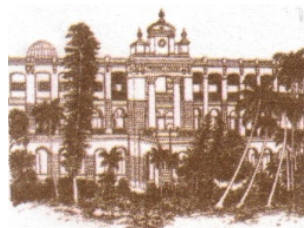


**Structure and Detailed Syllabus
of the Undergraduate (Major) Course (B.Sc.) in Geography
Department of Geography
Presidency University**



PRESIDENCY UNIVERSITY
KOLKATA



**Department of Geography
(Faculty of Natural Sciences and Mathematics),
Presidency University,
Hindoo College (1817-1855), Presidency College (1855-2010)
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Semester-wise Course Structure and Module Compositions

Semester	Papers	No. of Modules	Marks	Total Marks
Semester - I	Theory	1	50	100
	Practical	1	50	
Semester - II	Theory	1	50	100
	Practical	1	50	
Semester - III	Theory	2	100	150
	Practical	1	50	
Semester - IV	Theory	2	100	150
	Practical	1	50	
Semester - V	Theory	3	150	250
	Practical	2	100	
Semester - VI	Theory	3	150	250
	Practical	2	100	
Total	Theory	12	600	1000
	Practical	8	400	

Semester : First

Year : First

Sl. No.	Paper Type	Paper Name	Paper Code	Course No.	Credits
1	Theory	<i>Foundations of Geoscience</i>	MP-TH-1	GEOG0101	4
2	Practical	<i>Scale, Topographical Maps, Identification of Rocks & Minerals</i>	MP-PR-1	GEOG0191	6
Total - One Theory Module and One Practical Module					10

Semester : Second

Year : First

Sl. No.	Paper Type	Paper Name	Paper Code	Course No.	Credits
3	Theory	<i>Economic Geography</i>	MP-TH-2	GEOG0201	4
4	Practical	<i>Map Projections and Surveying</i>	MP-PR-2	GEOG0291	6
Total - One Theory Module and One Practical Module					10

Semester : Third

Year : Second

Sl. No.	Paper Type	Paper Name	Paper Code	Course No.	Credits
5	Theory	<i>Concepts in Geotectonics and Geomorphology</i>	MP-TH-3	GEOG0301	4
6	Theory	<i>Population and Settlement Geography</i>	MP-TH-4	GEOG0302	4
7	Practical	<i>Cartograms and Quantitative Techniques</i>	MP-PR-3	GEOG0391	6
Total - Two Theory Modules and One Practical Module					14

Semester : Fourth

Year : Second

Sl. No.	Paper Type	Paper Name	Paper Code	Course No.	Credits
8	Theory	<i>Geomorphology - Forms and Processes</i>	MP-TH-5	GEOG0401	4
9	Theory	<i>Climatology</i>	MP-TH-6	GEOG0402	4
10	Practical	<i>Geographical Information Systems & Earth Materials Analysis</i>	MP-PR-4	GEOG0491	6
Total - Two Theory Modules and One Practical Module					14

Semester : Fifth

Year : Third

Sl. No.	Paper Type	Paper Name	Paper Code	Course No.	Credits
11	Theory	<i>Hydrology and Oceanography</i>	MP-TH-7	GEOG0501	4
12	Theory	<i>Soil Geography</i>	MP-TH-8	GEOG0502	4
13	Theory	<i>Social, Cultural and Political Geography</i>	MP-TH-9	GEOG0503	4
14	Practical	<i>Statistical Techniques in Geography</i>	MP-PR-5	GEOG0591	6
15	Practical	<i>Remote Sensing</i>	MP-PR-6	GEOG0592	6
Total - Three Theory Modules and Two Practical Modules					24

Semester : Sixth

Year : Third

Sl. No.	Paper Type	Paper Name	Paper Code	Course No.	Credits
16	Theory	<i>Biogeography</i>	MP-TH-10	GEOG0601	4
17	Theory	<i>Regional Geography of India</i>	MP-TH-11	GEOG0602	4
18	Theory	<i>Philosophy of Geography</i>	MP-TH-12	GEOG0603	4
19	Practical	<i>Geological Map and Climate Data Analysis</i>	MP-PR-7	GEOG0691	6
20	Practical	<i>Field Work and Report Writing</i>	MP-PR-8	GEOG0692	6
Total - Three Theory Modules and Two Practical Modules					24

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

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

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

Students will also complete a total of 10 GenEd Modules within the first Four Semesters of the entire Course [3 + 3 + 2 + 2]

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

Module Name: *Foundations of Geoscience*

Paper Type: Theory

Paper Code: MP-TH-1

Course No.: GEOG 0101

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

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

Figures in [] indicate number of credit hours allocated for the topic (except for Assignments)

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

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

Internal Assessment (15 marks): Portions of the syllabus in italics marked by * will be evaluated during the course through assignments.

Unit I: Physical Concepts and Laws

- 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 [4]
- 1.2 Work – moment, couple, torque; Energy - potential and kinetic; Power; Stress, strain, deformation and elasticity; Hydrostatic balance, Buoyancy and Flotation; Viscosity [4]
- 1.3 Waves – Properties, types and propagation [3]
- 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**
- 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 [7]
- 1.7 *Exemplar natural thermodynamic systems and entropy relations, Heat engine**

Unit II: Fundamentals of Mathematics

- 2.1 Basic Algebra: Theory of Sets and Venn Diagrams; Progression and Series; Functions, Graphs and Equations [6]
- 2.2 Vector and Matrix Algebra: Vectors - Notation, Addition and Subtraction; Matrix - Addition, Subtraction, Multiplication, Determinants, Matrix Inverse, Solution of set of simultaneous equations [4]
- 2.3 Logarithms and Indices: Laws of Logarithm - solving equations and finding solution by experiments [3]
- 2.4 Plane Trigonometry: Trigonometric ratios; Trigonometric Identities - Trigonometric Ratios of sum and difference of two angles, and multiple and sub-multiple angles; Properties of Triangles [7]
- 2.5 Calculus: Differentiation - basic relationships, Differentiation of basic functions; Integration - basic relationships, area and volume [8]
- 2.6 *Exercises on application of Mathematics in Geography**

Unit III: Earth Materials and Structures

- 3.1 Minerals: Genesis, Characteristics, Classification [1]
- 3.2 Rocks: Igneous (Granite, Basalt), Sedimentary (Sandstone, Limestone, Conglomerate), Metamorphic (Gneiss, Schist, Marble) - Genesis, Characteristics, Classification (Mineralogical and Textural), Principles of Stratigraphy; *Rock Cycle ** [3]
- 3.3 Interior of the Earth - Seismological Evidences based Zonation, Properties of each Layer [2]
- 3.4 Folds and Faults: Formation, Mechanism, Classification, Economic importance [4]
- 3.5 Crustal Isostasy - Background & Discovery: Theories of Airy and Pratt; Global Isostatic Adjustments and Gravity Anomalies [2]
- 3.6 *Geological Timescale - Units, Significant Structural and Evolutionary Events in each Period **

Suggested Readings: Foundations of Geoscience

1. Beiser, A. (1974): *Schaum's Outline Series: Theories and Problems of Physical Science*, McGraw Hill, New York
2. Billings, M.P. (1972): *Structural Geology*, Prentice Hall, Upper Saddle River, New Jersey
3. Breach, M. (2011): *Fundamental Maths for Engineering and Science*, Palgrave Macmillan, New York
4. Cattermole, P. (2000): *Building Planet Earth: Five Billion Years of Earth History*, Cambridge University Press, Cambridge
5. Duff, D. (1993): *Holmes' Principles of Physical Geology*, Stanley Thornes, Cheltenham
6. Gerrard, A.J. (1988): *Rocks and Landforms*, Unwin Hyman, London
7. Krauskopf, K.B. (2007): *Fundamentals of Physical Science*, Read Books, Vancouver
8. Leeder, M.R. and Perez-Arlucea, M. (2005): *Physical Processes in Earth and Environmental Sciences*, Hoboken, New Jersey
9. Mason, G.W., Griffen, D.T., Merrill, J.J. and Thorne, J.M. (1997): *Physical Science Concepts*, Brigham Young University Press, Provo, Utah
10. Mukherjee, P.K. (2006): *A Textbook of Geology*, World Press (P) Ltd., Kolkata
11. Mussett, A.E., Khan, M.A. and Button, S. (2000): *Looking into the Earth: An Introduction to Geological Geophysics*, Cambridge University Press, Cambridge
12. Park, R.G. (1997): *Foundations of Structural Geology*, Chapman and Hall, London
13. Potter, A.W.R. and Robinson, H. (1982): *Geology*, Macdonald and Evans, Plymouth
14. Prothero, D.R. and Dott Jr., R.H. (2009): *Evolution of the Earth*, McGraw Hill, New York
15. Read, H.H. and Watson, J. (1977): *Introduction to Geology: Volume I - Principles*, John Wiley & Sons, New York
16. Riley, K. and Hobson, M. (2011): *Foundation Mathematics for the Physical Sciences*, Cambridge University Press, Cambridge
17. Rosen, J. and Gothand, L.Q. (2010): *Encyclopaedia of Physical Science*, Infobase Publishing, New York
18. Shipman, J.T., Wilson, J.D. and Todd, A.W. (1996): *Fundamentals of Physical Science*, D.C. Heath and Company, Lexington, Massachusetts
19. Shipman, J.T., Wilson, J.D. and Higgins, C.A. (2013): *An Introduction to Physical Science*, Brooks/Cole - Cengage Learning, Boston
20. Stewart, J. (2012): *Calculus: Early Transcendentals*, Cengage Learning, Belmont, California
21. Tillery, B.W. (2014): *Physical Science*, McGraw Hill, New York
22. West, K. (2009): *The Restless Earth*, Infobase Publishing, New York
23. Yang, X. (2009): *Introduction to Mathematics for Earth Scientists*, Dunedin Academic Press, London

