, vol.7
13. Zinck, J. A., Metternicht, G., Bocco, G., & Del Valle, H. F. (Eds.). (2015). *Geopedology: an integration of geomorphology and pedology for soil and landscape studies*. Springer.

## DEPARTMENT OF GEOGRAPHY PRESIDENCY UNIVERSITY

### Detailed Syllabus for Third Semester of the Postgraduate Course in Geography

**Module Name:** *Concepts and Theories of Regional Development and Urbanisation*

(Special Paper for Elective Stream II: Option A - Regional Development and Urban Studies)

**Paper Type:** Theory

**Paper Code:** GEOG 0902B1

**Total Marks:** 50 (Semester Examination - 35 and Internal Assessment - 15)

**Credit:** 4 Credit Hours / week (4 x 16 teaching weeks = 64 credit hours per semester)

Figures in [ ] indicate number of credit hours allocated for the topic

**Module Evaluation: Semester Examination (35 marks):** Written examination of 2 hours duration will be held at semester end.

**Question Pattern:** Four Long-answer type questions each of 10 marks (may be split into two parts, one carrying 2 marks at most) will be set for answering any two and five semi-long answer type questions, each of 5 marks will be set for answering any three.

**Internal Assessment (15 marks):** Mode of Internal Assessment (through viva-voce / class presentation / group discussion / written examination / assignment or any other method) will be notified for chosen topic(s) during the Course.

#### Unit I: Regional Development

##### 1.1 Introducing Regional Development

Timeline of Regional Development from European Renaissance to Post Second World War scenario [2]

Modernization Paradigm and its effect- U.N. sponsored programmes in the national and regional development in developing countries [3]

Re-thinking on development (D.Seers, Club of Rome, Neo Marxist) [3]

##### 1.2 Theories of Regional Development

Stage Model (Rostow and Marx) [4]

Polarized Development and Uneven Development (Perroux, Friedman, Hirschman, Myrdal); Alternative Development Models: Agropolitan Development, Import Substitution, Export-led Growth, Basic Needs Programme [8]

Theories of labour movement and urban economics (Berry, Davis, McGee, Fourastie) [4]

##### 1.3 The Centrifugal Forces of Regional Integration in India

External and Internal Forces (Kashmir Insurgency, Infiltration in North Eastern India, Maoist Resistance) [4]

Social Forces (Caste Conflicts in Gangetic Plain, Reservation Conflicts in India, Religion and Issues of Minority, Language Conflicts) [4]

Political Forces (Centre State Relations, Political Violence in West Bengal, Demands of New States) [4]

#### Unit II: Urbanisation

##### 2.1 Theories of Urban Planning and Urbanisation

Pioneer thinkers in urban planning (1880-1945): Anglo-American School-Howard, Wright and critiques; European School-Soria Mata, Le Corbusier and critiques [6]

Post War Planning: Barlow Commission [2]

Cities as Spaces of Production of Capital: Marx, Harvey, Castells [4]

Agglomeration economies (Krugman), urban bias (Lipton) and global cities (Friedman and Sassen) [2]

Recent Theoretical Development: Ordinary City (Robinson), Planetary Urbanization (Brenner) and Informal Urbanization (Roy) [2]

##### 2.2 Introducing the Challenges of Urban Planning

Land Question in Urban Areas- Development and Disposition [2]

Cities in the Global South: Issues [2]

History, Architecture and Popular Culture [2]

Planning Problems in Kolkata, Delhi, Bengaluru and Mumbai [6]

**Suggested Readings:** *Concepts and Theories of Regional Development and Urbanisation*

1. Abdoumalig Simone, *For the City yet to Come: Changing African Life in Four Cities*, Duke University Press, 2004
2. Ananya Roy and Aihwa Ong (eds.), *Worlding Cities: Asian Experiments and the Art of Being Global*, Blackwell, 2011
3. Arjun Appadurai, 'Spectre of Housing in Mumbai' in *The Future as a Cultural Fact: Essays on the Global Condition*, Verso, 2013
4. Asher Ghertner, *Rule by Aesthetics: World Class City Making in Delhi*, Oxford University Press, 2015
5. Brenner, N. and Schmid, C. (2015): *Towards a new epistemology of the urban?*, *City*, 19 (2-3), 151-182
6. Carter, H. (1995): *The Study of Urban Geography*, Edward Arnold, London
7. Castells, M. (1976): *The Urban Question: A Marxist Approach*, Edward Arnold, London
8. Friedmann, J. (1986): *The world city hypothesis*, *Development and Change*, 17, 69-83
9. Friedmann, J. (1987): *Planning in the Public Domain: From Knowledge to Action*, Princeton University Press, Princeton, New Jersey
10. GautamBhan, *In the Public's Interest: evictions, Citizenship and Inequality in Contemporary Delhi*, Orient Blackswan, 2016
11. Glaeser, E. L. (2008). *Cities, Agglomeration and Spatial Equilibrium*. Oxford University Press.
12. Hall, P. (1997): *Cities of Tomorrow: An Intellectual History of Urban Planning and Design in the Twentieth Century*, Wiley Blackwell, New Jersey
13. Hall, P. (2002): *Urban and Regional Planning*, Routledge, London and New York
14. Hall, T. and Barrett, H. (2012): *Urban Geography*, Routledge, London and New York
15. Harvey, D. (1985). *The Urbanization of Capital*. Basil Blackwell, Oxford.
16. Hervey, D. (1978): *The Urban Process under Capitalism: A Framework for Analysis*, *International journal of Urban and Regional Research*, 2 (1-3), 101-131
17. James Holston, *The Modernist City: An Anthropological Critique of Brasilia*, University of Chicago Press, 1989
18. Janaki Nair, *Promise of the Metropolis: Bangalore's Twentieth Century*, Oxford University Press, 2005
19. Jane Jacobs, *The Life and Death of Great American Cities*, Vintage Books, 1961
20. Johnston, R.J. et al (1983): *The Dictionary of Human Geography*, Basil Blackwell Publisher Limited, Oxford
21. K C Sivaramakrishnan, *The Urban Question*, Indian Institute of Advanced Study, 1978
22. Lipton, M. (1990): *Why Poor People Stay Poor: Urban Bias in World Development*, Harvard University Press, Harvard
23. Marshall Berman, *All that is Solid Melts into Air: The Experience of Modernity*, Verso, 1983
24. Mumford, L. (1972): *The City in History: Its Origins, Its Transformations, and Its Prospects*, Harcourt Books, New York
25. Myrdal, G. (1957): *Economic Theory and Underdeveloped Regions*, Gerald Duckworth, London
26. Nezar Al Sayyad and Ananya Roy (eds.), *Urban Informality: Transnational Perspectives from the Middle East, Latin America and South Asia*, Lexington Books, 2004
27. P Thankappan Nair, *A History of Calcutta's Streets*, Firma KLM, 1987
28. Partha Chatterjee, *The Politics of the Governed*, Columbia University Press, 2006
29. Peet, R. and Thrift, N (2002). *New Models in geography: The political-economy perspective*. Unwin Hyman, London.
30. Ramchandran, R. (1997): *Urbanization and Urban Systems in India*, Oxford University Press, Oxford
31. Raza, M. and Chattopadhyay, B. (1975): *Regional Development: Analytical Framework and Indicators*, *Indian Journal of Regional Science*, Vol 1, pp. 11-34
32. Robinson, J. (2005): *Ordinary City: Between Modernity and Development*, Routledge, London and New York
33. Rostow, W.W. (1960): *Stages of Economic Growth: A Non Communist Manifesto*, Cambridge University Press, Cambridge
34. Roy, A. (2009): *Why India Cannot Plan its Cities? Informality, Insurgence and the Idiom of urbanization*, *Planning Theory*, 8 (1), 76-87
35. Sanjay Srivastava, *Entangled Urbanism: Slum, Gated Community and the Shopping Mall*, OUP, 2014
36. Sassen, S. (1991): *The global city*, Princeton University Press, Princeton
37. TapatiGuhaThakurta, *In the Name of the Goddess: The Durga Pujas of Contemporary Kolkata*, Primus, 2016
38. Venables, A. J. (2005): *Spatial disparities in developing Countries: Cities, Region and International Trade*, *Journal of Economic Geography*, 5 (1), 3-21
39. Wareing, R.K. (2004): *Social and Economic Geography Made Simple*, Rupa& Co., New Delhi
40. World Development Report (2009): *Reshaping economic Geography*, World Bank

**DEPARTMENT OF GEOGRAPHY**  
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**Detailed Syllabus for Third Semester of the Postgraduate Course in Geography**

**Module Name:** *Geographies of Tourism and Development Issues*

*(Special Paper for Elective Stream II: Option B - Geographies of Development)*

**Paper Type:** Theory

**Paper Code:** GEOG 0902B2

**Total Marks:** 50 (Semester Examination- 35 and Internal Assessment - 15)

**Credit:** 4 Credit Hours / week (4 x 16 teaching weeks = 64 credit hours per semester)

Figures in [ ] indicate number of credit hours allocated for the topic

**Module Evaluation: Semester Examination (35 marks):** Written examination of 2 hours duration will be held at semester end.

**Question Pattern:** Four Long-answer type questions each of 10 marks (may be split into two parts, one carrying 2 marks at most) will be set for answering any two and five semi-long answer type questions, each of 5 marks will be set for answering any three.

**Internal Assessment (15 marks):** Mode of Internal Assessment (through viva-voce / class presentation / group discussion / written examination / assignment or any other method) will be notified for chosen topic(s) during the Course.

**Unit I: Basics of concepts in Geography of Tourism**

- 1.1 Nature, Scope and Development of Tourism Geography [3]
- 1.2 Changing definitions of tourism; Various tourist classification schemes [4]
- 1.3 Concept of touristscape, tourism typologies [2]
- 1.4 Tourism infrastructure and superstructures [3]
- 1.5 Concept of tourist accessibility and walkability [4]

**Unit II: Fundamental tourism theories and approaches**

- 2.1 Theories of Travel Motivation: Socio-psychological models of Crompton and Iso-Ahola [4]
- 2.2 Doxey's Irritation Index Model [2]
- 2.3 Butler's Tourist Area Life Cycle Model [2]
- 2.4 Hall's Theory of Tourism Market System [4]
- 2.5 Postmodern approaches in Tourism Geography [4]

**Unit III: Tourism, inequality and development**

- 3.1 The Tourism-Development Dilemma: Ecological impacts of Tourism [2]
- 3.2 Tourism, vulnerability and global environmental change [4]
- 3.3 Globalization, Neoliberal tourism and socio-cultural change [4]
- 3.4 Tourism and Justice- social and environmental: Tourism-Poverty nexus [2]
- 3.5 Postcolonial hegemony and tourism [4]

**Unit IV: Tourism planning and management**

- 4.1 Concepts and approaches of tourism planning and policy [2]
- 4.2 International governance of tourism: Manila, Cape Town, Kerala declarations [4]
- 4.3 Tourism Policies of India; Evolving tourism circuits [4]
- 4.4 Entrepreneurship, product development and tourism management [2]
- 4.5 Crisis Communication System and Tourism management [4]

