

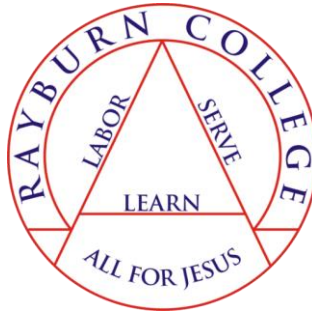
**Choice Based Credit System (CBCS)**

# **RAYBURN COLLEGE**

(Autonomous, Accredited B++ Grade, 2.96 CGPA out of 4 by NAAC 2023)

Affiliated to M.U: No. MU/1-65/98/CDC/136:07.08.2012.

Recognized by UGC under Section 2(f) & 12(B) of 1956 Act: No.8-29/2015(CPP-I/C):23/04/2015.



## **DEPARTMENT OF COMMERCE**

### **UNDERGRADUATE PROGRAMME**

**(Courses effective from Academic Year 2024-25)**

## SEMESTER I

Course: Core – 1 Course Code: GG 501

Section – A: Theory

Course Title: Foundations of Geography

4 Credits 100 Marks

**Unit-I** Meaning, scope, branches, and approaches of geography; Emergence of geography as a subject; Importance of geography ; Place of geography in the classification of science; Geography and other disciplines. **20 Marks**

**Unit- II** Physical Dimension of Geography: Universe, galaxies, solar system and Earth; Shape and size of the Earth; Revolution and rotation of the Earth; The seasons; Age of the Earth; Longitudes, latitudes, and time. **20 Marks**

**Unit- III** The Human Dimension in Geography: Man and environment; Society, culture, and civilization. **20 Marks**

**Unit- IV** Modern concepts in geography; Study of geography in India; Career opportunities for geographers. **20 Marks**

**Unit-V** Applied Geography: Definition, necessity, themes, emerging scope, method, and theoretical bases; Challenges and limitations. Recent trends in geography. **20 Marks**

### Recommended Books:

- Adhikari, Sudepta (2015): *Fundamentals of Geographical Thought*, Orient Black Swan, New Delhi.
- Dwivedi, A.K. (2021): *Fundamentals of Geography*, Vanya Publications , Kanpur.
- Gregory, Derek et al eds. (2009): *The Dictionary of Human Geography*, 5<sup>th</sup> Edition, Wiley BlackWell, Chichester.
- Jain, Ritu (2018): *Fundamentals of Geography*, Pratyush Publications, Delhi.
- Kaushik, Dr. S.D. and Rawat, Dr. D.S.(2018): *Geographical Thought and Methodology*, Rastogi Publications, Meerut.
- Khullar, D.R. (2019) : *Physical Geography*, Kalyani Publications, Ludhiana.
- Husain, Majid (2018): *Fundamentals of Physical Geography 5<sup>th</sup> Edition*, Rawat Publications, Jaipur.
- Leong, Goh Cheng (2020): *Certificate Physical and Human Geography*, Oxford University Press, New Delhi.
- Maiti, Ramkrishna and Maiti, Moumita Moitra (2021) : *Development of Geographical Thought – Contextualisation and Synthesis of Philosophies*, Nabodaya Publications, Kolkata.
- Maurya, Dr. S.D. (2016): *History of Geographical Thought*, Sharda Pustak Bhawan, Allahabad.

- Maurya, Dr. S.D. (2016): *Cultural Geography*, Sharda Pustak Bhawan, Allahabad.
- Singh, R.P. (2005): *Teaching of Geography*, R. Lall Book Depot, Meerut.

Note: Internet sources may be used for the areas for which books are not available.

**Course: Core – 1 Course Code: GG 501**

**Section – B: Practical**

**Course Title: Simple Astronomical Calculation and Scale 2 Credits 50 Marks**

**Unit-I** Measurement of shape and size of the Earth with past and present development.  
Calculation of radius of the Earth; Calculation of altitudes and declination of stars;  
Determination of time and calculation of local time using SunDial; Calculation of  
time of  
sunrise and sunset. **20 Marks**

**Unit –II** Scale: Definition and methods of representation; Types of scale; Construction and  
drawing of plain, diagonal, comparative, and vernier scales. **20**

**Marks**

Record Book

**5**

**Marks**

Viva-Voce

**5**

**Marks**

**Recommended Books:**

- Khullar, D.R. (2016): *Essentials of Practical Geography*, Academic Publishing Co, Jalandhar.
- Maltiar, K.K. and Maltiar, (Mrs) S.R.(2022): *Concepts of Cartography*, Remote Sensing and GIS, Rajesh Publications, New Delhi.
- Misra, R.P. et al (2014): *Fundamentals of Cartography*, 2<sup>nd</sup> Revised Edition, Concept Publishing Company, New Delhi.
- Robinson, A.H.et al (2010): *Elements of Cartography*, Wiley India, New Delhi.
- Saha, P. and Basu, P. (2014): *Advanced Practical Geography*, Books and Allied (P) Ltd., Kolkata
- Sarkar, Ashis (2015): *Practical Geography – A Systematic Approach*, Orient Black Swan, New Delhi.
- Singh, L.R. (2006): *Fundamentals of Practical Geography*, Sharda Pustak Bhawan, Allahabad.
- Sinha, M.M.P. and Bala, Seema (2021): *Advanced Cartography and Practical Geography*, Rajesh Publications, New Delhi.

**Course: Core – 2 Course Code: GG 502**

**Section – A: Theory**

**Course Title: Fundamentals of Physical Geography 4 Credits 100 Marks**

**Unit-I** Meaning, scope, and components of physical geography; Physical geography and other disciplines; Geological Time Scale. **20 Marks**

**Unit-II** Origin of the Earth; Interior of the Earth; Origin of continents and oceans; Isostasy; Earthquakes and volcanoes; Earth movements; Faults, folds, domes, and Cleavage; Continental Drift and Plate Tectonic Theories; Major landforms. **20 Marks**

**Unit-III** Minerals and rocks; Weathering and mass wasting; Types of stream; Drainage systems and patterns; Slope elements; Landforms made by river, wind, glacier, underground water, and sea waves. **20 Marks**

**Unit-IV** Elements of weather and climate; Composition and structure of the atmosphere; Insolation; Planetary wind; Rainfall; Tropical cyclones; Hydrological cycle. **20 Marks**

**Unit-V** Ocean bottom; Temperature and salinity of ocean water; Ocean current and deposits; Concept of ecosystem and food chain; Desertification and soil erosion. **20 Marks**

**Recommended Books:**

- Billings, Marland P. (2016): *Structural Geology*, 3<sup>rd</sup> Edition, Pearson Education, India, Noida.
- Holden, Joseph ed. (2017): *An Introduction to Physical Geography and the Environment*, Pearson Education Ltd., Harlow, UK.
- Husain, Majid (2018): *Fundamentals of Physical Geography*, 5<sup>th</sup> Edition, Rawat Publications, Jaipur.
- Khullar, D.R. (2019): *Physical Geography*, Kalyani Publishers, Ludhiana.
- Lal, D.S. (2014): *Physical Geography*, Sharda Pustak Bhawan, Allahabad.
- Siddhartha, K.(2017) : *Physical Geography*, Kitab Mahal, Allahabad.
- Singh, Savindra (2020): *Physical Geography*, Prayag Pustak Bhawan, Allahabad.
- Strahler, Alan (2016): *Introducing Physical Geography*, Wiley, New York.
- Tarbuck, Edward J. et al (2016): *Earth – An Introduction to Physical Geology*, 11<sup>th</sup> Edition, Pearson Education India, Noida.

**Course: Core – 2 Course Code: GG 502**

**Section – B: Practical**

**Course Title: Relief Mapping, Mineral and Rock Identification and Geological Map**

**Interpretation and Field visit**

**2 Credits 50 Marks**

**Unit-I** Method of Showing Relief: Hachure, hill shading, contour, formline, and layer tints; Drawing of contours and their cross section of slope elements, and fluvial, wind, karst,

glacial, and coastal landforms. Identification of drainage pattern from the 1:50,000 toposheets. Identification of minerals and rocks in hand specimen. **20 Marks**

**Unit- II** (i) Geological Map – Identification of various geological structures from the geological maps; Drawing of strike lines and determination of direction, amount of dip, and thickness of beds; Drawing of geological sections of horizontal, inclined, folded, faulted, unconformity, and complex structures and interpretation of each section.

**10 Marks**

(ii) Visit to the hilly area of Manipur with concerned teachers and identify the rocks and structures. Measurement of direction of strike lines, and direction and amount of true dips of folds by using Brunton Compass. Prepare a report and submit it to the department.

**10 Marks**

Record Book **5 Marks**

Viva-voce **5 Marks**

### **Recommended Books:**

- Bennison, George M., Oliver, Paul A. and Moseley, Keith A. (2018): *An Introduction to Geological Structures and Maps*, 8<sup>th</sup> Edition, Taylor and Francis Books India Pvt. Ltd., New Delhi.
- Chadha, S.K. (2020): *Elements of Geological Maps for Geology, Geography and Civil Engg.*, CBS Publishers and Distributors, New Delhi.
- Gokhale, N.W. (2009): *A Guide to Field Geology*, CBS Publishers and Distributor, New Delhi.
- Gokhale, N.W.(2017): *Manual of Geological Maps*, CBS Publishers and Distributor, New Delhi.
- Kannan, Monika and Yadav, Shilpi (2022): *Practical Geography*, Rawat Publications, Jaipur.
- Khan, Md. Zulfequar Ahmad (1998): *Textbook of Practical Geography*, Concept Publishing Company, New Delhi.
- Khullar, D.R. (2018): *Essentials of Practical Geography*, New Academic Publishing Co., Jalandhar.
- Maltman, Alex (2012): *Geological Map – An Introduction*, Springer, New York.
- Mathur, S.M. (2001): *Guide to Field Geology*, Prentice Hall India Learning Pvt. Ltd., New Delhi.
- Robinson, Arthur H. et al (2010): *Elements of Cartography*, 6<sup>th</sup> Edition, Wiley India, New Delhi.
- Saha, Pijushkanti and Basu, Partha (2014): *Advanced Practical Geography*, Books and Allied (P) Ltd., Kolkata.
- Sarkar, Ashis (2015): *Practical Geography – A Systematic Approach*, Orient Black Swan, New Delhi.
- Sen, Ajoy Kumar (2005): *Laboratory Manual of Geology*, Modern Book Agency Private Ltd., Calcutta.

- Singh, L.R. (2006): *Fundamentals of Practical Geography*, Sharda Pustak Bhawan, Allahabad.
- Singh R.L. and Singh Rana P.B. (2012): *Elements of Practical Geography*, Kalyani Publishers, Ludhiana.

**Course: SEC – 1      Course Code: GG 521**

**Course Title: Cartographic Techniques and Computer Application in Geography**

**4 Credits    100 Marks**

### **Cartographic Techniques**

**Unit-I** Meaning, scope, and development of cartography; Present status of cartography, cartographic use of the sphere, ellipsoid, and geoid; Geographical coordinates.

**20 Marks**

**Unit-II** Meaning and types of maps; Map designs and layout; Mechanics of map construction and map reproduction; Digital cartography – Concept, data models for digital cartographic information and map digitising. **20 Marks**

### **Computer Application in Geography**

**Unit-III** Definition of computer; Hardware and software for computer mapping; Applications of computer cartography.

**20 Marks**

**Unit –IV** Representation of Geographic Data by using Relevant Software: Histogram, bar graph, line graph, scatter diagram, and pie diagram. **20 Marks**

**Unit- V** Importance of Information Technology in Geographical Studies: Advantages of internet, browsing and surfing the geographical sites, web pages, portals, and downloading files.

**20 Marks**

### **Recommended Books:**

#### **Cartographic Techniques**

- International Cartographic Association (1984): *Basic Cartography for Students and Technicians, Vol.1.*
- Maltiar, K.K. and Maltiar, (Mrs) S.R. (2022): *Concepts of Cartography, Remote Sensing and GIS*, Rajesh Publications, New Delhi.
- Misra, R.P. et al (2014): *Fundamentals of Cartography*, 2<sup>nd</sup> Edition, Concept Publishing Company, New Delhi.
- Robinson, Arthur H. et al (2010): *Elements of Cartography*, 6<sup>th</sup> Edition, Wiley India(P) Ltd., New Delhi.

## **Computer Application in Geography**

- Maguire, David J. (1989): *Computers in Geography*, Longman, London.
- Mather, Paul M. (1993): *Computer Application in Geography*, John Wiley & Sons, New York.
- Monmonier, M.S. (1982): *Computer Assisted Cartography*, Prentice Hall, Englewood Cliff, New Jersey.
- Unwin, D.J. and Dawson, J.A. (1987): *Computer Programming for Geographers*, Longman, London.

Note: Internet sources may be used for the areas for which books are not available.

