

# PONDICHERY UNIVERSITY

(A CENTRAL UNIVERSITY)



## **B.Sc. Geography**

(Choice Based Credit System)

Syllabus

2017-18 onwards

## Proposed Scheme for Choice Based Credit System in B.Sc. Geography

| Semester | Core Course (C) (8) | Ability Enhancement Compulsory Courses (AECC) (4) | Skill Enhancement Courses (SEC) (4) | Elective Discipline Specific (DSSE) (6) | Elective: Generic (GE) (2) |
|----------|---------------------|---|-------------------------------------|---|----------------------------|
| I        | DSC-1A(111)         | MIL-1 (111)                                       |                                     |   |                            |
|          | DSC-2A(112)         | ENG-1 (112)                                       |                                     |   |                            |
|          |                     | PADM (113)  |                                     |   |                            |
| II       | DSC-1B (121)        | MIL-2 (121)                                       |                                     |   |                            |
|          | DSC-2B (122)        | ENG-1 (122)                                       |                                     |   |                            |
|          |                     | ENVS (123)  |                                     |   |                            |
| III      | DSC-1C (231)        | MIL-3 (231)                                       | SEC-1 (233)                         |   |                            |
|          | DSC-2C (232)        | ENG-3 (232)                                       |                                     |   |                            |
| IV       | DSC-1D (241)        | MIL-4 (241)                                       | SEC-2 (243)                         |   |                            |
|          | DSC-2D (242)        | ENG-4 (242)                                       |                                     |   |                            |
| V        |                     |   | SEC-3 (351)                         | Any Three DSE-1A (352)                  | GE-1 (357)                 |
|          |                     |   |                                     | DSE-2A (353)                            |                            |
|          |                     |   |                                     | DSE-3A (354)                            |                            |
|          |                     |   |                                     | DSE-4A (355)                            |                            |
|          |                     |   |                                     | DSE-5A (356)                            |                            |
| VI       |                     |   | SEC-4 (361)                         | Any Three- DSE-1B (362)                 | GE-2 (367)                 |
|          |                     |   |                                     | DSE-2B (363)                            |                            |
|          |                     |   |                                     | DSE-3B (364)                            |                            |
|          |                     |   |                                     | DSE-4B (365)                            |                            |
|          |                     |   |                                     | DSE-5B (366)                            |                            |

|                          | Lecture   | Theory    | Practical |                    |
|--------------------------|-----------|-----------|-----------|--------------------|
| <b>1. Core paper (8)</b> | 32        | 8         | 8         |                    |
| i) Theory                | 16        | 8         | -         |                    |
| ii) Practical            | 16        | -         | 8         |                    |
| 2. AECC (4)              | 28        | -         | -         |                    |
| 3. SEC (4)               | 08        | -         | -         |                    |
| 4. DSE (6)               | 24        | 6         | -         |                    |
| 5. GE (2)                | 6         | -         | -         |                    |
| <b>TOTAL</b>             | <b>98</b> | <b>14</b> | <b>8</b>  | <b>120 Credits</b> |

TEMPLATE

SCHEME FOR CHOICE BASED CREDIT SYSTEM IN

B.Sc. Geography programme to be implemented from 2017-18 Onwards

| Course              | Subject Code                         | Title of the Paper                                | Credits Allotted |                  |
|---------------------|--------------------------------------|---|------------------|------------------|
|                     |                                      |   | Lecture          | Tutorial/<br>Lab |
| <b>SEMESTER-I</b>   |                                      | <b>20 Credits</b>                                 |                  |                  |
| MIL-1               | LBEN/LHIN/LMAL/LSAN/<br>LTAM/LTE 111 | Bengali/Hindi/<br>Malayalam/Sanskrit/Tamil/Telugu | 03               |                  |
| English-1           | ENGL 112                             | English-I   | 03               |                  |
| DSC-1A              | XXXX 111                             | Physical Geography                                | 04               | 02               |
| DSC-2A              | XXXX 112                             | Cartographic Techniques                           | 04               | 02               |
| AECC-1              | PADM 113                             | Public Administration                             | 02               |                  |
| <b>SEMESTER-II</b>  |                                      | <b>20 Credits</b>                                 |                  |                  |
| MIL-2               | LBEN/LHIN/LMAL/LSAN/<br>LTAM/LTE 121 | Bengali/Hindi/<br>Malayalam/Sanskrit/Tamil/Telugu | 03               |                  |
| English-2           | ENGL 122                             | English-II  | 03               |                  |
| DSC-1B              | XXXX 121                             | Human Geography                                   | 04               | 02               |
| DSC-2B              | XXXX 122                             | Map Projection (P)                                | 04               | 02               |
| AECC-2              | ENVS 123                             | Environmental Studies                             | 02               |                  |
| <b>SEMESTER-III</b> |                                      | <b>20 Credits</b>                                 |                  |                  |
| MIL-3               | LBEN/LHIN/LMAL/LSAN/<br>LTAM/LTE 231 | Bengali/Hindi/<br>Malayalam/Sanskrit/Tamil/Telugu | 03               |                  |
| English-3           | ENGL 232                             | English-III                                       | 03               |                  |
| DSC-1c              | XXXX (231)                           | Economic Geography                                | 04               | 02               |
| DSC-2c              | XXXX (232)                           | Thematic Mapping Techniques (P)                   | 04               | 02               |
| SEC-1               | XXXX (233)                           | Geographic Information System<br>(P)              | 02               |                  |
| <b>SEMESTER-IV</b>  |                                      | <b>20 Credits</b>                                 |                  |                  |
| MIL-4               | LBEN/LHIN/LMAL/LSAN/<br>LTAM/LTE 241 | Bengali/Hindi/<br>Malayalam/Sanskrit/Tamil/Telugu | 03               |                  |
| English-4           | ENGL 242                             | English-IV  | 03               |                  |
| DSC-1D              | XXXX (241)                           | Climatology                                       | 04               | 02               |
| DSC-2D              | XXXX (242)                           | Statistics Methods in Geography.<br>(P)           | 04               | 02               |
| SEC-2               | XXXX (243)                           | Field Study & Surveying (P)                       | 02               |                  |
| <b>SEMESTER-V</b>   |                                      | <b>20 Credits</b>                                 |                  |                  |
| SEC-3               | XXXX (351)                           | Remote Sensing (P)                                | 02               |                  |
| DSE-1A              | XXXX (352)                           | Population Geography                              | 04               | 01               |
| DSE-2A              | XXXX (353)                           | Urban Geography                                   | 04               | 01               |
| DSE-3A              | XXXX (354)                           | Geography of Health and Well<br>beings            | 04               | 01               |
| DSE-4A              | XXXX (355)                           | Island Studies                                    | 04               | 01               |
| DSE-5A              | XXXX (356)                           | Geography of Tourism                              | 04               | 01               |

|                                    |            |   |    |    |
|------------------------------------|------------|---|----|----|
| GE-1                               | XXXX (357) | Disaster Risk Reduction                     | 03 |    |
| <b>SEMESTER-VI</b>                 |            | 20 Credits                                  |    |    |
| SEC-4                              | XXXX (361) | Research Methods (P)                        | 02 |    |
| DSE- 1B                            | XXXX (362) | Resource Geography                          | 04 | 01 |
| DSE-2B                             | XXXX (363) | Agricultural Geography                      | 04 | 01 |
| DSE- 3B                            | XXXX (364) | Political Geography                         | 04 | 01 |
| DSE-4B                             | XXXX (365) | Water Management                            | 04 | 01 |
| DSE-5B                             | XXXX (366) | Climatic Change: Vulnerability & Adaptation | 04 | 01 |
| GE-2                               | XXXX (367) | Sustainability and Development              | 03 |    |
| <b>Total Number of Credits 120</b> |            |   |    |    |