**Suggested Readings: Geographies of Tourism and Development Issues**

1. Ateljevic, I., Pritchard, A. and Morgan, N. (2007): *The Critical Turn in Tourism Studies: Innovative Research Methodologies*, Elsevier
2. Beeton, S. (2006): *Community Development through Tourism*, Landlinks Press
3. Buckley, R. (2009): *Ecotourism: Principles and Practices*, CABI
4. Butler, R. (2006): *The Tourism Area Life Cycle* (2 vols), Channel View Publications
5. Butler, R. and Hinch, T. (2007): *Tourism and Indigenous Peoples*, Taylor and Francis
6. Cooper, C. and Hall, C.M. (2008): *Contemporary Tourism: An International Approach*, Butterworth-Heinemann
7. Cooper, C.P. (2003): *Classic Reviews in Tourism*, Channel View Publications
8. Department of Tourism (2002): National Tourism Policy, Ministry of Tourism and Culture, Govt. of India
9. Dwyer, L., Gill, A. and Seetaram, N. (2012): *Handbook of Research Methods in Tourism: Quantitative and Qualitative Approaches*, Edward Elgar
10. Faulkner, H.W., Faulkner, B., Fredline, L., Jago, L. and Cooper, C.P. (2003): *Progressing Tourism Research*, Channel View Publications
11. Fennell, D.A. and Malloy, D.C. (2007): *Codes of Ethics in Tourism: Practice, Theory, Synthesis*, Channel View Publications
12. Gössling, S. and Hall, C.M. (2006): *Tourism and Global Environmental Change: Ecological, Social, Economic and Political*
13. Hall, C.M. (2011): *Fieldwork in Tourism: Methods, Issues and Reflections*, Routledge
14. Hall, C.M. and Higham, J. (2005): *Tourism, Recreation and Climate Change*, Channel View Publications
15. Hall, C.M. and Page, S.J. (2014): *The Geography of Tourism and Recreation: Environment, Place and Space*. Taylor & Francis
16. Hall, C.M. and Tucker, H. (2004): *Tourism and Postcolonialism: Contested Discourses, Identities and Representations*, Routledge
17. Hudman, L.E. and Jackson, R.H. (2003): *Geography of Travel and Tourism*, Thomson/Delmar Learning/Interrelationships, Routledge
18. Jafari, J. (2003): *Encyclopedia of Tourism*, Routledge
19. Jansen-Verbeke, M., Priestley, G.K. and Russo, A.P. (2008): *Cultural resources for tourism: patterns, processes and policies*, Nova Science Publishers
20. Knudsen, D.C. (2008): *Landscape, Tourism, and Meaning*, Ashgate Publishing
21. Lew, A., Hall, C.M. and Timothy, D.J.. (2008): *World Geography of Travel and Tourism: A Regional Approach*, Elsevier Science.
22. Lew, A.A., Hall, C.M. and Williams, A.M. (2008): *A Companion to Tourism*, Wiley
23. Lovelock, B. (2008): *Tourism and the Consumption of Wildlife: Hunting, Shooting and Sport Fishing*, Routledge
24. Mathur, R. (2007): *International Tourism*, ABD Publishers
25. Matias, Á., Nijkamp, P. and Sarmiento, M. (2012): *Quantitative Methods in Tourism Economics*, Physica-Verlag HD.
26. Newsome, D., Dowling, R.K. and Moore, S.A. (2005): *Wildlife Tourism*, Channel View Publications
27. Pearce, D.G. and Butler, R. (1999): *Contemporary Issues in Tourism Development*, Routledge
28. Phillimore, J. and Goodson, L. (2004): *Qualitative Research in Tourism: Ontologies, Epistemologies and Methodologies*, Routledge
29. Raina, A.K. (2005): *Ecology, Wildlife and Tourism Development: Principles, Practices and Strategies*, Sarup & Sons
30. Ritchie, B.W., Burns, P and Palmer, C. (2005): *Tourism Research Methods: Integrating Theory with Practice*, CABI
31. Robinson, P., Heitmann, S. and Dieke, P.U.C. (2011): *Research Themes for Tourism*, CABI
32. Scott, D., Hall, C.M. and Gössling, S. (2012): *Tourism and Climate Change: Impacts, Adaptation and Mitigation*, Taylor and Francis
33. Scott, N., Cooper, N.S.R.B.C. and Baggio, R. (2008): *Network Analysis and Tourism*, Channel View Publications
34. Sharma, K.K. (2004): *Tourism and Regional Development*, Sarup & Sons
35. Sharma, K.K. (2005): *Tourism and Development*, Sarup & Sons
36. Spirou, C. (2011): *Urban Tourism and Urban Change: Cities in a Global Economy*, Taylor and Francis
37. Suresh, K.T. (1994): *Tourism Policy of India: An Exploratory Study*, Equations, Bangalore
38. Tribe, J. (2009): *Philosophical Issues in Tourism*. Channel View Publications
39. Wearing, S. and Neil, J. (2013): *Ecotourism*, Taylor and Francis
40. Williams, S. (2009): *Tourism Geography: A New Synthesis*, Taylor & Francis



**DEPARTMENT OF GEOGRAPHY**  
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**Detailed Syllabus for Third Semester of the Postgraduate Course in Geography**

**Module Name:** *Techniques in Environmental Geography (Elective Stream I: Core Physical Geography)*

**Paper Type:** Practical

**Paper Code:** GEOG 0991A

**Total Marks:** 50

**Credit:** 6 Credit Hours / week (6 x 16 teaching weeks = 96 credit hours per semester)

Figures in [ ] indicate number of credit hours allocated to that particular topic per teaching week

**Module Evaluation:** Continuous Evaluation throughout the Semester

**Unit I: Sediment Analysis**

- 1.1 Instruments and techniques of sediment collection and sampling (both suspended and bed) [10]
- 1.2 Grain-size sorting, distribution, classification and application of statistical techniques [14]
- 1.3 Facies analysis : Layer identification, pinching, flow regime, deformation, grain size [8]

**Unit II: Ecological Survey Methods**

- 2.1 Counts : Assessing densities of large or obvious plants that are present at low density [5]
- 2.2 Quadrats: Measuring density, frequency, cover or biomass [5]
- 2.3 Point Quadrats: Estimating cover of grasses and herbs in short vegetation [5]
- 2.4 Transects: Line intercept, belt intercept, gradient-directed transect [5]
- 2.5 Mapping Terrestrial Vegetation [4]

**Unit III: Land Classification Techniques**

- 3.1 Definition and Components of Land Suitability [4]
- 3.2 Mapping of Land Suitability at Macro or Micro level of any part of India using the parameters following FAO guidelines: [20]  
Soil Reaction, Electrical Conductivity (EC), Organic Carbon (C), Availability of Nitrogen (N), Available phosphorus (P), Available Potassium (K), Exchangeable sodium percentage (ESP), Base Saturation (BS) and Cation exchange capacity (CEC), Soil texture

**Unit IV: Quantitative Techniques in Hydrology**

- 4.1 Analysis of precipitation data at different temporal and spatial scales with appropriate numerical and GIS techniques: [10]  
IMD Daily Data, Sub-daily data from Tropical Rainfall Measuring Mission (TRMM)  
Estimation of Missing Data: Normal Ratio Method, Distance Power Method
- 4.2 Hydrological Statistics: Frequency Analysis, Return Period, Probability Plotting, Extreme Value Distribution, Log-Pearson Distribution [8]
- 4.3 Flow routing methods: Level Pool, Muskingum, Series of Reservoirs [6]

**Suggested Readings:** *Techniques in Environmental Geography (Elective Stream I: Core Physical Geography)*

1. Chow, V.T, Maidment, D.R and Mays, L.W. (1988): *Applied Hydrology*, McGraw Hill
2. FAO/UNESCO (1974): *Soil Map of the World, Vol. I Legend*, UNESCO, Paris
3. FAO, (1981): *A Framework for Land Evaluation*, FAO, Rome
4. FAO, (1995): *Planning for Sustainable Use of Land Resources- towards a New Approach, Land and Water Bulletin 2*, FAO, Rome
5. Subramanya, K (2013): *Engineering Hydrology*, Tata McGraw Hill, New Delhi
6. Sutherland, W.J. (eds.) (2006): *Ecological Census Techniques: A Handbook*, Cambridge University Press, New York
7. Guerit1, L. Barrier1, C. Narteau1, F. Métivier1, Y. Liu2,3, E. Lajeunesse1, E. Gayer1, P. Meunier4, L. Malverti1, and B. Ye2. The Grain-size Patchiness of Braided Gravel-Bed Streams -example of the Urumqi River (northeast Tian Shan, China) *Adv. Geosci.*, 37, 27–39, 014www.adv-geosci.net/37/27/2014/ doi:10.5194/adgeo-37-27-2014.
8. Grain Size Analysis, Grain Size Analysis; In book: *Encyclopedia of Geoarchaeology* Publisher: Springer ,Editors: Allan S. Gilbert; 2016, DOI: 10.1007/978-1-4020-4409-0\_18.
9. S.M. Sengupta, *Introduction to Sedimentology* 2015.
10. Milan Vuković, Andjelko Soro Determination of hydraulic conductivity of porous media from grain-size composition; *Water Resources Publications*, 1992, ISBN 0918334772, 9780918334770.
11. *Facies Models; Response to sea Level Change* edited by R. G. Walker and N. P. James. Geological Association of Canada, 1992. No. of pages: 409. Price: \$CDN 30.00 (paperback). ISBN 0 919216 49 8. M. Williams.
12. *Sedimentary Basins; Evolution, Facies, and Sediment Budget*, Authors: Einsele, Gerhard , ISBN 978-3-662-04029-4.

**DEPARTMENT OF GEOGRAPHY**  
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**Detailed Syllabus for Third Semester of the Postgraduate Course in Geography**

**Module Name:** *Techniques in Human Geography (Elective Stream II: Core Human Geography)*

**Paper Type:** Practical

**Paper Code:** GEOG 0991B

**Total Marks:** 50

**Credit:** 6 Credit Hours / week (6 x 16 teaching weeks = 96 credit hours per semester)

Figures in [ ] indicate number of credit hours allocated to that particular topic per teaching week

**Module Evaluation:** Continuous Evaluation throughout the Semester

**Unit-I: Survey Methods**

- |  |      |
|--|------|
| 1.1 Qualitative measurement through scaling methods- Nominal scale, Ordinal scale, Ratio scale, Attitude scale | [10] |
| 1.2 Grounded Theory  | [6]  |
| 1.3 Concurrent Triangulation Approach  | [4]  |
| 1.4 In-depth Interviews with structured questionnaire schedule   | [6]  |
| 1.5 Group Interviews / Focus Group Discussion  | [4]  |
| 1.6 Participant Observations   | [4]  |
| 1.7 Biographical Research  | [4]  |
| 1.8 Ethnographic analysis  | [8]  |

**Unit-II: Analysis Techniques**

- |   |      |
|---|------|
| 2.1 Textual Analysis / Content Analysis     | [8]  |
| 2.2 Narrative Analysis                      | [8]  |
| 2.3 Conversational Analysis                 | [8]  |
| 2.4 Discourse Analysis                      | [4]  |
| 2.5 Article and Book review                 | [12] |
| 2.6 Spatial Clustering and Auto-correlation | [10] |

**Suggested Readings:** *Techniques in Human Geography (Elective Stream II: Core Human Geography)*

- Berg, B.L. and Lune, H. (2012): *Qualitative Research Methods for the Social Sciences*, Pearson Education Limited, New York
- Creswell, J. W. (2009): *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*, SAGE Publications, London
- Given, L. M. (2008): *The Sage Encyclopedia of Qualitative Research Methods: A-L ; Vol. 2, M-Z Index*, SAGE, London
- Grbich, C. (2004): *New Approaches in Social Research*, SAGE Publications, London
- Marvasti, A. (2003): *Qualitative Research in Sociology*, SAGE Publications, London
- Miller, J. H. and Page, S. E. (2009): *Complex Adaptive Systems: An Introduction to Computational Models of Social Life: An Introduction to Computational Models of Social Life*, Princeton University Press, Princeton
- Rihoux, B. and Ragin, C.C. (2009): *Configurational Comparative Methods: Qualitative Comparative Analysis (QCA) and Related Techniques*, SAGE Publications, London
- Shaw, I. and Gould, N. (2001): *Qualitative Research in Social Work*, SAGE Publications, London

**DEPARTMENT OF GEOGRAPHY**  
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**Detailed Syllabus for Third Semester of the Postgraduate Course in Geography**

**Module Name:** *Techniques in River Science*

*(Special Paper for Elective Stream I: Option A - River Science)*

**Paper Type:** Practical

**Paper Code:** GEOG 0992A1

**Total Marks:** 50

**Credit:** 6 Credit Hours / week (6 x 16 teaching weeks = 96 credit hours per semester)

Figures in [ ] indicate number of credit hours allocated to that particular topic per teaching week

**Module Evaluation:** Continuous Evaluation throughout the Semester

**Unit I: Field Measurements and Data Representation**

- 1.1 Quantitative analysis of channel planform: Channel sinuosity and meander geometry, Braiding Index (BI) [1]
- 1.2 Field measurement, computation and interpretation of hydraulic parameters: Channel cross-section and Thalweg surveys, Velocity measurement by current meter, Bathymetry survey using echo-sounder, Discharge, stream power and shear stress calculations [10]
- 1.3 Graphical representation of hydrological data: Normal and Storm Hydrograph, Unit Hydrograph, Rating Curve, Different components of Time series analysis of sediment and stream discharge [8]
- 1.4 Identification and measurement of fluvial features from satellite images and Google Earth: River channel bars, alluvial fans and floodplain aspects; Temporal analysis of Channel planform morphology and bankline shifting [5]

**Unit II: RS - GIS Application in Fluvial Studies**

- 2.1 Digital image analysis and extraction of waterbodies-related indices from optical and thermal imagery; Enumerating LULC changes and related indices within the riparian zone [4]
- 2.2 Extraction of drainage network from DEM, catchment demarcation and extraction of morphometric parameters [4]
- 2.3 Analysis of basin linear aspects: Ordering, Drainage composition Laws, TDCN-TICN and Binary Numbering, Drainage orientation [2]
- 2.4 Analysis of basin areal aspects: shape parameters; Basin and network ratios and relation with runoff [2]
- 2.5 Analysis of basin relief parameters: terrain parameters, clinographic model, basin asymmetry and hypsometry, tectonic indices [2]
- 2.6 Longitudinal and cross profiles of rivers: simple, normalised, SL index, concavity, curve-fits and structural relations [4]
- 2.7 Basin prioritisation schemes and techniques [2]
- 2.8 Background of Hydraulic Modelling; Channel geometry and cross-section creation; Basic flood modelling in HEC-RAS [12]
- 2.9 Geomorphological Mapping: defining mapping units, preparation of a geomorphological map legend, survey and map preparation [8]

**Unit III: Modelling Rainfall-Runoff-Sediment Yield at Regional Scale**

- 3.1 Theoretical Background of The Soil and Water Assessment Tool (SWAT) [4]
- 3.2 Gathering data: Precipitation, Topography, Land Use, Soil, Discharge and Sediment load [10]
- 3.3 Creating SWAT Model with ArcSWAT [10]
- 3.4 Automated multi-criteria model calibration and validation with SWAT-CUP [8]