## SEMESTER II

**Course: Core – 3 Course Code: GG 503**

**Section – A: Theory**

**Course Title: Fundamentals of Human Geography 4 Credits 100 Marks**

- Unit-I** Meaning, scope, and branches of human geography; Approaches to the study of human geography. **20 Marks**
- Unit-II** Races, languages, religions, and cultural regions. **20 Marks**
- Unit- III** Human Adaptation to Environment: Cold region – Eskimos, Hot region – Bushman, Plateau region – Gonds, Mountain region – Gujjars. **20 Marks**
- Unit-IV** Population distribution; Origin, function, and classification of rural and urban settlement; Types of agriculture. **20 Marks**
- Unit-V** Economic Structures of Mankind: Consumption (Primary, secondary, tertiary, quaternary, and quinary) and exchange; Rostow’s economic growth model; Human development. **20 Marks**

### **Recommended Books:**

- Husain, Majid (2021): *Human Geography*, Rawat Publications, New Delhi.
- Maurya, S.D.(2018): *Human Geography*, Pravalika Publications, Allahabad.
- Maurya, S.D.(2016): *Cultural Geography*, Sardha Pustak Bhawan, Allahabad.
- Patra, Punyatoya et al (2020): *Perspectives in Human Geography*, Concept Publishing Company, Ltd., New Delhi.
- Rubenstein, James M. (2012): *Contemporary Human Geography*, Prentice Hall of India, New Delhi.
- Saxena, H.M. (2018): *Economic Geography*, 2<sup>nd</sup> Edition, Rawat Publications, New Delhi. ● Singh, Dr. L.R. (2018): *Fundamentals of Human Geography*, Sharda Pustak Bhawan, Allahabad.
- Singh, Th. Nabakumar (2019): *Human Geography*, Reliable Book Center, Imphal.

**Course: Core – 3 Course Code: GG 503 Section – B: Practical**

**Course Title: Distribution Mapping, Human Development and Field Visit.**

**2 Credits 50 Marks**



**Unit-I** Preparation of Distribution Maps: Naming method showing races, languages, and religions of India or Manipur State; Meaning and types of graph and diagram; Preparation of simple bar diagram and pie diagram showing economic data. **20 Marks**

**Unit-II** (i) Calculation of cephalic index, human development index, and human poverty index. **10 Marks**

(ii) Visit a nearby village or town for studying human activities. Prepare a report and submit it to the concerned department. **10 Marks**

Record Book **5 Marks**

Viva - Voce **5 Marks**

**Recommended Books:**

- Khullar, D.R. (2018): *Essentials of Practical Geography*, New Academic Publishing Co., Jalandhar.
- Saha, Pijushkanti and Basu, Partha (2014): *Advanced Practical Geography*, Books & Allied (P) Ltd., Kolkata.
- Sarkar, Ashis (2015): *Practical Geography – A Systematic Approach*, Orient Black Swan, New Delhi.
- Singh, Gopal (1998): *Map Work and Practical Geography*, Vikas Publishing House Pvt. Ltd., New Delhi.
- Singh, Dr. L.R. (2006): *Fundamentals of Practical Geography*, Sharda Pustak Bhawan, Allahabad.
- Singh, Dr. L.R. (2018): *Fundamentals of Human Geography*, Sharda Pustak Bhawan, Allahabad.

**Course: Core – 4      Course Code: GG 504**

**Section – A: Theory**

**Course Title: Fundamentals of Remote Sensing, Photogrammetry and GPS**

**4 Credits    100 Marks Remote Sensing**

**Unit-I**      Definition, types, development, advantages, and limitations of remote sensing; Principles of remote sensing and remote sensing sensors; Remote sensing platforms; Capturing and processing of drone image. **20 Marks**

**Unit-II** Thermal, infrared, and microwave remote sensing; Digital image processing and analysis; Principles of image interpretation. **20 Marks**

**Unit-III** Weather and resource satellites; Application of remote sensing – land use and land cover, urban sprawl analysis, forest monitoring, water resources and natural hazards.

**20 Marks Photogrammetry**

**Unit-IV** Concept, development, advantages and disadvantages of photogrammetry; Types, elements and geometry of aerial photograph; Scale factor, distortion and relief displacement, tool and equipment, resolution, flight direction, time and season, and stereoscopic coverage of aerial photograph; Parallax; Interpretation of Aerial Photograph – Land use, land cover, and environmental assessment. **20 Marks**

### **GPS**

**Unit - V** Concept, history, advantage, and disadvantage of GPS; Segments of GPS: Types of GPS receivers; GPS surveying techniques; Error in GPS and correction; Application of GPS.

**20 Marks**

### **Recommended Books:**

- Bhatta, Basudab (2021): *Remote Sensing and GIS*, Oxford University Press, New Delhi.
- Chandra, A.M. (2016): *Geoinformatics*, New Age International Publishers, New Delhi.
- Chandra, AM and Gosh, S.K. (2018): *Remote Sensing and Geographic Information System*, 2<sup>nd</sup> Edition, Narosa, New Delhi.
- Fazal, Shahab (2012): *Remote Sensing Basic*, Kalyani, Publishers, Ludhiana.
- Frazier, Amy E. and Singh, Kunwar K. eds. (2021): *Fundamentals of Capturing and Processing of Drone Imagery and Data*, CRC Press, New York.
- Garg, PK (2019): *Principles and Theory of Geoinformatics*, Khanna Book Publishing Co. (P) Ltd., New Delhi.
- Gupta, R.K. and Chander, Subhash (2008): *Principles of Geoinformation*, Jain Brothers, New Delhi.
- Jensen, John R. (2013): *Remote Sensing of the Environment – An Earth Resource Perspectives*, Pearson Education India, Noida.
- Joseph George and Jeganathan C, (2018): *Fundamentals of Remote Sensing*, 3<sup>rd</sup> Edition, University Press, Hyderabad.
- Lillesand, Thomas M. et al (2015): *Remote Sensing and Image Interpretation*, 7<sup>th</sup> Edition, Wiley, New York and Wiley India, New Delhi.
- Mikhail, Edward M. et al (2012): *Introduction to Modern Photogrammetry*, Wiley India Pvt. Ltd., New Delhi.
- Panda, Dr. B.C. (2009): *Remote Sensing – Principle and Application*, Viva Books Private Ltd., New Delhi.
- Patel, A.N. (2018): *Remote Sensing – Principles and Applications*, Scientific Publishers, Jodhpur.
- Rahman, Atiqur and Fazal, Shahab (2017): *Global Positioning System – Concept, Technique and Application*, New Age International Publishers, New Delhi.

- Reddy, M. Anji (2012): *Textbook of Remote Sensing and Geographical Information System*, 4<sup>th</sup> Edition, BS Publications, Hyderabad.
- Rampal, K.K. (1999): *Handbook of Aerial Photography and Interpretation*, Concept Publishing Company, New Delhi.

**Course: Core – 4 Course Code: GG 504**

**Section – B: Practical**

**Course Title: Remote Sensing, GIS, Photogrammetry, GPS and Drone Practical**

**2 Credits 50**

**Marks Unit-I** Remote Sensing and GIS: Down loading of remote sensing images from online platforms

(like Bhuvan, USGS, ASF, Copernicus etc.). Land use classification (Supervised and

Un-supervised) using downloaded images and GIS packages. Mapping from satellite imagery – land use and land cover. **20 Marks**

**Unit-II (i)** Photogrammetry: Determination of scale of aerial photographs; Determination of height of objects from aerial photograph using parallax bar under a mirror stereoscope; Identification and mapping of physical and cultural features from aerial photograph using mirror stereoscope; Image interpretation of the aerial photographs on a computer platform; Creating digital elevation models (DEMS) and ortho – photos from aerial photograph. **15 Marks**

**(ii)** GPS and Drone: Identification of latitude, longitude and height of important points or objects in your college campus or nearby area. Taking images using drones, and mapping and analysis. **5 Marks**

Record Books **5 Marks**

Viva - Voce **5 Marks**

**Recommended Books:**

- Boro, Dr. Anil (2021): *Handbook of Practicals in Remote Sensing, GIS and GPS*, EBH Publishers (India), Guwahati.
- Casagrande, Gianluca et al eds. (2018): *Small Flying Drones – Application for Geographic Observation*, Spriger, Gewerbestrasse, Switzerland.
- Das, Chandan Surabhi and Mallick, Debajyoti (2020): *Geospatial Technique and Research in Geography*, Enova Publications, Kolkata.
- Frazier, Amy and Singh Kunwar (2021): *Fundamentals of Capturing and Processing Drone Imagery and Data*, CRC Press, New York.
- Garg, P.K (2019): *Principles and Theory of Geoinformatics*, Khanna Book Publishing Co. (P) Ltd., New Delhi.
- Lillesand, Thomas M. et al (2015): *Remote Sensing and Image Interpretation*, 7<sup>th</sup> Edition, Wiley, New York and Wiley, India, New Delhi.

- Maltiar, K.K. and Maltiar, (Mrs)) S.R. (2022): *Concepts of Cartography*, Remote Sensing and GIS, Rajesh Publications, New Delhi.
- Misra, R.P. et al (2014): *Fundamentals of Cartography*, 2<sup>nd</sup> Edition, Concept Publishing Company, New Delhi.
- Rahman, Atiqur and Fazal, Shahab (2017): *Global Positioning System – Concept, Technique and Application*, New Age International Publishers, New Delhi.
- Saha Pijushkanti and Basu, Partha (2014): *Advanced Practical Geography*, Books and Allied (P) Ltd., Kolkata.
- Saikia, Ranjan and Thakuria, Gitika (2015): *Practical Geography*, EBH Publishers (India), Guwahati.
- Sarkar, Ashis (2015): *Practical Geography – A Systematic Approach*, 3<sup>rd</sup> Edition, Orient Black Swan, New Delhi.
- Sugdel, Jake (2020): *Drone Photography – Art and Techniques*, The Crowood Press Ltd., Ramsbury.

**Course: SEC – 2      Course Code: GG 522**

**Course Title: Geographical Information System**

**4 Credits    100 Marks**

**Unit- I** Geographical Information System (GIS): Definition, components, and historical development; Definition and need of Land Information System. (LIS).      **20 Marks**

**Unit – II** Advantages and disadvantages of GIS; Representation of geographical data; Converting the geospatial data.      **20 Marks**

**Unit – III** GIS Data Structure: Types (spatial and non-spatial), raster and vector data structure.      **20 Marks**

**Unit – IV** GIS Data Analysis: Input; Geo-referencing; Editing, output, and query; Overlays.      **20 Marks**

**Unit – V** Application of GIS: Landuse mapping, urban sprawl analysis, forest monitoring, and natural disasters; Future of GIS; GIS in India.      **20 Marks**

**Recommended Books:**

- Bhatta, B. (2010): *Analysis of Urban Growth and Sprawl from Remote Sensing*, Springer, Berlin.
- Burrough, P.A. and McDonnell, R.A. (2000): *Principles of Geographical Information System – Spatial Information System and Geo-statistics*, Oxford University Press, Oxford.
- Chang, Kang-tsung (2015): *Introduction to Geographic Information System*, 8<sup>th</sup> Edition, McGraw Hill, New York.

- Das, Chandan Surabhi and Mallick, Debojyoti (2020): *Geospatial Techniques and Research in Geography*, Enova Publications, Kolkata.
- Garg, P.K. (2019): *Principles and Theory of Geoinformatics*, Khanna Book Publishing Co. (P) Ltd., New Delhi.
- Gomarasca, M. A. (2009); *Basics of Geomatic*, Springer Science, New York.
- Heywoods, I, Cornelius, Sand Carver, S. (2011): *An Introduction to Geographical Information System*, Prentice Hall, Upper Saddle River, NJ.
- Maltiar, K.K and Maltiar (Mrs) S.R. (2022): *Concepts of Cartography, Remote Sensing and GIS*, Rajesh Publications, New Delhi.
- Misra R.P. et al (2014): *Fundamentals of Cartography*, 2<sup>nd</sup> Edition, Concept Publishing Company Pvt. Ltd., New Delhi.
- Nag, P. (2008): *Introduction to GIS*, Concept Publishing Company Pvt. Ltd., New Delhi.
- Sarkar, A (2015): *Practical Geography – A Systematic Approach*, 3<sup>rd</sup> Edition, Orient BlackSwan Pvt. Ltd., New Delhi.