DEPARTMENT OF GEOGRAPHY
PRESIDENCY UNIVERSITY

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

Module Name: *Scales, Rocks and Minerals, Topographical Maps*

Paper Type: Practical

Paper Code: MP-PR-1

Course No.: GEOG 0191

Total Marks: 50

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

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

Module Evaluation: Continuous Evaluation throughout the Semester

Unit I: Scale

- | | |
|---|------|
| 1.1 Definition and Types | [4] |
| 1.2 Construction of Scales: Linear, Diagonal, Vernier | [12] |
| 1.3 Scale Enlargement and Reduction | [6] |

Unit II: Identification of field specimens of Rocks and Minerals

- | | |
|---|------|
| 2.1 Identification of Rocks: Igneous: Granite, Basalt, Dolerite; Sedimentary: Shale, Sandstone, Limestone, Conglomerate, Laterite; Metamorphic: Slate, Phyllite, Schist, Marble, Quartz, Gneiss | [10] |
| 2.2. Identification of Minerals: Talc, Gypsum, Calcite, Mica, Feldspar, Quartz, Chalcopyrite, Haematite, Magnetite, Bauxite, Galena | [10] |

Unit III: Interpretation of Topographical Map of Plateau Region with R.F. 1:50,000

- | | |
|---|------|
| 3.1 Principles of Topographical Map Numbering as followed by Survey of India | [4] |
| 3.2 Drawing of cross section and demarcation of Broad Physiographic Divisions | [6] |
| 3.3 Construction of profiles: Superimposed, Projected, Composite | [9] |
| 3.4 Morphometric Techniques in 10cm x 12cm area: Relative Relief (after G.H. Smith, 1935), Average Slope (after C.K. Wentworth, 1930), Drainage Density (after R.E. Horton, 1945), Road Density | [12] |
| 3.5 Interpretation of relief, drainage and vegetation characteristics | [9] |
| 3.6 Interpretation of settlement, transport and communication systems | [8] |
| 3.7 Relationship between physical and cultural elements | [6] |

Suggested Readings: *Scales, Rocks and Minerals, Topographical Maps*

1. Monkhouse, F.J. and Williamson, R.H. (1963): *Maps and Diagrams: Their Compilation and Construction*, Methuen, London
2. Saha, P.K. and Basu, P. (2009): *Advanced Practical Geography*, Books and Allied (P) Ltd., Kolkata
3. Sarkar, A. (2008): *Practical Geography: A Systematic Approach*, Orient BlackSwan, Kolkata
4. Sen, A.K. (1995): *Laboratory Manual of Geology*, Modern Book Agency (P) Ltd., Kolkata
5. Singh, R.L. and Singh, P.B. (2009): *Elements of Practical Geography*, Kalyani Publishers, New Delhi

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

Module Name: *Economic Geography*

Paper Type: Theory

Paper Code: MP-TH-2

Course No.: GEOG 0201

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

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

Figures in [] indicate number of credit hours allocated for the topic (except for Assignments)

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

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

Internal Assessment (15 marks): Portions of the syllabus in italics marked by * will be evaluated during the course through assignments.

Unit I: Resource Studies

- 1.1. *Resource - Concept and Classification **
- 1.2. Resource Perception and Functional Theory of Resource [2]
- 1.3. Resource Utilization – Economic and Environmental Approach [3]
- 1.4. Resource conservation – Forrester Meadows model on Limits to Growth, Concept of Spaceship Earth [6]
- 1.5. Concept of Human Resource [2]
- 1.6. *Resource depletion and Sustainable use of resources **

Unit II: Agricultural Geography

- 2.1. Concept and techniques of agricultural regionalization – normative, empirical, single element and statistical [6]
- 2.2. Crop Combination and Crop Diversification [4]
- 2.3. Measures of agricultural productivity and efficiency. [4]
- 2.4. Classification of world agricultural system after Whittlesey [3]
- 2.5. *Selected agricultural production systems- Intensive Rice farming (South East Asia), Extensive Wheat farming (USA), Plantation Farming (Rubber in SE Asia), Mixed Farming (NW Europe) **
- 2.6. Models in Agricultural Geography - Von Thunen's model on spatial distribution of agriculture, Haggerstrand's model on diffusion [4]

Unit III: Industrial Geography

- 3.1. *Factors influencing the development of an industry **
- 3.2. Mining Industry in India [2]
- 3.3. Resource based and foot loose industries – concept and determinants [4]
- 3.4. Theories of industrial location - Weber, Losch, Walter Isard [6]
- 3.5. Gunnar Myrdal's cumulative causation model on economic development [3]
- 3.6. *Impact of mining and manufacturing industrial activities on environment **

Unit IV: Geography of Transport and Tourism

- 4.1. Concept of Distance, Accessibility and Connectivity [4]
- 4.2. Place of tourism activities in the realm of Geography; Leisure – recreation – tourism relationship [3]
- 4.3. *Tourism as an industry and its components **
- 4.4. Tourism Area Life Cycle (TALC) model after Richard W. Butler [4]
- 4.5. *Responsible tourism and social tourism – impacts on nature & society and associated sustainability issues **
- 4.6. Tourism – Climate interface and impacts of climate change on destinations. [4]

Suggested Readings: *Economic Geography*

1. Berry, B.J.L., Conklin, E.C. and Ray, M.D. (1976): *The Geography of Economic Systems*, Prentice Hall, New Jersey
2. Boniface, B.G. and Cooper, C. (2005): *Worldwide Destinations: The Geography of Travel and Tourism*, Butterworth-Heinemann, Oxford
3. Bradford, M.G. and Kent, W.A. (1977): *Human Geography, Theories and Applications*, Oxford University Press, Oxford
4. Butler, R. (eds.) (2006): *The tourism area life cycle: application and modifications* Volume-1, Channel View Publications, U.K.
5. Gourtney, P. (1965): *Plantation Agriculture*, G. Bell and Sons, London
6. Guha, J.L. and Chattaraj, P.R. (1989): *A New Approach to Economic Geography: A Study of Resources*, World Press Ltd., Kolkata
7. Hall, C.M. and Page, S. (2005): *The Geography of Tourism and Recreation: Environment, Place and Space*, Routledge, London and New York
8. Hartshorn, T.A. and Alexander, J.W. (1988): *Economic Geography*, Prentice Hall India, New Delhi
9. Jones, C.F. and Darkenwald, G.G. (1954): *Economic Geography*, Macmillan, New York
10. Leong, G.C. and Morgan, G.C. (1975): *Human and Economic Geography*, Oxford University Press, Hong Kong
11. Miller, E. (1962): *A Geography of Manufacturing*, Prentice Hall, Englewood Cliff, New Jersey
12. Morgan, W.B. and Manton, R.J.C. (1971): *Agricultural Geography*, Methuen, London
13. Paterson, J.H. (1976): *Land, Work and Resources - An Introduction to Economic Geography*, Edward Arnold, London
14. Scott, D., Hall, C.M. and Gossling, S. (2012): *Tourism and Climate Change: Impacts, Adaptation and Mitigation*, Routledge, London and New York
15. Simmons, I.G. (1981): *The Ecology of Natural Resources*, ELBS/ Edward Arnold, London
16. Singh, J. (1974): *An Agricultural Atlas of India: A Geographical Analysis*, Vishal Publications, Kurukshetra
17. Smith, D.N. (1971): *Industrial Location - An Economical Geographical Analysis*, John Wiley, New York
18. Thomas, R.S. and Corbin, P.B. (1968): *Geography of Economic Activity*, McGraw Hill, New York
19. Wearing, S. and Neil, J. (1999): *Ecotourism: Impacts, Potentials and Possibilities*, Butterworth-Heinemann, Oxford
20. Wheeler, J.O. and Muller, P.O., (1986): *Economic Geography*, John Wiley, New York
21. William, S. (2009): *Tourism Geography: A New Synthesis*, Routledge, London and New York

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

Module Name: *Map Projection and Surveying*

Paper Type: Practical

Paper Code: MP-PR-2

Course No.: GEOG 0291

Total Marks: 50

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

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

Module Evaluation: Continuous Evaluation throughout the Semester

Unit I: Map Projection

- | | |
|---|-----|
| 1.1 Maps - nature and classification | [2] |
| 1.2 Map Projections - necessity and classification | [6] |
| 1.3 Basic concepts - parallels and meridians, datum, spheroid, geoid, great circles, scale factor, deformations, orthodrome, loxodrome and geodesic (simple problems) | [8] |
| 1.4 Co-ordinate systems and location on globe and 2D planes, Transformations | |
| 1.5 Principles, Theories, Construction and Properties of select Map Projections | |
| Polar Zenithal Case (Gnomonic, Stereographic, Orthographic) | [6] |
| Conical Case (Simple Conical Projection with one Standard Parallel, Bonne's, Polyconic, Sinusoidal) | [8] |
| Cylindrical Case (Equal Area, Orthomorphic, Mercator, Gall) | [8] |
| Special Case (Molleweide) | [6] |
| 1.6 Universal Transverse Mercator Grid System | [4] |

Unit II: Surveying

- | | |
|--|------|
| 2.1 Make Your Own Map: Introduction to mapping with hand-held GPS including the concepts of Waypoints and Tracks; Data downloading and visualization | [20] |
| 2.2 Levelling by Dumpy Level with at least one change point: Drawing of profile | [16] |
| 2.3 Use of Prismatic Compass for determination of magnetic bearings; Contouring with Prismatic Compass and Dumpy Level | [12] |

Suggested Readings: *Map Projection and Surveying*

1. Arora, K.R. (2010): *Surveying (Volumes I & II)*, Standard Book House, New Delhi
2. Gopi, S. (2005): *Global Positioning System: Principles and Applications*, Tata McGraw-Hill Education, New Delhi
3. Kulkarni, S.V. and Kanetkar, T.R. (1965): *Surveying and Levelling (Volumes I & II)*, A.V.G. Prakashan, New Delhi
4. Saha, P.K. and Basu, P. (2009): *Advanced Practical Geography*, Books and Allied (P) Ltd., Kolkata
5. Sarkar, A. (2008): *Practical Geography: A Systematic Approach*, Orient BlackSwan, Kolkata
6. Singh, R.L. and Singh, P.B. (2009): *Elements of Practical Geography*, Kalyani Publishers, New Delhi

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

Module Name: *Concepts in Geotectonics and Geomorphology*

Paper Type: Theory

Paper Code: MP-TH-3

Course No.: GEOG 0301

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

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

Figures in [] indicate number of credit hours allocated for the topic (except for Assignments)

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

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

Internal Assessment (15 marks): Portions of the syllabus in italics marked by * will be evaluated during the course through assignments.