**Suggested Readings: *Techniques in River Science (Elective)***

1. Carbonneau, P.E. and Piegay, H. (2012): *Fluvial Remote Sensing for Science and Management*, Wiley-Blackwell, Chichester
2. Di Baldassarre, G. (2013): *Floods in Changing Climate: Inundation Modelling*, Cambridge University Press, Cambridge
3. Monkhouse, F.J. and Williamson, R.H. (1963): *Maps and Diagrams: Their Compilation and Construction*, Methuen, London
4. Morisawa, M. (1985): *Rivers- Form and Process*, Longman Publisher Group, London
5. Morisawa, M.E. (ed.) (1971): *Quantitative Geomorphology: Some Aspects and Applications*, State University of New York, Binghamton
6. NATMO (2000): *Geomorphological Mapping*, Monograph No. 010MONO, NATMO, Kolkata
7. Pal, S.K. (1972): 'A classification of morphometric methods', *Geographical Review of India*, Vol. 34, No. 1, pp.
8. Raghunath, H.M. (2006): *Hydrology: Principles, Analysis and Design*, New Age International (P) Limited Publishers, New Delhi
9. Sarkar, A. (2008): *Practical Geography: A Systematic Approach*, Orient BlackSwan, Kolkata
10. Sen, P.K. (1993): *Geomorphological Analysis of Drainage Basins*, The University of Burdwan, Burdwan
11. Strahler, A (1957) 'Quantitative analysis of watershed geomorphology', *Transactions of the American Geophysical Union*, 38(6): 913-920
12. Suresh, M., Sudhakar, S., Tiwari, K.N. and Chowdary, V.M. (2004): 'Prioritisation of watersheds using morphometric parameters and assessment of surface water potential using Remote Sensing', *Journal of the Indian Society of Remote Sensing*, 32(3): 249 - 259
13. Wilson, J.P. and Gallant, J.C. (ed.) (2000): *Terrain Analysis- Principles and Applications*, Wiley, New York, pp. 479
14. Wood, J. (1996b): *The geomorphological characterisation of digital elevation models*, Unpublished Ph.D. Thesis, University of Leicester

**DEPARTMENT OF GEOGRAPHY**  
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**Detailed Syllabus for Third Semester of the Postgraduate Course in Geography**

**Module Name:** *Techniques in Physical Landscape Analysis and Management*

*(Special Paper for Elective Stream I: Option B - Physical Basis of Landscape Management)*

**Paper Type:** Practical

**Paper Code:** GEOG 0992A2

**Total Marks:** 50

**Credit:** 6 Credit Hours / week (6 x 16 teaching weeks = 96 credit hours per semester)

Figures in [ ] indicate number of credit hours allocated to that particular topic per teaching week

**Module Evaluation:** Continuous Evaluation throughout the Semester

**Unit I: Assessment of Water and Noise Pollution**

- |   |      |
|---|------|
| 1.1 pH, Iron, Total Hardness, Salinity, Conductivity, DO, TDS and Turbidity | [12] |
| 1.2 Nitrate, Nitrite, Chloride, Residual Chlorine                           | [8]  |
| 1.3 Calculation of WQI and its application                                  | [6]  |
| 1.4 Measurement of Noise Pollution  | [8]  |

**Unit II: Environmental Survey and Data Analysis**

- |   |     |
|---|-----|
| 2.1 Perception Survey Techniques, preparation of Survey Schedule and Questionnaires for perception survey | [6] |
| 2.2 Likert Scale Surveys and Application of Ridit Method to Likert Scale Surveys                          | [6] |
| 2.3 SWOT Analysis   | [6] |
| 2.4 Environmental Impact Assessment Methodologies   | [6] |

**Unit III: Laboratory Analysis of Soil Samples**

- |  |     |
|--|-----|
| 3.1 Soil Sampling: Site selection, digging soil pit, Sample collection, Preparing soil sample for analysis | [6] |
| 3.2 Particle Size Analysis by sieving and sedimentation; Determination of soil texture                     | [6] |
| 3.3 Determination of Specific Gravity and Bulk Density by Gravimetric Method                               | [8] |
| 3.4 Determination of oxidizable carbon and soil organic matter by Wet Combustion Method                    | [8] |
| 3.5 Determination of Soil pH by Colourimetric Method   | [4] |
| 3.6 Basics of Spectrophotometry and determination of Ammoniacal Nitrogen using Spectrophotometry           | [6] |

**Suggested Readings:** *Techniques in Physical Landscape Analysis and Management (Elective)*

1. Agarwal, B.L. (1988): *Basic Statistics*, New Age International Publisher, New Delhi
2. Anjaneyulu, Y., & Manickam, V. (2011). *Environmental impact assessment methodologies*. BS Publications
3. Cole, J.P and King, C.A.M. (1970): *Quantitative Geography*, John Wiley and Sons, New York
4. Croxton, F.E. and Cowden, D.J. (1939): *Applied General Statistics*, Prentice Hall, New Jersey
5. Dickinson, G.C. (1973): *Statistical mapping and the presentation of statistics*, Edward Arnold, London
6. Hadley, G. (1977): *Linear Algebra*, Addison-Wesley Publishing Company, Boston
7. Healy, F.J., (2010): *Statistics: A tool for Social Research*, Cengage Learning, New York
8. Kundu, A. (1980): *Measurement of urban processes: A study in Regionalization*, Popular Prakashan, New Delhi
9. Rogerson, P. (2001): *Statistical Methods for Geography*, Sage Publications, London

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**Detailed Syllabus for Third Semester of the Postgraduate Course in Geography**

**Module Name:** *Techniques in Regional and Urban Analysis*

*(Special Paper for Elective Stream II: Option A - Regional Development and Urban Studies)*

**Paper Type:** Practical

**Paper Code:** GEOG 0992B1

**Total Marks:** 50

**Credit:** 6 Credit Hours / week (6 x 16 teaching weeks = 96 credit hours per semester)

Figures in [ ] indicate number of credit hours allocated to that particular topic per teaching week

**Module Evaluation:** Continuous Evaluation throughout the Semester

**Unit I: Demographic Analysis**

- 1.1 Geographic Distribution of Population: Lorenz Curve, Accessibility Index, Location quotient [8]
- 1.2 Measure of Migration: Gravity Model [8]
- 1.3 Spatial Analyses of Population: Moran's I, Geographically Weighted Regression [8]
- 1.4 Population Projection [8]

**Unit II: Techniques in Regional Analysis**

- 2.1 Input Output Analysis and estimation of final demand [6]
- 2.2 Linear Programming Problem - Transport Problem - North West Corner Method [6]
- 2.3 Choice of indicators - Axiomatic Principles [4]
- 2.4 Calculation of growth rates: Arithmetic, Geometric and Exponential [6]
- 2.5 Drawing of Isodopane through Weberian Technique [4]

**Unit III: Measuring urban form**

- 3.1 Extraction of Built up Area (BAEM, SLEA, DMSP) [6]
- 3.2 Growth Types (Infill, Edge, Outlying) [4]
- 3.3 Urban Sprawl (Sprawl Metrics, Landscape Metrics) [4]
- 3.4 Growth Prediction: Integration of CA-Markov Model, Artificial Neural Network (ANN) [6]

**Unit IV: Environment and Urbanization**

- 4.1 Urban Ecosystem Service Assessment. [4]
- 4.2 Livability Assessment: 'K'-means cluster analysis and Entropy. [6]

**Unit V: Infrastructure, Basic Services and Finance**

- 5.1 Assessment of Splintered Urbanism: AccesstoPotableDrinking water [4]
- 5.2 Housing demand analysis: Hedonic price model [4]

**Suggested Readings:** *Techniques in Regional and Urban Analysis*

1. Agarwal, B.L. (1988): Basic Statistics, New Age International Publisher, New Delhi
2. Cole, J.P and King, C.A.M. (1970): Quantitative Geography, John Wiley and Sons, New York
3. Croxton, F.E. and Cowden, D.J. (1939): Applied General Statistics, Prentice Hall, New Jersey
4. Dickinson, G.C. (1973): Statistical mapping and the presentation of statistics, Edward Arnold, London
5. Hadley, G. (1977): Linear Algebra, Addison-Wesley Publishing Company, Boston
6. Healy, F.J., (2010): Statistics: A tool for Social Research, Cengage Learning, New York
7. Kundu, A. (1980): Measurement of urban processes: A study in Regionalization, Popular Prakashan, New Delhi
8. Rogerson, P. (2001): Statistical Methods for Geography, Sage Publications, London

## DEPARTMENT OF GEOGRAPHY PRESIDENCY UNIVERSITY

### Detailed Syllabus for Third Semester of the Postgraduate Course in Geography

**Module Name:** *Methods in Developmental Geographies*

*(Special Paper for Elective Stream II: Option B - Geographies of Development)*

**Paper Type:** Practical

**Paper Code:** GEOG 0992B2

**Total Marks:** 50

**Credit:** 6 Credit Hours / week (6 x 16 teaching weeks = 96 credit hours per semester)

Figures in [ ] indicate number of credit hours allocated to that particular topic per teaching week

**Module Evaluation:** Continuous Evaluation throughout the Semester

#### Unit I: Social Indicators of development and Community development

- |   |      |
|---|------|
| 1.1 Compositing indices: Problems of synthesising large size data into smaller dimensions; Choice of variables in construction of indicators, weightage and ranking method, Range equalisation techniques | [4]  |
| 1.2 Social Indicators: Selection of Social Indicators: Education, Housing and Crime   | [10] |
| 1.3 Measuring Wellbeing: Construction of Quality of Life Indicators   | [6]  |
| 1.4 Livelihood Analysis: Methods  | [4]  |
| 1.5 Community development research tools: Uses of Participatory Rural Appraisal (PRA) / Rapid Rural Appraisal (RRA)   | [8]  |

#### Unit II: Methods in Tourism Geography

- |   |     |
|---|-----|
| 2.1 Designing of questionnaires for tourism related surveys and application of Likert scale     | [4] |
| 2.2 Delphi technique and its application in tourism research                                    | [4] |
| 2.3 Technique of multi-criteria decision making in tourism: Analytic Hierarchy Process and SWOT | [6] |
| 2.4 Tourists' Satisfaction Index  | [4] |
| 2.5 Structural Equation Modelling in Tourism Analysis   | [4] |
| 2.6 Application of Geographical Weighted Regression model in tourism studies                    | [4] |
| 2.7 Network analysis in tourism   | [4] |
| 2.8 Preparation of tourist literature with emphasis on mapping                                  | [2] |

#### Unit III: Measuring Agricultural Development

- |  |      |
|--|------|
| 3.1 Methods of agriculture regionalization: cropping pattern & crop concentration  | [4]  |
| 3.2 Measurement of crop diversification (Bhatia and Gibb's-Martin)   | [4]  |
| 3.3 Measurement of crop productivity (W.M. Yang, Singh, Shafi); Measurement of agricultural efficiency ( Shafi and Enayedi)  | [6]  |
| 3.4 Representation of Agricultural data: Land use, distribution of crops; Trends in production, yield and area under crops   | [4]  |
| 3.5 Correlation of different variables relating to agricultural development in India or in any part of the country   | [4]  |
| 3.6 Farm Survey: Preparation of survey schedules, Farmers survey-Purchase behavior of agricultural inputs; Farmers' marketing practices- Regulated markets and its role in marketing of farm produce | [10] |

#### Suggested Readings: *Methods in Developmental Geographies*

1. Chandra Shekara, P., & et al (2016): *Farmer's Handbook on Basic Agriculture*, Desai Fruits & Vegetables Pvt. Ltd. Navsari, Gujarat
2. Crop Production Guide (2005): Directorate of Agriculture, Govt. Of West Bengal
3. Freudenberge K. S., *Rapid Rural Appraisal (RRA) and Participatory Rural Appraisal (PRA)-A manual for CRS field works and partners*, Maryland.
4. ICAR. (2006): *Handbook of Agriculture. Indian Council of Agricultural Research*, New Delhi.
5. Kahlon A.S. and S.D.Tyagi, (2000): *Agricultural Price Policy in India*, Allied Publishers Pvt. Ltd., Bombay.
6. Kundu, A. (1980): *Measurement of urban processes: A study in Regionalization*, Popular Prakashan, New Delhi
7. Rogerson, P. (2001): *Statistical Methods for Geography*, Sage Publications, London
8. Sadanandan S., Natarajan P., et al (2007): *Data Tools: Participatory Rural Appraisal Techniques*, Cochin.
9. Sivarama Prasad A., (1999): *Agricultural Marketing in India*, Mittal Publications, New Delhi.

**DEPARTMENT OF GEOGRAPHY**  
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**Detailed Syllabus for Third Semester of the Postgraduate Course in Geography**

**Module Name:** *Dissertation Methods*

**Paper Type:** Practical

**Paper Code:** GEOG 0993

**Total Marks:** 50

**Credit:** 6 Credit Hours / week (6 x 16 teaching weeks = 96 credit hours per semester)

Figures in [ ] indicate number of credit hours allocated to that particular topic per teaching week

**Module Evaluation:** Continuous Evaluation throughout the Semester

The content for this module shall be framed separately by the respective Dissertation Supervisor(s) for each candidate, on the basis of their determined Dissertation Topics and aspects allied to it.

The framed content(s) of this Module for each student shall be submitted by the respective Supervisors before the commencement of the Semester.

A Candidate shall be judged on the content framed specifically for him / her for this Module in the Continuous Evaluation Mode.



**DEPARTMENT OF GEOGRAPHY**  
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**Detailed Syllabus for Fourth Semester of the Postgraduate Course in Geography**

**Module Name:** *Regional Geomorphic Entities (Elective Stream I: Core Physical Geography)*

**Paper Type:** Theory

**Course No.:** GEOG 1001A

**Total Marks:** 50 (Semester Examination - 35 and Internal Assessment - 15)

**Credit:** 4 Credit Hours / week (4 x 16 teaching weeks = 64 credit hours per semester)

Figures in [ ] indicate number of credit hours allocated for the topic

**Module Evaluation: Semester Examination (35 marks):** Written examination of 2 hours duration will be held at semester end.