### SEMESTER: III

Course: Core – 5 Course Code: GG 601

Section – A: Theory

Course Title: Geomorphology

4 Credits 100 Marks

**Unit-I** Definition, scope, and branches of geomorphology; Evolution of geomorphic thought; Geomorphic systems and models; Approaches and techniques of geomorphic analysis; Concepts of geomorphology; and Relationships of geomorphology with other branches of Earth Sciences. **20 Marks**

**Unit-II** Landforms and Their Classification – Genetic, quantitative, Monkhouse's, and Murphy's systems of classification; Cenozoic tectonism and tectonic landforms; Quaternary climate and Quaternary geomorphology; and concept of morphogenetic region. **20 Marks**

**Unit-III** Weathering and Mass Wasting – Geomorphic importance of weathering, topographic expression and geomorphic effect of mass-wasting, role of man in weathering and mass wasting, and mass-wasting in Himalayan region and hilly parts of North-East India; Slope - Elements, approaches to the study of slope development, classification, and evolution models. **20 Marks**

**Unit –IV** Landscape evolution theories of Davis, Penck, King, Hack and Morisawa; Interruption and rejuvenation in cycle of erosion and resultant features; Evolution of landscape in humid and dry climates, and horizontal, folded, faulted and domal structures; Evolution of Meghalaya plateau and Indo-Myanmar range; Geomorphic processes and features on Mars planet. **20 Marks**

**Unit-V** Remote sensing in identification of landforms, geomorphological mapping, identification of geomorphic changes, and landslide studies; Application of geomorphology to land use survey, settlement, transport, mining, resource evaluation, and environmental hazard assessment and management. **20 Marks**

#### Recommended Books:

- Ahmad, Enayat (1999): *Geomorphology*, Kalyani Publishers, Ludhiana.
- Bhattacharyya, N.N. (2018): *North East India – A Systematic Geography*, Rajesh Publications, New Delhi.
- Bloom, Arthur L. (2012): *Geomorphology – A systematic Analysis of Late Cenozoic Landform*, Rawat Publications, Jaipur.
- Dayal, P (2015): *A Textbook of Geomorphology*, 7<sup>th</sup> Edition, Rajesh Publications, New Delhi.
- Goudie, Andrew ed. (2003): *Encyclopedia of Geomorphology Vol.1 & 2*, Routledge, London.

- Gautam, Alka (2012): *Geomorphology*, Sharda Pustak Bhawan, Allahabad.
- Gutierrez, Mateo (2018): *Geomorphology*, CRC Press, New York.
- Huggett, Richard John (2016): *Fundamentals of Geomorphology*, 4<sup>th</sup> Edition, Routledge, New Delhi.
- Jha, V.C. (2000): *Geomorphology and Remote Sensing*, acb Publications, Calcutta.
- Kale, Vishwas S. and Gupta, Avijit (2018): *Introduction to Geomorphology*, University press, Hyderabad.
- Lillesand, Thomas M. et al (2015): *Remote Sensing and Image Interpretation*, 7<sup>th</sup> Edition, John Wiley and Sons, New York.
- Mc Sween, Jr., Harry Y. et al (2019): *Planetary Geoscience*, Cambridge University Press, Cambridge.
- Monkhouse, F.J. (2009): *Physical Geography*, Platinum Publishers, Kolkata.
- Nandy, D.R. (2017): *Geodynamics of Northeastern India and the Adjoining Region*, Scientific Book Centre, New Delhi.
- Ritter, Dale F. et al (2011): *Process Geomorphology*, 5<sup>th</sup> Edition, Wmc Brown Publishers, Dubuque, IA.
- Singh, R.L. (1992): *India – A Regional Geography*, UBS Publishers, New Delhi.
- Singh, Savindra (2018): *Geomorphology*, Pravalika Publications, Allahabad.
- Strahler, Arthur N. (1975): *Physical Geography*, 4<sup>th</sup> Edition, John Wiley & Sons Inc., New York.
- Thornbury, William D. (2020): *Principles of Geomorphology*, 3<sup>rd</sup> Edition, New Age International Publishers, New Delhi.
- Verma, V.K. (1999): *Lecturers on Geomorphology*, Pilgrims Books Pvt. Ltd., Delhi.

**Course: Core – 5 Course Code: GG 601**

**Section - B: Practical**

**Course Title: Geomorphological Mapping and Field Visit**

**2 Credits 50 Marks**

**Unit- I** Generating data from topo sheet of 1:50,000 and preparation of profiles (Superimposed, projected, composite, and serial), average slope map, hypsometric curve, and area height curve. **20 Marks**

**Unit-II** (i) Identification and mapping of geomorphic features from aerial photographs; Preparation of geomorphological map using Polish Legend System.

**10 Marks**

(ii) Visit a selected place with the concerned teacher and examine the geomorphic processes and features. Prepare a report and submit it to the department. **10 Marks**

Record Book **5 Marks**

Viva - Voce **5 Marks**



### **Recommended Books:**

- Fairbridge, Rhodes W. ed. (1968): *Encyclopedia of Geomorphology*, Reinhold Book Corporation , New York.
- Lillesand, Thomas M. et al (2015): *Remote Sensing and Image Interpretation*, 7<sup>th</sup>Edition, John Wiley and Sons, New York.
- Monkhouse, F.J. (1989): *Maps and Diagrams – Their Compilation and Construction*, BI Publications Pvt. Ltd., New Delhi.
- Saha, Pijushkanti and Basu, Partha (2014): *Advanced Practical Geography*, Books & Allied (P) Ltd., Kolkata.
- Saikia, Ranjan and Thakuria, Gitika (2015): *Practical Geography*, EBH Publishers, Guwahati.
- Sarkar, Ashis (2015): *Practical Geography – A Systematic Approach*, Orient Black Swan, New Delhi.
- Singh, L.R. (2005): *Fundamentals of Practical Geography*, Sharda Pustak Bhawan, Allahabad.
- Singh, Savindra (2018): *Geomorphology*, Pravalika Publications, Allahabad.
- Sinha, M.M.P. and Bala, Seema (2021): *Advanced Cartography and Practical Geography*, Rajesh Publications, New Delhi.

**Course: Core – 6 Course Code: GG 602**  
**Section – A: Theory**

**Course Title: Climatology and Hydrology**

**4 Credits 100 Marks**

### **Climatology**

**Unit-I** Meaning, scope, and branches of climatology; weather and climate; origin, composition and structure of atmosphere; Atmospheric hazard; Insolation; Heat budget; Heat transfer – Temperature scales, latent heat, conduction, convection, and radiation; Atmosphere of Mars Planet. **20 Marks**

**Unit-II** Planetary and local winds; General circulation of air; Jet streams; Atmospheric Moisture – Evaporation, condensation, humidity, fog, clouds, and precipitation; Mechanism of cloud formation and cloud seeding; Atmospheric Equilibrium – Stability and instability; Air masses and fronts; Cyclones, anticyclones, typhoons, hurricanes, thunderstorms, tornadoes, and waterspouts. **20 Marks**

**Unit-III** Classification of Climate – Köppen, Thornthwaite and Trewartha; Weather forecasting; Applied Climatology – Climate and agriculture, climate and housing and climate and urban planning. **20 Marks**

### **Hydrology**

**Unit-IV** Meaning, scope, and development of hydrology; Pure and applied hydrology; Hydrological cycle and human interference; Global and India's water budget; Evaporation and evapotranspiration; Infiltration and runoff; Groundwater; Groundwater resources of India. **20 Marks**

**Unit-V** Flood and drought; water crisis and river water disputes; Integrated water resource management; Watershed and watershed management, Application of remote sensing in hydrological studies. **20 Marks**

### **Recommended Books:**

#### **Climatology**

- Ahrens, C. Donald and Henson, Robert (2019): *Meteorology Today – An Introduction to Weather, Climate and the Environment*, 12<sup>th</sup> Edition, Cengage, Boston, USA.
- Barry, Roger G. and Chorley, Richard J. (2017): *Atmosphere, Weather and Climate*, Routledge, London.
- Chandrasekhar, A. (2013): *Basics of Atmospheric Science*, PHI Learning Private Ltd., New Delhi.

- Critchfield, Howard J. (2008): *General Climatology*, Pearson Education India, Noida.
- Lal, D.S.(2021): *Climatology*, Sharda Pustak Bhawan, Prayagraj.
- Lutgens, Frederick K. et al (2015): *The Atmosphere – An Introduction to Meteorology*, Pearson India Education Services Pvt. Ltd., Noida.
- Mc Sween, Jr., Harry Y. et al (2019): *Planetary Geoscience*, Cambridge University Press, Cambridge.
- Singh, Savindra (2020): *Climatology*, Pravalika Publication, Allahabad.

## Hydrology

- Bedient, Philip B. et al (2020): *Hydrology and Floodplain Analysis*, 6<sup>th</sup> Edition, Pearson India Education Services Pvt. Ltd., Noida.
- Das, Madan and Saikia, Mimi Das (2013): *Watershed Management*, PHI Learning Pvt. Ltd., New Delhi.
- Maidment, David R. ed. (1992): *Handbook of Hydrology*, McGraw Hill Inc. , New York.
- Murty, JVS (2018): *Watershed Management*, New Age International Publishers, New Delhi.
- Raghunath, HM (2022): *Hydrology – Principles, Analysis and Design*, 4<sup>th</sup> Edition, New Age International Publishers, New Delhi.
- Reddy, Dr. P. Jaya Rami (2016): *A Textbook of Hydrology*, University Science Press, New Delhi.
- Subramanya, K. (2020): *Engineering Hydrology*, 5<sup>th</sup> Edition, McGraw Hill Education (India) Private Ltd., Noida.
- Suresh, R. (2019): *Watershed Hydrology*, Standard Publishers Distributors, Delhi.
- Suresh, R.(2017): *Watershed Planning & Management*, Standard Publishers Distributors, Delhi.
- Singh, Savindra(2019): *Fundamentals of Hydrology*, Pravalika Publications, Allahabad.
- Viessman, Warren and Lewis, Jr Garry L. (2014): *Introduction to Hydrology*, 5<sup>th</sup> Edition, PHI Learning Pvt. Ltd., Delhi.

**Course: Core – 6 Course Code: GG 602**

**Section - B: Practical**

**Course Title: Climatological Diagrams, Hydrological Analysis and Field Visit.**

**2 Credits 50 Marks**

**Unit- I** Drawing of hythergraph, climograph, wind rose diagram, rainfall dispersion diagram, columnar diagram, and line & bar diagram representing temperature and rainfall; Interpretation of weather chart of Indian Meteorological Organization for July and

January; Measurement of rainfall, air pressure, humidity, temperature, wind speed, and wind direction. **20 Marks**

**Unit-II** (i) Estimation of discharge, runoff volume and rainfall runoff relationship; Estimation of average depth of rainfall using (a) Arithmetic Mean Method, (b) Thiessen Polygon Method, and (c) Isohyetal Method; Drawing of unit hydrograph and interpretation; Measurement of permeability using Darcy's Law. **10 Marks**

(ii) Visit a meteorological station and take readings. Predict the weather condition of the day based on readings and cloud conditions. Prepare a report and submit it to the department. **10 Marks**

Record Book **5 Marks**

Viva - Voce **5 Marks**

#### **Recommended Books:**

- Khullar, D.R. (2018): *Essentials of Practical Geography*, New Academic Publishing Co., Jalandhar.
- Reddy, Dr. P. Jaya Rami (2016): *A Textbook of Hydrology*, University Science Press, New Delhi.
- Saha, Pijushkanti and Basu, Partha (2014): *Advanced Practical Geography*, Book & Allied (P) Ltd., Kolkata.
- Sarkar, Ashis (2015): *Practical Geography – A Systematic Approach*, Orient Black Swan, New Delhi.
- Singh, L.R. (2006): *Fundamentals of Practical Geography*, Sharda Pustak Bhawan, Allahabad.
- Singh, R.L. and Singh, Rana P.B. (2012): *Elements of Practical Geography*, Kalyani Publishers, Ludhiana.
- Subramanya, K (2020): *Engineering Hydrology*, 5<sup>th</sup> Edition, McGraw Hill Education (India) Pvt. Ltd., Noida.
- Suresh, R. (2019): *Watershed Hydrology*, Standard Publishers Distributors, Delhi.
- Viessman, Warren and Lewis, Jr. Gary L. (2014): *Introduction to Hydrology*, 5<sup>th</sup> Edition, PHI Learning Pvt. Ltd., New Delhi.