Unit I : Conceptualising Global Tectonics

- 1.1 Continental Drifting - Early Premises, postulates and oppositions [2]
- 1.2 Wegener's Hypothesis – claims, evidences, criticisms, refutes, importance and later revival [4]
- 1.3 Palaeomagnetism: Concept, Measurement, Polarity changes & Magnetic reversals – Implications for Tectonics [4]
- 1.4 Sea-floor spreading & Crustal Rifting: Concept, Discovery, Mechanism, Ocean Bottom Topography- Tectonic Implications [4]
- 1.5 Major and Minor Plates on the Earth Surface: Position & Composition, Rates of Movement, History of Plate Motions [2]
- 1.6 *Benchmark Studies in Plate Tectonics and Evolutionary Timeline of the Concept from inception to the present **

Unit III : Tectonic Interactions and Landscapes

- 2.1 Plate Margins: Types, Mechanisms, Landforms & Impacts on Surface Processes [6]
- 2.2 Relationships between Plate Tectonics and Vulcanicity: Bowen's Reaction Series, Hot-Spots and Intra-Plate Volcanism [4]
- 2.3 *Volcanic Eruptions: Types, Distribution and Associated Landforms **
- 2.4 Mountain Building: Orogenic Types and Classification - relation with Tectonics [4]
- 2.5 Plate Tectonics and Earthquake Genesis: Seismological Measurements, Distribution & Intensity, Prediction & Safeguards [2]
- 2.6 *Impact of Plate Tectonics on Environmental Resources: Formation, Distribution, Extraction, Utilisation, Conservation **

Unit III : Geomorphological Concepts

- 3.1 Uniformitarianism and Neo-catastrophic Approaches, Basic Geomorphic Principles [4]
- 3.2 Spatial and Temporal Scales, Landform Hierarchy and Landscape Changes [4]
- 3.3 Systems Approach - Concept and Classification; Weathering Processes and Drainage Basins as Geomorphic Systems [4]
- 3.4 *Glaciers and Coasts as Geomorphic Systems - Components and Interrelationships **
- 3.5 Concepts of Base Level, Graded Stream, Interruption and Rejuvenation of Erosion Cycle and effects on landforms [4]

Unit IV : Landscape Formation and Evolution

- 4.1 Climatic Geomorphology: Basic Concepts; Morphogenetic Regions and Morphoclimatic Zones - Ideas of Peltier and Budel [4]
- 4.2 Structural Geomorphology: Landforms and Drainage alignments in regions of uniclinal, folded and faulted structures [4]
- 4.3 Slopes - Genesis, Morphology, Denudational Balance and Classification Scheme of Dalrymple [4]
- 4.4 Landscape Evolution Models - Davis, Penck and Hack [4]
- 4.5 *Planation Surfaces - Identification, Evolution and Classification **

Suggested Readings: Concepts in Geotectonics and Geomorphology

1. Aleshire, A. (2007): *The Extreme Earth: Ocean Ridges and Trenches*, Infobase Publishing, New York
2. Bloom, A. L. (2002): *Geomorphology: A Systematic Analysis of Late Cenozoic Landforms*, Prentice Hall, Upper Saddle River, New Jersey
3. Chorley, R.J. and Kennedy, B.A. (1971): *Physical Geography: A Systems Approach*, Prentice Hall, Upper Saddle River, New Jersey
4. Condie, K.C. (2003): *Plate Tectonics and Crustal Evolution*, Butterworth-Heinemann, Oxford, Burlington
5. Derbyshire, E. (1973): *Climatic Geomorphology*, Macmillan, London
6. Duff, D. (1993): *Holmes' Principles of Physical Geology*, Stanley Thornes, Cheltenham
7. Erickson, J. (2001): *Plate Tectonics: Unravelling the Mysteries of the Earth*, Checkmark Books, New York
8. Firsch, W., Meschede, M. and Blakey, R. (2011): *Plate Tectonics, Continental Drift and Mountain Building*, Springer-Verlag, Berlin
9. Gilbert, G.K. (1914): *The Transportation of Debris by Running Water*, USGS Professional Paper No. 86, United States Geological Survey, Denver
10. Goudie, A.S. (ed.) (2004): *Encyclopaedia of Geomorphology*, Routledge, London
11. Goudie, A.S. and Viles, H. (2010): *Landscapes and Geomorphology: A Very Short Introduction*, Oxford University Press, Oxford
12. Gutierrez, M. (2013): *Geomorphology*, CRC Press, Boca Ranton, Florida
13. Hamblin, W.K. and Christiansen, E. (2003): *Earth's Dynamic Systems*, Prentice Hall, Upper Saddle River, New Jersey
14. Holmes, A. (1978): *Principles of Physical Geology*, Van Nostrand Reinhold, New York
15. Huggett, R.J. (2011): *Fundamentals of Geomorphology*, Routledge, New York
16. Kale, V.S. and Gupta, A. (2001): *Introduction to Geomorphology*, Orient Longman, Kolkata
17. Keary, P. and Vine, M. (1997): *Global Tectonics*, Blackwell Scientific Publications, Oxford
18. Melhorn, W.N. and Flemal, R.C. (1975): *Theories of Landform Development*, George Allen and Unwin, Sydney
19. Ollier, C.D. (1969): *Volcanoes*, MIT Press, Boston
20. Ollier, C.D. (1981): *Tectonics and Landforms*, Longman Group Ltd., London
21. Oreskes, N. (2003): *Plate Tectonics: An Insider's History of the Modern Theory of the Earth*, Westview Press, Boulder, Colorado
22. Petts, G.E. and Amoros, C. (eds.) (1996): *Fluvial Hydrosystems*, Chapman and Hall, London
23. Pitty, A. (1974): *Introduction to Geomorphology*, Methuen, London
24. Selby, M.J. (1985): *Earth's Changing Surface: An Introduction to Geomorphology*, Clarendon Press, Oxford
25. Short, N.M. Blair Jr., R.W. (1986): *Geomorphology from Space*, NASA, Houston (Online Edition at NASA Website - <http://disc.sci.gsfc.nasa.gov/geomorphology>)
26. Siddhartha, K. (2001): *The Earth's Dynamic Surface*, Kisalaya Publications, New Delhi
27. Singh, S. (2000): *Geomorphology*, Prayag Pustak Bhavan, Allahabad
28. Small, R.J. (1978): *The Study of Landforms: A Textbook of Geomorphology*, Cambridge University Press, Cambridge
29. Sparks, B.W. (1972): *Geomorphology*, Longman, London
30. Strahler, A.H. and Strahler A.N. (1992): *Modern Physical Geography*, John Wiley & Sons, New York
31. Summerfield, M.A. (1991): *Global Geomorphology: An Introduction to the Study of Landforms*, Longman, London
32. Summerfield, M.A. (ed.) (2000): *Geomorphology and Global Tectonics*, Wiley, Chichester
33. Thorn, C. (1988): *Introduction to Theoretical Geomorphology*, Unwin Hyman, Boston
34. Thornbury, W. D. (1960): *Principles of Geomorphology*, John Wiley & Sons, New York
35. Tomecek, S.M. (2009): *Plate Tectonics*, Chelsea House Publishers, New York
36. United States Geological Survey (1993): *This Dynamic Earth: The Story of Plate Tectonics*, USGS, Denver (Online Edition and Ebook as .pdf available for download at USGS Website - <http://pubs.usgs.gov/gip/dynamic/dynamic.html>)
37. van der Pluijm, B.A. and Marshak, S. (2003): *Earth Structure*, W.W. Norton & Company, New York
38. Wegener, A. (1929): *Die Entstehung der Kontinent und Ozeane*, Friedrich Vieweg & Sohn Akt. Ges., Braunschweig (Translated into English by Biram, J., (1966): *The Origin of Continents and Oceans*, Dover Publications, Mineola, New York)
39. Wooldridge, S.W. and Morgan, R.S. (1937): *An Outline of Geomorphology: The Physical Basis of Geography*, Longman, London
40. Young, A. (1972): *Slopes*, Oliver and Boyd, Edinburgh

DEPARTMENT OF GEOGRAPHY PRESIDENCY UNIVERSITY

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

Module Name: *Population and Settlement Geography*

Paper Type: Theory

Paper Code: MP-TH-4

Course No.: GEOG 0302

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

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

Figures in [] indicate number of credit hours allocated for the topic (except for Assignments)

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

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

Internal Assessment (15 marks): Portions of the syllabus in italics marked by * will be evaluated during the course through assignments.