**Question Pattern:** Four Long-answer type questions each of 10 marks (may be split into two parts, one carrying 2 marks at most) will be set for answering any two and five semi-long answer type questions, each of 5 marks will be set for answering any three.

**Internal Assessment (15 marks):** Mode of Internal Assessment (through viva-voce / class presentation / group discussion / written examination / assignment or any other method) will be notified for chosen topic(s) during the Course.

**Unit I: Deltaic Environments**

- 1.1 Developments in Delta studies [1]
- 1.2 Delta Evolution Models: Hinterland and receiving basin characteristics; Delta front development, progradation and lobe morphology; Delta abandonment processes and characteristics of moribund channels [6]
- 1.3 Sediment dynamics, succession and facies in fluvial and tide-dominated deltas: Sediment aggradation/degradation mechanisms; Sediment induced deformation; Impacts of tectonics and offshore morphology [5]
- 1.4 Classification, architecture and evolution of Large River Deltas in different environments: High destructive waves, High constructive lobate, High destructive tide, High constructive elongate [4]
- 1.5 Regional geomorphology of the Ganga-Brahmaputra-Meghna and Okavango Deltas [5]

**Unit II: Estuarine Environments**

- 2.1 Definitions, distribution, formational factors, typical characteristics, dimensions and geomorphic classification of estuaries [2]
- 2.2 Water mixing, sediment flux and transportation mechanisms in estuaries; Estuarine morphodynamics: effects of sea level, tides, waves, currents, river discharge and tectonics; Morphological attributes of the fluvio-tidal transition zone [4]
- 2.3 Estuarine sedimentary facies in different geomorphic settings: tide-dominated, wave-dominated, mixed wave-tide-dominated and river-dominated environments; Life cycles of estuarine islands [3]
- 2.4 Estuarine sub-environments: Characteristics of Lower and upper tidal zones, tidal creeks, mudflats, salt marshes and lagoons [3]
- 2.5 Global, climatic and regional controls on mangrove development; Water movement, wave dissipation and sedimentation processes in mangroves; Mangrove degradation causes and restoration programmes [5]
- 2.6 Estuarine habitats and their ecosystem services; Impacts of aquaculture and agriculture on estuarine ecology [2]
- 2.7 Regional geomorphology of the Narmada estuary [2]

**Unit III: Plateau and Plateau Fringe Environments**

- 3.1 Plateau formation mechanisms; Plateau types: Stratigraphy, denudation rates and soil characteristics [4]
- 3.2 Tors and inselbergs: Formation processes and theories; Examples from Western Bengal, Dartmoor and Southern Africa [5]
- 3.3 Laterites and lateritic landscapes: leaching processes, profile characteristics, duricrust formation; Gullying processes and soil loss from lateritic landscapes [4]
- 3.4 Planation surfaces: Development, tectonic deformation and palaeoclimate imprints; Case studies of Chotonagpur and Deccan [3]
- 3.5 Hydroclimatic extremities and changing ecosystems of plateau provinces: Examples from the Tibetan and Meghalaya Plateaux [2]
- 3.6 Runoff and sediment regimes of shield and cratonic rivers: Case studies of Tapi and Kaveri Rivers [4]

**Suggested Readings: Regional Geomorphic Entities (Elective Stream I: Core Physical Geography)**

1. Aleva, G.J.J. (1994): Laterites: concepts, geology, morphology and chemistry. International Soil Reference and Information Centre
2. Bagchi, K.N., Munshi, S.K. & Bhattacharya, R (Ed.) (1972): The Bhagarathi Hooghly Basin, Proceedings of the Interdisciplinary Symposium, Department of Geography, Calcutta University
3. Biswas, A. (1987): Laterites and lateritoids of Rarh Bengal. In: datye, V. S. et al. (Ed.). Explorations in the Tropics. Prof. KD Dikshit Felicitation Volume Committee, 48-54.
4. Biswas, B. (1959): Surface Geology of West Bengal, India. Proc. Dev. Petrol., Res. ECAFE, Min. Res. Dev. Ser.No. 10.
5. Culver H.E. (2015): The Formation of Laterite. Palala Press
6. Defining the Delta: Multidisciplinary Perspectives on the Lower Mississippi River Delta ,Edited by Janelle Collins,Copyright Date: 2015 Published by: University of Arkansas Press DOI: 10.2307/j.ctt1ffjg6m
7. Jackson, NL. (2013): Estuaries. In: John F. Shroder (ed.) Treatise on Geomorphology, Volume 10, pp. 308-327. San Diego: Academic Press.
8. JANOK P. BHATTACHARYA,Robert E. Sheriff, Professor Of Sequence Stratigraphy, Geosciences Department, SR1 Rm. 312,University Of Houston, 4800 Calhoun Rd., Houston, Texas 77204-5007, U.S.A.
9. Juan Miguel Ramírez-Cuesta1\*, Inmaculada Rodríguez Santalla1 And Fernando Barrio-Parra1 Application Of Methods For Change Detection To Identify Geomorphological Changes. Case Study: Mouth Of The Ebro Delta, 1 Universidad Rey Juan Carlos, Dpto. De Biología Y Geología, C/Tulipán S/N, 28933 Móstoles (Spain).
10. Kennish, M.J. (ed.) (2016): Encyclopedia of Estuaries. Springer, Dordrecht.
11. Liviu GiosanJanok P. Bhattacharya.2005 River Deltas–Concepts, Models, And Examples. SEPM Society For Sedimentary Geology,Volume-83,DOI: <https://doi.org/10.2110/Pec.05.83> ,ISBN Electronic:9781565762190.
12. Mcfarlane, M. J. (1986): Geomorphological analysis of laterites and its role in prospecting geological survey of India. Memoirs. Laterization Processes. v. 120, 41-50.
13. McGetchin, T.R., Burke, K.C., Thompson, G.A., Young, R.A. (2013): Mode and Mechanisms of Plateau Uplifts. Geodynamics Series, 99–110. DOI: 10.1029/gd001p0099
14. Mukhopadhyay S.C. (1968): Erosion surfaces of the Sanjay River Valley, The Subarnarekha System, Bihar, IGU, S-25, Ranchi University
15. ofcanada, 317 p.
16. Pope G.A. (2013): Weathering in the Tropics, and Related Extratropical Processes. In: John F. Shroder (ed.) Treatise on Geomorphology, Volume 4, pp. 179-196. San Diego: Academic Press.
17. Richards, K. (1978): *Fluvial Geomorphology*, Blackwell, London
18. Rudra, Kalyan, 2018Rivers Of The Ganga-Brahmaputra-Meghna Delta A Fluvial Account Of Bengal, ISBN 978-3-319-76544-0.
19. Sengupta, S. (1966): Geological and Geophysical studies of the Western part of Bengal Basin, India, Bull. Ammer. Assoc. Petrol Geologist, Vol. 50, pp. 1001-1017
20. Sherman, D.J., (2013): Perspectives on coastal geomorphology: introduction. In: Shroder, J. (Editor in Chief), Sherman, D.J. (Ed.), Treatise on Geomorphology. Academic Press, San Diego, CA, vol. 10
21. T. Elliott, Chapter 6 Deltas.
22. Technical Report No. 424,1985,Deltaic Morphology And Sedimentology With Special Reference To The Indus River Delta J. T. Wells And J. M. Coleman .
23. Vörösmarty, c.j., sharma, k.p., balázs, m.f., copeland, a.h., holden, j.,marble, j., and lough, j.a., 1997, the storage and aging of continental runoff in large reservoir systems of the world: ambio, v. 26, p. 210–219.
24. Walker, r.g., 1984. Facies models, second edition: geological association
25. Walker, r.g., 1992, facies, facies models and modern stratigraphic concepts, *in* walker, r.g., and james, n.p., eds., facies models: response to sea level change: geological association of canada, p. 1–14.
26. Walker, r.g., and harms, j.c., 1971, the “catskill delta”: a prograding muddy shoreline in central pennsylvania: journal of geology, v. 79, p. 381–399.
27. Walker, r.g., and plint, a.g., 1992, wave- and storm-dominated shallow marine systems, *in* walker, r.g., and james, n.p., eds.,facies models:
28. Wolanski, E., Elliot M. (2016): Estuarine Ecohydrology- An Introduction. Elsevier, Amsterdam.
29. Spencer, T., Moller, I. (2013) Mangrove Systems. In: John F. Shroder (ed.) Treatise on Geomorphology, Volume 10, pp. 361-391. San Diego: Academic Press.

**DEPARTMENT OF GEOGRAPHY**  
**PRESIDENCY UNIVERSITY**

**Detailed Syllabus for Fourth Semester of the Postgraduate Course in Geography**

**Module Name:** *Geography of Development and Political Economy (Elective Stream II: Core Human Geography)*

**Paper Type:** Theory

**Paper Code:** GEOG 1001B

**Total Marks: 50** (Semester Examination - 35 and Internal Assessment - 15)

**Credit:** 4 Credit Hours / week (4 x 16 teaching weeks = 64 credit hours per semester)

Figures in [ ] indicate number of credit hours allocated for the topic

**Module Evaluation: Semester Examination (35 marks):** Written examination of 2 hours duration will be held at semester end.

**Question Pattern:** Four Long-answer type questions each of 10 marks (may be split into two parts, one carrying 2 marks at most) will be set for answering any two and five semi-long answer type questions, each of 5 marks will be set for answering any three.

**Internal Assessment (15 marks):** Mode of Internal Assessment (through viva-voce, class presentation, group discussion, written examination, assignment or any other method) will be notified for chosen topic(s) during the Course.

**Unit I : Geography of Development**

- 1.1 Conceptualizing Development: The meaning of the word 'development'; Critical Reflection on the 'nature' of development; Alternative interpretations of development; Measuring Development: from GNP to HDI [8]
- 1.2 Spatializing Development: The emergence of the Third World; Critiques of the Third World; Third World since the 1990s [6]
- 1.3 Governing Development: Geographies of Globalization; Market-led development; The role of the state in human development and economic development; Development performance across Indian states: role of governments [6]
- 1.4 Paradigms of development: Sustainable Development Goals 2030; Poverty and SDGs; Relative poverty and inequalities at a global scale; Current Debates around SDGs; Alternative Development: Civil Society, Social Capital and Non-Governmental Organisations [12]

**Unit II : Political Economy**

- 2.1 Theory of state, politics and economics: The Rise of Modern World Economy: Hegemony and Machiavellianism; Contemporary International Politics: Marxism and Critical Views; Globalization and Multinational Corporations: Capitalism; Welfare States, International Trade, Social Contract, Pluralism [20]
- 2.2 Contemporary Political Economy of India: Post Independent Political Economy, Politics of Clientelism; Markets and Politics- Politics of Economic Reform and Depression; Political Economy of Voting Behaviour; Role of political economy upon structure and function of democracy [12]

**Suggested Readings:** *Geography of Development and Political Economy*

1. Acemoglu, D. and Robinson, J. (2013): *Why Nations Fail: The Origin of Power, Prosperity and Poverty*, Crown, London
2. Berlin, Isaiah. "Two Concepts of Liberty." In *Four Essays on Liberty*. New York, Oxford University Press, 1990.
3. Cohn, Theodore – *Global Political Economy: Theory and Practice*.
4. Easterly, W. (2014): *The Tyranny of Experts: Economists, Experts and Forgotten Rights of the Poor*, Basic Books, New York
5. Friedman, Milton. *Capitalism and Freedom*. Chicago, IL: University of Chicago Press, 1982, pp. 1-55, 108-37, and 161-90.
6. Gill, Stephen – *Power and Resistance in the New World Order*.
7. Gilpin, Robert – *Global Political Economy*
8. Graham Bannock, R.E. Baxter, and Evan Davis, *The Penguin Dictionary of Economics*, Eighth edition (New York: Penguin, 2011).
9. Howard, M. C., and J. E. King. *The Political Economy of Marx*. New York, NY: New York University Press, 1988, pp. 1-180.
10. Jeffrey Frieden, David Lake, and Lawrence Broz, Editors, *International Political Economy: Perspectives on Global Power and Wealth*, Fifth Edition (New York: W. W. Norton, 2010).
11. Machiavelli, *The Prince*
12. Pieterse, J. N. (2010). *Development Theory*. Sage, Los Angeles.
13. Polanyi, Karl. Chapters 3-14 in *The Great Transformation: The Political and Economic Origins of Our Time*. Boston, MA: Beacon Press, 2001.
14. Potter, R., Binns, T., Smith, D.W. and Elliott, J. (2008): *Geographies of Development: An Introduction to Development Studies*, Prentice Hall, New York
15. Potter, R., Conway, D., Evans, R and Lloyd-Evans, S. (2012). *Key Concepts in Development Geography*. Sage, Los Angeles.
16. Randy Charles Epping, *A Beginner's Guide to the World Economy*, Third Edition (New York: Vintage, 2001).
17. Ravenhill, John – *Global Political Economy*.
18. Samuelson, P.A. (ed.) (1948): *Economics: An Introductory Analysis*, McGraw-Hill, London
19. Thomas Oatley, *International Political Economy: Interests and Institutions in the Global Economy*, Fifth Edition (New York: Pearson Longman, 2012).
20. Weber, Max. Introduction and chapters 1-3, and 5 in *The Protestant Ethic and the Spirit of Capitalism*, 2010.
21. Williams, G., Meth, P. and Willis, K. (2009): *Geographies of Developing Areas: The global south in a changing world*, Routledge, London
22. Yusuf, S. (2009): *Development Economics through the Decades: A Critical Look at 30 Years of the World Development Report*, World Bank, Washington D.C.