**Course: Core 7 Course Code: GG 603**

**A: Theory**

**Course Title: Oceanography and Marine Biodiversity & Ecology**

**4 Credits 100**

**Marks Oceanography**

**Unit-I** Meaning, scope, branches, and growth of oceanography; Oceanography as a branch of science and geography; Origin and morphology of ocean basins. **20 Marks**

**Unit-II** Constituent, temperature, density, salinity, and current of ocean water; Atmosphere and sea interaction. **20 Marks**

**Unit-III** Marine sediments and deposits; Sea waves, tides and tsunamis; Coral reefs; Marine resources; Man and ocean. **20 Marks**

**Marine Biodiversity & Ecology**

**Unit- IV** Meaning and concept of marine biodiversity; Ocean habitats; Marine organisms; Marine biological community. **20 Marks**

**Unit-V** Meaning and concept of marine ecology; Factors of marine ecology; Adaptations of phytoplanktons; Nekton and benthic communities to marine environment; Energy flow in marine ecosystem; Marine biological cycles. **20 Marks**

**Recommended Books:**

- Garrison, Tom (2011): *Essentials of Oceanography*, 6<sup>th</sup> Edition, Book / Cole, California.
- Khullar, D.R (2019): *Physical Geography*, Kalyani Publishers, Ludhiana.
- Lal, D.S. (2015): *Climatology and Oceanography*, Sharda Pustak Bhawan, Allahabad.
- Pinet, Paul R. (2019): *Invitation to Oceanography*; 8<sup>th</sup> Edition, Jones and Bartlett.
- Sharma, R.C. and Vatal, M. (2018): *Oceanography for Geographers*, Surjeet Publications, New Delhi.
- Singh, Savindra (2020): *Biogeography*, Pravalika Publications, Allahabad.
- Singh, Savindra (2021): *Oceanography*, Pravalika Publications, Allahabad.

**Course: Core – 7 Course Code: GG 603**

**Section - B: Tutorial 5 Lectures**

**1 Credit**

**25 Marks**

**Course: GEC – 1 Course Code: GG 631**

**Section – A: Theory**

**Course Title: Climate Change Vulnerability and Adaptation 4 Credits 100 Marks**

**Unit –I** Climate Change: Understanding climate change; Greenhouse gasses and global warming;  
Global climatic assessment –IPCC. **20 Marks**

**Unit –II** Climate Change and Vulnerability: Physical vulnerability, economic vulnerability, and social vulnerability. **20 Marks**

**Unit-III** Impact of Climate Change: Agriculture and water, flora and fauna, human health. **20 Marks**

**Unit-IV** Adaptation and Mitigation: Global initiatives with particular reference to South Asia. **20 Marks**

**Unit-V** National action plan on climate change; Local institutions (Urban local bodies, panchayats) **20 marks**

**Recommended Books:**

- Colligan, L.H.,(2012): *Global Warming, Marshal Cavendish Benchmark*, Tarrytown, New York.
- Harris, Stuart A, ed, (2010): *Global Warming*, SCIYO, Janeza Trdena, Croatia, Marshall Cavendish, New York.
- 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.
- IPCC (2007): *Climate Change 2007: Impact, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*.
- Leroux, Marcal (2005): *Global Warming – Myth or Reality*, Springer and Praxis Publishing Ltd., Chichester, UK.
- Mathez, Edmond A. and Smerdon, Jason E, (2018): *Climate Change: The Science of Global Warming and Our Energy Future*, 2<sup>nd</sup> Edition, Columbia University Press, New York.
- OECD (2008): *Climate Change Mitigation: “what do we do?” (Organisation and Economic Co-operation and Development)*.
- Sen, Roy, S., and Singh, R.B., (2002): *Climate Variability, Extreme Events and Agriculture Productivity in Mountain Regions*, Oxford & IBH Pub.,New Delhi.

- 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, New Delhi.
- Singh, R.B., Mal, Suraj, and Huggel, Christian (2018): *Climate Change, Extreme Events and Disaster Risk Reduction*, Springer, Switzerland.
- UNEP (2007): *Global Environment Outlook: GEO4: Environment for Development, United Nations Environment Programme.*

**Course: GEC – 1 Course Code: GG 631**

**Section - B: Tutorial 5 Lectures**

**1 Credit**

**25 Marks**

**SEMESTER IV**

**Course: Core- 8**

**Course Code: GG 604**

**Course Title: Soil Geography and Biogeography 4 Credits Marks**

**Soil Geography**

**Unit – I** Meaning of pedology and soil geography; Definition, components, colour, texture and structure of soil; Soil forming processes and factors affecting soil formation; Soil profile and horizons; Classification and distribution of soil. **20 Marks**

**Unit – II** Soil aeration and temperature; Soil acidity and alkalinity; Soil fertility and Soil quality/ health; Soil erosion and its control; Remote sensing in soil studies. **20 Marks**

**Biogeography**

**Unit – III** Definition, scope, branches, and development of biogeography; Approaches to biogeographical studies; Biogeography and related sciences **20 Marks**

**Unit – IV** Ecology, ecosystem and biomes; Biogeographical processes; Evolution, dispersal, and distribution of plants and animal communities; Biogeography regions. **20 Marks**

**Unit – V** Meaning and components of biodiversity; Biodiversity hotspots; Biodiversity conservation; Forest and wildlife conservation in India; Remote sensing in the study of biodiversity **20 Marks**

**Recommended Books:**

**Soil Geography**

- Biswas, TD and Mukherjee SK(2017): *Textbook of Soil Science*, 2<sup>nd</sup> Edition, McGraw Hill Education (India) Pvt. Ltd., Chennai.
- Bryant, Rechar H. (2018): *Physical Geography*, Rupa & Co, Mumbai.
- Das, Dilip (2020): *Introductory Soil Science*, Kalyani Publishers, Ludhiana.
- Indian Society of Soil Sciences (2015): *Soil Science – An Introduction*, New Delhi.
- Kale, V.B. (2020): *Soil Geography*, Himalaya Publishing House, Mumbai.
- Schaetzl, Randall J. And Thompson Michael L. (2015): *Soils – Genesis and Geomorphology*, 2<sup>nd</sup> Edition, Cambridge University Press, Cambridge.
- Tripathi, R.P. and Singh, H.P. (2001): *Soil Erosion and Conservation*, New Age International (P) Ltd. Publishers, New Delhi.

- Weil, Ray P. and Brady, Nyle C. (2016): *The Nature and Properties of Soil*, 15<sup>th</sup> Edition, Pearson, London.

### **Biogeography**

- Agrawal, L.C. (2018): *Biogeography*, Rawat Publications, Jaipur.
- Bhattacharyya, N.N. (2006): *Biogeography*, Rajesh Publications, New Delhi.
- Bryant, Richard H. (2018): *Physical Geography*, Rupa & Co., Mumbai.
- Lomolino, Mark V. et al (2016): *Biogeography - Biological Diversity Across Space and Time*, 5<sup>th</sup> Edition, Oxford University Press, New York.
- Maiti, Parbodh K. and Maiti, Paulani (2017): *Biodiversity - Perception, Peril and Preservation*, 2<sup>nd</sup> Edition, PHI Learning Private Ltd., New Delhi.
- Odum, Eugene P. and Barrett, Gary W. (2005): *Fundamentals of Ecology*, 5<sup>th</sup> Edition, Thomson Asia Pte. Ltd., Singapore and Affiliated East West Press Pvt. Ltd., New Delhi.
- Singh, Savindra (2020): *Biogeography*, Pravallika Publications, Allahabad.
- Singh, Savindra (2020): *Environmental Geography*, Pravallika Publications, Allahabad.

**Course: Core – 8 Course Code: GG 604**

### **Section - B: Practical**

**Course Title: Soil Analysis & Identification and Biogeographical Measurement**

**2 Credits 50 Marks**

**Unit – I** Measurement of pH value, temperature, and components of soil; Identification of physical structure of soil, and soil horizons of a soil profile and preparation of diagrams; Determination of soil texture by feel method; Particle size analysis with plotation on ternary graph; Preparation of soil map from aerial photograph and satellite imagery.

**20 Marks**

**Unit – II** Measurement of Biodiversity – Alpha diversity, Beta diversity, Gamma diversity, and species diversity indices; Identification of plant type/class growing in and around your college campus. Examine the pond ecosystem of nearby ponds and prepare diagrams.

**20**

**Marks Record Book**

**5 Marks Viva - Voce**

**5 Marks**

**Recommended Books:**



- Bryant, Rechar H. (2018): *Physical Geography*, Rupa & Co, Mumbai.
- Dubey, Sarvesh Kumar and Arora, Asha (2018 ): *A Practical Book on Soil, Plant, Water and Fertilizer Analysis*, S.R. Scientific Publications, New Delhi.
- Kumar, Vijay and Kumar Rakesh (2018): *Practical Manual of Soil Science*, Brilliant Publishing, New Delhi.
- Lilliesand, Thomas M. et al (2015): *Remote Sensing and Image Interpretation*, 7<sup>th</sup> Edition, Wiley, New York.
- Maiti, Parbodh K. and Maiti, Paulani (2017): *Biodiversity - Perception, Peril and Preservation*, 2<sup>nd</sup> Edition, PHI Learning Private Ltd., New Delhi.
- Weil, Ray P. and Brady, Nyle C. (2016): *The Nature and Properties of Soil*, 15<sup>th</sup> Edition, Pearson, London.

**Course: Core- 9**  
**Section – A: Theory**

**Course Code: GG 605**

**Course Title: Environmental Geography and Climate Change 4 Credits      Marks**  
**Environmental Geography**

**Unit – I** Meaning, scope, and importance of environmental geography; Environmental geography and related sciences; Fundamental concepts; The environment. **20 Marks**

**Unit – II** Man - environment relationship; Man and environmental process; Man - induced soil erosion and sedimentation; Environmental degradation and pollution. **20 Marks**

**Unit – III** Environmental planning and management; Government and geo-politics of the environment; Environmental degradation, pollution, and planning in India; Environmental ethics and legislation in India; Remote sensing in environmental management. **20 Marks**

#### **Climate Change**

**Unit – IV** Meaning of global warming and climate change; Causes, evidences, and process of global warming; Indication of climate change; Causes and theories of climate change;  
Past climate. **20 Marks**

**Unit – V** Impacts and consequences of climate change; Future of climate change; UN framework  
countries on climate change; National and local (urban local bodies and panchayats) action plan on climate change **20 Marks**

#### **Recommended Books:**

- Barry, Roger. G. and Chorley, Richard J. (2017): *Atmosphere, Weather and Climate*, Routledge, London.
- Chandana, R.D. (2006): *Environmental Geography*, Kalyani Publishers, Ludhiana.
- Gautam, Alka (2018): *Environmental Geography*, Sharda Pustak Bhawan, Allahabad.
- Haque, M.A. (2021): *Understanding Climate Change*, National Book Trust, New Delhi.
- Houghton, Sir John (2004): *Global Warming – The Complete Briefing*, 3<sup>rd</sup> Edition, Cambridge University Press, Cambridge.
- Hussain, Julfikar and Naskar, Bipasha (2020): *Environmental Geography*, Notion Press, India.
- Leroux, Marcel (2005): *Global Warming – Myth and Reality*, Springer, New York.

- Mathez, Edmond A. and Smerdon, Jason E. (2018): *Climate Change*, 2<sup>nd</sup> Edition, Columbia University Press, New York.
- Saxena, H.M. (2017): *Environmental Geography*, 3<sup>rd</sup> Edition., Rawat Publications, Jaipur.
- Singh, Savindra (2020): *Environmental Geography*, Pravalika Publications, Allahabad.

**Course Title: Environmental Geography Practical, Climate Change Analysis and Field Visit**

**2 Credits 50 Marks**

**Unit – I** Methods of measurement of parameters and pollutants; Methods used for air environment study; Air quality monitoring methods; Methods for air pollutants analysis; Water analysis method; Permissible noise level. Measurement of air, water, and noise pollution. **15 Marks**

**Unit – II (i)** Proxy data, proxy climatic indicators, and climatic reconstruction; Preparation and analysis of trend graph showing mean temperature for a successive period of 10/30 years; Analysis of past climate in conjunction with tree ring dating method or Pollen analysis method. **15 Marks**

**(ii)** Visit to the environmentally degraded area and investigate causes of degradation. Prepare a report based on field investigation and submit it to the department.

**10 Marks**

**Record Book 5 Marks**

**Viva - Voce 5 Marks**

**Recommended Books:**

- Goudie, Andrew et al eds. (1990): *Geomorphological Techniques*, 2<sup>nd</sup> Edition, Unwin Hyman, London.
- Kudesia, V.P. (2003): *Environmental Chemistry*, Pragati Prakashan, Meerut.
- Kumble, Rahul K. (2018): *Questions and Answers in Environmental Science Practical*, Competition Tutor, Jodhpur.
- Mathews, John A. et al eds. (2003): *The Encyclopaedic Dictionary of Environmental Change*, Arnold, London.