Unit I: Population Geography

- | | |
|--|-----|
| 1.1 Spatial distribution of population – Factors, Measures of population density | [4] |
| 1.2 Age-sex structure of population of Developed and Developing Countries | [4] |
| 1.3 Population growth: Determinants and measures of Fertility and Mortality, <i>Global trends and patterns</i> * | [4] |
| 1.4 Theory of Population Growth - Malthus | [2] |
| 1.5 Migration: Causes and types, <i>Consequences</i> *, Theories of Migration: Lee and Ravenstein | [6] |
| 1.6 Demographic Transition Model | [2] |

UNIT II: Settlement Geography

- | | |
|---|------|
| 2.1 Definition, Nature and scope, Criteria for delimitation | [4] |
| 2.2 Urban Settlements: Census categories, Metropolitan concept, City-region and Conurbation, Urban Landuse | [9] |
| 2.3 Urban Landuse and Morphology: Classical models - Burgess, Homer-Hoyt, Harris and Ullman | [6] |
| 2.4 Rural Settlements: Site and situation, nature and characteristics, <i>Types and patterns of rural settlement</i> * | |
| Classification of rural settlements, Morphology of rural settlement in the Indian context | [10] |
| 2.5 Regional Settlement Hierarchy: Primate City, Rank-Size Rule, Central Place Theory | [9] |
| 2.6 <i>Settlement Classification based on situation and functions</i> *, Method of functional classification by Harris and Nelson | [4] |

Suggested Readings: *Population and Settlement Geography*

1. Beaujeu- Garnier, J. (1966): *Geography of Population*, Longman, London
2. Bhende, A.A. and Kanetkar, T. (1978): *Principles of Population Studies*, Himalayan Publishing House, Mumbai
3. Carter, H. (1975): *The Study of Urban Geography*, Edward Arnold, London
4. Chandna, R.C. (1986): *A Geography of Population*, Kalyani Publishers, New Delhi
5. Clarke, J.I. (1972): *Population Geography*, Pergamon Press, Oxford
6. Daniel, P. and Hopkins, M. (1989): *A Geography of Settlement*, Oliver and Boyd, Essex
7. Ghosh, S. (1998): *Settlement Geography*, Orient Longman Ltd. , Kolkata
8. Hudson, F.S. (1977): *A Geography of Settlements*, Macdonald & Evans Ltd., Plymouth
9. Johnson, J.H. (1977): *Urban Geography - An Introductory Analysis*, Pergamon press, Oxford
10. Johnston, R.J. (1984): *Urban Geography*, Penguin, London
11. Jones, H.R., (2000): *Population Geography*, Paul Chapman, London
12. Mandal, R.B. (2001): *Introduction to Rural Settlements*, Concept Publishing Company, New Delhi
13. Ramachandran, R. (2010): *Urbanisation and Urban Systems of India*, Oxford University Press, New Delhi
14. Singh, R.Y. (1994): *Geography of Settlement*, Rawat Publications, Jaipur
15. Trewartha, G.T. (1969): *A Geography of Population - World Patterns*, John Wiley, New York
16. Trewartha, G.T. (1972): *The Less Developed Realms - A Population Geography*, McGraw Hill, New York
17. Verma, L.N. (2006): *Urban Geography*, Rawat Publications, Jaipur
18. Woods, R. (1997): *Theoretical Population Geography*, Longman, London
19. Zacharia, E. and Sinha, V.C. (1986): *Elements of Demography*, Allied Publishers Pvt. Ltd., New Delhi
20. Zelinsky, W. (1966): *A Prologue to Population Geography*, Prentice Hall India, New Delhi

DEPARTMENT OF GEOGRAPHY
PRESIDENCY UNIVERSITY

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

Module Name: *Cartograms and Quantitative Techniques*

Paper Type: Practical

Paper Code: MP-PR-3

Course No.: GEOG 0391

Total Marks: 50

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

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

Module Evaluation: Continuous Evaluation throughout the Semester

- | | |
|--|------|
| 1.1 Data: Nature and Characteristics | [2] |
| Data representation by Graphs (using Microsoft Office Excel) | [8] |
| Data representation by Pie and Ternary Diagrams (using Microsoft Office Excel) | [8] |
| Data representation by Maps: Dot and Sphere, Choropleth Map | [10] |
| 1.2 Computation of Human Development Index and ranking of countries and Indian states based on HDI and GDI | [10] |
| 1.3 Preparation of Questionnaire and Survey Schedule for Assessment of Development and Perception Study | [8] |
| 1.4 Measures of Inequality: Index of Dissimilarity, Lorenz Curve and Gini Coefficient, Location Quotient | [14] |
| 1.5 Measures of Interaction and Spatial Distribution: Nearest Neighbour Analysis, Rank-Size Rule (Zipf, Berry), Gravity and Potential Models | [18] |
| 1.6 Combinational Analysis: Dominant Distinctive Function, Weaver's Method of Crop Combination and Rafiullah's Method of Critical Combination, Ternary Diagram | [18] |

Suggested Readings: *Cartograms and Quantitative Techniques*

- Alvi, Z. (1995): *Statistical Geography: Methods and Applications*, Rawat Publications, Jaipur
- Basu, R. and Bhaduri, S. eds., (2007): *Contemporary Issues and Techniques in Geography*, Progressive Publishers, Kolkata
- Mahmood, A. (1977): *Statistical Methods in Geographical Studies*, Rajesh Publications, New Delhi
- Pal, S. K. (1998): *Statistics For Geoscientists Techniques and Applications*, Concept Publishing Company, New Delhi
- Saha, P. K. and Basu, P. (2009): *Advanced Practical Geography*, Books and Allied (P) Ltd, Kolkata
- Sarkar, A. (2008): *Practical Geography: A Systematic Approach*, Orient BlackSwan, Kolkata
- Sarkar, A. (2013): *Quantitative Geography: Techniques and Presentations*, Orient BlackSwan, New Delhi

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

Module Name: *Geomorphology - Forms and Processes*

Paper Type: Theory

Paper Code: MP-TH-5

Course No.: GEOG 0401

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

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

Figures in [] indicate number of credit hours allocated for the topic (except for Assignments)

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

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

Internal Assessment (15 marks): Portions of the syllabus in italics marked by * will be evaluated during the course through assignments.

Unit I: Weathering, Hillslope Stability and Mass Movement

- 1.1 Climatic control and measurement of Erosion and Deudational Rates with Vertical Zonation and Soil Formation [6]
- 1.2 Spatial variation of Weathering Processes and Resultant Landforms - Tropical, Sub-Tropical, Polar Regions [9]
- 1.3 Supergene Mineral Ores and Placers [2]
- 1.4 Hillslope Erosion and Failure due to Running Water and Mass Movement [8]
- 1.5 *Falls, Slides, Topples, Lateral Speeding and Complex Mass Movements* *
- 1.6 *Landslide Prediction and Mitigation* *

Unit II: Fluvial and Glacial Geomorphology

- 2.1 Fluvial Processes and Landforms
 - Hydraulics of Fluid Flow [2]
 - Sediment Transport [2]
 - Fluvial Erosion [1]
 - Longitudinal Profile, Base Level and Stream Capture [2]
 - Fluvial Channel Systems [1]
 - Fluvial Sedimentation and Forms [3]
 - Fluvial Terraces [1]
 - Flooding* *
- 2.2 Glacial Processes and Landforms
 - Present and Past Extents of Glaciers [1]
 - Mass Balance in Glaciers: Accumulation and Ablation [1]
 - Glacial Movements [1]
 - Processes of Erosion and resulting Landforms [3]
 - Mechanisms of Glacial Deposition and resulting Landforms [3]

Unit III: Aeolian and Coastal Geomorphology

- 3.1 Aeolian Processes and Landforms
 - Origin and Characteristics of Aeolian particles [1]
 - Aeolian Erosion and resulting Landforms [3]
 - Dune Processes [1]
 - Desert Dust* *
- 3.2 Marine Processes and Landforms
 - Waves, Currents and Tides [3]
 - Cliff Coasts and Rocky Platforms [3]
 - Beaches, Barriers and Spits [3]
 - Mudflats and Salt Marshes [2]
 - *Estuaries and Deltas**
 - *Coastal Risk and Management**

Suggested Readings: *Geomorphology - Forms and Processes*

1. Anderson, R.S. and Anderson, S.P. (2010): *Geomorphology: The Mechanics and Chemistry of Landscapes*, Cambridge University Press, Cambridge
2. Chorley, R., Schumm, S. and Sugden, D.E. (1994): *Geomorphology*, Methuen, London
3. Faniran, A. and Jeje, L.K. (1983): *Humid Tropical Geomorphology*, Longman, London
4. Goudie, A.S. (ed.) (2004): *Encyclopaedia of Geomorphology*, Routledge, London
5. Gutierrez, M. (2013): *Geomorphology*, CRC Press, Boca Ranton, Florida
6. Kale, V.S. and Gupta, A. (2001): *Introduction to Geomorphology*, Orient Longman, Kolkata
7. Ollier, C.D. (1984): *Weathering*, Longman, London
8. Rice, R.J. (1988): *Fundamentals of Geomorphology*, Longman Scientific and Technical, London
9. Taylor, G. and Eggleton, R.A. (2001): *Regolith Geology and Geomorphology*, John Wiley & Sons, Chichester
10. Thomas, M.F. (1994): *Geomorphology in the Tropics: A study of weathering and denudation in low latitudes*, John Wiley & Sons, Chichester

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

Module Name: *Climatology*

Paper Type: Theory

Paper Code: MP-TH-6

Course No.: GEOG 0402

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

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

Figures in [] indicate number of credit hours allocated for the topic (except for Assignments)

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

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

Internal Assessment (15 marks): Portions of the syllabus in italics marked by * will be evaluated during the course through assignments.