# **B.Sc. Geography**

**Note:**

**1. Practical paper will not have tutorials.**

## **Core Courses**

### **Semester I**

1. DSC-1A (111) Physical Geography
2. DSC-2A (112) Cartographic Techniques (Practical)

### **Semester II**

3. DSC-1B (121) Human Geography
4. DSC-2B (122) Map Projection (Practical)

### **Semester III**

5. DSC-1C (231) Economic Geography
6. DSC-2C (232) Thematic Mapping techniques (Practical)

### **Semester IV**

7. DSC-ID (241) Climatology
8. DSC-2D (242) Statistical Methods in Geography (Practical)

## **Skill Enhancement Course**

### **Semester III**

1. SEC-I (233) Geographic Information System (Practical)

### **Semester IV**

2. SEC-2 (243) Field Study and Surveying (Practical)

### **Semester V**

3. SEC-3 (351) Remote Sensing and GPS Based project Report (Practical)

### **Semester VI**

4. SEC-4 (361) Research method (Practical)

## **Elective Discipline Specific (any Three)**

### **Semester V**

1. **DSE-1A (352)** Population Geography
2. DSE-2A (353) Urban Geography
3. DSE-3A (354) Geography of Health and Wellbeing
4. DSE-4A (355) Island Studies
5. DSE-5A (356) geography of Tourism

### **Semester VI**

#### **DSE-3**

1. DSE-1B (362) Resource Development
2. DSE-2B (363) Agriculture Geography
3. DSE-3B (364) Political Geography
4. DSE-4B (365) Water resource Management
5. DSE-5B (366) Climatic Change: Vulnerability and Adaptation

## **Elective Generic Papers**

### **Semester V**

1. GE-1 (357) Disaster Risk Reduction

### **Semester VI**

2. GE-2 (367) Sustainability and Development

# **B.Sc. Geography**

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## **Core Courses**

### **Semester I**

1. DSC-1A (111) Physical Geography
2. DSC-2A (112) Cartographic Techniques (Practical)

### **Semester II**

3. DSC-1B (121) Human Geography
4. DSC-2B (122) Map Projection (Practical)

### **Semester III**

5. DSC-1C (231) Economic Geography
6. DSC-2C (232) Thematic Mapping techniques (Practical)

### **Semester IV**

7. DSC-ID (241) Climatology
8. DSC-2D (242) Statistical Methods in Geography (Practical)

## **Skill Enhancement Course**

### **Semester III**

1. SEC-I (233) Geographic Information System (Practical)

### **Semester IV**

2. SEC-2 (243) Field Study and Surveying (Practical)

### **Semester V**

3. SEC-3 (351) Remote Sensing and GPS Based project Report (Practical)

### **Semester VI**

4. SEC-4 (361) Research method (Practical)

## **Elective Discipline Specific (any Three)**

### **Semester V**

1. **DSE-1A (352)** Population Geography
2. DSE-2A (353) Urban Geography
3. DSE-3A (354) Geography of Health and Wellbeing
4. DSE-4A (355) Island Studies
5. DSE-5A (356) geography of Tourism

### **Semester VI**

#### **DSE-3**

1. DSE-1B (362) Resource Development
2. DSE-2B (363) Agriculture Geography
3. DSE-3B (364) Political Geography
4. DSE-4B (365) Water resource Management
5. DSE-5B (366) Climatic Change: Vulnerability and Adaptation

## **Elective Generic Papers**

### **Semester V**

1. GE-1 (357) Disaster Risk Reduction

### **Semester VI**

2. GE-2 (367) Sustainability and Development

## DSC-1A (111)

### 1. PHYSICAL GEOGRAPHY (C5)

1. Earth: Interior Structure and Isostasy. Origin of earth (Jean and Jeffery) Interior of Earth.
2. Earth Movements: Plate Tectonics, Types of Folds and Faults, Earthquakes and Volcanoes.( Types and Distribution)
3. Geomorphic Processes: Weathering, Mass Wasting, Cycle of Erosion (Davis and Penck).
4. Evolution of Landforms (Erosional and Depositional): Fluvial, Aeolian, Glacial.

#### Reading List

1. Bloom A. L., 2003: *Geomorphology: A Systematic Analysis of Late Cenozoic Landforms*, Prentice-Hall of India, New Delhi.
2. Bridges E. M., 1990: *World Geomorphology*, Cambridge University Press, Cambridge.
3. Christopherson, Robert W., (2011), *Geosystems: An Introduction to Physical Geography*, 8 Ed., Macmillan Publishing Company
4. Kale V. S. and Gupta A., 2001: *Introduction to Geomorphology*, Orient Longman, Hyderabad.
5. Knighton A. D., 1984: *Fluvial Forms and Processes*, Edward Arnold Publishers, London.
6. Richards K. S., 1982: *Rivers: Form and Processes in Alluvial Channels*, Methuen, London.
7. Selby, M.J., (2005), *Earth's Changing Surface*, Indian Edition, OUP
8. Skinner, Brian J. and Stephen C. Porter (2000), *The Dynamic Earth: An Introduction to physical Geology*, 4th Edition, John Wiley and Sons
9. Thornbury W. D., 1968: *Principles of Geomorphology*, Wiley.
10. Gautam, A (2010): *Bhautik Bhugol*, Rastogi Publications, Meerut
11. Tikkaa, R N (1989): *Bhautik Bhugol ka Swaroop*, Kedarnath Ram Nath, Meerut
12. Singh, S (2009): *Bhautik Bhugol ka Swaroop*, Prayag Pustak, Allahab

## DSC-2A (112)

### 2. CARTOGRAPHIC TECHNIQUES (PRACTICAL) (C2)

1. Cartography – History and Importance of cartography
2. Scales – Concept and application; Graphical Construction of Plain, Comparative and Diagonal Scales.
3. Weather map interpretation, Mapping terrain & Climatic data (Hythergraph, Climograph, Isopleth), profile and Contours.
4. Topographical Map – Interpretation of a Mountain area with the help of Cross and Longitudinal Profiles.
5. Slope Analysis – Wentworth's method.

**Practical Record:** A Project File in pencil, comprising one exercise *each*, on scale, map projection, interpretation of topographic sheet and slope analysis.