**Course Title: Disaster Management**

**4 Credits**

**Marks**

- Unit – I:** Definition, concept, risk, vulnerability, and classification of disaster; Disaster and hazard. **20 Marks**
- Unit – II:** Meaning, concept, methods and approaches of disaster management. **20 Marks**
- Unit – III:** Management of flood, drought, landslide, hailstorm, earthquake, tsunami, and cyclone disaster with reference to India. **20 Marks**
- Unit – IV:** Man Made Disasters - Causes, impact, distribution, and mapping. **20 Marks**
- Unit – V:** Mitigation, response and preparedness of disaster; Disaster Management in India – Laws, NDMA and NIDM; Indigenous knowledge and community-based disaster management; and Do's and Don'ts during and post-disaster. **20 Marks**

**Recommended Books:**

- Arulsamy, Dr S. and J. Jeyadevi (2016): Disaster Management, Neelkamal.
- Government of India (2011): Disaster Management in India, Ministry of Home Affairs, New Delhi.
- Kumar. P. (2021): Disaster Management, Oak Bridge Publications, New Delhi.
- Pandey. Dr. Mrinalini (2014): Disaster Management, Wiley India, New Delhi.
- Pandey, Rajendra Kumar (2020): Disaster Management in India, Sage Publications India Pvt. Ltd., New Delhi.
- Srivastava, A.K. (2021): Text Book of Disaster Management, Scientific Publishers, New Delhi.
- Singh, Savindra and Singh, Jeetendra (2013): Disaster Management, Pravalika Publications, Allahabad.
- Subramanian, R. (2018): Disaster Management, Vikas Publishing House, New Delhi.
- Sylphey, M.M. and Safeer, M.M. (2017): Introduction to Disaster Management, Prentice Hall of India, New Delhi.
- Vaidyanathan, S. (2020): Introduction to Disaster Management – Natural Disaster and Man Made Hazards, CBS Publishers, New Delhi.
- Vashistha, Venod Kumar and Das, Dipak Kumar (2018): Disaster Management, Nath Ram Publications, Varanasi.

## **Section- B: Practical**

**Course Title: Disaster Management Project Work**

**2 Credits    50 Marks**

The Project Report based on any two fields based case studies among following disasters and one disaster preparedness plan of respective college, locality and district.

1. Flood
2. Drought
3. Cyclone and Hailstorm
4. Earthquakes and Volcanoes
5. Landslides
6. Human Induced Disaster: Fire hazard, Chemical and industrial accidents.

**Project Report    40 Marks**

**Viva - Voce    10 Marks**

### **Recommended Books:**

Same as above (Section - A: Theory).

**Course: GEC 2 Course Code: GG 632**

**Section – A Theory**

**Course Title: Geospatial Information Technology      4 Credits      100 Marks**

**Unit – I:** Introduction: Definitions, concept, and historical development of geospatial technology.

**20 Marks**

**Unit – II:** Geospatial Data: Web data sources; Registration and projection; Data structures; Data interpolation and modeling.

**20 Marks**

**Unit – III:** Working on spatial information systems.

**20 Marks**

**Unit – IV:** Functions of Geospatial Information System: Information retrieval; Topological modeling; Networks; Overlay; Data output.

**20 Marks**

**Unit – V:** Application of geospatial information technology for sustainable development.

**20 Marks**

**Recommended Books:**

- Esperanca and Samet, H.,(1997): “*An overview of the SAND spatial database system, to appear in communications of the ACM*” <http://www.cs.umd.edu/~hjs/pubs/sandprog.ps.gz>).
- Heywood, I., Cornelius, S., and Carver, S., (2006): *An Introduction to Geographical Information Systems*, Prentice Hall, Upper Saddle River, NJ.
- Hjaltason, G. and Samet, H., *Ranking in Spatial Databases in Advances in Spatial Databases – 4<sup>th</sup> Symposium, SSD’95*, M.J. Egenhofer and J.R. Herring, Eds., Lecture Notes in Computer Science 951.
- <http://www.cs.umd.edu/~hjs/pubs/kim2.ps>.
- Kumar, Dilip, Singh, R.B., and Kaur, Ranjeet., (2019): *Spatial Information Technology for Sustainable Development Goals*, Springer, New York.
- Samet, H. (1990): *Applications of Spatial Data Structures*, Image Processing and GIS, Addison-Wesley, Reading, MA.
- Samet, H., (1995): *Spatial Data Structures in Modern Database Systems: The Object Model, Interoperability, and Beyond*, W. Kim, Ed., Addison-Wesley/ACM Press, 361-385, <http://www.cs.umb.edu/~hjs/pubs/kim.ps>.
- Tomlin,D. (1990): *Geographic Information Systems and Cartographic Modeling*, PrenticeHall, Englewood Cliffs, NJ.

**Course: GEC – 2 Course Code: GG 632**

**Section - B: Tutorial      5 Lecturers**

**25 Marks**

**1 Credit**

**SEMESTER: V**

**Course: Core – 11 Course Code: GG 701**

**Section – A: Theory**

**Course Title: Economic and Resource Geography**

**4 Credits 100 Marks**

**Unit – I** Meaning, scope, and approaches of economic geography; Economic geography and economics; Recent trends in economic geography. **20 Marks**

**Unit – II** Concept and classification of resources; Concept and different views of resource conservation; Conservation of Resources – Forest conservation, soil conservation, water conservation, and energy conservation. **20 Marks**

**Unit – III** Agricultural Products - Rice, wheat, tea, coffee, cotton, and sugarcane; Mineral Resources - Iron ore, aluminum, and manganese; Energy Resources – Coal, petroleum, and hydro - electric power. **20 Marks**

**Unit – IV** Industries - Iron and steel, cotton textile, and chemical; Industrial regions of the world; Industrial Location Theories – Weber, Losch, Isard, Smith, and Ranner; Special Economic Zones and technology parks. **20 Marks**

**Unit – V** World Transport Pattern – Land, water, and air; Trade – Internal and international; Globalisation; Trading Blocks - IOR-ARC, BRICS and SAARC; Applied economic geography. **20 Marks**

**Recommended Books:**

- Hartshorn, Truman and Alexander, J.W (2000): *Economic Geography*, 3<sup>rd</sup> Edition, Prentice Hall of India, New Delhi.
- Gautam, Dr Alka (2015): *Advanced Economic Geography*, Sharda Puntak Bhawan, Allahabad.
- Gautam, Dr Alka (2017): *Geography of Resources: Exploitation, Conservation and Management*, Sharda Pustak Bhawan, Allahabad.
- Guha, J.L. and Chattoraj, P.R. (2009): *A New Approach to Economic Geography – A Study of Resources*, World Press, Kolkata.
- Knowles, R. and Warieng, J. (2004): *Economic and Social Geography, Made Simple*, Rupa & Co., Calcutta.
- Maurya, S.D. (2018): *Economic Geography*, Pravalika Publications, Allahabad.
- Roy, Prithwish (2014): *Economic Geography – A Study of Resources*, New Central Book Agency, Kolkata.
- Saxena, H.M. (2018): *Economic Geography*, 2<sup>nd</sup> Edition, Rawat Publications, Jaipur.





**Unit – II** Growth, distribution, and density of population; Fertility, mortality, and migration; Population composition and literacy; Schedule castes and tribes; Nuptiality and marriage; Population, environment, and disaster; Demographic situation in developed and developing countries. **20 Marks**

**Unit – III** Population and Resources – Under population, overpopulation and optimum population; Population Theories – Malthus, Spencer, Ricardo, Marx, and Demographic Transition Theory; Population projections; Population problems, policies and planning; Population policy in India. **20 Marks**

### **Settlement Geography**

**Unit – IV** Meaning, scope, approaches, and development of settlement geography; Fundamental concepts in settlement geography; Origin, type, pattern, size, and spacing, morphology and houses of rural settlement; Rural service center and market; Rural problems and planning. **20 Marks**

**Unit – V** Concept, origin, growth, classification, and morphology of town; Central Place Theory, Rank-Size Rule and Primate City; Urban hierarchy; Urbanization and conurbation; Ruralurban fringe and umland; Urban problems and urban slum; Urban planning; Smart City  
Project of India. **20 Marks**

### **Recommended Books:**

#### **Population Geography**

- Bhende, Asha S. and Kanitkar, Tara (2015): *Principles of Population Studies*, Himalaya Publishing House, Mumbai.
- Chandana, R.C. (2021): *Geography of Population – Concept, Determinants and World Pattern*, Part - I, Kalyani Publishers, Ludhiana.
- Chandra, R.C. (2015): *Geography of Population – Concept, Determinants and Pattern*, Kalyani Publishers, Ludhiana.
- Hassan, Mohammad Izhar (2007): *Population Geography*, Rawat Publications, Jaipur.
- Maurya, S.D. (2018): *Population Geography*, Pravalika Publications, Allahabad.
- Nag, Dr. Prithvish and Debnath, Dr. G.C. (2021): *Population Geography*, Bharati Prakashan, Varanasi.

#### **Settlement Geography**

- Maurya, S.D. (2014): *Settlement Geography*, Sharda Pustak Bhawan, Allahabad.
- Singh, R.Y. (2002): *Geography of Settlements*, Rawat Publications, Jaipur.
- Sinha, V.N.P., Verma, Usha and Sahay, Anuradha (2017): *Introduction to Settlement Geography*, Rajesh Publications, New Delhi.
- Tiwari, R.C. (2020): *Settlement Geography – Rural and Urban Settlement*, Pravalika Publications, Prayagraj.

**Course Title: Maps and Diagrams of Population and Settlement Geography**

**Unit – I** Calculations of population density, population growth, and population projection; Measurement of fertility, mortality, migration, and population potential; Drawing and analysis of multiple bar (male, female, and total population), age - sex pyramid, trend graph showing population growth, and Lorenz curve; Preparation of map of India or Manipur showing population distribution (dot and spheres), population density, scheduled caste, and scheduled tribe. **20 Marks**

**Unit – II** Determination of spatial mean and median center of settlement; Identification of service center; Calculation and mapping of areal size, population size, relative spacing, village density and dispersion of rural settlement; Preparation of choropleth map showing settlement types; Calculation of Nearest Neighbour Index, identification of settlement pattern from 1:50,000 toposheet. **20 Marks**

Record Book **5 Marks**

Viva - Voce **5 Marks**

**Recommended Books:**

- Mahammod, Aslam (2008): Statistical Methods in Geographical Studies, Rajesh Publications, New Delhi.
- Mandal, R.B., Uyanga, Joseph and Prasad, Hanuman (2007): Introductory Methods in Population Analysis, Concept Publishing Company, New Delhi.
- Pathak, K. B. and Ram, F. (1998): Techniques of Demographic Analysis, Himalaya Publishing Company, Mumbai.
- Saha, Pijushkanti and Basu, Partha (2014): Advanced Practical Geography, Books & Allied (P) Ltd., Kolkata.
- Saikia, Ranjan and Thakuria, Gitika (2015): Practical Geography, EBH Publishers (India), Guwahati.
- Sarkar, Ashis (2013): Quantitative Geography – Techniques and Presentation, Orient Black Swan, New Delhi.
- Sinha, M.M.P. and Bala, Seema (2021): Advanced Cartography and Practical Geography, Rajesh Publications, New Delhi.

and all the books listed above in the theory section.

**Course: DSE – 1 Course Code: GG 711**

**Section – A: Theory**

**Course Title: Agricultural Geography**

**4 Credits 100 Marks**

**Unit – I** Meaning, scope, significance, approaches, and development of agricultural geography; Indian geographers' contribution to agricultural geography; Principles and basic concepts of agricultural geography; Agricultural geography and related discipline.

**20 Marks**

**Unit – II** Origin and diffusion of agriculture; Physical and Socio-economic factor of agriculture practices. **20 Marks**

**Unit – III** Agricultural regionalization; Agricultural statistics and sample. **20 Marks**

**Unit – IV** Agricultural system of the world and India; Models in agricultural geography; Agricultural typology. **20 Marks**

**Unit – V** Population, food, nutrition, and health; Agricultural revolutions in India; Indian Agriculture – Problems, planning, and management; Contemporary issues in Indian agriculture; Remote sensing application in agriculture. **20 Marks**

**Recommended Books:**

- Gautam, Alka (2021): Agricultural Geography, Sharda Pustak Bhawan, Allahabad.
- Husain, Majid (2019): Systematic Agricultural Geography, 2<sup>nd</sup> Edition, Rawat Publications, Jaipur.
- Joseph, George and Jeganathan, C. (2018): Fundamentals of Remote Sensing, 3<sup>rd</sup> Edition, University Press, Hyderabad.
- Shafi, M. (2006): Agricultural Geography, Dorling Kindersley India Pvt. Ltd., New Delhi.
- Singh, Jasbir and Dhillon, S.S. (2004): Agricultural Geography, 3<sup>rd</sup> Edition, Tata McGraw Hill, New Delhi.
- Tarrant, J.R. (1973): Agricultural Geography, David and Charles, Devon.