Unit I : Structure and Energy Exchange of the Atmosphere

- 1.1 Atmospheric composition: Constant and variable gases [2]
- 1.2 Vertical structure of the atmosphere [4]
- 1.3 *Ozone depletion- a global issue**
- 1.4 Mechanism of energy transfers: Conduction, convection and radiation; Nature of radiation; radiation laws [4]
- 1.5 Atmosphere-Solar radiation interactions - reflection, scattering, absorption, transmission [2]
- 1.6 Planetary Radiation balance; Latitudinal heat balance; Green house effect and Kyoto protocol [5]
- 1.7 Inversion of temperature [1]
- 1.8 *Heat waves; urban heat island**

Unit II : Atmospheric Moisture

- 2.1 Vapour pressure and saturation; Measures and measurement of atmospheric humidity [3]
- 2.2 Adiabatic temperature changes and condensation; Lifting processes- orographic, frontal, convergence and convective [3]
- 2.3 Near surface condensation- dew, mist, fog; Condensation [4]
- 2.4 Mechanisms of Precipitation [4]
- 2.5 *Measurement of precipitation, Spatial variability of rainfall in India**

Unit III : Atmospheric Circulation

- 3.1 Factors influencing air motion and resulting flow patterns [4]
- 3.2 Idealized Tricellular Model of global atmospheric circulation - its modifications at surface and upper air circulation: Jet streams; Zonal circulations- tropical, mid latitudes and high latitudes; [10]

Unit IV : Atmosphere-Ocean Interactions and Climatic Classification

- 4.1 Mid-latitude weather pattern: Polar front theory; front; Structure and life cycle of a mid-latitude cyclone; Cyclogenesis [6]
- 4.2 Tropical Cyclones- formation, decay, cross section; Naming tropical storms; Disastrous effects of storm surge and flooding; Saffir-Simpson scale of cyclone intensity [6]
- 4.3 Walker circulation and ENSO [2]
- 4.4 *Severe cyclones in the Bay of Bengal**
- 4.5 Classification of world climate- Schemes of Koppen and Thornthwaite [4]

Suggested Readings: *Climatology*

1. Rohli, R.V. and Vega, A.J. (2013): *Climatology*, Jones and Bartlett Publishers, Massachusetts
2. Oliver, J.E. (1993): *Climatology: An Atmospheric Science*, Pearson Education India, New Delhi
3. Barry, R.G. and Chorley, R.J. (2003): *Atmosphere, Weather and Climate*, Psychology Press, Hove, East Sussex
4. 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
5. Ahrens, C.D. (2012): *Essentials of Meteorology: An Invitation to the Atmosphere*, Cengage Learning, Boston

Module Name: *Geographical Information Systems and Earth Materials Analysis*

Paper Type: Practical

Paper Code: MP-PR-4

Course No.: GEOG 0491

Total Marks: 50

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

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

Module Evaluation: Continuous Evaluation throughout the Semester

Unit I: Geographical Information Systems

1.1 Theoretical Basis of a GIS [5]

- Definitions, Historical Development, Components of a GIS
- Types of Geospatial datasets: Raster, Vector, Surface - Attributes and Functionality
- Attributes of a Geodatabase
- GIS Applications: Case Studies

1.2 Preliminary GIS Operations [10]

- Map Georeferencing (Part of a topographical map / administrative map/ thematic map)
- Creation of vector layers (Point, Segment and Polygon) with associated attribute tables and digitization
- Extraction of Location co-ordinates of point features, Distances between point features, Length of a line feature
- Computation of Perimeter, Area and Centroid of a polygon feature

1.3 Database Manipulation [15]

- Attaching attribute data for point, segment and polygon layers
- Attribute Table Maintenance - editing, updating, adding, deleting data fields
- Importing and incorporating external datasets into existent databases - Census data, Surveyed data, GPS data
- Exporting geodatabases, inter-operability functions with other softwares, Integrating datasets with Google Earth

1.4 Thematic Map Generation [15]

- Query Building and Information Extraction
- Buffer demarcation for point, segment and polygon layers
- Map Overlays and Layer Combinations
- Creation of thematic maps for point, segment and polygon layers with annotated layouts

1.5 Surface Models [15]

- Generation of TIN and DEM from digitised contour datasets
- Creating 3-D views with draped overlays
- Basic terrain morphometry analysis using generated DEMs
- Extractions of Surface Cross-sections and Viewshed Analysis

Unit II: Earth Materials Analysis

2.1 Soil Analysis [20]

- Soil Sample Collection Methods and Techniques
- Determination of N, P, K Status in collected Soil Sample
- Estimation of Organic Matter in collected Soil Sample
- Determination of Soil pH

2.2 Grain Size Analysis [12]

- Computation of Indices
- Graphical Representation

2.3 Water Analysis [16]

- Water Sample Collection Methods and Techniques
- Determination of pH of collected sample
- Water Quality Analysis and Mapping

Suggested Readings: *Geographical Information Systems*

1. Albretch, J. (2007): *Key Concepts & Techniques in GIS*, SAGE Publications Ltd., London
2. Burroughs, P.A. and McDonnell, R.A. (1998): *Principles of Geographic Information Systems*, Oxford University Press, New York
3. Clark, K.C. (2010): *Getting Started with Geographic Information Systems*, Prentice Hall, Upper Saddle River, New Jersey
4. Daniel, J., Loree, P. and Whitener, A. (2002): *Inside Mapinfo Professional*, Onword Press, Albany, New York
5. Fazal, S. (2008): *GIS Basics*, New Age International (P) Limited, Publishers, New Delhi
6. Harvey, F. (2008): *A Primer of GIS: Fundamental Geographic and Cartographic Concepts*, The Guilford Press, New York
7. Heywood, D.I., Cornelius, S. and Carver, S. (2006): *An Introduction to Geographical Information Systems*, Prentice Hall, Upper Saddle River, New Jersey
8. Longley, P., Goodchild, M., Maguire, D.J. and Rhind, D.W. (2011): *Geographic Information Systems and Science*, John Wiley & Sons, New York
9. Shekhar, S. and Xiong, H. (eds.) (2008): *Encyclopaedia of GIS*, Springer, New York

DEPARTMENT OF GEOGRAPHY
PRESIDENCY UNIVERSITY

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

Module Name: *Hydrology and Oceanography*

Paper Type: Theory

Paper Code: MP-TH-7

Course No.: GEOG 0501

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

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

Figures in [] indicate number of credit hours allocated for the topic (except for Assignments)

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

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

Internal Assessment (15 marks): Portions of the syllabus in italics marked by * will be evaluated during the course through assignments.

Unit I: Hydrology

- | | |
|--|-----|
| 1.1 Global and Basin Hydrological Cycle | [2] |
| 1.2 Precipitation: Frequency Analysis of Point Rainfall: Intensity-Duration-Frequency Relationships | [4] |
| 1.3 Evaporation and Transpiration: Nature, Factors; Estimates of Potential Evapotranspiration by Thornthwaite's Equation | [4] |
| 1.4 Infiltration: Nature and Factors, Infiltration Capacity, <i>Calculating Infiltration with ϕ Index and Green-Ampt Model</i> * | [6] |
| 1.5 Surface Runoff: Infiltration Excess and Saturation Excess Surface Runoff, <i>NRSC CN Method for Estimating Runoff</i> * | [4] |
| 1.6 Hydrographs: Factors Affecting a Hydrograph, Baseflow separation, <i>Rating Curve and Unit Hydrograph</i> * | [6] |
| 1.7 Flood Frequency Analysis | [2] |
| 1.8 Groundwater: Types of sub-surface water, Types of aquifers, Groundwater flow: Darcy's Law; <i>Salt Water Intrusion</i> * | [4] |

Unit II: Oceanography

- | | |
|---|------|
| 2.1 Spatio-Temporal Changes in Sea Levels | [2] |
| 2.2 Evolution and Structure of Ocean Floor and Ridges - Atlantic, Pacific and Indian Oceans | [12] |
| 2.3 Ocean Heat Budget, Deep Water Circulation and Currents | [8] |
| 2.4 Properties of Ocean Water - Physical and Chemical | [6] |
| 2.5 Origin and classification of Ocean Sediments | [6] |
| 2.6 <i>Coral and Volcanic Islands</i> * | |
| 2.7 <i>Resource Potentiality of Oceans</i> * | |

Suggested Readings: *Hydrology and Oceanography*

- Basu, S.K. (2003) (ed): *Handbook of Oceanography*, Global Vision, Delhi
- Chow, V.T., Maidment, D.R. and Mays, L.W. (1988): *Applied Hydrology*, McGraw Hill, New York
- Davis, R.A. (1972): *Principles of Oceanography*, Addison-Wesley Publishing Co., Reading, Massachusetts
- Garrison, T. (1999): *Oceanography*, Brooks/Cole Wadsworth, New York
- Garrison, T. (2004): *Essentials of Oceanography*, Thompson, Australia
- Gross M.G. (1982): *Oceanography*, Prentice Hall, Upper Saddle River, New Jersey
- King Cuchlain A. M (1962) (ed.): *Oceanography for Geographers*, Edward Arnold, London
- Meinzer, O.E. (1949): *Hydrology*, Dover Publications, Mineola, New York
- Raghunath, H.M. (2006): *Hydrology: Principles, Analysis and Design*, New Age International (P) Limited Publishers, New Delhi
- Reddy, P.J.R. (2005): *A Textbook of Hydrology*, Firewall Media, New Delhi
- Sharma, R.C. and Vatal, M. (1962): *Oceanography for Geographers*, Chaitanya Publishing House, Allahabad
- Subramanya, K. (1994): *Engineering Hydrology*, Tata McGraw Hill Education, New Delhi
- Thurman, H.V. (1985): *Introductory Oceanography*, Bell and Howell Co., London
- Viessman Jr., W. and Lewis, G.L. (2008): *Introduction to Hydrology*, Prentice Hall, Upper Saddle River, New Jersey
- Weisberg, J. and Howard, P. (1974): *Introductory Oceanography*, McGraw Hill, Kogakusha, Tokyo
- 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: *Soil Geography*

Paper Type: Theory

Paper Code: MP-TH-8

Course No.: GEOG 0502

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

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

Figures in [] indicate number of credit hours allocated for the topic (except for Assignments)

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

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

Internal Assessment (15 marks): Portions of the syllabus in italics marked by * will be evaluated during the course through assignments.