**DEPARTMENT OF GEOGRAPHY**  
**PRESIDENCY UNIVERSITY**

**Detailed Syllabus for Fourth Semester of the Postgraduate Course in Geography**

**Module Name:** *Sediment in the Fluvial System*

(Special Paper for Elective Stream I: Option A- Fluvial Geomorphology)

**Paper Type:** Theory

**Paper Code:** GEOG 1002A1

**Total Marks:** 50 (Semester Examination - 35 and Internal Assessment - 15)

**Credit:** 4 Credit Hours / week (4 x 16 teaching weeks = 64 credit hours per semester)

Figures in [ ] indicate number of credit hours allocated for the topic

**Module Evaluation: Semester Examination (35 marks):** Written examination of 2 hours duration will be held at semester end.

**Question Pattern:** Four Long-answer type questions each of 10 marks (may be split into two parts, one carrying 2 marks at most) will be set for answering any two and five semi-long answer type questions, each of 5 marks will be set for answering any three.

**Internal Assessment (15 marks):** Mode of Internal Assessment (through viva-voce / class presentation / group discussion / written examination / assignment or any other method) will be notified for chosen topic(s) during the Course.

**Unit I: Sediment Genesis**

- 1.1 Runoff generation: patterns and controls on overland flow; Hortonian, Hewlettian and Variable Source Area concepts of overland flow production; Runoff mechanisms and processes in cold, temperate, arid and humid environments [5]
- 1.2 Water flow at the plot scale: Soil hydrology and preferential flow phenomena; Unsaturated and saturated flow and solute transport; Sediment transport capacity of overland flow [3]
- 1.4 Channel initiation and network development: models and mechanisms [3]
- 1.5 Sediment budgets of riparian environments; Sediment sources, Hillslope-channel connectivity and sediment delivery mechanisms; Flash floods and sediment transfer; Mean sediment residence time; Global denudation and erosion rates [3]
- 1.6 Slope-catchment influence on sediment transfer and river channel morphology; Components of the sediment cascade [2]
- 1.7 Sediment stratigraphy: Composition, texture and internal features; Relationships with underlying and overlying layers; Succession, grain size distribution and flow behavior linkages; Facies coding schemes; Estimating palaeofloods from sediment deposits [8]
- 1.8 Anthropogenic impacts on runoff and sediment amounts; Land use and sediment yield correlations; Formation of valley plugs and phytogeomorphic response; Faunal influences in sediment genesis and modification of geomorphic forms [3]
- 1.9 Riverbank failure factors, processes and mechanisms; Bank erosion measurement and hazard assessment: tools and techniques; Structural and vegetation-based erosion mitigation measures: types, pros and cons, implementation [5]

**Unit II: Sediment Flux**

- 2.1 Processes of erosion in alluvial channels [4]
- 2.2 Critical shear stress: Definition and Estimation, Sediment entrainment and transport, Armour formation [6]
- 2.3 Bed parameters and sediment motion; Flow turbulence and sediment motion [6]
- 2.4 Sediment transport rate; Sediment sorting and orientation during erosion and deposition [6]
- 2.5 Suspended load: Suspension of cohesive and non-cohesive sediment- Effect of size and stratification [3]
- 2.6 Bedload: Characteristics, Grain Kinematics, Eulerian approach of measuring bedload transport rates [4]
- 2.7 Effect of sediment transport on flow characteristics [6]

**Suggested Readings:** *Sediment in the Fluvial System*

1. Boggs, S. Jr. (2006): *Principles of Sedimentology and Stratigraphy*, Prentice Hall, Upper Saddle River, New Jersey
2. Fryirs, K.A. and Brierley, G.J. (2012): *Geomorphic Analysis of River Systems: An Approach to Reading the Landscape*, Wiley, New York
3. Gilbert, G.K. (1914): *The Transportation of Debris by Running Water*, USGS Professional Paper No. 86, USGS, Denver
4. Gutierrez, M. (2013): *Geomorphology*, CRC Press, BocaRanton, Florida
5. Knighton, D. (1998): *Fluvial Forms and Processes- A New Perspective*, Routledge, London
6. Perry, C. and Taylor, K. (2007): *Environmental Sedimentology*, Blackwell Publishing, Oxford
7. Petts, G.E. and Amoros, C. (eds.) (1996): *Fluvial Hydrosystems*, Chapman and Hall, London
8. Summerfield, M.A. (1991): *Global Geomorphology: An Introduction to the Study of Landforms*, Longman, London
9. Thornbury, W. D. (1960): *Principles of Geomorphology*, John Wiley & Sons, New York
10. Young, A. (1972): *Slopes*, Oliver and Boyd, Edinburgh

**DEPARTMENT OF GEOGRAPHY**  
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**Detailed Syllabus for Fourth Semester of the Postgraduate Course in Geography**

**Module Name:** *Assessing Landscape and Water Quality*

*(Special Paper for Elective Stream I: Option B - Physical Basis of Landscape Management)*

**Paper Type:** Theory

**Paper Code:** GEOG 1002A2

**Total Marks: 50** (Semester Examination - 35 and Internal Assessment - 15)

**Credit:** 4 Credit Hours / week (4 x 16 teaching weeks = 64 credit hours per semester)

Figures in [ ] indicate number of credit hours allocated for the topic

**Module Evaluation: Semester Examination (35 marks):** Written examination of 2 hours duration will be held at semester end.

**Question Pattern:** Four Long-answer type questions each of 10 marks (may be split into two parts, one carrying 2 marks at most) will be set for answering any two and five semi-long answer type questions, each of 5 marks will be set for answering any three.

**Internal Assessment (15 marks):** Mode of Internal Assessment (through viva-voce, class presentation, group discussion, written examination, assignment or any other method) will be notified for chosen topic(s) during the Course.

**Unit I: Landscape Quality Assessment**

- 1.1 The Ecological Profile of Landscape Assessment: Principles and Definitions, Landscape Ecology Indicators, Structural Control Indices, Spatial Indices, Numeric Indices, Functional Control Indices [6]
- 1.2 Assessing Visual and Social Perception of Landscape: Principles and Definitions, The Study of Visual and Multi-Sensorial Perception, The Study of Social Perception, The Scenic Value of Landscapes and the relevant indicators, The Social Value of Landscapes and the relevant indicators [7]
- 1.3 Landuse Indicators for Landscape Assessment: Principles and Definitions, Territorial-use Indicators [3]
- 1.4 Assessing the Economic Aspect of Landscape: Principles and Definitions, Economic Landscape Indicators, Assessment of Expenses for the Conservation of Natural Landscape [5]
- 1.5 Indicators for Assessing the Landscape Transformation on a Regional and Local scale [3]

**Unit II: Water Quality Monitoring and Management**

- 2.1 Sources and Effects of Water Pollution: Toxic Metals and Other Inorganic Pollutants, Organic Pollutants, Nutrients, Micro-organisms, Irrigation-Induced Contamination and Other Non-Point Source Water Pollutants [3]
- 2.2 Water Quality Parameters for Surface Water, Ground Water, Drinking Water [3]
- 2.3 Water Quality Monitoring: WHO Guidelines and Country Standards; Clean Water Act, Safe Drinking Water Act; Drinking water Quality Regulation; Threats to the safety of drinking water and approaches to meeting those threats; Water Quality Index [4]

**Unit III: Water Footprint and Pricing**

- 3.1 Water Footprint Assessment: Goals of water footprint assessment; Water footprint sustainability assessment; Water footprint response formulation [6]
- 3.2 Water Footprint Accounting: Blue Water Footprint, Grey Water Footprint, Green Water Footprint; Water footprint calculation within a geographically delineated area; Water footprint accounting for municipalities or other administrative units [6]
- 3.3 Water Pricing: Tariff design, payment behaviour and willingness to pay, subsidies and targets [3]

**Unit IV: Grey Water and Green Landscape**

- 4.1 Greywater systems, sources and Greywater flow estimate: Definition and types of Greywater systems, identification of grey water systems, Calculating greywater flow, estimating flow rate of different fixtures [6]
- 4.2 Choosing a Greywater System: System design consideration, Using greywater indoor, choosing a greywater irrigation system, outdoor fixtures, whole-house greywater systems, subsoil infiltration systems, greywater for greenhouses, constructed wetlands [6]
- 4.3 Installing a Laundry-to-Landscape System [3]

**Suggested Readings: Assessing Landscape and Water Quality**

1. Allen, L., Christian-Smith, J., &Palaniappan, M. (2010). Overview of greywater reuse: the potential of greywater systems to aid sustainable water management. *Pacific Institute*, 654, 19-21
2. Anjaneyulu, Y., &Manickam, V. (2011). *Environmental impact assessment methodologies*. BS Publications.
3. Blears, W. F. (2016). *Soil and environmental chemistry*. Academic Press.
4. Craswell, E., Bonnell, M., Bossio, D., Demuth, S., & van de Giesen, N. (Eds.). (2007). *Integrated assessment of water resources and global change: a north-south analysis*. Springer Science & Business Media.
5. Dinar, A., & Subramanian, A. (1997). *Water pricing experiences: An international perspective*. The World Bank.
6. Dixon, A. M., Butler, D., &Fewkes, A. (1999). Guidelines for greywater re-use: health issues. *Water and Environment Journal*, 13(5), 322-326.
7. Fricke, K. (2013). *Analysis and Modelling of Water Supply and Demand Under Climate Change, Land Use Transformation and Socio-Economic Development: The Water Resource Challenge and Adaptation Measures for Urumqi Region, Northwest China*. Springer Science & Business Media.
8. Goel, P. K. (2006). *Water pollution: causes, effects and control*. New Age International.
9. Hoekstra, A. Y., Chapagain, A. K., Mekonnen, M. M., &Aldaya, M. M. (2011). *The water footprint assessment manual: Setting the global standard*. Routledge.
10. Hülsmann, S., &Ardakanian, R. (Eds.). (2018). *Managing Water, Soil and Waste Resources to Achieve Sustainable Development Goals: Monitoring and Implementation of Integrated Resources Management*. Springer.
11. Jeppesen, B. (1996). Domestic greywater re-use: Australia's challenge for the future. *Desalination*, 106(1-3), 311-315.
12. Jørgensen, S. E., Xu, L., &Costanza, R. (Eds.). (2016). *Handbook of ecological indicators for assessment of ecosystem health*. CRC press.
13. Kapustka, L. A., & Landis, W. G. (Eds.). (2010). *Environmental risk assessment and management from a landscape perspective*. John Wiley & Sons.
14. Mareddy, A. R., Shah, A., &Davergave, N. (2017). *Environmental impact assessment: theory and practice*. Butterworth-Heinemann.
15. Moncur, J. E. (1987). Urban water pricing and drought management. *Water Resources Research*, 23(3), 393-398.
16. Nolde, E. (2005). Greywater recycling systems in Germany—results, experiences and guidelines. *Water Science and Technology*, 51(10), 203-210.
17. Patnaik, P. (2010). *Handbook of environmental analysis: chemical pollutants in air, water, soil, and solid wastes*. Crc Press.
18. Peano, A. (2011). *Landscape Indicators: Assessing and Monitoring Landscape Quality*. Springer Verlag.
19. Pereira, T. (2009). Sustainability: An integral engineering design approach. *Renewable and Sustainable Energy Reviews*, 13(5), 1133-1137.
20. Pierce, F. J. (1998). *Advances in soil and water conservation*. CRC Press.
21. Plieninger, T., &Bieling, C. (Eds.). (2012). *Resilience and the cultural landscape: understanding and managing change in human-shaped environments*. Cambridge University Press.
22. Raftelis, G. A. (2014). *Water and Wastewater Finance and Pricing: The Changing Landscape*. CRC Press.
23. Roy, U., &Majumder, M. (2015). *Vulnerability of Watersheds to Climate Change Assessed by Neural Network and Analytical Hierarchy Process*. Springer.
24. Theodore, L., &Dupont, R. R. (2012). *Environmental health and hazard risk assessment: Principles and calculations*. CRC Press.
25. Tyagi, S., Sharma, B., Singh, P., &Dobhal, R. (2013). Water quality assessment in terms of water quality index. *American Journal of Water Resources*, 1(3), 34-38.
26. Viessman, W., Hammer, M. J., Perez, E. M., &Chadik, P. A. (1998). *Water supply and pollution control*.
27. Zhang, L., &Schwärzel, K. (Eds.). (2017). *Multifunctional Land-Use Systems for Managing the Nexus of Environmental Resources*. Springer.

**DEPARTMENT OF GEOGRAPHY**  
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**Detailed Syllabus for Fourth Semester of the Postgraduate Course in Geography**

**Module Name:** *Sustainable Urban Development*

*(Special Paper for Elective Stream II: Option A - Geography of Development and Planning)*

**Paper Type:** Theory

**Paper Code:** GEOG 1002B1

**Total Marks:** 50 (Semester Examination - 35 and Internal Assessment - 15)

**Credit:** 4 Credit Hours / week (4 x 16 teaching weeks = 64 credit hours per semester)

Figures in [ ] indicate number of credit hours allocated for the topic

**Module Evaluation: Semester Examination (35 marks):** Written examination of 2 hours duration will be held at semester end.

**Question Pattern:** Four Long-answer type questions each of 10 marks (may be split into two parts, one carrying 2 marks at most) will be set for answering any two and five semi-long answer type questions, each of 5 marks will be set for answering any three.