**Course: DSE – 1 Course Code: GG 711**

**Section-B: Practical**

**Course Title: Agricultural Regionalisation and Diagrams and Field Visit**

**2 Credits 50 Marks**

**Unit – I** Regionalisation of Agriculture – Crop combination, crop concentration, crop diversification, crop intensity, and agricultural efficiency. **15 Marks**

**Unit – II** (i) Agricultural Statistics – Index of area under crop, index of net area sown, index of

cropping pattern, index of yield, and index of productivity; Agricultural land use mapping. **15 Marks**

(ii) Visit a farm and investigate how agricultural practice is done. Prepare a report and submit it to the department. **10 Marks**

Record Book **5 Marks**

Viva - Voce **5 Marks**

### **Recommended Books:**

- Gautam, Dr. Alka (2021): *Agricultural Geography*, Sharda Pustak Bhawan, Allahabad.
- Husain, Majid (2019): *Systematic Agricultural Geography*, Rawat Publications, Jaipur.
- Shafi, M. (2006): *Agricultural Geography*, Dorling Kindersley India Pvt. Ltd., New Delhi.
- Sinha, M.M.P. and Bala, Seema (2021): *Advanced Cartography and Practical Geography*, Rajesh Publications, New Delhi.
- Singh, Jasbir and Dhillon, S.S. (2004): *Agricultural Geography*, 3<sup>rd</sup> Edition, Tata McGraw Hill, New Delhi.

**(OR)**

**Course: DSE – 1 Course Code: GG 712**

**Section-A: Theory**

**Course Title: Fluvial Geomorphology**

**4 Credits 100 Marks**

**Unit-I** Fluvial Geomorphology and Geography; hydrological cycle and subcycle; drainage pattern evolution; limits of drainage development; channel changes with time. **20 Marks**

**Unit-II** Fluvial Processes – Streamflow fluctuation, mechanics of flow, thresholds of erosion, sediment transport and sediment deposition. **20 Marks**

**Unit-III** Channel Form Adjustment – Characteristics of adjustment, cross-sectional form, bed configuration, channel pattern, and channel gradient and the longitudinal profile. **20 Marks**

**Unit-IV** Drainage basin as a fundamental geomorphic unit. Drainage basin form and process; drainage basin morphometry; morphometric interrelations. **20 Marks**

**Unit-IV** Applied fluvial geomorphology; human adjustment to flood plain, alluvial fans and deltaic environments (case studies). Effects of reservoirs on fluvial systems. Remote sensing and GIS application to fluvial environments. **20 Marks**

**Recommended Books:**

- Charlton, RO (2007): *Fundamentals of Fluvial Geomorphology*, Routledge, Oxfordshire.
- Chorley, R.J. (ed) (1973): *Introduction of Fluvial Processes*, Methuen & Co., London,
- 1973 Coates, D.R. and Vitek J.I. (1980): *Thresholds in Geomorphology*. George Allen &
- Unwin, London.
- Gleick, P.H. ed. (1993): *Water in Crisis*, Oxford University Press, New York.
- Gregory, K.J. (1977): *River Channel Changes*, John Wiley & Sons, New York.

Gregory, K.J. and Walling, D.E. (1985): *Drainage Basin : Forms and Processes – A*

*Geomorphological Approach*, John Wiley & Sons, New York.

- Kingston, D. (1984): *Fluvial Forms and Processes in Geomorphology*, Hodder Arnold,
- London. Kondolf, G.Mathias and Piegoy, Herve eds. (2016): *Tools in Fluvial Geomorphology*, Wiley – Blackwell.
- Leopold, L.B. et. al. (2020): *Fluvial Processes in Geomorphology 2<sup>nd</sup> Edition*, Dover Publications Inc., New York.
- Morisawa, M. ed. (1968): *Streams – Their Dynamics and Morphology*, McGraw Hill, New

York.

**Course: DSE – 1 Course Code: GG 712**

**Section-B: Practical**

**Course Title: Basin Morphometry and Field Visit**

**2 Credits 50 Marks**

**Unit-I** Select a small drainage basin from the toposheet of 1:50,000 and determine linear, areal and relief attributes with interpretation. **20 Marks**

**Unit-II** (i) Preparation and interpretation of cross and longitudinal profiles of streams. **10 Marks**

(ii) Field Visit – Measurement of channel cross-section in the field; preparation of map of channel bed; study of erosional and depositional features in the field; preparation of field report .

**10 Marks**

Record Book **5 Marks**

Viva - Voce **5 Marks**

**Recommended Books:**

Same as above (Theory Section)

**Course: GEC – 3**

**Course Code: GG 731**

**Section – A: Theory**

**Course Title: Industrial Development**

**4 Credits 100 Marks**

**Unit – I** Nature and scope of industrial geography. **20 Marks**

**Unit – II** Types, geographical characteristics, and location of industries (Weber’s Theory); Small and medium industry. **20 Marks**

**Unit – III** Heavy Industries: Coal and iron based industries; Rural based industries. **20 Marks**

**Unit – IV** Mega Industrial Complexes: National Capital Region, Mumbai-Pune Industrial Region, Bengaluru - Chennai Industrial Region and Chota Nagpur Industrial Region. **20 Marks**

**Unit – V** Impact of Industrialisation in India: Environmental; Social and economic industrial policy of India. **20 Marks**

**Recommended Books:**

- Chapman, Keith and Walker, David F. (1991): *Industrial Location*, 2<sup>nd</sup> Edition, Wiley Eastern Ltd., New Delhi.
- Gunnar, Alexandersson., (1967): *Geography of Manufacturing*, Prentice Hall, New Jersey.
- Hayter, Roger (2000): *The Dynamics of Industrial Location*, John Wiley & Sons, Chichester, England.
- Leong, G.C. and Morgan, G.C., (1997): *Human and economic geography*, Oxford University Press, New York.
- Miller, E., (1962): *Geography of Manufacturing*, Prentice Hall, Englewood Cliff, New Jersey.
- Pathak, C.R., (2003): *Spatial Structure and Processes of Development in India*, Regional Science Assoc., Kolkata.
- Saxena, H.M. (2018): *Economic Geography*, 2<sup>nd</sup> Edition, Rawat Publications, Jaipur.
- Sharma, T.C., (2013): *Economic Geography of India*, Rawat Publications, Jaipur.
- Singh, Jagdish (2003): *India - A Comprehensive & Systematic Geography*, Gyanodaya Prakashan, Gorakhpur.
- Tritha, Ranjit (2002): *Geography of India*, Rawat Publications, Jaipur & New Delhi.
- Tiwari, R.C., (2007): *Geography of India*, Prayag Pustak Bhawan, Allahabad.
- Truman, A. Hartshorn, and Alexander, John W. (2000): *Economic Geography*, Prentice Hall of India Ltd., New Delhi.

**Course: GEC – 3 Course Code: GG 731**

**Section-B: Tutorial (5 Lecturers)**

**1 Credits 25 Marks**

## SEMESTER VI

Course: Core 13 Course Code:  
GG703 Section – A: Theory

### Course Title: Regional Planning and Sustainable Development

4 Credits 100 Marks

**Unit – I** Concept of region; Meaning, scope, approaches, methods, techniques, content, objectives, necessity, types, and principles of regional planning; Geography and regional planning. **20 Marks**

**Unit – II** Choice of a Region for Planning – Characteristics of an ideal planning region; Hierarchy, need and demarcation of planning region; Regionalisation of India for planning; Survey for planning. **20 Marks**

**Unit – III** Theories and Models of Regional Planning – Central Place Theory, Growth Pole Model of Perroux, Growth Foci Theory of Misra, Myrdal, Hirschman, Friedmann, and Rostow; Village cluster. **20 Marks**

**Unit – IV** Concept and factors affecting regional development; Causes and measurement of regional disparity; Indicators of development; Regional disparities in India. Examples of regional planning in India. **20 Marks**

**Unit – V** Meaning, development, challenges, indicators and goals of sustainable development; Strategy for sustainable development; Sustainable Development Policies and Programmes – Rio+20; goal-based development; Financing for sustainable development; Principles of good governance. **20 Marks**

### Recommended Books:

#### Regional Planning

- Chand, Mahesh and Puri, V.K. (2012): Regional Planning in India. Allied Publishers Limited, New Delhi.
- Chandana, R.C. (2016): Regional Planning and Development, Kalyani Publishers, Ludhiana.
- Chatterji, Kanan (2017): Regional Planning – Concept, Theory and Practices, Concept Pub. Company Pvt. Ltd., New Delhi.
- Glasson, John and Marshall, Tim (2007): Regional Planning, Routledge, London.

- Gupta, H.S. (2017): Regional Development and Planning – Concept, Theories and Techniques, Kalyani Publishers, New Delhi.
- Jiwan, Janki (2021): Regional Development and Planning, Rawat Publications, Jaipur.
- Maurya, S.D. (2022): Regional Planning and Development, Pravalika Publications, Prayagraj.
- Misra, R.P. ed. (2002): Regional Planning – Concept, Techniques, Policies and Case Studies, Concept Pub. Company Pvt. Ltd., New Delhi.

### **Sustainable Development**

- Elliott, Jennifer, A. (2013): An Introduction to Sustainable Development, Routledge, London.
- Maurya, S.D. (2022): Regional Planning and Development, Pravalika Publications, Prayagraj.
- Rogers, Peter P., Jalal, Kazi F. and Boyd, John (2008): An Introduction to Sustainable Development, Glen Educational Foundation, Inc., London.
- Sachs, Jeffrey D. (2015): The Age of Sustainable Development, Columbia University Press, New York.

**Course: Core – 13      Course  
Code: GG703 Section-B: Practical**

**Course Title: Spatial Analysis and Field Visit      2 Credits      50 Marks**

**Unit – I** Exercises on gravity model, measure of centrality, location quotient analysis, and cell model.      **10 Marks**

**Unit – II (i)** Measurement of Regional Disparities – Summit of rank method, quartile index method, aggregation of relative scores method, standard deviation method, range categorization method, deprivation index method, principal component method, and human development index method; Measurement of Development – Economic, social, and composite.      **20 Marks**

**(ii)** Visit a village and investigate/ examine/ observe the various development works. Prepare a report and submit it to the department.      **10 Marks**

Record Book      **5 Marks**

Viva - Voce      **5 Marks**

**Recommended Books:**



- Chatterjee, Kanan (2017): *Regional Planning – Concepts, Theory and Practice*, Concept Publishing Company Pvt. Ltd., New Delhi.
- Maurya, S.D. (2022): *Regional Planning and Development*, Pravalika Publications, Prayagraj.
- Singh, R.L. and Singh, Rana P.B. (2012): *Elements of Practical Geography*, Kalyani Publishers, Ludhiana.

**Course: Core 14 Course Code:  
GG704 Section – A: Theory**

**Course Title: Statistical Methods in Geography 4 Credits 100 Marks**

**Unit – I** Use of data in geography; Significance of statistical method in geography; Sources of data and scale of measurement (nominal, ordinal, interval, and ratio). **20 Marks**

**Unit – II** Tabulation and Descriptive Statistics: Frequencies (deciles and quartiles); Cross tabulation; Central tendency (mean, median and mode, cartographic technique); Dispersion (standard deviation, variance and coefficient of variation). **20 Marks**

**Unit – III** Sampling: Purposive, random, systematic, and stratified. **20 Marks**

**Unit – IV** Theoretical Distribution: Probability and normal distribution. **20 Marks**

**Unit – V** Association and Correlation: Rank correlation, product moment correlation, and regression and testing the significance. **20 Marks**

**Recommended Books:**

- Alvi, Zamir (2008): *Statistical Geography – Methods & Applications*, Rawat Publications, Jaipur.
- Burt, James E., Barber, Gerald M. and Rigby, David L. (2009): *Elementary Statistics for Geography*, The Guilford Press, New York.
- Jha, Shiva Nand (2020): *Statistical Methods in Geography*, Raghav Publications, New Delhi.
- Mc Carroll, Danny (2017): *Simple Statistical Test for Geography*, CRC, Press, Boca Raton.
- Mahmood, Aslam (2008): *Statistical Method in Geographical Studies*, Rajesh Publications, New Delhi.
- Methew, John A.(1981): *Quantitative and Statistical Approaches to Geography – A Practical Manual*, Pergamon Press, Oxford.
- Mckillup, Steve and Dyar, Melinda Darby (2010): *Geostatistics Explained: An Introductory Guide for Earth Scientists*, Cambridge University Press, Cambridge.



**Course: DSE 2 Course Code: GG713**  
**Section – A: Theory**

**Course Title: Political Geography**

**4 Credits 100 Marks**

**Unit-I** Introduction: Concept, nature, scope, approach, development and relation to other social sciences. **20 Marks**

**Unit-II** State, Nation, and Nation State: Concept of nation and state; Attribution of State – Frontiers, boundaries, shape, size, territory, and sovereignty; Concept of nation state; Geopolitics; Theories (Heartland and Rimland). **20 Marks**

**Unit-III** Electoral Geography: Geography of voting, geographic influences on voting pattern, geography of representation and gerrymandering. **20 Marks**

**Unit-IV** Political Geography of Resource Conflict: Water sharing disputes; Disputes and conflicts related to forest rights and minerals. **20 Marks**

**Unit -V** Politics of Development: Issues of relief, compensation, and rehabilitation with reference to dams, highways, and Special Economic Zone. **20 Marks**

**Recommended Books:**

- Adhikari, S. (2010): Political Geography, Rawat Publications, New Delhi.
- Adhikari, S. (2013): Political Geography of India, Sharda Pustak Bhawan, Allahabad.
- Agnew, John et al eds. (2003): A Companion to Political Geography, BlackWell, London.
- Cox, K.R., Law, M. and Robinson J. (2008): The Sage Handbook of Political Geography, Sage Publications, London.
- Dikshit, R.D. (2020): Political Geography – A Contemporary Perspective, MacMillan Publishers India, Noida.
- Dwivedi, R.L. and Misra, H. N. (2019): Fundamentals of Political Geography, Surjeet Publications, Delhi.
- Gallahar, Carplyn et al (2009): Key Concepts in Political Geography, Sage Publications, London.
- Kannan, Dr Monika (2018): Political Geography, Blue Rose Publishers, India.