Unit I: Soil Basics

- 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 [4]
- 1.3 *Study of soil profiles from photographs**
- 1.4 Units: Pedon, polypedon, soilscape, soil continuum, soil mapping unit [2]

Unit II: Soil Properties

- 2.1 Soil Morphology: Colour; Texture; Structure; Bulk Density; Porosity; Consistence [5]
- 2.2 Soil Mineralogy: Types of clay minerals; crystal structure, properties and occurrences of oxides and silicates [5]
- 2.3 Soil Organisms: Types; Roles in nitrogen fixation, nitrification, denitrification and ammonification [2]
- 2.4 Soil Organic Matter: Sources, composition, decomposition of soluble and insoluble substances; Humus; Clay-humus complex; Properties of soil colloids [5]
- 2.5 Soil Water: Modes of occurrence; Forces on soil water; Soil water retention; Soil water movement [3]
- 2.6 Soil pH: Definition and development of soil pH; Effects on nutrient availability; causes of soil acidity and liming of acid soils; Buffering capacity; Causes and effects of soil alkalinity; Reclamation of saline soils [6]
- 2.7 Soil Fertility: Plant nutrients and their sources; Roles of NPK in plant's growth; Cation Exchange; Base Saturation [5]
- 2.8 *Influence of soil texture, structure and organic matter on other soil properties and soil fertility, Munsel colour system**

Unit III: Soil Forming Factors and Processes

- 3.1 Jenny's factorial model of soil genesis: Parent material, relief, biotic, climate and time factors [6]
- 3.2 Pedogenic Processes: Simonsen's process-system model; Fundamental processes – Eluviations and Illuviation [2]
- 3.3 Specific processes of horizon differentiation: Calcification-decalcification; Podzolization; Laterization; Latosolization; Gleization; Lessivage; Pedoturbation; Paludization; Melanization [5]
- 3.4 Typical soil profile development: Podzol; Laterite and Chernozem [4]
- 3.5 *Major soil types in India**

Unit IV: Soil Classification and Soil Erosion

- 4.1 1938 Soil Classification System; System of Soil Taxonomy – diagnostic horizons, soil moisture and temperature regimes; Soil names and formative elements [5]
- 4.2 Soil erosion: Mechanisms and factors of soil erosion [3]
- 4.3 *Techniques on soil conservation in humid regions and on mountain slopes **

Suggested Readings: Soil Geography

1. Daji, J.A. (1970): *A Textbook of Soil Science*, Asia Publishing House, London
2. Gerrard, J. (2000): *Fundamentals of Soils (Routledge Fundamentals of Physical Geography Series)*, Routledge, London
3. Plaster, E.J. (2009): *Soil Science and Management*, Cengage Learning, Boston
4. Sarkar, D. (2003): *Fundamentals and Applications of Pedology*, Kalyani Publishers, New Delhi
5. Sehgal, J. (1996): *Pedology: Concepts and Applications*, Kalyani Publishers, New Delhi

DEPARTMENT OF GEOGRAPHY PRESIDENCY UNIVERSITY

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

Module Name: *Social, Cultural and Political Geography*

Paper Type: Theory

Paper Code: MP-TH-9

Course No.: GEOG 0503

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

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

Figures in [] indicate number of credit hours allocated for the topic (except for Assignments)

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

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

Internal Assessment (15 marks): Portions of the syllabus in italics marked by * will be evaluated during the course through assignments.

Unit I: Social and Cultural Geography

- 1.1 Social Geography: Definition, Evolution and its relation with other Social Sciences; Sources of Social Statistics in India [4]
- 1.2 Social Space and Elements of Society
Social Space, Elements of Society: Social Structure, Social Organization, Social Process and Spatial Form -
Origin of Socio-Cultural Regions [6]
- 1.3 Basics of Cultural Geography
Nature and Scope of Cultural Geography, Environment and culture; Concept of Culture-areas and Cultural Regions;
Theories of tribal groups; Dwelling places as cultural expressions [6]
- 1.4 Elements of Cultural Geography
Concept of culture: Cultural Hearth and Realm, Cultural Landscape, Cultural Diffusion, Cultural Segregation and Regeneration, [4]
Socio-Cultural Transformations: Sanskritisation, Westernisation, Globalisation [6]
- 1.5 Geography of Language
Concept of Languages: Dialects, Language Families, Classification of Indian languages, Spatial distributions, Minority languages,
Language Shift, Language Concentration and Diversification Index [6]
- 1.6 *Mapping Distribution: Spatial concentration of Scheduled and Non-Scheduled Populations (Idea of socio-spatial exclusivity) **
- 1.7 *Mapping Social Space: Preparation of Perception Map, Mapping Social Inequality **

UNIT II: Political Geography

- 2.1 Nature, Scope, Content and Evolution of Political Geography, Relation with other branches of Social Sciences [4]
Politics, Power and Political Geography: Nation, State and Territory as the central organising principle of Political Geography [4]
Evolution of Political Geography: Classical Phase - Ratzel, German Geopolitics [4]
Mackinder and Spykeman, Modern Phase (1930 - 1970), Postmodern Phase - (After1970) [4]
- 2.2 Indian Political Structure
Colonial Structure of India, Bases of Reorganization of Indian States since Independence, Local Self-Governance [4]
Federalism, Centre - State Relations, Basic Structure of India's Constitution [4]
- 2.3 Inter-State Disputes, Socio-Political and Regional Aspirations and Movements in India, Creation of New States [4]
- 2.4 Electoral Geography and Election System in India, Gerrymandering [4]
- 2.5 *Understanding social and political theories and concepts through popular texts: Mahabharata (Vyas Deva), Arthashastra (Kautilya), Raktakarabi (Rabindranath Tagore), The Prince (Niccolo Machiavelli), 1984 (George Orwell), The Wealth of Nations (Adam Smith), Das Kapital (Karl Marx), Orientalism (Edward Said) **

Suggested Readings: Social & Cultural Geography

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

Suggested Readings: Political Geography

1. Agnew, J., (2002): *Making Political Geography*, Arnold, London
2. Agnew, J., Mitchell, K. and Toal, G. (eds.) (2003): *A Companion to Political Geography*, Blackwell, Oxford
3. Cohen, S. (1964): *Geography and Politics in a World Divided*, Random House, New York
4. Cox, K.R., Low, M. and Robinson, J. (2008): *The SAGE Handbook of Political Geography*, SAGE Publications Ltd., London
5. Cox, K.R., (2002): *Political Geography: Territory, State and Society*, Wiley-Blackwell, Chichester
6. de Blij, H.J. and Glassner, M. (1968): *Systematic Political Geography*, John Wiley & Sons, New York
7. Dikshit, R.D. (1987): *Political Geography and Geopolitics*, Tata McGraw Hill, New Delhi
8. Dikshit, R.D. (2000): *Political Geography: A Contemporary Perspective*, Prentice-Hall, New Delhi
9. Gallaher, C., Dahlman, C.T., Gilmartin, M., Mountz, A. and Shirlow, P. (2009): *Key Concepts in Human Geography: Key Concepts in Political Geography*, SAGE Publications Ltd., London
10. Glassner, M., (1993): *Political Geography*, John Wiley & Sons, New York
11. Jones, M., (2004): *An Introduction to Political Geography: Space, Place and Politics*, Routledge, London
12. Mathur, H.M. and Cernea, M.M. (eds.) (1995): *Development, Displacement and Resettlement - Focus on Asian Experience*, Vikas Publishing House Ltd., New Delhi
13. Painter, J. and Jeffrey, A., (2009): *Political Geography*, SAGE Publications Ltd., London
14. Prescott, J.R.V. (1972): *The Political Geography*, Methuen, London
15. Taylor, P. and Flint, C. (2000): *Political Geography*, Pearson Education, Harlow, Essex

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

Module Name: *Statistical Techniques in Geography*

Paper Type: Practical

Paper Code: MP-PR-5

Course No.: GEOG 0591

Total Marks: 50

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

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

Module Evaluation: Continuous Evaluation throughout the Semester

Unit I: Descriptive Statistics

- 1.1 Measurement scales of geographical data; Types of statistical analysis in Geography; Population and sample; Sampling strategies [4]
- 1.2 Summarizing data - Preparation of Table; Frequency Distribution - graphical description [4]
- 1.3 Numerical description of frequency distribution - Central Tendency (Mean, Median and Mode),
Partition values (Quartiles, Deciles and Percentiles) - Dispersion (Absolute and Relative) [6]
- 1.4 Description of Shape - Skewness, Kurtosis, Moments [4]
- 1.5 Geographical interpretations of frequency curves; Box-plots [6]