#### Reading List

1. Anson R. and Ormelling F. J., 1994: *International Cartographic Association: Basic Cartographic Vol.* Pregmen Press.
2. Gupta K.K. and Tyagi, V. C., 1992: *Working with Map*, Survey of India, DST, New Delhi.
3. Mishra R.P. and Ramesh, A., 1989: *Fundamentals of Cartography*, Concept, New Delhi.
4. Monkhouse F. J. and Wilkinson H. R., 1973: *Maps and Diagrams*, Methuen, London.
5. Rhind D. W. and Taylor D. R. F., (eds.), 1989: *Cartography: Past, Present and Future*, Elsevier, International Cartographic Association.
6. Robinson A. H., 2009: *Elements of Cartography*, John Wiley and Sons, New York.
7. Sharma J. P., 2010: *Prayogic Bhugol*, Rastogi Publishers, Meerut.
8. Singh R. L. and Singh R. P. B., 1999: *Elements of Practical Geography*, Kalyani Publishers.
9. Sarkar, A. (2015) *Practical geography: A systematic approach*. Orient Black Swan Private Ltd., New Delhi
10. Singh R L & Rana P B Singh(1991) *Prayogtmak Bhugol ke Mool Tatva*, Kalyani Publishers, New Delhi
11. Sharma, J P (2010) *Prayogtmak Bhugol ki Rooprekha*, Rastogi Publications, Meerut
12. Singh, R L & Dutta, P K (2012) *Prayogtmak Bhugol*, Central Book Depot, Allahabad

## **DSC-1B (121)**

### **3. HUMAN GEOGRAPHY (C3)**

1. Introduction: Defining Human Geography; Major Themes, (Determinism, Possibilism, Neo determinism), emergence of man, Race of Mankind,
2. Population: Population Growth and Distribution; Population Composition; Demographic Transition Theory
3. Settlements: Types of Rural Settlements; Classification of Urban Settlements; Trends and Patterns of World Urbanization
4. Population-Resource Relationship (Population problems of developed & developing countries,

#### **Reading List**

1. Chandna, R.C. (2010) Population Geography, Kalyani Publisher.
2. Hassan, M.I. (2005) Population Geography, Rawat Publications, Jaipur
3. Daniel, P.A. and Hopkinson, M.F. (1989) The Geography of Settlement, Oliver & Boyd, London.
4. Johnston R; Gregory D, Pratt G. et al. (2008) The Dictionary of Human Geography, Blackwell Publication.
5. Jordan-Bychkov et al. (2006) The Human Mosaic: A Thematic Introduction to Cultural Geography. W. H. Freeman and Company, New York.
6. Kaushik, S.D. (2010) Manav Bhugol, Rastogi Publication, Meerut.
7. Maurya, S.D. (2012) Manav Bhugol, Sharda Pustak Bhawan. Allahabad.
8. Hussain, Majid (2012) Manav Bhugol. Rawat Publications, Jaipur.

## **DSC-2B (122)**

### **12. MAP PROJECTIONS (C12)**

1. Map Projection : Definition, significance and types. Choices of map projections.
2. Construction, properties, merits, demerits and uses of Conical Projections : Conical Projection with two standard parallels, Polyconic Projection and Bonne's Projection.
3. Construction, properties, merits, demerits and uses of Zenithal Projections : Gnomonic, Stereographic, Orthographic, Equidistant and Equal Area Projection.\
4. Construction, properties, merits, demerits and uses of Cylindrical Projections : Simple Cylindrical Projection, Cylindrical Equal Area Projection and Mercator's Projection. Conventional Projections : Mollweide's Projection and International Projection.

#### **Reading List:**

1. Misra R.P and A Ramesh (2002) Fundamentals of Cartography. Concept Publishing House, New Delhi.
2. Sharma J.P (2008) Prayogik Bhugol, Rastogi Publications, Meerut.
3. Singh, G (2005) Map work and Practical Geography, Vikas Publishing House, New Delhi.
4. Singh, L.R (2006) Fundamentals of Practical Geography, Sharda Pustak Bhawan, Allahabad.
5. Singh R.L and R.B.P Singh (2000) Elements of Practical Geography, Kalyani Publishers, New Delhi.
6. Tiwari, R.C and Tripathi, S (2007), Abhinav Prayothmak Bhugol, Prayag Pustak Bhawan, Allahabad.
7. Yadav, Hiralal (2010) Prayogathmak Bhugol, Radha Publications, New Delhi.



## **DSC-1C (231)**

### **5. ECONOMIC GEOGRAPHY (C1)**

1. Introduction: Concept and classification of economic activity
2. Factors Affecting location of Economic Activity with special reference to Agriculture (Von Thunen theory), Industry (Weber's theory).
3. Primary Activities: Subsistence and Commercial agriculture, forestry, fishing and mining.
4. Secondary Activities: Manufacturing (Cotton Textile, Iron and Steel), Concept of Manufacturing Regions, Special Economic Zones and Technology Parks.
5. Tertiary Activities: Transport, Trade and Services, & Quaternary activities

#### **Reading List**

1. Alexander J. W., 1963: *Economic Geography*, Prentice-Hall Inc., Englewood Cliffs, New Jersey.
2. Coe N. M., Kelly P. F. and Yeung H. W., 2007: *Economic Geography: A Contemporary Introduction*, Wiley-Blackwell.
3. Hodder B. W. and Lee Roger, 1974: *Economic Geography*, Taylor and Francis.
4. Combes P., Mayer T. and Thisse J. F., 2008: *Economic Geography: The Integration of Regions and Nations*, Princeton University Press.
5. Wheeler J. O., 1998: *Economic Geography*, Wiley.
6. Durand L., 1961: *Economic Geography*, Crowell.
7. Bagchi-Sen S. and Smith H. L., 2006: *Economic Geography: Past, Present and Future*, Taylor and Francis.
8. Willington D. E., 2008: *Economic Geography*, Husband Press.
9. Clark, Gordon L.; Feldman, M.P. and Gertler, M.S., eds. 2000: *The Oxford*.

## **DSC-2C (232)**

### **6. THEMATIC MAPPING TECHNIQUES (PRACTICAL) (C7)**

1. Map Scale, Types
2. Map classification and Types; Principles of Map Design.
3. Diagrammatic Data Presentation – Line, Bar and Circle.
4. Thematic Mapping Techniques – Properties, Uses and Limitations; Areal Data -- Choropleth, Dot, Point Data – Isopleths.

**Practical Record:** A Thematic Atlas should be prepared on a specific theme with five plates of any state in India.

#### **Reading List**

1. Cuff J. D. and Mattson M. T., 1982: *Thematic Maps: Their Design and Production*, Methuen Young Books
2. Dent B. D., Torguson J. S., and Holder T. W., 2008: *Cartography: Thematic Map Design* (6th Edition), Mcgraw-Hill Higher Education
3. Gupta K. K. and Tyagi V. C., 1992: *Working with Maps*, Survey of India, DST, New Delhi.
4. Kraak M.-J. and Ormeling F., 2003: *Cartography: Visualization of Geo-Spatial Data*, Prentice-Hall.
5. Mishra R. P. and Ramesh A., 1989: *Fundamentals of Cartography*, Concept, New Delhi.
6. Sharma J. P., 2010: *Prayogic Bhugol*, Rastogi Publishers, Meerut.
7. Singh R. L. and Singh R. P. B., 1999: *Elements of Practical Geography*, Kalyani Publishers.
8. Slocum T. A., McMaster R. B. and Kessler F. C., 2008: *Thematic Cartography and Geovisualization* (3rd Edition), Prentice Hall.
9. Tyner J. A., 2010: *Principles of Map Design*, The Guilford Press.
10. Sarkar, A. (2015) *Practical geography: A systematic approach*. Orient Black Swan Private Ltd., New Delhi
11. Singh, L R & Singh R (1977): *Manchitra or Pryaogatamek Bhugol* , Central Book, Depot, Allahabad
12. Bhopal Singh R L and Dutta P K (2012) *Prayogatama Bhugol*, Central Book Depot, Allahabad.