- Muir, Richard (1989): *Modern Political Geography*, 2<sup>nd</sup> Edition, MacMillan, Houndmills, UK.
- Sen, Jyotirmoy (2019): *A Textbook of Political Geography*, Kalyani Publishers, Ludhiana.
- Taylor, P. and Flint, D. (2000): *Political Geography*, Pearson Education, London.

**Course: DSE– 2 Course Code: GG 713**

**Section-B: Tutorial**

**1 Credit**

**25 Marks**

**5 Lectures**

**OR**

**Course: DSE – 2 Course Code: GG 714**

**Section – A: Theory**

**Course Title: Urbanization and Urban System**

**4 Credits**

**100 Marks**

**Unit-I** Urban Geography: Introduction, nature, scope and approaches.

**20 Marks**

**Unit-II** Patterns of Urbanisation in developed and developing countries.

**20 Marks**

**Unit-III** Functional classification of cities: Quantitative and Qualitative Methods, Hierarchy of urban settlement and urban morphology.

**Unit-IV** Cities and Central Place Theory: Christaller and Losch.

**20 Marks**

**Unit-V** Urban Issues: Problems of housing, slums, civic amenities (water and transport); Case studies of Delhi, Mumbai, Kolkata, Chennai; and urban planning.

**20 Marks**

**Recommended Books:**

- Carter, H., (1972): *The Study of Urban Geography*, Edward Arnold, London.
- Fyfe, N.R. and Kenny, J.T., (2005): *The Urban Geography Reader*, Routledge.
- Graham, S. and Marvin, S., (2001): *Splintering Urbanism: Networked Infrastructures*
- *Technological Mobilities and the Urban Condition*, Routledge.
- Hall, T., (2006): *Urban Geography*, Taylor and Francis.
- Kaplan, D. H., Wheeler, J.O. and Holloways, S.R., (2008): *Urban Geography*, John Wiley.
- Knox, P. L., and McCarthy, L., (2005): *Urbanization: An Introduction to Urban Geography*, Pearson Prentice Hall, New York.
- Knox, P. L., and Pinch, S., (2006): *Urban Social Geography: An Introduction*, Prentice Hall.
- Mandal, R.B. (2000): *Urban Geography – A Textbook*, Concept Publishing Company, New Delhi.
- Maurya, S.D. (2014): *Settlement Geography*, Sharda Pustak Bhawan, Allahabad.
- Pacione, M., (2009): *Urban Geography: A Global Perspective*, Taylor and Francis.
- Ramachandran, R., (1989): *Urbanisation and Urban System of India*, Oxford University Press, New Delhi.

- Ramachandran R., (1992): *The study of Urbanisation*, Oxford University Press, Delhi.
- Sassen, S., (2001): *The Global City: New York, London and Tokyo*, Princeton University Press.
- Singh, R.B., ed. (2015): *Urban development, challenges, risks and resilience in Asian megacities, Advances in Geographical and Environmental Studies*, Springer.
- Singh, R.B., ed. (2001): *Urban Sustainability in the Context of Global Change*, Science Pub., Inc., Enfield (NH), USA and Oxford & IBH Pub., New Delhi.
- Sharma, Poonam and Rajput, Swati eds. (2007): *Sustainable Smart Cities in India; Challenges and Future Perspectives*, Springer.
- Siddhartha, K. and Mukherjee, S. (2016): *Cities, Urbanisation & Urban System*, Kitab Mahal, Allahabad.

●Sinha, V.N.P. et al (2017): *Introduction to Settlement Geography*, Rajesh Publications, New Delhi.

**Course: DSE – 2 Course Code: GG 714**  
**Section – B: Tutorial (5 Lecturers) 1**  
**Credits 25 Marks**

**Course: GEC – 4 Course Code: GG 732**  
**Section – A: Theory**

**Course Title: Coupled Human and Environment System 4 Credits 100 Marks**

**Unit – I** Concept, components, and theories of coupled human environment system. **20 Marks**

**Unit – II** Biogeochemical cycles: Interactions and impact between human and natural systems. **20**

**Marks Unit – III** Global and Regional Case Studies: Himalaya-Ganga system; Atmosphere-water system; Surface and ground water and coastal-water interaction. **20 Marks**

**Unit – IV** Integrated assessment of vulnerability risk; Resilience and sustainability. **20 Marks**

**Unit – V** Management, governance and policies **20 Marks**

**Recommended Books:**

- Clarke, G.L.. (1967). *Elements of Ecology*, John Wiley, New York.
- Haden-Guest, S., Wright, J.K., and Teclaff, E.M. (1956): *World Geography of Forest Resources*, Ronald Press Co.,New York.
- Hoyt, J.B. (1992): *Man, and the Earth*, Prentice Hall, USA.
- Lapedes, D.N., (1974): *Encyclopedia of Environmental Science*, McGraw Hill, New York.
- Parmesan, C., Yohe, G. (2003): *A globally coherent fingerprint of climate change impacts across natural systems*, Nature, 421 (6918), 37 - 42.
- Singh, Savindra (2015): *Environmental Geography*, Prayag Pushtak Bhawan, Allahabad.
- Singh, R.B., Schickhoff, Udo and Mal, Suraj., (2016): *Climate Change, Glaciers Response and Vegetation Dynamics in the Himalaya*, Springer, Switzerland.
- Singh, R.B., and Prokop, Pawel, eds. (2016): *Environmental Geography of South Asia*, Springer, Japan.
- Sivaperuman, Chandrakasan et al. (2018): *Biodiversity and Climate Change Adaptation in Tropical Island*, Academic Press, London.
- Trewartha, G.T., (1980): *An Introduction to Climate*, McGraw Hill Company, New York.

- UNEP (2002): *Mountain and Tree Cover in Mountain Region* Report - 2002, UNEPWCMC.

**Course: GEC – 4 Course Code: GG 732**

**Section-B: Tutorial (5 Lectures) 1 Credit 25 Marks**

**SEMESTER: VII**

**Course: Core – 15 Course Code: GG 801**

**Section – A: Theory**

**Course Title: Evolution of Geographical Thought                      4 Credits    100 Marks**

**Unit-I**    Pre Modern – Geographical knowledge in ancient India and ancient China; Greek and Roman contribution to geography; Dark Age in Europe; Contributions of Arab geographers. **20 Marks**

**Unit-II**    Modern – Geography in Renaissance period and classical period of modern geography; Evolution of geographical thinking and disciplinary trends in Germany, France, Britain, and United States of America; Modern Indian geography. **20 Marks**

**Unit-III** Debates – Determinism and possibilism and neo- determinism, systematic and regional, and idiographic and nomothetic. **20 Marks**

**Unit –IV** Paradigms and models in geography; System analysis in geography; Place, space, and locality; Space and time. **20 Marks**

**Unit – V** Trends – Quantitative revolution and its impacts, behaviouralism, radicalism, feminism, fordism, and post-modernism; Future of geography. **20 Marks**

**Recommended Books:**

- Adhikari, Sudepta (2015): *Fundamentals of Geographical Thought*, Orient Black Swan, New Delhi.
- Dikshit, R.D. (2018): *Geographical Thought – A Contextual History of Ideas*, 2<sup>nd</sup> Edition, Prentice Hall of India, New Delhi.
- Doi, R.D. (2002): *Geographic Thought – A Spectrum of Compilation to Coherence*, University Book House (P) Ltd., Jaipur.
- Kaushik, Dr. S.D. and Rawat, D.S.(2017): *Geographical Thought and Methodology*, Rastogi Publications, Meerut.
- Maiti, Ramkrishna and Maiti, Moumita Maitra (2021): *Development of Geographical Thought – Contextualisation and Synthesis of Philosophy*, Nabodaya Publications, Kolkata.
- Martin, Geoffrey J. (2005): *All Possible Worlds – A History of Geographical Ideas*, Oxford University Press, New York.
- Maurya, S.D. (2016): *History of Geographical Thought*, 2<sup>nd</sup> Edition, Sharda Pustak Bhawan, Allahabad.
- Peet, Richard (2011): *Modern Geographical Thought*, Rawat Publications, Jaipur.
- Rana, Lalita (2019): *Geographical Thought – Classical to Contemporary*, Concept Publishing Company, New Delhi.

**Course: Core – 15 Course Code: GG 801**

**Section-B: Tutorial**

**1 Credit    25 Marks**



## 5 Lectures

**Course: Core – 16 Course Code: GG 802**

**Section – A: Theory**

**Course Title: World Regional Geography**

**4 Credits 100 Marks**

**Unit-I** Asia – Relief, drainage, climate, natural vegetation, soil, population, agriculture, industry, and transport; Regional study of South – East Asia. **20 Marks**

**Unit -II** Europe – Physical, economic, and demographic characteristics; Geographical account of British Isles. **20 Marks**

**Unit-III** North and South America – Physical, economic, and demographic set up; Regional studies of USA and Brazil. **20 Marks**

**Unit –IV** Australia and New Zealand and Pacific Islands – Physical, economic, and demographic set up. **20 Marks**

**Unit – V** Africa – Physical, economic, and demographic set up. **20 Marks**

### **Recommended Books:**

- Bradshaw, Michael et al (2008): Contemporary World Regional Geography, McGraw – Hill, New York.
- Gautam, Alka (2020): Regional Geography of the World, Sharda Pustak Bhawan, Allahabad.
- Hobbs, Joseph J. (2008): World Regional Geography, Books/ Cole, California.
- Husain, Majid (2016): World Geography, Rawat Publications, Jaipur.
- Johnson, Douglas L. et al (2011): World Regional Geography, Prentice Hall of India, New Delhi.
- Manku, Darshan Singh (2017): A Regional Geography of the World, Kalyani Publishers, Ludhiana.
- Maurya, S.D. (2021): World Regional Geography, Pravalika Publications, Prayagraj.
- Tikka, R.N., Bali, P.K. and Sekhon, M.S. (2012): World Regional Geography, New Academic Publishing Co., Jalandhar.

**Course: Core – 16 Course Code: GG 802**

**Section-B: Practical**

**Course Title: Map Projection****2 Credits 50 Marks****Unit- I** Meaning, classification, types, and necessity of map projection; Drawing of graticules forconical and cylindrical map projections by graphical/ mathematical methods with suitable outline maps and their properties and uses. **20 Marks** **Unit -II** Construction of zenithal and conventional map projections by graphical/ mathematical methods with properties and uses; Identification and choice of map projections.**20****Marks.** Record Book**5 Marks** Viva - Voce**5 Marks****Recommended Books:**

- Kellaway, George P. (1979): *Map Projection*, BI Publications, New Delhi.
- Khullar, D.R. (2016): *Essentials of Practical Geography*, New Academic Publishing Co., Jalandhar.
- Maltiar, K.K. and Maltiar (Mrs) S.R. (2022): *Concepts of Cartography*, Remote Sensing and GIS, Rajesh Publications, New Delhi.
- Robinson, Arthur H. et al (2010): *Elements of Cartography*, 6<sup>th</sup> Edition, Wiley India Pvt. Ltd., New Delhi.
- Pearson, Frederick II (1990): *Map projection – Theory and Application*, CRC Press, Boca Raton.
- Sarkar, Ashis (2015): *Practical geography – A Systematic Approach*, Orient Black Swan, New Delhi.
- Singh, L.R. (2006): *Fundamentals of Practical Geography*, Sharda Pustak Bhawan, Allahabad.
- Syder, John P. (1987): *Map Projection – A Working Manual*, US. Geological Survey Professional Paper 1395, Washington DC.
- Talukder, Suren (2008): *An Introduction to Map Projection*, EBH Publishers (India), Guwahati.

**Course: DSE – 3 Course Code: GG 811****Section – A: Theory****Course Title: Geography of Health****4 Credits 100 Marks****Unit-I** Meaning , scope, and development of geography of health; Debate in health geography and medical geography; Geographical factors affecting human health and diseases.**20 Marks****Unit -II** Types and classification of disease; Disease mapping; Disease diffusion. **20 Marks**

**Unit -III** Quantitative methods, quantitative approach and GIS in interpreting geography of health; Health care and caring; Management of health services in India. **20 Marks**

**Unit - IV** Past diseases and diseases of modern civilization; Health and diseases pattern in environmental context with special reference to India. **20 Marks**

**Unit- V** Climate change and human health; Changes in Climate System – Heat and cold, biological disease agents, food production and nutrition; Health policy and planning in India.