**Internal Assessment (15 marks):** Mode of Internal Assessment (through viva-voce, class presentation, group discussion, written examination, assignment or any other method) will be notified for chosen topic(s) during the Course.

**Unit I: Making of an urban 'place': Community and Neighbourhood**

- 1.1 Urban Place-making; Suburbanisation; Challenges for today's planners [2]
- 1.2 Healthy Urban Communities: Migration and mobility; Connectivity, Density and Walkability [4]
- 1.3 Role of planners; Planning cities as loci of production and consumption [3]

**Unit II: Communities and Planning**

- 2.1 Urban Poverty: Measures of urban poverty; cities as sites for poverty reduction [5]
- 2.2 Affordable housing; Refugee crisis [4]
- 2.3 Urban Risks and Vulnerabilities; Safety and Violence (Case Study) [5]

**Unit III: Human Development in Cities**

- 3.1 Urban Public Health: Health services and planning solutions [4]
- 3.2 Education and skills; women in informal economy [4]
- 3.3 Gender Equality; Law, Human Rights and Justice [6]

**Unit IV: Planning for the Sustainable City**

- 4.1 Types of Urban Plans in India: Master Plan/Development Plan, Transportation Plan; Strategic Plan; City Development Plan, Area Development Plan [4]
- 4.2 National Urban Policy Framework, 2018 [2]
- 4.3 Land management for planning: Land Acquisition and Land Pooling Model, TDR, FSI, FAR [4]
- 4.4 Cities' Future: New Town, Smart Growth/Compact City, Green City and Urban Agriculture, Resilient City, Liveability [4]

**Unit V: Implementing the changes**

- 5.1 UN Global Cities Compact: United Cities and Local Governments (UCLG) [2]
- 5.2 International Council for Local Environmental Initiatives (ICLEI) [4]
- 5.3 UN-Habitat and International Development and Financing agencies [4]
- 5.4 Urban innovation: Role of community-based organisations and civil society [3]



**Suggested Readings: Sustainable Urban Development**

1. Allen, Adriana. "Environmental planning and management of the peri-urban interface: perspectives on an emerging field." *Environment and urbanization* 15.1 (2003): 135-148.
2. An interactive Display of Global Cities of the Future by McKinsey&Company
3. Cities-engines of Economic Development 2005, United Nations Human Settlements Programme (UN-Habitat)
4. GOLD III: Basic Services for all in an Urbanizing world, UCLG, 2013
5. GOLD IV 2016, Fourth Global Report on Decentralization and Local Democracy, Co-Creating The Urban Future - The Agenda Of Metropolises, Cities And Territories - by UCLG
6. Head, Peter (2016) "Implementing the Global Goals in City Regions", *Urbanisation*, Vol 1, Issue 1, pp. 19 - 30.
7. International guidelines on urban and territorial planning, UN Habitat, 2015
8. LSE Cities : New Urban Governance - Urban complexity and institutional capacities of cities - Data and Publications
9. Roy, Ananya. Why India cannot plan its cities: Informality, insurgency and the idiom of urbanization. *Planning Theory* 8.1 (2009): 76-87
10. World Bank on Urban Water
11. World Bank. 2013. Urban Agriculture : Findings from Four City Case Studies. Urban Development Series Knowledge Papers;No. 18. Washington, DC. © World Bank. <https://openknowledge.worldbank.org/handle/10986/16273> License: CC BY 3.0 IGO.
12. World Cities Report 2016, UN-Habitat
13. World Disasters Report 2010 - Focus on Urban Risk
14. World Urbanization Prospects (Interactive Data), United Nations Populations Division
15. World Urbanization Prospects 2014: Highlights

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**Detailed Syllabus for Fourth Semester of the Postgraduate Course in Geography**

**Module Name:** *Social Well-Being and Community Development with special reference to India*  
(Special Paper for Elective Stream II: Option B - Geographies of Development)

**Paper Type:** Theory

**Paper Code:** GEOG 1002B2

**Total Marks: 50** (Semester Examination - 35 and Internal Assessment - 15)

**Credit:** 4 Credit Hours / week (4 x 16 teaching weeks = 64 credit hours per semester)

Figures in [ ] indicate number of credit hours allocated for the topic

**Module Evaluation: Semester Examination (35 marks):** Written examination of 2 hours duration will be held at semester end.

**Question Pattern:** Four Long-answer type questions each of 10 marks (may be split into two parts, one carrying 2 marks at most) will be set for answering any two and five semi-long answer type questions, each of 5 marks will be set for answering any three.

**Internal Assessment (15 marks):** Mode of Internal Assessment (through viva-voce, class presentation, group discussion, written examination, assignment or any other method) will be notified for chosen topic(s) during the Course.

**Unit I: Development Geography and Welfare Tradition**

- 1.1 Geographies of development: nature, and scope; Welfare Geography: nature, scope and emergence [4]
- 1.2 Social wellbeing: meaning, philosophical and methodological issues of human wellbeing; Needs and wants: different explanations- Maslow; Quality of life: meaning, criteria, approaches and significance [4]
- 1.3 The consumption satisfaction approach to well-being; Social welfare function, just distribution of welfare, social conflict and welfare distribution; Theory of income and marginal productivity [6]
- 1.4 Spatial distribution of well-being (after D.M. Smith); Social contracts and distributive justice [6]

**Unit II: Social Wellbeing in the Indian Context**

- 2.1 Education and Wellbeing: Dimensions of education and Wellbeing; Structure of educational system in India; Education policies in India: Sarva Siksha Abhiyan, Right to Education Act [8]
- 2.2 Housing and wellbeing: Housing as a basic human right; Dimensions of housing and social wellbeing; Housing problems in India; Government policies on affordable housing [8]
- 2.3 Crime and social wellbeing: Crime: meaning, nature and significance in geographical studies; Radical critique by Peet on the geography of crime; Typology of crimes; Spatiality of crime in India and its socio-geographical correlates [8]

**Unit III: Community Development**

- 3.1 Community development: Definition and concept, Bottom up approach [3]
- 3.2 Tribal development approaches in India: Nehru and Elwin's perspective [3]
- 3.2 Tribal development programmes and policies: Health, Education, Poverty and Employment [6]
- 3.3 Development induced displacement of tribes: Issues and policy [4]
- 3.4 Forest right and tribal livelihood question: Forest Right Act 2006 [6]

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**Suggested Readings: *Social Well-Being and Community Development with special reference to India***

1. Behera, D. K., Pfeffer, G., (eds) (1999): *Contemporary Society: Tribal Studies*, Vol- III, Concept Publishing Company, New Delhi.
2. Chaudhuri, B., (ed.) (1992): *Socio-Economic and Ecological Development*, Inter-India Publications, New Delhi.
3. Das, B. K., Das R.K., (eds) (2017): *Rethinking Tribe in Indian Context*, Rawat Publications, Jaipur.
4. Dasgupta, P. (1993): *An enquiry into wellbeing and destitution*, Oxford University Press, New York
5. Desai, Vandana and Robert B. Potter eds(2008) *The Companion to Development Studies*.Routledge.
6. Freudenberge K. S., *Rapid Rural Appraisal (RRA) and Participatory Rural Appraisal (PRA)-A manual for CRS field works and partners*, Maryland.
7. Friedman, M. (1962): *Capitalism and Freedom*, University Press, Chicago
8. Harvey, D. (1973): *Social Justice and the City*, Edward Arnold, London
9. Narayan, S. (2002): *The Dynamics of Tribals Development- Issues and Challenges*, Gyan Publishing House, Delhi.
10. Nathan, D., Xaxa, V., (eds) (2017): *Social Exclusion and Adverse Inclusion-Development and Deprivation of Adivasis in India*, Oxford Press.
11. Peet, R., Hartwick, E. (2015) *Theories of Development*, Third Edition, Guilford Press
12. Pfeffer, G., Behera, D. K. (eds) (1997): *Contemporary Society: Tribal Studies*, Vol-II, Concept Publishing Company, New Delhi.
13. Potter, R.,et. all (2017) *Geographies of Development*. London: Routledge.
14. Raha M. K., Coomar P. C. (eds) (1989): *Tribal India: Problem development Prospect*. Vol- I & II, Gian Publishing House, New Delhi.
15. Rath, G.C (ed.) (2006): *Tribal Development in India- The Contemporary Debate*, Sage Publications, New Delhi.
16. Rose, H.M. (1971): *The Black Ghetto: A Spatial Behavioral Perspective*, McGraw Hill, New York
17. Roy, K. (ed.) (2008): *Education and Health Problems in Tribal Development- A Study of National Integration*, Concept Publishing Company, New Delhi.
18. Sadanandan S., Natarajan P., et al (2007): *Data Tools: Participatory Rural Appraisal Techniques*, Cochin.
19. Smith D. M. (1973): *The geography of social well-being in the United States: an introduction to territorial social indicators*, McGraw-Hill, London
20. Smith D. M. (1977): *Human geography: A welfare approach*, St. Martin's Press, London
21. Smith D. M. (1979): *Where the Grass is Greener: Geographical Perspectives on Inequality*, Croom Helm, London
22. Smith, N. (2010) *Uneven Development: Nature, Capital, and the Production of Space*, University of Georgia Press
23. Tripathy S.N., (2013): *Tribal Development-Issues and Policy Options*, Abhijeet Publications, New Delhi.

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**Detailed Syllabus for Fourth Semester of the Postgraduate Course in Geography**

**Module Name:** *Riverine Landscape Components and Management*

*(Special Paper for Elective Stream I: Option A - River Science)*

**Paper Type:** Theory

**Paper Code:** GEOG 1003A1

**Total Marks:** 50 (Semester Examination - 35 and Internal Assessment - 15)

**Credit:** 4 Credit Hours / week (4 x 16 teaching weeks = 64 credit hours per semester)

Figures in [ ] indicate number of credit hours allocated for the topic

**Module Evaluation: Semester Examination (35 marks):** Written examination of 2 hours duration will be held at semester end.

**Question Pattern:** Four Long-answer type questions each of 10 marks (may be split into two parts, one carrying 2 marks at most) will be set for answering any two and five semi-long answer type questions, each of 5 marks will be set for answering any three.

**Internal Assessment (15 marks):** Mode of Internal Assessment (through viva-voce, class presentation, group discussion, written examination, assignment or any other method) will be notified for chosen topic(s) during the Course.

**Unit I: River Landscape Components**

- 1.1 Drainage Basin Evolution: the ergodic hypothesis and physical simulation [2]
- 1.2 River terraces: Types and formation mechanisms; Typical characteristics of strath and fill terraces with respective facies models; Interpretating terrace chronology with implications for climate-tectonic forcing; Case Studies from Garhwal or Sikkim [7]
- 1.3 Alluvial fans: Boundary conditions for formation; Origin and growth processes and models of fan evolution; Alluvial Fan shapes and Fan lobe development; Hydraulic and sediment fluxes in fan domains; Typical fan sedimentology, stratigraphy and facies; Neotectonics and landform deformation in fan area; Case Studies from the Himalayas [7]
- 1.4 Valley fills and floodplains: Conditions for creation and common formation processes (lateral, vertical, braided channel and counter-point accretion), Typical sedimentation characteristics of floodplains constructed by sinuous, braided and anabranching streams; Genetic Classification (Nanson and Croke, 1992), Floodplain re-working processes (lateral migration, cut-offs, splays, floodplain stripping) and floodplain transformations; Floodplain sediment succession with alteration of facies layering and palaeo-fluvial regimes; Floodplain geomorphic units their form-process relations; Negative relief of large floodplains: formation and hydrological importance; Case Study of the Brahmaputra valley [9]
- 1.5 In-stream geomorphic units: Types (sculpted coarse and fine-grained, mid-channel, bank-attached features) and their form-process interpretations [4]
- 1.6 Bedforms: Theories of initiation and development, Typology and Classification (Lower and Upper Regimes and Bedform Phases), Flow characteristics over bedforms and linkages with sediment transport; Typical bedform configurations in gravel-bed and sand-bed channels; Bedform preservation and their sedimentary structures [5]

**Unit II: Riparian Interlinkages and River Management**

- 2.1 River Continuum Concept: Stream hierarchy and ecosystem communities structure and stability; Flood Pulse Concept: Basis, functions and human alterations; Nutrient Spiralling Concept: Basis and pathways; Serial Discontinuity Concept: Stream impoundment issues; Stream Functions Pyramid: Components, measures and assessment methods [5]
- 2.2 Vegetation and stream morphology linkages: Lateral zonation and longitudinal distribution of plant communities and their structures; Hydrogeomorphic controls on vegetation dynamics and succession; Vegetation impacts on flow resistance and sediment transport; Conceptual Models of Vegetation-Hydrogeomorphology interactions (Gurnell et al. 2015) and feedbacks; Channel stage linkages with riparian habitats and accrued ecosystem benefits (Cluer and Thorne, 2013) [6]
- 2.3 Fluvial hydrosystems approach: Concept and components; Channel-floodplain connectivity: importance, interlinkages, measures and models, Floodplain-Channel disconnection causes and reconnection methods with impacts on riparian corridor ecology and benefits [4]
- 2.4 Hyporheic Exchange Flows: Importance, Controlling factors, Variations along channel types and across channel geomorphic units, Nature of losing and gaining reaches [3]
- 2.5 Environmental flows: Concept; Natural flow regimes and alteration consequences; Ecological importance of E-flow components; Frameworks for determining E-flow requirements: BBM, DRIFT and ELOHA; E-flow issues and concerns [6]
- 2.6 River Restoration: Common goals; Rapid Geomorphic Assessment of streams; Typical structural (channelisation and vanes) and non-structural (root-based soil reinforcement, floodplain zonation, dam removal) measures and their impacts on channel functions and riparian ecology; Assessment of river recovery potential and trajectories (Fryirs, 2016); River restoration examples [6]