## DSC-ID (241)

### 7. CLIMATOLOGY (C8)

1. Composition and Structure of atmosphere – Variation with Altitude, Latitude and Season.
2. Insolation– Factors and Distribution, Heat Budget, Temperature Inversion.
3. Atmospheric Pressure and Winds – Planetary Winds, Forces affecting Winds, General Circulation, Jet Streams.
4. Atmospheric Moisture – Evaporation, Humidity, Condensation, Fog and Clouds, Precipitation Types, Air Mass, Climatic Regions (Koppen)
5. Cyclones and Related Phenomena- Cyclone, Anti cyclone, Tornado, Water Spouts.

#### Reading List

1. Barry R. G. and Carleton A. M., 2001: *Synoptic and Dynamic Climatology*, Routledge, UK.
2. Barry R. G. and Corley R. J., 1998: *Atmosphere, Weather and Climate*, Routledge, New York.
3. Critchfield H. J., 1987: *General Climatology*, Prentice-Hall of India, New Delhi
4. Lutgens F. K., Tarbuck E. J. and Tasa D., 2009: *The Atmosphere: An Introduction to Meteorology*, Prentice-Hall, Englewood Cliffs, New Jersey.
5. Oliver J. E. and Hidore J. J., 2002: *Climatology: An Atmospheric Science*, Pearson Education, New Delhi.
6. Trewartha G. T. and Horne L. H., 1980: *An Introduction to Climate*, McGraw-Hill.
7. Gupta L S(2000): *Jalvayu Vigyan, Hindi Madhyam Karyanvay Nidishalya*, Delhi Vishwa Vidhyalaya, Delhi
8. Lal, D S (2006): *Jalvayu Vigyan, Prayag Pustak Bhavan, Allahabad*
9. Vatal, M (1986): *Bhautik Bhugol, Central Book Depot, Allahabad*
10. Singh, S (2009): *Jalvayu Vigyan, Prayag Pustak Bhawan, Allahabad*

## DSC-2D (242)

### 8. STATISTICAL METHODS IN GEOGRAPHY (PRACTICAL) (C4)

1. Use of Data in Geography: Geographical Data Matrix, Significance of Statistical Methods in Geography; Sources of Data.
2. Tabulation and Descriptive Statistics: Frequencies (Deciles, Quartiles), Cross Tabulation, Central Tendency (Mean, Median and Mode, Dispersion (Standard Deviation, Variance and Coefficient of Variation).
3. Sampling: Purposive, Random, Systematic and Stratified.
4. Theoretical Distribution: Probability and Normal Distribution.
5. Association and Correlation: Rank Correlation, Product Moment Correlation, and Simple Regression.

**Class Record:** Each student will submit a record containing five exercises:

1. Construct a data matrix of about (10 x 10) with each row representing an areal unit (districts or villages or towns) and about 10 columns of relevant attributes of the areal units.
2. Based on the above table, a frequency table, measures of central tendency and dispersion would be computed and interpreted for any two attributes.
3. Histograms and frequency curve would be prepared **on the entire data set** and attempt to fit a normal curve and interpreted for one or two variables.
4. From the data matrix a sample set (20 Percent) would be drawn using, random - systematic and stratified methods of sampling and locate the samples on a map with a short note on methods used.
5. Based on of the sample set and using two relevant attributes, a scatter and regression line would be plotted and residual and regression line would be mapped with a short interpretation.

#### Reading List

1. Berry B. J. L. and Marble D. F. (eds.): *Spatial Analysis – A Reader in Geography*.
2. Ebdon D., 1977: *Statistics in Geography: A Practical Approach*.
3. Hammond P. and McCullagh P. S., 1978: *Quantitative Techniques in Geography: An Introduction*, Oxford University Press.
4. King L. S., 1969: *Statistical Analysis in Geography*, Prentice-Hall.
5. Mahmood A., 1977: *Statistical Methods in Geographical Studies*, Concept.
6. Pal S. K., 1998: *Statistics for Geoscientists*, Tata McGraw Hill, New Delhi.
7. Sarkar, A. (2013) *Quantitative geography: techniques and presentations*. Orient Black Swan Private Ltd., New Delhi
8. Silk J., 1979: *Statistical Concepts in Geography*, Allen and Unwin, London.

9. Spiegel M. R.: Statistics, *Schaum's Outline Series*.
10. Yeates M., 1974: *An Introduction to Quantitative Analysis in Human Geography*, McGraw Hill, New York.
11. Shinha, Indira (2007) *Sankhyiki bhugol*. Discovery Publishing House, New Delhi

## **Skill Enhancement Course**

### **SEC-1(233)**

#### **1. GEOGRAPHICAL INFORMATION SYSTEM (PRACTICAL)**

1. Geographical Information System (GIS): Definition and Components.
2. Global Positioning System (GPS) – Principles and Uses; DGPS.
3. GIS Data Structures: Types (spatial and Non-spatial), Raster and Vector Data Structure.
4. GIS Data Analysis: Input; Geo-Referencing; Editing, Output and Query; Overlays.
5. Application of GIS: Land Use Mapping; Urban Sprawl Analysis; Forests Monitoring.

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

#### **Reading List**

1. Bhatta, B. (2010) *Analysis of Urban Growth and Sprawl from Remote Sensing*, Springer, Berlin Heidelberg.41
2. Burrough, P.A., and McDonnell, R.A. (2000) *Principles of Geographical Information System-Spatial Information System and Geo-statistics*. Oxford University Press
3. Chauniyal, D.D. (2010) *Sudur Samvedan evam Bhogolik Suchana Pranali*, Sharda Pustak Bhawan, Allahabad
4. Heywoods, I., Cornelius, S and Carver, S. (2006) *An Introduction to Geographical Information system*. Prentice Hall.
5. Jha, M.M. and Singh, R.B. (2008) *Land Use: Reflection on Spatial Informatics Agriculture and Development*, New Delhi: Concept.
6. Nag, P. (2008) *Introduction to GIS*, Concept India, New Delhi.
7. Sarkar, A. (2015) *Practical geography: A systematic approach*. Orient Black Swan Private Ltd., New Delhi
8. Singh, R.B. and Murai, S. (1998) *Space Informatics for Sustainable Development*, Oxford and IBH, New Delhi.