Unit II: Probability and Sampling

- 2.1 Counting rules: Permutation and Combination [6]
- 2.2 Sample Spaces and Events; Union, Intersection and Compliments of Events; Conditional Probability and Independence;
Rules of Probability (Addition, Conditional Probability, Multiplicative Rule); Decision Table and Tree;
Theorem of Total Probability - Baye's Theorem [8]
- 2.3 Probability Distributions - Discrete and Continuous; Probability Mass Function and Probability Density Function;
Normal Distribution; Binomial Distribution; Poisson distribution [10]
- 2.4 Sampling Distribution - Variables and Proportions; Student's *t* Distribution [8]

Unit III: Analysing Hypotheses

- 3.1 Estimating Confidence Interval and Statistical Significance [4]
- 3.2 Hypothesis Testing - Concept and Types; Null and Alternative Hypothesis; Type I and Type II Errors; Test statistics;
Degree of freedom; Rejection and acceptance of Null Hypothesis; General steps in hypothesis testing [8]
- 3.3 Hypothesis Testing - Z test and *t* test [8]

Unit IV: Correlation and Regression

- 4.1 Covariance and Correlation; Correlation Coefficients and Sum of Squares [10]
- 4.2 Ordinary Least Square Method; Simple Linear Regression; Curvilinear Regression - Polynomial, Logarithmic, Power and
Exponential Curve Fitting; Residual Mapping [10]

Suggested Reading: *Statistical Techniques in Geography*

1. Acevedo, M.F. (2012): *Data Analysis and Statistics for Geography, Environmental Science and Engineering*, CRC Press, Boca Ranton, Florida
2. Ebdon, D. (1985): *Statistics in Geography: A Practical Approach*, John Wiley & Sons, New York
3. Harris, R. and Jarvis, C. (2011): *Statistics for Geography and Environmental Science*, Prentice Hall, London
4. Pal, S.K. (1988): *Statistics for Geoscientists*, Concept Publishing Company, New Delhi
5. Piegorsch, W.W. and Bailer, A.J. (2005): *Analyzing Environmental Data*, John Wiley & Sons, Chichester
6. Rogerson, P.A. (2010): *Statistical Methods for Geography: A Student's Guide*, SAGE Publications Ltd., London
7. Sarkar, A. (2013): *Quantitative Geography: Techniques and Presentations*, Orient BlackSwan, New Delhi
8. Walford, N. (2011): *Practical Statistics for Geographers and Earth Scientists*, John Wiley & Sons, New York

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

Module Name: *Remote Sensing*

Paper Type: Practical

Paper Code: MP-PR-6

Course No.: GEOG 0592

Total Marks: 50

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

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

Module Evaluation: Continuous Evaluation throughout the Semester

Unit I: Introduction to Remote Sensing

- 1.1 Electromagnetic Radiation and the Electromagnetic Spectrum [4]
- 1.2 EMR interactions with the Earth's surface [4]
- 1.3 Major Remote Sensing Systems and Free Sources of Remote Sensing Data [4]

Unit II: Image Pre-processing

- 2.1 Geometric Corrections [4]
- 2.2 Radiometric Corrections [4]

Unit III: Image Enhancement

- 3.1 Visualising Multispectral Images [2]
- 3.2 Contrast Stretching [4]
- 3.3 Filtering Techniques: Low Pass, High Pass, Directional Filters, Edge Enhancement [4]

Unit IV: Estimation of Earth Surface Properties

- 4.1 Band Math: Addition, Subtraction, Ratio, Simple Model Building [10]
- 4.2 Vegetation Indices: NDVI, Tasseled Cap, EVI [6]
- 4.3 Supervised Classification [6]
- 4.4 Unsupervised Classification [4]
- 4.5 Land Cover Mapping and Accuracy Assessment [12]
- 4.6 Change Detection [10]

Unit V: Terrain Modelling

- 5.1 Introduction to DEM and its Sources [4]
- 5.2 DEM Visualization: Hill Shade, Viewshed [4]
- 5.3 Extraction of Basin Characteristics from a DEM [10]

Suggested Readings: *Remote Sensing*

1. Campbell, J.B. and Wynne, R.H. (2011): *Introduction to Remote Sensing*, The Guilford Press, New York
2. Jensen, J.R. (006): *Remote Sensing of the Environment: An Earth Resource Perspective*, Prentice Hall, Upper Saddle River, New Jersey
3. Lillesand, T.M., Kiefer, R.W. and Chipman, J.W. (2008): *Remote Sensing and Image Interpretation*, John Wiley & Sons, New York
4. Sabins, F.F. (2008): *Remote Sensing: Principles and Interpretation*, Waveland Press Inc., Illinois
5. Sahu, K.C. (2007): *Textbook of Remote Sensing and Geographical Information Systems*, Atlantic Publishers, New Delhi

DEPARTMENT OF GEOGRAPHY
PRESIDENCY UNIVERSITY

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

Module Name: *Biogeography*

Paper Type: Theory

Paper Code: MP-TH-10

Course No.: GEOG 0601

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

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

Figures in [] indicate number of credit hours allocated for the topic (except for Assignments)

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

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

Internal Assessment (15 marks): Portions of the syllabus in italics marked by * will be evaluated during the course through assignments.

Unit I: Basics of Biogeography

- 1.1 Introductory Biogeography: Nature, Scope and Content; Significance of Biogeography and its relation to other Sciences;
Contributions of Philip Lutley Sclater and Alfred Russel Wallace in development of Biogeography *; Contemporary Biogeography [6]
- 1.2 Ecological foundations of Biogeography: Biosphere and Ecosphere - Definition, Nature and Hierarchy of structure (Organism, Species, Population, Community, Ecosystem, Biome) [6]
- 1.3 Ecosystem Structure - Components, Trophic Structure, Food Chain and Food Web, Keystone Species, *Ecological Pyramids* * [6]
- 1.4 Ecosystem Functioning - Energy Flow, Biogeochemical Cycles, Gross and Net Productivity [8]
- 1.5 Ecosystem Processes - Plant Community Dynamics (Competition, Predation, Mutualism, Symbiosis); Causes, Stages and Types of Plant Succession, Climax Community; Adaptation Strategies of Hydrophytes, Xerophytes and Halophytes;
Ecosystem Types - Terrestrial and Aquatic [10]
- 1.6 *Methods of studying Plant Communities - Species density, frequency, abundance, cover, association index and index of similarity* *;
Delineation of ecosystem boundaries *

Unit II: Biogeographical Pattern and Processes:

- 2.1 Agents of Biogeographical Pattern: The Geographic Template - Climate, Substrate and Terrain; [6]
- 2.2 Ecological controls - Physical limiting factors and Habitat; Niche and life forms; Relationships - Niche and geographic range, and distribution and abundance, *Methods of mapping and measuring range* * [6]
- 2.3 Distribution of Communities: Major Biomes of the World - Tropical and Temperate Forests and Grasslands [6]
Biogeographical Regions- Phytogeographical Regions and Zoo-geographical Realms *
- 2.4 Historical Processes: Speciation, diversification and extinction; Dispersal- mechanisms of range expansion, Barriers and Corridors [4]
- 2.5 Concepts, Significance and Types of Biodiversity, Biodiversity Indices [6]

Suggested Readings: *Biogeography*

1. Chapman, J.L. and Reiss, M.J. (1992): *Ecology Principles and Applications*, Cambridge University Press, Cambridge
2. Cox, C.B. and Moore, P.D. (2010): *Biogeography: An Ecological and Evolutionary Approach*, J. Wiley and Sons Inc., New Jersey
3. Kendeigh, S.C. (1975): *Ecology with Special Reference to Man and Animals*, Prentice Hall, New York
4. Kormondy, E.J. (1991): *Concepts of Ecology*, Prentice Hall India, New Delhi
5. Nebel, J.B. (1981): *Environmental Science*, Prentice Hall, New York
6. Odum, E.P. (1971): *Fundamentals of Ecology*, W.B. Saunders, Philadelphia
7. Simmons, I.G. (1980): *Bio-geographical Processes*, George Allen and Unwin, London
8. Watts, D. (1971): *Principles of Biogeography: An Introduction to Functional Mechanisms of Ecosystems*, McGraw Hill, London

DEPARTMENT OF GEOGRAPHY PRESIDENCY UNIVERSITY

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

Module Name: *Regional Geography of India*

Paper Type: Theory

Paper Code: MP-TH-11

Course No.: GEOG 0602

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

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

Figures in [] indicate number of credit hours allocated for the topic (except for Assignments)

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

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

Internal Assessment (15 marks): Portions of the syllabus in italics marked by * will be evaluated during the course through assignments.