**Suggested Readings:** *Riverine Landscape Components and Management*

1. Brierley, G.J., Fryirs, K.A. (2006): *Geomorphology and River Management Applications of the River Styles Framework*. Blackwell Publishing.
2. Butler, DR., Hupp, CR (2013.): *Treatise on fluvial geomorphology*. In: Shroder, J. (Editor in Chief), Wohl, E. (Ed.), *Treatise on Geomorphology*. Academic Press, San Diego, CA, vol. 12.
3. Gupta. A. (ed.) (2007): *Large Rivers: Geomorphology and Management*. John Wiley & Sons Ltd.
4. Morisawa, M.E. (ed.) (1977): *Fluvial Geomorphology*, State University of New York (Binghamton), New York, pp. 9 - 21
5. Richards, K. (1978): *Fluvial Geomorphology*, Blackwell, London
6. Saha, S. K. and Barrow, C. J. (1981): *River Basin Planning: Theory and Practice*, Wiley, Chichester
7. Wohl, E., (2013.): *Treatise on fluvial geomorphology*. In: Shroder, J. (Editor in Chief), Wohl, E. (Ed.), *Treatise on Geomorphology*. Academic Press, San Diego, CA, vol.9.
8. Fryirs, K.A., Brierley, G.J. (2013): *Geomorphic Analysis of River Systems*. Wiley-Blackwell, Chichester

**DEPARTMENT OF GEOGRAPHY**  
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**Detailed Syllabus for Fourth Semester of the Postgraduate Course in Geography**

**Module Name:** *Integrated Landscape and Water Management*

*(Special Paper for Elective Stream I: Option B - Physical Basis of Landscape Management)*

**Paper Type:** Theory

**Paper Code:** GEOG 1003A2

**Total Marks:** 50 (Semester Examination - 35 and Internal Assessment - 15)

**Credit:** 4 Credit Hours / week (4 x 16 teaching weeks = 64 credit hours per semester)

Figures in [ ] indicate number of credit hours allocated for the topic

**Module Evaluation: Semester Examination (35 marks):** Written examination of 2 hours duration will be held at semester end.

**Question Pattern:** Four Long-answer type questions each of 10 marks (may be split into two parts, one carrying 2 marks at most) will be set for answering any two and five semi-long answer type questions, each of 5 marks will be set for answering any three.

**Internal Assessment (15 marks):** Mode of Internal Assessment (through viva-voce / class presentation / group discussion / written examination / assignment or any other method) will be notified for chosen topic(s) during the Course.

**Unit I: Landscape Ecology**

- 1.1 Introduction to landscape ecology: Definition of Landscape; Concept of Landscape Ecology [2]
- 1.2 Landscape pattern formation: Physical and Biotic processes; Disturbance regimes [4]
- 1.3 Landscape dynamics: Concepts of Landscape dynamics; Modelling Landscapes; Landscape disturbance-succession models [4]
- 1.4 Consequences of landscape pattern: Populations and communities; Landscape genetics and ecosystem processes [4]

**Unit II: Landscape Change**

- 2.1 Patterns of landscape change; Landscape in species perspective- Landscape contour model; Pattern-based landscape models; Loss, degradation, fragmentation and isolation of habitats- nature, causes and impacts on individual species; Changes in behaviour, biology and specie interactions; Specie extinction prone-ness criteria [7]
- 2.2 Human modification of landscape- patch-size reduction, species-area relationships; types of edge effects; landscape connectivity- concepts, quantification, features contributing to connectivity, wild-life corridors; nestedness- concept, significance, quantification, mechanisms for nested assemblage [7]
- 2.3 Managing landscape patterns: Restoration of large patches, native matrix, buffers, corridors and landscape heterogeneity; maintenance of Keystone and endangered species [5]

**Unit III: Landscape and Water Management**

- 3.1 Landscape management: Ecocentric approach for managing complex landscapes; Conservation biology and ecosystem management [4]
- 3.2 Landscape Management using Green Infrastructure Practices: Bioswales; Permeable pavements; Green roofs, Urban Tree canopy [4]
- 3.3 Water Harvesting and Conservation: Water harvesting techniques, Micro catchments, Design of small water harvesting structures, Urban Futures: delivering water sensitive cities [4]
- 3.4 Rain Gardens: Definition and concept of rain garden; Role of rain garden in soil and water conservation; Fundamental traits and needs of a rain garden; Designing a rain garden relative to the specific needs of a location considering climate, topography and native vegetation; Planter boxes [5]

**Unit IV: Landscape Modelling**

- 4.1 GIS-based Ecological modelling: ArcGIS toolkits for connectivity and corridor modelling, habitat modelling and linkage design [4]
- 4.2 Computation of landscape metrics using FRAGSTATS [3]
- 4.3 Introduction to Spatial Modelling Environmental (SME): Workspace configuration, Unit model development in STELLA, importing modules, simulation Module Markup Language, model configuration, model building, running models [7]

**Suggested Readings: *Integrated Landscape and Water Management***

1. Abi Aad, M. P., Suidan, M. T., & Shuster, W. D. (2009). Modeling techniques of best management practices: Rain barrels and rain gardens using EPA SWMM-5. *Journal of Hydrologic Engineering*, 15(6), 434-443.
2. Anděl, J., Bičík, I., Dostál, P., Lipský, Z., & Shahneshin, S. G. (Eds.). (2010). *Landscape Modelling: Geographical Space, Transformation and Future Scenarios* (Vol. 8). Springer Science & Business Media.
3. Anděl, J., Bičík, I., Dostál, P., Lipský, Z., & Shahneshin, S. G. (Eds.). (2010). *Landscape Modelling: Geographical Space, Transformation and Future Scenarios* (Vol. 8). Springer Science & Business Media.
4. Andersson, E., Barthel, S., Borgström, S., Colding, J., Elmqvist, T., Folke, C., & Gren, Å. (2014). Reconnecting cities to the biosphere: stewardship of green infrastructure and urban ecosystem services. *Ambio*, 43(4), 445-453.
5. Banks, S. C., Cary, G. J., Smith, A. L., Davies, I. D., Driscoll, D. A., Gill, A. M., ... & Peakall, R. (2013). How does ecological disturbance influence genetic diversity?. *Trends in ecology & evolution*, 28(11), 670-679.
6. Baudry, J., Zonneveld, I. S., & Forman, R. T. (1990). *Changing landscapes: an ecological perspective*. Springer.
7. Bennett, A. F., & Saunders, D. A. (2010). Habitat fragmentation and landscape change. *Conservation biology for all*, 93, 1544-1550.
8. Cantrell, B. E., & Holzman, J. (2015). *Responsive landscapes: strategies for responsive technologies in landscape architecture*. Routledge.
9. Costanza, R., & Voinov, A. (Eds.). (2003). *Landscape simulation modeling: a spatially explicit, dynamic approach*. Springer Science & Business Media.
10. Coutts, A. M., Tapper, N. J., Beringer, J., Loughnan, M., & Demuzere, M. (2013). Watering our cities: The capacity for Water Sensitive Urban Design to support urban cooling and improve human thermal comfort in the Australian context. *Progress in Physical Geography*, 37(1), 2-28.
11. Echols, S. (2007). Artful rainwater design in the urban landscape. *Journal of Green Building*, 2(4), 101-122.
12. Fall, A., & Fall, J. (2001). A domain-specific language for models of landscape dynamics. *Ecological modelling*, 141(1-3), 1-18.
13. Foster, D. R., Knight, D. H., & Franklin, J. F. (1998). Landscape patterns and legacies resulting from large, infrequent forest disturbances. *Ecosystems*, 1(6), 497-510.
14. Fischer, J., & Lindenmayer, D. B. (2007). Landscape modification and habitat fragmentation: a synthesis. *Global ecology and biogeography*, 16(3), 265-280.
15. Gergel, S. E., & Turner, M. G. (Eds.). (2017). *Learning landscape ecology: a practical guide to concepts and techniques*. Springer.
16. Hansson, L., Fahrig, L., & Merriam, G. (Eds.). (1994). *Mosaic landscapes and ecological processes* (Vol. 2). Springer Science & Business Media.
17. Holden, J. (Ed.). (2005). *An introduction to physical geography and the environment*. Pearson Education.
18. Johnson, G. D., & Patil, G. P. (2007). *Landscape pattern analysis for assessing ecosystem condition* (Vol. 1). Springer Science & Business Media.
19. Jørgensen, S. E., Xu, L., & Costanza, R. (Eds.). (2016). *Handbook of ecological indicators for assessment of ecosystem health*. CRC press.
20. Keane, R. E., Cary, G. J., Davies, I. D., Flannigan, M. D., Gardner, R. H., Lavorel, S., ... & Rupp, T. S. (2004). A classification of landscape fire succession models: spatial simulations of fire and vegetation dynamics. *Ecological modelling*, 179(1), 3-27.
21. Lindenmayer, D. B., & Fischer, J. (2013). *Habitat fragmentation and landscape change: an ecological and conservation synthesis*. Island Press.
22. Lopez, R. D. (2017). *Remote Sensing for Landscape Ecology*. CRC Press.
23. Manel, S., & Holderegger, R. (2013). Ten years of landscape genetics. *Trends in ecology & evolution*, 28(10), 614-621.
24. McCarty, L. B., Hubbard, L. R., & Quisenberry, V. L. (2016). *Applied soil physical properties, drainage, and irrigation strategies*. Springer International Publishing.
25. Mell, I. C. (2008, June). Green infrastructure: concepts and planning. In *FORUM ejournal* (Vol. 8, No. 1, pp. 69-80).
26. Mladenoff, D. J. (2004). LANDIS and forest landscape models. *Ecological modelling*, 180(1), 7-19.
27. Newell, J. P., Seymour, M., Yee, T., Renteria, J., Longcore, T., Wolch, J. R., & Shishkovsky, A. (2013). Green Alley Programs: Planning for a sustainable urban infrastructure?. *Cities*, 31, 144-155.
28. Netusil, N. R., Levin, Z., Shandas, V., & Hart, T. (2014). Valuing green infrastructure in Portland, Oregon. *Landscape and Urban Planning*, 124, 14-21.
29. Turner, M. G., Gardner, R. H., O'Neill, R. V., & O'Neill, R. V. (2001). *Landscape ecology in theory and practice* (Vol. 401). New York: Springer.
30. Sutton, R. K. (1991). CHANGING LANDSCAPES: AN ECOLOGICAL PERSPECTIVE. *Landscape Journal*, 10(1), 81-82.
31. Ward, J. (1998). Riverine landscapes: biodiversity patterns, disturbance regimes, and aquatic conservation. *Biological conservation*, 83(3), 269-278.

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**Detailed Syllabus for Fourth Semester of the Postgraduate Course in Geography**

**Module Name:** *Urban Governance, Infrastructure and Development*

*(Special Paper for Elective Stream II: Option A - Regional Development and Urban Studies)*

**Paper Type:** Theory

**Paper Code:** GEOG 1003B1

**Total Marks:** 50 (Semester Examination - 35 and Internal Assessment - 15)

**Credit:** 4 Credit Hours / week (4 x 16 teaching weeks = 64 credit hours per semester)

Figures in [ ] indicate number of credit hours allocated for the topic

**Module Evaluation: Semester Examination (35 marks):** Written examination of 2 hours duration will be held at semester end.

**Question Pattern:** Four Long-answer type questions each of 10 marks (may be split into two parts, one carrying 2 marks at most) will be set for answering any two and five semi-long answer type questions, each of 5 marks will be set for answering any three.

**Internal Assessment (15 marks):** Mode of Internal Assessment (through viva-voce / class presentation / group discussion / written examination / assignment or any other method) will be notified for chosen topic(s) during the Course.