### **SEC-2 (243)**

#### **2. FIELD STUDY AND SURVEYING (PRACTICAL)**

1. Field Work In Geographical Studies – Role, Value, Data and Ethics of Field-Work
2. Defining the Field and Identifying the Case Study – Rural / Urban / Physical / Human / Environmental.
3. Field Techniques – Merits, Demerits and Selection of the Appropriate Technique; Observation (Participant / Non Participant), Questionnaires (Open/ Closed / Structured / Non-Structured); Interview with Special Focus on Focused Group Discussions; Space Survey (Transects and Quadrants, Constructing a Sketch)
4. Use of Field Tools – Collection of Material for Physical and Socio-Economic Surveys.
5. Designing the Field Report – Aims and Objectives, Methodology, Analysis, Interpretation and Writing the Report.

#### **Practical Record**

1. Each student will prepare an individual report based on primary and secondary data collected during field work.
2. The duration of the field work should not exceed 10 days.
3. The word count of the report should be about **8000 to 12,000** excluding figures, tables, photographs, maps, references and appendices.

4. One copy of the report on A 4 size paper should be submitted in soft binding.

#### **Reading List**

1. Creswell J., 1994: *Research Design: Qualitative and Quantitative Approaches* Sage Publications.
2. Dikshit, R. D. 2003. *The Art and Science of Geography: Integrated Readings*. Prentice-Hall of India, New Delhi.
3. Evans M., 1988: "Participant Observation: The Researcher as Research Tool" in *Qualitative Methods in Human Geography*, eds. J. Eyles and D. Smith, Polity.
4. Mukherjee, Neela 1993. *Participatory Rural Appraisal: Methodology and Application*. Concept Pubs. Co., New Delhi.
5. Mukherjee, Neela 2002. *Participatory Learning and Action: with 100 Field Methods*. Concept Pubs. Co., New Delhi
6. Robinson A., 1998: "*Thinking Straight and Writing That Way*", in *Writing Empirical Research Reports: A Basic Guide for Students of the Social and Behavioural Sciences*, eds. by F. Pryczak and R. Bruce Pryczak, Publishing: Los Angeles.
7. Special Issue on "Doing Fieldwork" *The Geographical Review* 91:1-2 (2001).
8. Stoddard R. H., 1982: *Field Techniques and Research Methods in Geography*, Kendall/Hunt.
10. Wolcott, H. 1995. *The Art of Fieldwork*. Alta Mira Press, Walnut Creek, CA.

### **SEC-3 (351)**

#### **3. REMOTE SENSING AND GPS BASED PROJECT REPORT (PRACTICAL)**

1. Remote Sensing: Definition and Development; Platforms and Types. Photogrammetry.
2. Aerial Photography: Principles, Types and Geometry.
3. Satellite Remote Sensing: principles, EMR interaction with atmosphere and Earth Surface, Satellites (LANDSAT & IRS) and Sensor.
  
4. Interpretation and Application of Remote Sensing: Land Use /Land Cover
5. Global Positioning System( GPS) principles and Uses.

**Practical Record:** A project file consisting of 5 exercises will be done from aerial photos, satellite images interpretation and GPS Field Survey.

#### **Reading List**

1. Campbell J. B., 2007: *Introduction to Remote Sensing*, Guildford Press
2. Jensen, J. R. (2004) *Introductory Digital Image Processing: A Remote Sensing Perspective*, Pearson Prentice-Hall.
3. Joseph, G. 2005: *Fundamentals of Remote Sensing*, United Press India.
4. Lillesand T. M., Kiefer R. W. and Chipman J. W., 2004: *Remote Sensing and Image Interpretation*, Wiley. (Wiley Student Edition).
5. Nag P. and Kudra, M., 1998: *Digital Remote Sensing*, Concept, New Delhi.
6. Rees W.G (2001): *Physical principles of Remote Sensing*, Cambridge University.
7. Singh R. B. and Murai S., 1998: *Space-informatics for Sustainable Development*, Oxford and IBH Pub.
8. Wolf P.R. and Dewitt B.A (2000): *Elements of Photogrammetry with Application in GIS*, McGraw-Hill.

### **SEC-4 (361)**

#### **4. RESEARCH METHODS (PRACTICAL)**

1. Geographic Enquiry: Definition and Ethics; Framing Research Questions, Objectives and Hypothesis; Literature Review; Preparing Sample Questionnaire
2. Data Collection: Type and Sources of Data; Methods of Collection; Input and Editing
3. Data Analysis: Qualitative Data Analysis; Quantitative Data Analysis; Data Representation Techniques
4. Structure of a Research Report: Preliminaries; Text; References, Bibliography and Citations; Abstract
5. Preparation of Research Report

## Reading List

1. Creswell J., 1994: *Research Design: Qualitative and Quantitative Approaches* Sage Publications.
2. Dikshit, R. D. 2003. *The Art and Science of Geography: Integrated Readings*. Prentice-Hall of India, New Delhi.
3. Evans M., 1988: "Participant Observation: The Researcher as Research Tool" in *Qualitative Methods in Human Geography*, eds. J. Eyles and D. Smith, Polity.
4. Misra, R.P. (2002) *Research Methodology*, Concept Publications, New Delhi.
5. Mukherjee, Neela 1993. *Participatory Rural Appraisal: Methodology and Application*. Concept Pubs. Co., New Delhi.
6. Mukherjee, Neela 2002. *Participatory Learning and Action: with 100 Field Methods*. Concept Pubs. Co., New Delhi
7. Robinson A., 1998: "*Thinking Straight and Writing That Way*", in *Writing Empirical Research Reports: A Basic Guide for Students of the Social and Behavioural Sciences*, eds. by F. Pryczak and R. Bruce Pryczak, Publishing: Los Angeles.
8. Special Issue on "Doing Fieldwork" *The Geographical Review* 91:1-2 (2001).
9. Stoddard R. H., 1982: *Field Techniques and Research Methods in Geography*, Kendall/Hunt.
11. Wolcott, H. 1995. *The Art of Fieldwork*. Alta Mira Press, Walnut Creek, CA.
12. Yadav, H. (2013) *Shodh Pravidhi Evam Matratamak Bhugol*, Raja Publications, Delhi.

## Elective Discipline Specific

### DSE-1A (352) (Any Three)

#### 1. Population Geography

1. Defining the Field – Nature and Scope; Sources of Data with special reference to India (Census, Vital Statistics and NSS).
2. Population Size, Distribution and Growth – Determinants and Patterns; Theories of Growth – Malthusian Theory and Demographic Transition Theory.
3. Population Dynamics: Fertility, Mortality and Migration – Measures, Determinants and Implications.
4. Population Composition and Characteristics – Age-Sex Composition; Rural and Urban Composition; Literacy.
5. Contemporary Issues – Ageing of Population; Declining Sex Ratio; HIV/AIDS.