Unit I: Physical Setup

- | | |
|---|-----|
| 1.1 Major Geological Structures and Physiographic Divisions; <i>Regional Accounts of Physical Units</i> * | [6] |
| 1.2 Drainage Characteristics; Peninsular and Extra-peninsular Drainage - Origins and Regimes | [2] |
| 1.3 Climatic Regions of India, Mechanisms of the Indian Monsoon | [4] |
| 1.4 Major Soil Groups; Forest Types and Characteristics | [2] |
| 1.5 Agro-climatic Regions and Agro-ecological Zones – Delineation and Characteristics | [2] |

Unit II: Economic Aspects

- | | |
|--|-----|
| 2.1 Five Year Plans - Characteristics and Schemes specific to Agriculture, Industry and Infrastructural Development | [6] |
| 2.2 <i>Information Technology Sector, Petrochemical, Power and Heavy Manufacturing Industries - Location and Characteristics</i> * | |
| 2.3 Regional and Local Development Programmes: MGNREGA, IAY and PMGSY (Rural) and JNNURM & NIUS (Urban) | [6] |
| 2.4 SEZ and EEZ - Delineation and Development, Policies and Problems | [4] |

Unit III: Regional Issues: Case Studies

- | | |
|--|-----|
| 3.1 Big Dams - Garhwal Region and Narmada Valley: Development vs. Displacement | [4] |
| 3.2 Chotanagpur: Economic Wealth vs. Economic Development; | [4] |
| 3.3 Drought and Agricultural Issues: Bundelkhand and Telangana; | [4] |
| 3.4 Development Issues facing North-eastern States - Political, Ethnic and Economic Status | [4] |
| 3.5 <i>Environmental Movements in India; Protecting Biodiversity: Chipko and Silent Valley Movements</i> * | |

Unit IV: West Bengal

- | | |
|---|-----|
| 4.1 Physiographic Units and related Climatic - Drainage Characteristics; <i>Soil - Vegetation Linkages and Agricultural Regions</i> * | [2] |
| 4.2 Population Characteristics: Population Growth and Migration Aspects | [4] |
| 4.3 Urbanisation: Problems and Prospects of metropolitan growth of Kolkata | [4] |
| 4.4 North Bengal - Landslide Hazards and Riverbank Erosion Problems | [2] |
| 4.5 Rarh Bengal – Water Scarcity and Irrigation, Tribal development | [2] |
| 4.6 Ganga Delta - Flooding, Salinisation and Arsenic Problems | [2] |

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. Agarwal, A. and Narain, S. (1997): *Fourth Citizen's Report - Dying Wisdom [SOE-4]: Floods, Floodplains and Environmental Myths*, Centre for Science and Environment, New Delhi
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. Husain, M. (2014): *Geography of India*, Tata McGraw-Hill Education, New Delhi
6. Khullar, D.R. (2011): *India: A Comprehensive Geography*, Kalyani Publishers, New Delhi
7. Krishnan, M.S. (1949): *Geology of India and Burma*, The Madras Law Journal Press, Chennai
8. Mamoria, C.B. (1995): *Economic and Commercial Geography of India*, Shiv Lal Agarwal & Co., Agra
9. Pal, S.K. (1998): *Physical Geography of India*, Sangam Books Ltd., New Delhi
10. Sharma, T.C. and Coutinho, O. (1992): *Economic Geography of India*, Vikas Publications, New Delhi
11. Singh, J. and Dhillon, S.S. (2004): *Agricultural Geography*, Tata McGrawHill Education, New Delhi
12. Singh, R.L. (1993): *India: A Regional Geography*, UBS Publishers Distributors, New Delhi
13. Spate, O.H.K. and Learmonth, A.T.A. (1962): *India and Pakistan*, Methuen and Co., London
14. Tirtha, R. (2002): *Geography of India*, Rawat Publications, Jaipur
15. Valdiya, K.S. (2010): *The Making of India - Geodynamic Evolution*, Macmillan Publishers India Ltd., New Delhi
16. Valdiya, K.S. (2013): *Environmental Geology: Indian Context*, Tata McGraw-Hill, New Delhi
17. Wadia, D.N. (1919): *Geology of India*, Macmillan & Co. Ltd., London

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

Module Name: *Philosophy of Geography*

Paper Type: Theory

Paper Code: MP-TH-12

Course No.: GEOG 0603

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

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

Figures in [] indicate number of credit hours allocated for the topic (except for Assignments)

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

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

Internal Assessment (15 marks): Portions of the syllabus in italics marked by * will be evaluated during the course through assignments.

Unit I: Evolution of Geographical Thought

1.1 Nature and Evolution of Geographical Thought in the Ancient and Medieval Period

*Nature and definitions of Geography and its relation to other branches of epistemology **

*Evolution of Geography in Ancient and Medieval Periods, Encyclopaedic Nature of Geography, Contributions of Greek, Roman, Arab and Indian Geographers **

European Renaissance and contributions of the voyages, Age of Imperialism

[8]

1.2 Dichotomy and Dualism in Geography

*Physical and Human **

*Regional (Idiographic) vs. Systematic (Nomothetic) Approach **

Inductive and Deductive Methods

[4]

Qualitative vs. Quantitative Approach

[4]

Debate between Environmental Determinism and Possibilism, Stop-and-go Determinism

[6]

1.3 Nature of Geography

Hartshorne-Schaefer Debate; Exceptionalism in Geography

[6]

1.4 Theory and Paradigm in Geography with special reference to Kuhn

[6]

Unit II: Core Concepts of Geographical Thought

2.1 Positivist Philosophy and its Critique

Empiricism, Positivism and Quantitative Revolution

[6]

Structural Perspective in Geography

[4]

Marxian Dialectical Materialism

[2]

Radical ideology in Geography

[4]

2.2 Concept of Space, Domain of Humanistic Geography

[6]

2.3 Modern Concepts in Geographical Thought

Pragmatism, Functionalism, Phenomenology

[4]

Existentialism, Realism

[2]

Behaviouralism in Geography

[2]

*Systems Approach in Geography **

*Cultural Landscape Approach of Carl. O. Sauer **

2.4 Ecological Approach in Geography

*Concept of Ecosystem **

*Human Ecology **

Urban Ecology

[2]

Suggested Readings: *Philosophy of Geography*

1. Bowen, M. (1981): *Empiricism and Geographical Thought*, Cambridge University Press, Cambridge
2. Dickinson, R.E. (1969): *Makers of Modern Geography*, Routledge, London
3. Dikshit, R.D. (2004): *Geographical Thought: A Critical History of Ideas*, Prentice Hall of India, New Delhi
4. Freeman, T.W. (1961): *A Hundred Years of Geography*, Gerald Duckworth, London
5. Gregory, D. (1978): *Ideology, Science and Human Geography*, Hutchinson, London
6. Hartshorne, R. (1959): *Perspectives on the Nature of Geography*, Rand MacNally and Co., Chicago
7. Hartshorne, R. (1939): *The Nature of Geography*, Association of American Geographers, Lancaster
8. Harvey, D. (1969): *Explanation in Geography*, Arnold, London
9. Harvey, D. (1973): *Social Justice and the City*, Arnold, London
10. James, P.E. (1972): *All Possible Worlds: A History of Geographical Ideas*, The Odyssey Press, Indianapolis
11. Johnston, R., Gregory D., Pratt G., Watts M. and Whatmore, S. (2003): *The Dictionary of Human Geography*, Blackwell Publishers, Oxford
12. Johnston, R.J. (1983): *Geography and Geographers*, Edward Arnold, London
13. Johnston, R.J. (1985): *The Future of Geography*, Methuen and Company Ltd., New York
14. Johnston, R.J. and Sidaway, J.D. (2004): *Geography and Geographers*, Edward Arnold, London
15. Martin, G. (2005): *All Possible Worlds: A History of Geographical Ideas*, Oxford University Press, New York
16. Peet, R. (1998): *Modern Geographical Thought*, Blackwell Publishers Inc., Massachusetts
17. Soja, E. (1989): *Post-modern Geographies*, Verso Press, London
18. Tuan, Y. (1977): *Space and Place: The Perspective of Experience*, Edward Arnold, London

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

Module Name: *Geological Map and Climatic Data Analysis*

Paper Type: Practical

Paper Code: MP-PR-7

Course No.: GEOG 0691

Total Marks: 50

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

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

Module Evaluation: Continuous Evaluation throughout the Semester

Unit I: Interpretation of Geological Maps

- 1.1 Study on different structures like Horizontal, Vertical, Uniclinal, Folded and Faulted [14]
- 1.2 Drawing of cross sections depicting unconformity, strike/ dip/ bedding planes/ succession of beds, intrusion and their thickness [20]
- 1.3 Interpretation of the section covering geological history and relation between structure and topography [8]
- 1.4 Study of one G.S.I. Quadrangle map [6]

Unit II: Climate Data Analysis

- 2.1 Preparation of Station model and interpretation of synoptic chart [14]
- 2.2 Preparation of climatological diagrams [12]
- 2.3 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 [22]

Suggested Readings: *Geological Map and Climatic Data Analysis*

1. Basu, R. And Bhaduri, S. (2008): *Contemporary Issues and Techniques in Geography*, Progressive Publishers, Kolkata
2. Saha, P.K. and Basu, P. (2009): *Advanced Practical Geography*, Books and Allied (P) Ltd., Kolkata
3. Sarkar, A. (2008): *Practical Geography: A Systematic Approach*, Orient BlackSwan, Kolkata
4. Sen, A.K. (1995): *Laboratory Manual of Geology*, Modern Book Agency (P) Ltd., Kolkata
5. Singh, R.L. and Singh, P.B. (2009): *Elements of Practical Geography*, Kalyani Publishers, New Delhi

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

Module Name: *Field Work and Report Writing*

Paper Type: Practical

Paper Code: MP-PR-8

Course No.: GEOG 0692

Total Marks: 50

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

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

Module Evaluation: Part Evaluation by Internal Examiners in the Field and during preparation of the Field Report and during a Presentation and Viva Examination at Semester end by External Examiners

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.

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

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 = not more than 5000, excluding Tables and Appendix (Computer typed, Line Spacing = 1½, Arial / Times New Roman / Helvetica /Calibri / Trebuchet 10 / 11)

Time allotted for Examinee Group = 30 minutes (maximum), LCD Presentation by a group, followed by Group Discussion.

Marks on Field Performance of individual students (=15) shall be awarded by the Internal Examiner(s) and on both Presentation (= 15) and Viva Voce (= 20) by the External Examiner(s).

Suggested Readings: *Field Report*

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