

**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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## Content

Topic	Page No.
<b>A. Semester-wise Course Structure and Module Compositions</b>	<b>3</b>
<b>B. Detailed Syllabus and Suggested Reading List for respective Modules</b>	<b>5 - 43</b>
<i>Geotectonics and Geomorphology</i>	5
<i>Cartographic Techniques and Computations</i>	7
<i>Geography of Tourism</i>	9
<i>Human Geography</i>	10
<i>Thematic Cartography and Surveying</i>	12
<i>Regional Development</i>	14
<i>Climatology</i>	15
<i>Statistical Methods in Geography</i>	17
<i>Regional Geography of India</i>	19
<i>Climate Change: Vulnerability and Adaptation</i>	21
<i>Geographical Information Systems</i>	22
<i>Economic Geography</i>	23
<i>Environmental Geography</i>	25
<i>Nature and Natural Disasters</i>	27
<i>Sustainable Development</i>	29
<i>Research Methods</i>	30
<i>Regional Planning and Development</i>	31
<i>Remote Sensing</i>	33
<i>Hydrology and Oceanography</i>	34
<i>Agricultural Geography</i>	36
<i>Evolution of Geographical Thought</i>	38
<i>Fieldwork</i>	39
<i>Soil Geography</i>	40
<i>Social and Political Geography</i>	42

**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, Brunsdon 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**  
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**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  
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**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 Isoleth 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         |      |
|     | Drawing of cross sections and mapping horizontal, vertical, uniclinal, 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**  
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**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**  
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**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**  
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**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**  
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**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 Venables 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**  
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**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 Environmental Science:
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 and Forests, 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**  
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**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**  
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**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  
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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***

1. Bhatta, B. 2011. Remote Sensing and GIS, 2nd ed, Oxford Univ. Press.
2. Campbell, J.B. and Wynne, R.H. (2011): *Introduction to Remote Sensing*, The Guilford Press, New York
3. Jensen, J.R. (006): *Remote Sensing of the Environment: An Earth Resource Perspective*, Prentice Hall, New Jersey
4. Joseph, G. and Jegannathan, C. 2018. Fundamentals of Remote Sensing, 3rd ed, Universities Press.
5. Lillesand, T.M., Kiefer, R.W. and Chipman, J.W. (2008): *Remote Sensing and Image Interpretation*, John Wiley & Sons, New York
6. Nag P. and Kudra, M., 1998: Digital Remote Sensing, Concept, New Delhi.
7. Rees W. G., 2001: Physical Principles of Remote Sensing, Cambridge University Press.
8. Sabins, F.F. (2008): *Remote Sensing: Principles and Interpretation*, Waveland Press Inc., Illinois
9. Sahu, K.C. (2007): *Textbook of Remote Sensing and Geographical Information Systems*, Atlantic Publishers, New Delhi
10. Sarkar, A. (2015) Practical geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi
11. 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

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

**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]

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**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.

DEPARTMENT OF GEOGRAPHY  
PRESIDENCY UNIVERSITY

**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.