#### Reading List

1. Barrett H. R., 1995: *Population Geography*, Oliver and Boyd.
2. Bhende A. and Kankar T., 2000: *Principles of Population Studies*, Himalaya Publishing House.
3. Chandna R. C. and Sidhu M. S., 1980: *An Introduction to Population Geography*, Kalyani Publishers.
4. Clarke J. I., 1965: *Population Geography*, Pergamon Press, Oxford.
5. Jones, H. R., 2000: *Population Geography*, 3<sup>rd</sup> ed. Paul Chapman, London.
6. Lutz W., Warren C. S. and Scherbov S., 2004: *The End of the World Population Growth in the 21st Century*, Earthscan
7. Newbold K. B., 2009: *Population Geography: Tools and Issues*, Rowman and Littlefield Publishers.
8. Pacione M., 1986: *Population Geography: Progress and Prospect*, Taylor and Francis.
9. Wilson M. G. A., 1968: *Population Geography*, Nelson.
10. Panda B P (1988): *Janasankya Bhugol*, M P Hindi Granth Academy, Bhopal
11. Maurya S D (2009) *Jansankya Bhugol*, Sharda Putak Bhawan, Allahabad
12. Chandna, R C (2006), *Jansankhya Bhugol*, Kalyani Publishers, Delhi.

### DSE-2A (353)

#### 2. URBAN GEOGRAPHY

1. Urban geography: Introduction, Origin of Urbanisation, Urban Morphology, major aspect of Urbanisation
2. Patterns of Urbanisation in developed and developing countries
3. Functional classification of cities: Quantitative and Qualitative Methods
4. Urban Issues: problems of housing, slums, civic amenities (water and transport)
5. Case studies of Delhi, Mumbai, Kolkata, Chennai, Chandigarh and Port Blair with reference to Land use and Urban Issues

### **Reading List**

1. Fyfe N. R. and Kenny J. T., 2005: *The Urban Geography Reader*, Routledge.
2. Graham S. and Marvin S., 2001: *Splintering Urbanism: Networked Infrastructures, Technological Mobilities and the Urban Condition*, Routledge.
3. Hall T., 2006: *Urban Geography*, Taylor and Francis.
4. Kaplan D. H., Wheeler J. O. and Holloway S. R., 2008: *Urban Geography*, John Wiley.
5. Knox P. L. and McCarthy L., 2005: *Urbanization: An Introduction to Urban Geography*, Pearson Prentice Hall New York.
6. Knox P. L. and Pinch S., 2006: *Urban Social Geography: An Introduction*, Prentice-Hall.
7. Pacione M., 2009: *Urban Geography: A Global Perspective*, Taylor and Francis.
8. Sassen S., 2001: *The Global City: New York, London and Tokyo*, Princeton University Press.
9. Ramachandran R (1989): *Urbanisation and Urban Systems of India*, Oxford University Press, New Delhi
10. Ramachandran, R., 1992: *The Study of Urbanisation*, Oxford University Press, Delhi
11. Singh, R.B. (Eds.) (2001) *Urban Sustainability in the Context of Global Change*, Science Pub., Inc., Enfield (NH), USA and Oxford & IBH Pub., New Delhi.
12. Singh, R.B. (Ed.) (2015) *Urban development, challenges, risks and resilience in Asian megacities*. *Advances in Geographical and Environmental Studies*, Springer.

### **DSE-3A (354)**

#### **3. GEOGRAPHY OF HEALTH AND WELLBEING**

1. Perspectives on Health: Definition; linkages with environment, development and health; driving forces in health and environmental trends - population dynamics, urbanization, poverty and inequality.
2. Pressure on Environmental Quality and Health: Human activities and environmental pressure land use and agricultural development; industrialisation; transport and energy.
3. Exposure and Health Risks: Air pollution; household wastes; water; housing; workplace.
4. Health and Disease Pattern in Environmental Context with special reference to India, Types of Diseases and their regional pattern (Communicable and Lifestyle related diseases).
5. Climate Change and Human Health: Changes in climate system – heat and cold; Biological disease agents; food production and nutrition.

#### **Reading List:**

1. Akhtar Rais (Ed.), 1990 : *Environment and Health Themes in Medical Geography*, Ashish Publishing House, New Delhi.
2. Avon Joan L. and Jonathan A Patzed.2001 : *Ecosystem Changes and Public Health*, Baltimin, John Hopling Unit Press(ed).
3. Bradley,D.,1977: *Water, Wastes and Health in Hot Climates*, John Wiley Chichesten.
4. Christaler George and Hristopoles Dionissios, 1998: *Spatio Temporal Environment Health Modelling* , Boston Kluwer Academic Press.
5. Cliff, A.D. and Peter,H., 1988 : *Atlas of Disease Distributions*, Blackwell Publishers, Oxford.
6. Gatrell, A.,and Loytonen, 1998 : *GIS and Health*, Taylor and Francis Ltd, London.
7. Hardham T. and Tannav M.,(eds): *Urban Health in Developing Countries; Progress, Projects, Earthgoan*, London.
8. Murray C. and A. Lopez, 1996 : *The Global Burden of Disease*, Harvard University Press.
9. Moeller Dade wed., 1993: *Environmental Health*, Cambridge, Harward Univ. Press.
10. Phillips, D.and Verhasselt, Y., 1994: *Health and Development*, Routledge, London.
11. Tromp, S., 1980: *Biometeorology: The Impact of Weather and Climate on Humans and their Environment*, Heydon and Son.

### **DSE-4A (355)**

#### **4. ISLAND STUDIES**

1. Introduction of Island studies: emerging interdisciplinary and comparative study of island and archipelagos-cultures-geography of islands and island states-historical development- environment issues.
2. Island biogeography-physical features-climate-ecosystem, biodiversity-flora and fauna ecosystem processes-island vulnerability-managing beach resource-coastal resource and island tourism-is sustainability possible?
3. Island migration dependency and in equality- globalisation, new labour migration and development of islands-government policy to support migrant workers-promoting sustainable rural coastal and island communities.
4. Island Issues: Social-political-economic issues-island urbanisation-poverty, climate change and social issues-strategic importance, environmental changes and challenges of the Andaman and Nicobar Islands.
5. Integrated Coastal zone management plan for India islands-existing management regulations and local level policy, coastal erosion and shore protection, conflicts and perceptions of the stakeholders in Islands.

**(A field trip to any place in Andaman and Nicobar Islands and to submit a report of 25 marks)**

## **References**

1. Peter M. Vitousek, Lloyd L. Loope, Henning Adersen, Islands Biological Diversity and Ecosystem Function, Springer-Verlag Berlin Heidelberg-1995.
2. T.N Prakash L. Sheela Nair T.S. Shahul Hameed Geomorphology and Physical Oceanography of Lakshadweep Coral Islands in the Indian Ocean, Springer Cham Heidelberg New York Dordrecht London-2015.
3. Stewart Firth, Globalisation and governance in the Pacific Island University printing Services. ANU-2006. Geography of Islands, geography, 74,2, 106-116 A selection of essays from: Baldacchino G., Niles D. (eds), 2011, Island Futures. Conservation and development across the Asia-Pacific region, Springer, London.