**Unit I: Urbanization, Urban Growth and Urban Restructuring**

- 1.1 Stages of urban development: Klaassen et al. and Berg et al.; Urbanisation Cycle [4]
- 1.2 Contemporary thesis of urbanization in South Asia: Unregulated Growth, Exclusionary Urbanization, Polarization Reversal, Extended Metropolis, Ruralopolis, Subaltern Urbanization [6]

**Unit II: Governance- Finance, Infrastructure and Basic Services**

- 2.1 Urban governance: Concept, stakeholders, participation; 74<sup>th</sup> CAA. Crisis of governance in the census towns. Forms of Urban government and their institutional frameworks [6]
- 2.2 Basic Urban Services: Water and sanitation [3]
- 2.3 Sources of municipal revenue and fields of expenditure; Municipal budget analysis (Decentralization Index and devolution index) [4]
- 2.4 Financing Infrastructure and basic services: Traditional and innovative financing [3]

**Unit III: Urban Housing and Neighborhood Change**

- 3.1 Urban housing policies in India [2]
- 3.2 Housing submarkets in India [2]
- 3.3 Residential Mobility: Concept and theories (Rossi, Turner and Edwards) [4]
- 3.4 Neighbourhood Change: Concept and models (Downs and Bourne) [4]
- 3.5 Residential segregation: Concept and theories (Spatial Assimilation and Spatial Stratification Theory) [4]

**Unit IV: Issues of Urban Sustainability**

- 4.1 SDGs: Measuring and Monitoring [4]
- 4.2 Sustainable services: Infrastructure and Transport Planning [4]
- 4.3 Case study: Sendai Framework for Disaster Risk Reduction 2015-2030 [4]

**Unit V: Measuring Urban Forms and Inequality**

- 5.1 Components of urban growth and their measurement [2]
- 5.2 Peri-Urban Land use Dynamics: Application of Mixed Method (Defining Agreement, Evidence and Confidence Level) [4]
- 5.3 Measuring Inequalities: Dissimilarity Index and Herfindahl Index [4]



**Suggested Readings: *Urban Governance, Infrastructure and Development***

1. Aijaz, R. (2008): Form of Urban Local Government in India, *Journal of Asian and African Studies*, 43 (2), 131-154
2. Arabi, U., Musthaf and Nagendra (2007): Urban Housing Policies in India: Strategies and Issues, *Nagarlok*, 39 (2), 32-60
3. Baud, I. S. A. and de Wit, J. (2008): *New Forms of Urban Governance in India: Shifts, Models, Networks and Contestations*, Sage Publication, New Delhi
4. Das, A. K. (2007): *Urban Planning in India*, Rawat Publication, New Delhi
5. Denis, E. and Zérah, M. H. (2017). *Subaltern Urbanisation in India: An Introduction to the Dynamics of Ordinary Towns*, Springer, New York.
6. Denis, E., Mukhopadhyay, P. and Zerah, M. H. (2012): Subaltern urbanization in India, *Economic and Political Weekly*, 47 (30), 52-62
7. Gilbert, A. (1993): Third World cities: The changing national settlement system, *Urban Studies*, 30 (4/5): 721-740
8. Ginsburg, N., Koppel, B. and McGee, T. G. (1991): *The Extended Metropolis: Settlement Transition in Asia*, University of Hawaii Press, Honolulu
9. Graham, S. and Marvin, S. (2001). *Splintering Urbanism: Networked Infrastructures, Technological Mobilities and the Urban Condition*, Routledge, London and New York.
10. Jiménez, B and Rose, J. (2009). *Urban Water Security: Managing Risks*. CRC Press, London, Newyork, Leiden, Boca Raton.
11. Kundu, A. (2009): Exclusionary Urbanisation in Asia: A Macro Overview, *Economic and Political Weekly*, 44 (48), 48-58
12. Latham, A., McCormack, D., McNanara, K and McNeill, D.(2009). *Key Concepts in Urban Geography*. Sage, Los Angeles.
13. Macionis, John J. and Vincent N. Parrillo (2017): *Cities and Urban Life*, Pearson, United States.
14. Mathur, K. (2008) *From Government to Governance: A Brief Survey of the Indian Experience*, National Book Trust, India
15. Pacione, M. (2009): *Urban Geography: A Global Perspective*, Routledge, London and New York
16. Pugh, C. (1990): *Housing and Urbanization: A Study of India*, Sage Publication, New Delhi
17. Sivaramakrishnan, K. C. (2015): *Governance of Megacities: Fractured Thinking, Fragmented Setup*, Oxford University Press, New Delhi

**DEPARTMENT OF GEOGRAPHY**  
**PRESIDENCY UNIVERSITY**

**Detailed Syllabus for Fourth Semester of the Postgraduate Course in Geography**

**Module Name:** *Agricultural Geography*

*(Special Paper for Elective Stream II: Option B - Geographies of Development)*

**Paper Type:** Theory

**Paper Code:** GEOG 1003B2

**Total Marks:** 50 (Semester Examination - 35 and Internal Assessment - 15)

**Credit:** 4 Credit Hours / week (4 x 16 teaching weeks = 64 credit hours per semester)

Figures in [ ] indicate number of credit hours allocated for the topic

**Module Evaluation: Semester Examination (35 marks):** Written examination of 2 hours duration will be held at semester end.

**Question Pattern:** Four Long-answer type questions each of 10 marks (may be split into two parts, one carrying 2 marks at most) will be set for answering any two and five semi-long answer type questions, each of 5 marks will be set for answering any three.

**Internal Assessment (15 marks):** Mode of Internal Assessment (through viva-voce / class presentation / group discussion / written examination / assignment or any other method) will be notified for chosen topic(s) during the Course.

**Unit I: Approaches, Parameters and Agricultural Systems**

- 1.1 Approaches to Agriculture Geography: commodity, systematic, regional and ecological [6]
- 1.2 Determinants of agricultural development: physical, technological, institutional; World agricultural systems. [4]
- 1.3 Role of agro based industries in employment, Agriculture in GDP [4]

**Unit II: Water and Agriculture**

- 2.1 Water use efficiency in agriculture; Water-efficient irrigation: prospects and difficulties of innovative practices; Watershed development for water use efficiency in agriculture [4]
- 2.2 Economic importance of water; Dominance of agricultural water use; Pressures on the supply of water for irrigation; Role of water in agricultural development [4]
- 2.3 Sources of irrigation: Tube well, pumpsets, canals, RLI; Irrigated and unirrigated area; Irrigation efficiency and management [6]
- 2.4 Types of irrigation system in India; Groundwater and surface water use for agriculture; Irrigation Programmes in India  
Irrigated farming and Dry farming: Concepts and principles [4]

**Unit III: New Dimensions in Agriculture**

- 3.1 Mechanization of agriculture: need, scope and progress of mechanization; Use of GM Seeds and its economic and social impact [4]
- 3.2 Diffusion of agricultural innovations: social diffusion and spatial diffusion; agribusiness; contract farming; corporate agriculture [4]
- 3.3 Risk and Uncertainty in Production: input related risk and risk aversion; Adoption of modern technology under production uncertainty [4]
- 3.4 The National Agricultural Policy; Evaluation of the New Agricultural Policy [4]

**Unit IV: Contemporary Issues in Indian Agriculture**

- 4.1 Agricultural credit; Agricultural Price Policy; Agricultural subsidies [4]
- 4.2 Poverty alleviation strategies; Food aid (OXFAM) and nutrition programmes [4]
- 4.3 Food security and its components; Agricultural Indebtedness; Farmer suicide- critiques of agricultural policies and market pricing [4]
- 4.4 Sustainable development of agriculture; Decline in agricultural sector in India [4]

**Suggested Readings: Agricultural Geography**

1. Bhalla, G.S. & Alagh, Y.K., *Performance of Indian Agriculture*, Sterling Pub., New Delhi
2. Duckhan, A.N. and Masfield, G.B., *Farming Systems of the World*, London.
3. Griggs, D. *An Introduction to Agricultural Geography*, Routledge, London.
4. Haque, T. *Agrarian Distress in India: Causes & Remedies*, Concept Publishers, New Delhi
5. Husain, Majid. *Agricultural Geography*, New Delhi.
6. John, R, Tarrant. *Agricultural Geography*.
7. Mohammad, A. *Food Production and Food Problem in India*, New Delhi.
8. Mohammad, A. *Environment, Agriculture & Poverty*, Concept Publishers.
9. Mohammad, N. *Perspectives in Agricultural Geography*, New Delhi.
10. Morgan, W.B. and Munton, P.J.C. *Agricultural Geography*, London.
11. Panda, S.C. *Mechanization of Agriculture*, Kalyani Publishers.
12. Shafi, M. *Agricultural Geography of South Asia*, Macmillan, New Delhi.
13. Shafi, M., *Agricultural Geography*, Dorling Kindersley, New Delhi.
14. Singh, J. and Dhillon, S.S. *Agricultural Geography*. Tata McGraw Hill
15. Symons, L. *Agricultural Geography*, London.

Detailed Syllabus for Fourth Semester of the Postgraduate Course in Geography

Module Name: **Fieldwork Project**

Paper Type: Practical

Paper Code: **GEOG 1091**

Total Marks: 50

**Module Evaluation:** Part Evaluation based on performance in the Field and during preparation of the Field Report,  
Part Evaluation based on Presentation and Viva Examination at semester end

One proto-type research project based on guided tour type or pseudo-experimental fieldwork has to be undertaken. Candidates are expected to make factual or values enquiry using objective or subjective data, respectively, through the sequential stages of observation and perception; definition and description; analysis and explanation; prediction and evaluation; and decision-making. Following is a list of possible topics for project work.

**Physical Geography Topics (For Elective Stream I):**

**People-environmentrelationship**

- hazards like- flood, slope instability etc. and perception of such hazards (related to frequency, severity, risk etc.)
- pattern and fluctuation of pollution within an area
- effects of tourism pressure on a local beauty spot
- conflicts of interest over landuse change
- causes and effects of soil/land erosion
- environments costs and economic benefits of development projects
- environmental and ecological effects of excessive water abstraction

**Comparing contrasting places**

- two stretches of coasts with respect to forms, processes, habitats etc.
- two rivers or different stretches of one river with respect to morphology, hydrology, ecology etc.
- soils up a catena
- a succession of sand dunes
- areas of two different rock types
- local climate of two slopes, in and out of a town, in and out of a forest

**Temporal changes**

- Time scale may vary from a few days to few months or even years. But methods for collecting/deriving temporal data are to be so chosen that they yield comparable data sets.
- variations in beach profiles in different seasons of the year
- effects of deforestation or expansion of built-up area on sediment yield
- pattern of shoreline changes
- shifting of river
- change of vegetal cover
- erosion/accretion of riverine islands

**Analysis of distributions**

- landforms, drainage patterns
- sediment characteristics
- meanders and ox-bow lakes
- soil types, plant associations
- nature and amount of slope

**Analysis of processes**

- weathering and erosion, mass movement
- factors controlling river hydrograph
- beach processes
- development of soil profile, ecosystem processes

**Human Geography Topics (For Elective Stream II)**

**Investigating local issues**

- disadvantaged inner-city areas/housing estates
- decaying green belts
- provision for an aging population
- rise in criminal activities
- impacts of the construction of a super market
- environmental/economic impacts of opening of a new bypass

**Examining a theory**

- Central Place theory
- models of urban morphology
- von Thunen's model of agricultural landuse
- demographic transition model

**Comparing contrasting places**

- areas of influence of three/four urban centres
- two or more markets
- two or more urban wards/boroughs/neighbourhoods

**Temporal changes**

- population characteristics of a country/state/urban centre over a Century
- characterization and impacts of social change in a rural village/urban centre
- landuse in rural/urban area
- gentrification of a small inner city area
- shop types along a major road

**Analysis of distributions**

- ethnic groups
- health facility centres
- crime
- diseases and morbidity
- schools
- deep tube wells for irrigation

**Study of People's behaviour**

- shopping behaviour
- household movement
- tourism and recreation
- residential preference
- health related practices (smoking, alcoholism, physical exercise etc.)

Pages containing illustrations (sketches, graphs, diagrams, maps, photographs, etc) = 25 (maximum). Documentation and generation of the field report with the following arrangement : preface, introduction, objectives, methodology, data acquisition, data analysis, data display and interpretation, analysis and conclusion, appendix (of data), and bibliography / references. Word Limit = 8000 (maximum) excluding Tables and Appendix (Computer typed, Line Spacing = 1½, Arial / Times New Roman /Calibri10 / 11) Time allotted for Viva Voce / Examinee = 15 minutes (maximum), Marks on Field Performance of individual students (= 15) shall be awarded by the Internal Examiner(s) and on both Presentation (= 15) and Viva Voce (= 20) by the External Examiner(s).

**Suggested Readings:** *Fieldwork Project*

1. Saha, P.K. and Basu, P. (2009): *Advanced Practical Geography*, Books and Allied (P) Ltd., Kolkata
2. Sarkar, A. (2008): *Practical Geography: A Systematic Approach*, Orient BlackSwan, Kolkata

**DEPARTMENT OF GEOGRAPHY**  
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**Detailed Syllabus for Fourth Semester of the Postgraduate Course in Geography**

**Module Name:** *Dissertation Project*

**Paper Type:** Dissertation

**Paper Code:** GEOG 1092

**Total Marks:** 50

**Module Evaluation:** Part Evaluation based on performance in the Field and during preparation of the Dissertation Report and its Research and Academic Quality, Part Evaluation based on Presentation and Viva Examination at semester end

**Dissertation Report** comprises an object-specific, goal-oriented Geographical Study based on the following types:

- 1) those which test a hypothesis or theory, as virtually all aspects of Geography have theories attached to them,
- 2) those which compare the geographical characteristics of two places or phenomena. A variation on this theme is a comparison of the geographical characteristics of one place or phenomena at two or more stages of time, i.e., a study of changes over time,
- 3) those which study a geographical problem related to the habitat, economy and society of people.

Each Examinee shall prepare a Dissertation Paper individually under the supervision of a Departmental Faculty on his / her own chosen Theme.

The Report must be documented in triplicate (1 = examinee, 2 = seminar library, 3 = supervisor) under the following Heads - *Introduction & Conceptual Background; Statement of the Problem; Objectives of Study; Literature Review; Methodology including data / information / map collection; Location of the Study Area; Analysis, Display and Interpretation of Data (relating to each Objective separately); and Conclusion.*

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

Pages containing Illustrations (Sketches, Graphs, Diagrams, Maps, Photographs, etc) = 40 (maximum).

Word Limit = 10000 (maximum) excluding Tables and Appendix (Computer typed, Line Spacing = 1½; Font = Arial Narrow / Times New Roman / Calibri; Font size = 10 / 11).

Each Examinee shall present his / her Paper before an audience comprising Internal / External Examiners and others on the day of Examination using OHP or LCD Projector (maximum 25 slides about - *concept / idea / theme; major objectives; methodology; study area; observations and analysis; conclusion*).

Marks shall be awarded by the External Examiner(s) on the Research and Academic Quality of the Report (= 15) followed by the Presentation and Viva Voce (= 35).