## **DSE-5A (356)**

### **5. GEOGRAPHY OF TOURISM**

1. Scope and Nature: Concepts and Issues, Tourism, Recreation and Leisure Inter-Relations; Geographical Parameters of Tourism by Robinson.
2. Type of Tourism: Nature Tourism, Cultural Tourism, Medical Tourism, Pilgrimage
3. Recent Trends of Tourism: International and Regional; Domestic (India); Eco-Tourism, Sustainable Tourism, Meetings Incentives Conventions and Exhibitions (MICE)
4. Impact of Tourism: Economy; Environment; Society
5. Tourism in India: Tourism Infrastructure; Case Studies of Himalaya, Desert and Coastal Areas; National Tourism Policy, Andaman Islands: Factor influencing tourism, Structure, Mode of transport, Major tourist spots.

#### **Reading List**

1. Dhar, P.N. (2006) International Tourism: Emerging Challenges and Future Prospects. Kanishka, New Delhi.
2. Hall, M. and Stephen, P. (2006) Geography of Tourism and Recreation – Environment,

Place and Space, Routledge, London.

3. Kamra, K. K. and Chand, M. (2007) Basics of Tourism: Theory, Operation and Practise, Kanishka Publishers, Pune.

4. Page, S. J. (2011) Tourism Management: An Introduction, Butterworth-Heinemann-USA. Chapter 2.

5. Raj, R. and Nigel, D. (2007) Morpeth Religious Tourism and Pilgrimage Festivals Management: An International perspective by, CABI, Cambridge, USA, [www.cabi.org](http://www.cabi.org).

6. Tourism Recreation and Research Journal, Center for Tourism Research and Development, Lucknow

7. Singh Jagbir (2014) "Eco-Tourism" Published by - I.K. International Pvt. Ltd. S-25, Green Park Extension, Uphaar Cinema Market, New Delhi, India ([www.ikbooks.com](http://www.ikbooks.com)).

## **DSE-1B (362) (Any Three)**

### **1. RESOURCE GEOGRAPHY**

1. Natural Resource: Concept, Classification and Techniques

2. Distribution, Utilisation, Problems and Management of Land Resources and Water Resources

3. Distribution, Utilisation, Problems and Management of Forests and Energy Resources

4. Appraisal and Conservation of Natural Resources

5. Sustainable Resource Development

#### **Reading List**

1. Cutter S. N., Renwick H. L. and Renwick W., 1991: *Exploitation, Conservation, Preservation: A Geographical Perspective on Natural Resources Use*, John Wiley and Sons, New York.

2. Gadgil M. and Guha R., 2005: *The Use and Abuse of Nature: Incorporating This Fissured Land: An Ecological History of India and Ecology and Equity*, Oxford University Press. USA.

3. Holechek J. L. C., Richard A., Fisher J. T. and Valdez R., 2003: *Natural Resources: Ecology, Economics and Policy*, Prentice Hall, New Jersey.

4. Jones G. and Hollier G., 1997: *Resources, Society and Environmental Management*, Paul Chapman, London.

5. Klee G., 1991: *Conservation of Natural Resources*, Prentice Hall, Englewood.

6. Mather A. S. and Chapman K., 1995: *Environmental Resources*, John Wiley and Sons, New York.

7. Mitchell B., 1997: *Resource and Environmental Management*, Longman Harlow, England.

8. Owen S. and Owen P. L., 1991: *Environment, Resources and Conservation*, Cambridge University Press, New York.

9. Rees J., 1990: *Natural Resources: Allocation, Economics and Policy*, Routledge, London

## **DSE-2B (363)**

### **2. AGRICULTURAL GEOGRAPHY**

1. Defining the Field: Introduction, nature and scope; Land use/ land cover definition and classification.

2. Determinants of Agriculture: Physical, Technological and Institutional

3. Agricultural Regions of India: Agro-climatic, Agro-ecological & Crop Combination Regions.

4. Agricultural Systems of the World (Whittlesey's classification) and Agricultural Land use model (Von Thuenen, modification and relevance).

5. Agricultural Revolutions in India: Green, White, Blue, Pink

#### **Reading List**

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. Grigg, D.B., 1984: *Introduction to Agricultural Geography*, Hutchinson, London.

5. Ilbery B. W., 1985: *Agricultural Geography: A Social and Economic Analysis*, Oxford University Press.

6. Mohammad, N., 1992: *New Dimension in Agriculture Geography*, Vol. I to VIII, Concept Pub., New Delhi.

7. Roling, N.G., and Wagerutgers, M.A.E.,(ed.) 1998: *Facilitating Sustainable Agriculture*, Cambridge



University Press, Cambridge.

8. Shafi, M., 2006: *Agricultural Geography*, Doring Kindersley India Pvt. Ltd., New Delhi
9. Singh, J., and Dhillon, S.S., 1984: *Agricultural Geography*, Tata McGraw Hill, New Delhi.
10. Tarrant J. R., 1973: *Agricultural Geography*, David and Charles, Devon.

### **DSE-3B (364)**

#### **3. POLITICAL GEOGRAPHY**

1. Introduction: Concepts, Nature and Scope.
2. State, Nation and Nation State – Concept of Nation and State, Attributes of State – Frontiers, Boundaries, Shape, Size, Territory and Sovereignty, Concept of Nation State; Geopolitics; Theories (Heartland and Rimland)
3. Electoral Geography – Geography of Voting, Geographic Influences on Voting pattern, Geography of Representation, Gerrymandering.
4. Political Geography of Resource Conflicts – Water Sharing Disputes, Disputes and Conflicts Related to Forest Rights and Minerals.
5. Politics of Displacement: Issues of relief, compensation and rehabilitation: with reference to Dams and Special Economic Zones

#### **Reading List**

1. Agnew J., 2002: *Making Political Geography*, Arnold.
2. Agnew J., Mitchell K. and Toal G., 2003: *A Companion to Political Geography*, Blackwell.
3. Cox K. R., Low M. and Robinson J., 2008: *The Sage Handbook of Political Geography*, Sage Publications.
4. Cox K., 2002: *Political Geography: Territory, State and Society*, Wiley-Blackwell
5. Gallaher C., et al, 2009: *Key Concepts in Political Geography*, Sage Publications.
6. Glassner M., 1993: *Political Geography*, Wiley.
7. Jones M., 2004: *An Introduction to Political Geography: Space, Place and Politics*, Routledge .
8. Mathur H M and M M Cernea (eds.) Development, Displacement and Resettlement – Focus on Asian Experience, Vikas, Delhi
9. Painter J. and Jeffrey A., 2009: *Political Geography*, Sage Publications.
10. Taylor P. and Flint C., 2000: *Political Geography*, Pearson Education.
11. Verma M K (2004): Development, Displacement and Resettlement, Rawat Publications, Delhi
12. Hodder Dick, Sarah J Llyod and Keith S McLachlan (1998), *Land Locked States of Africa and Asia* (vo.2), Frank Cass.

### **DSE-4B (365)**

#### **4. WATER RESOURCES MANAGEMENT**

1. Sources of water, Atmospheric relationship of water: rainfall and temperature, evapo- transpiration, rainfall and runoff relationship, hydrological cycle. Rain harvesting as strategies of water resource conservation, other strategies of water conservation; water recycling.
2. Hydrological, hydro-morphological and hydro-pedagogical assessment. Morphological units and drainage classifications assessment of surface and sub surface (ground water) discharge and recharge condition and water table relationship. Measurement of soil moisture, soil classification and water quality; Water logging and salinization, floods and droughts.
3. Watershed management; concept of watershed; morphological units, morphogenetic classification, morphometric analysis, importance of watershed protection and approaches to watershed protection, watershed management.
4. Impact of modern development on water resource: - need of water for domestic and non-domestic use. Irrigation development and water resource management, Big and Small irrigation project and their impact on water resource, Tank and Well irrigation and their impact on water resource. Industrialization and its impact on water resource, Urbanization and its impact on water resource. Demand and supply position of water resource, contemporary water crisis.

#### **Reading List:**

1. Bruce J.P. & R.H. Clerk, Introduction to hydrometeorology, pergamon press, Oxford, 1996.

2. David Keith Todd, Ground water hydrology, John Wiley and sons, New York, 1959.
3. Robert J. Reimold, watershed management, practice, policies and co-Ordination, McGraw-Hill, New Delhi, 1998.
4. B.D. Dhawan, Indian water resource management for Irrigation : Issues Critiques reviews, Commonwealth publishers, New Delhi, 1993.
5. Ravi Misra, Fresh water Environment, Anmol publication pvt.LTD, New Delhi, 2002.
6. Ramaswamy R. Iyer, water perspective, Issues, concerns, SAGE publications, New Delhi, 2003.

## **DSE-5B (366)**

### **5. CLIMATE CHANGE: VULNERABILITY AND ADAPTATION**

1. Science of Climate Change: Understanding Climate Change; Green House Gases and Global Warming; Global Climatic Assessment- IPCC
2. Climate Change and Vulnerability: Physical Vulnerability; Economic Vulnerability; Social Vulnerability
3. Impact of Climate Change: Agriculture and Water; Flora and Fauna; Human Health
4. Adaptation and Mitigation: Global Initiatives with Particular Reference to South Asia.
5. National Action Plan on Climate Change; Local Institutions (Urban Local Bodies, Panchayats)

#### **Further Readings**

1. IPCC. (2007) Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.
2. IPCC (2014) *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
3. IPCC (2014) *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
4. Palutikof, J. P., van der Linden, P. J. and Hanson, C. E. (eds.), Cambridge University Press, Cambridge, UK.
5. OECD. (2008) Climate Change Mitigation: What Do we Do? Organisation and Economic Cooperation and Development.
6. UNEP. (2007) Global Environment Outlook: GEO4: Environment for Development, United Nations Environment Programme.
7. Singh, M., Singh, R.B. and Hassan, M.I. (Eds.) (2014) Climate change and biodiversity: Proceedings of IGU Rohtak Conference, Volume 1. Advances in Geographical and Environmental Studies, Springer
8. Sen Roy, S. and Singh, R.B. (2002) Climate Variability, Extreme Events and Agricultural Productivity in Mountain Regions, Oxford & IBH Pub., New Delhi

## **Elective Generic Papers**

### **GE-1 (357)**

#### **1. DISASTER RISK REDUCTION**

1. Disasters: Hazards, Risk, Vulnerability; and Disasters: Definition and Concepts.
2. Disasters in India: (a) Causes, Impact, Distribution and Mapping; Flood and Drought.
3. Disasters in India: (b) Causes, Impact, Distribution and Mapping; Earthquake and Cyclone
4. Human induced disasters: Causes, Impact, Distribution and Mapping.
5. Disaster Risk Reduction : Mitigation and Preparedness, NDMA and NIDM; Community – Based Disaster Management; Do's and Don'ts during disasters.

#### **Reading List**

1. Government of India. (1997) Vulnerability Atlas of India. New Delhi, Building Materials & Technology Promotion Council, Ministry of Urban Development, Government of India.
2. Kapur, A. (2010) Vulnerable India: A Geographical Study of Disasters, Sage Publication, New Delhi.
3. Modh, S. (2010) Managing Natural Disaster: Hydrological, Marine and Geological Disasters, Macmillan, Delhi.
4. Singh, R.B. (2005) Risk Assessment and Vulnerability Analysis, IGNOU, New Delhi. Chapter 1, 2 and 3
5. Singh, R. B. (ed.), (2006) Natural Hazards and Disaster Management: Vulnerability and Mitigation, Rawat Publications, New Delhi.
6. Sinha, A. (2001). Disaster Management: Lessons Drawn and Strategies for Future, New United Press, New Delhi.
7. Stoltman, J.P. et al. (2004) International Perspectives on Natural Disasters, Kluwer Academic Publications. Dordrecht.
8. Singh Jagbir (2007) "Disaster Management Future Challenges and Opportunities", 2007. Publisher- I.K. International Pvt. Ltd. S-25, Green Park Extension, Uphaar Cinema Market, New Delhi, India ([www.ikbooks.com](http://www.ikbooks.com)).

## **GE-2 (367)**

### **2. SUSTAINABILITY AND DEVELOPMENT**

1. Sustainable Development: Definition, Components, Limitations and Historical Background.
2. The Millennium Development Goals: National Strategies and International Experiences
3. Sustainable Regional Development: Need and examples from different Ecosystems.
4. Inclusive Development: Education, Health; Climate Change: The role of higher education in sustainable development; The human right to health; Poverty and disease; The Challenges of Universal Health Coverage; Policies and Global Cooperation for Climate Change
5. Sustainable Development Policies and Programmes: The proposal for SDGs at Rio+20; Illustrative SDGs; Goal-Based Development; Financing for Sustainable Development; Principles of Good Governance; National Environmental Policy, CDM.

#### **Reading List**

1. Agyeman, Julian, Robert D. Bullard and Bob Evans (Eds.) (2003) Just Sustainabilities: Development in an Unequal World. London: Earthscan. (Introduction and conclusion.).
2. Ayers, Jessica and David Dodman (2010) "Climate change adaptation and development I: the state of the debate". Progress in Development Studies 10 (2): 161-168.
3. Baker, Susan (2006) Sustainable Development. Milton Park, Abingdon, Oxon; New York, N.Y.: Routledge. (Chapter 2, "The concept of sustainable development").
4. Brosius, Peter (1997) "Endangered forest, endangered people: Environmentalist representations of indigenous knowledge", Human Ecology 25: 47-69.
5. Lohman, Larry (2003) "Re-imagining the population debate". Corner House Briefing 28.
6. Martínez-Alier, Joan et al (2010) "Sustainable de-growth: Mapping the context, criticisms and future prospects of an emergent paradigm" Ecological Economics 69: 1741-1747.
7. Merchant, Carolyn (Ed.) (1994) Ecology. Atlantic Highlands, N.J: Humanities Press. (Introduction, pp 1-25.)
8. Osorio, Leonardo et al (2005) "Debates on sustainable development: towards a holistic view of reality".

Environment, Development and Sustainability 7: 501-518.

9. Robbins, Paul (2004) Political Ecology: A Critical Introduction. Blackwell Publishing.

10. Singh, R.B. (Eds.) (2001) Urban Sustainability in the Context of Global Change, Science Pub., Inc.,

Enfield (NH), USA and Oxford & IBH Pub., New Delhi.