**20 Marks**

### **Recommended Books:**

- Akhtar, Rais ed. (1990): *Environment and Health Themes in Medical Geography*, Ashish Publishing House, New Delhi.
- Akhtar, Rais and Izhar, Nilofar eds.(2010): *Global Medical Geography*, Rawat Publications, Jaipur.
- Avon, Joan, L. and Jonathan, A. Patzed (2001): *Ecosystem Changes and Public Health*, John Hopkins University Press, Batimin.
- Brown, Tim et al eds. (2010): *A Companion to Health and Medical Geography*, Wiley BlackWell, Chichester.
- Christaler, George and Hristopoles, Deonirson (1998): *Spatio – Temporal Environment Health Modeling*, Kluwer Academic Press, Boston.
- Cliff, A.D. and Peter, H. (1988): *Atlas of Disease Distributions*, BlackWell Publishers, Oxford.
- Emch, Michael et al (2017): *Health and Medical Geography*, 4<sup>th</sup> Edition, Guilford Press, New York.
- Gatrell, Anthony C. and Elliott, Susan J. (2015): *Geography of Health – An Introduction*, 3<sup>rd</sup> Edition, Wiley BlackWell, Chichester.
- Gatrell, A and Laytosen (1998): *GIS and Health*, Taylor and Francis Ltd., London.
- Harphon T. and Tanner, M., eds (1995): *Urban Health in Developing Countries – Progress and Prospects*, Routledge, London.
- Meade, Melinda S. and Emch Michael (2010): *Medical Geography*, 3<sup>rd</sup> Edition, The Guilford Press, New York.
- Misra, R.P. (2007): *Geography of Health – A Treatise on Geography of Life and Death in India*, Concept Publishing Company, New Delhi.
- Moeller, Dade (1993): *Environmental Health*, Harvard University Press, Cambridge.
- Tromp, S (1980): *Biometeorology: The Impact of Weather and Climate on Humans and Their Environment*, Heydon and Sons.

## Section-B: Practical

### Course Title: Maps and Diagrams of Health Data and Field Visit

2 Credits 50 Marks

Unit - I Preparation of line, bar, pie diagrams, and choropleth maps using health data and interpretation. 15 Marks

Unit -II i) Maps and geographic information system in health geography; Preparation of diagrams and choropleth maps using GIS softwares of health data. 15 Marks

ii) Visit a village or an urban area and investigate / examine / observe health conditions and the health care system. Prepare a report and submit the same to the department. 10 Marks

Record Book 5 Marks

Viva-Voce 5 Marks

### Recommended Books:

- Gatrell, Anthony C. and Elliott, Susan J. (2015): *Geographies of Health – An Introduction, 3rd Edition*, Wiley BlackWell, Chichester.
- Meade, Melinda S. and Emch, Michael (2010): *Medical Geography, 3<sup>rd</sup> Edition*, The Guilford Press, New York.
- Misra, R.P. (2007): *Geography of Health – A Treatise on Geography of Life and Death in India*, Concept Publishing Company, New Delhi.

(OR)

Course: DSE – 3 Course Code: GG 812

### Section-A: Theory

### Course Title: Geography of Social Wellbeing

4 Credits 100 Marks

Unit-I Geography of Social Wellbeing: Concept, Origin, Nature and Scope. 20 Marks

Unit-II Social Diversity: Caste, Class, Religion, Race and Gender and their Spatial distribution. 20 Marks

Unit-III Social Wellbeing and Inclusive Development: Concept and Components – Healthcare, Housing and Education. 20 Marks

Unit-IV Social Geographies of Inclusion and Exclusion, Slums, Gated Communities, Communal Conflicts

and Crime.

**20  
Marks  
20  
Marks**

**Unit-V** Social welfare programmes and policies.

**Recommended Books:**

- Ahmed, A., (1999): *Social Geography*, Rawat Publications.
- Casino, V.J.D., Jr., (2009): *Social Geography: A Critical Introduction*, Wiley Blackwell.
- Cater, J. and Jones, T., (2000): *Social Geography: An Introduction to Contemporary Issues*, Hodder Arnold.
- Holt, L., (2011): *Geographies of Children, Youth and Families: An International Perspective*, Taylor & Francis.
- Panelli, R., (2004): *Social Geographies: From Difference to Action*, Sage.
- Rachel, P., Burke, M., Fuller, D., Gough, J., Macfarlane, R. and Mowl, G., (2001) : *Introducing Social Geographies*, Oxford University Press.
- Ramotra, K.C., (2008): *Development Processes and the Schedule Castes*, Rawat Publication.
- Smith, D.M., (1977): *Human Geography: A Welfare Approach*, Edward Arnold, London.
- Smith, D.M., (1944): *Geography and Social Justice*, Blackwell, Oxford.
- Smith, S.J., Pain, R., Marston, S. A., Jones, J.P., (2009): *The SAGE Handbook of Social Geographies*, Sage Publications.
- Sopher, David., (1980): *An Exploration of India*, Cornell University Press, Ithasa.
- Valentine, G., (2001): *Social Geographies: Space and Society*, Prentice Hall.

**Course: DSE – 3 Course Code: GG 812**

**Section-B: Tutorial 5 Lectures**

**1 Credits 100 Marks**

**Course: GEC – 5 Course Code: GG 831**

**Section – A: Theory**

**Course Title: Rural Development**

**4 Credits 100 Marks**

- Unit - I** Defining Development: Inter- dependence of urban and rural sectors of the economy;  
Need for rural development; Gandhian approach of rural development. **20 Marks**
- Unit - II** Rural Economic Base: Panchayati raj system, agriculture and allied sectors, seasonality and need for expanding non - farming activities, co- operatives, and PURA. **20 Marks**
- Unit -III** Area Based Approach to Rural Development: Drought prone area programmes, (DPAP), PMGSY. **20 Marks**
- Unit-IV** Target Group Approach to Rural Development: SJSY, MNREGA, Jan Dhan Yojana and Rural connectivity. **20 Marks**
- Unit- V** Provision of Services – Physical and socio – economic access to elementary education

and primary health care and micro credit.

**20 Marks**

**Recommended Books:**

- Anand, Subhash (2013): *Dynamics of Rural Development*, Research India Press, Delhi.
- Gilg, A.W. (1985): *An Introduction to Rural Geography*, Edwin Arnold, London.
- Krishnamurthy, J., (2000): *Rural Development - Problems and Prospects*, Rawat Pubs., Jaipur.
- Lee, D.A.. and Chaudhri, D.P., eds.(1983): *Rural Development and State*, Methuen, London.
- Misra, R.P., and Sundaram, K.V., eds.(1979): *Rural Area Development – Perspectives and Approaches*, Sterling, New Dwlhi.
- Misra, R.P., ed.(1985): *Rural Development – Capitalist and Socialist Paths, Vol. 1* , Concept, New Delhi.
- Palione, M.(1984): *Rural Geography*, Harper and Row, London.
- Ramachandran, H., and Guimaraes, J.P.C. (1991): *Integrated Rural Development in Asia Learning from Recent Experience*, Concept Publishing, New Delhi.
- Robb, P. (1983): *Rural South Asia – Linkages, Change and Development*, Curzon Press.
- Singh, R.B. (1985): *Geography of Rural Development*, Inter India, New Delhi.
- UNAPDI (1986): *Local Level Planning and Rural Development Alternative Strategies*, (United Nations Asian & Pacific Development Institute, Bangkok), Concept Publications Co., New Delhi.
- Wanmali, S. (1992): *Rural Infrastructure Settlement Systems and Development of the Regional Economy in South India*, International Food Policy Research Institute, Washington, D.C.
- Yugandhar, B.N. and Mukherjee, Neela eds. (1991): *Studies in Village India: Issues in Rural Development*, Concept Publications. Co., New Delhi.

**Course: GEC – 5 Course Code: GG 831**

**Section-B: Tutorial (5 Lectures)**

**1 Credit**

**25 Marks**

## SEMESTER: VIII

**Course: Core – 17 Course Code: GG 803**

**Section – A: Theory**

**Course Title: Geography of India, North East India and Manipur 4 Credits 100 Marks**

**Unit-I** Physical: Location, physiographic division, climate, soil, and natural vegetation.

**20 Marks**

**Unit-II** Population: Distribution and growth; Social: Race, caste, religion, language, and tribes.

**20 Marks**

**Unit-III** Agriculture: Agriculture production of rice, wheat, cotton, and sugarcane; Agricultural Regionalisation – R.L. Singh Scheme, Agro-Climatic Regions, and Agro-Ecological Regions; Economic: Distributions and production of iron ore, coal and petroleum; Industry – Iron and steel, textiles, automobile, information technology and industrial regions; Transport system.

**30 Marks**

**Unit-IV** North East India – Administrative divisions, physical features, climate, drainage, vegetation, population, settlement, agriculture, industry, transport, environmental problems, regional development, and geopolitical problems. **15 Marks**

**Unit- V** Manipur – Location, physical features, climate, landslides, drainage, soil, vegetation, agriculture, industry, tourism, and transport system. **15 Marks**

### **Recommended Books:**

#### **India**

- Chatterjee, Rupali (2012): *Geography of India*, Global Vision Publishers House, New Delhi.
- Khullar, D.R. (2018): *India – A Comprehensive Geography*, Kalyani Publishers, Ludhiana.
- Gautam, Alka (2015): *Advanced Geography of India*, Sharda Pustak Bhawan, Allahabad.
- Husain, Majid (2020): *Geography of India*, McGraw Hill Education Pvt. Ltd., New Delhi.
- Sharma, T.C. (2008): *Economic Geography of India*, Rawat Publications, Jaipur.
- Singh, Jagdish (2003): *India – A Comprehensive & Systematic Geography*, Gyanodaya Prakashan, Gorakhpur.
- Tiwari R.C. (2016): *Geography of India*, Pravalika Publications, Allahabad.

#### **North East India**

- Barad, Gomit K. (2018): *Geography of North East India*, Pacific Book International. Bhattacharyya, N.N. (2018): *North East India – A Systematic Geography*, Rajesh Publications, New Delhi.
- Devee, Geeta and Das, Puspanjalee (2018): *North East India – A Comprehensive Geography*, EBH Publishers (India), Guwahati.
-

Taher, M. (2020): *Geography of North East India*, Mani Manik Prakash, Guwahati.

### **Manipur**

- Bhattacharyya, N.N. (2006): *Manipur – Land, People and Economy*, Rajesh Publications, New Delhi.
- Laiba, Dr. M.T. (2018): *Geography of Manipur*, Imphal.
- Singh, Dr. Th. Nabakumar (2014): *Geography of Manipur*, Rajesh Publications, New Delhi.

**Course: Core – 17 Course Code: GG 803**

**Section-B: Practical**

**2 Credits 50 Marks**

### **Course Title: Surveying and Topographical Sheet Interpretation**

**Unit - I** Meaning, objectives, and classification of surveying; Survey by chain, compass, plane table, dumpy level, theodolite, and total station. **20 Marks**

**Unit –II** Meaning of topographical map; Indian topographical sheets; Method of interpretation of topographical sheet; Interpretation of Indian topographical sheets (1: 50,000) of hilly, plateaus and plain regions in respect of relief, drainage, settlement, and transport and communication. **20 Marks**

Record Book **5 Marks**

Viva- Voce **5 Marks**

### **Recommended Books:**

#### **Surveying**

- Agor, R. (2015): *A Textbook of Surveying and Leveling*, Khanna Publishers, New Delhi.
- Anderson, James M. and Mikhael, Edward M.(2015): *Surveying – Theory and Practice*, 7<sup>th</sup> Edition, McGraw Hill Education (India), Pvt. Ltd., New Delhi.
- Duggal, S.K. (2019): *Surveying Vol. 1*, 5<sup>th</sup> Edition, McGraw Hill Education (India) Pvt. Ltd., New Delhi.
- Gupta, R.K. and Chander, Subhash (2014): *Principles of Geoinformatics*, 5<sup>th</sup> Edition, Jain Brothers, New Delhi.
- Punmia, Dr. B.C. et al (2018): *Surveying Vol.1.*, Laxmi Publications (P) Ltd., New Delhi. • Subramanian, R. (2012): *Surveying and Leveling*, Oxford University Press, New Delhi.

#### **Toposheet Interpretation**



- Khan, Md. Zulfequar Ahemad (1998): *Text Book of Practical Geography*, Concept Publishing Co., New Delhi.
- Sarkar, Ashis (2015): *Practical Geography – A Systematic Approach*, 3<sup>rd</sup> Edition Orient Black Swan, New Delhi
- Singh, Dr. L.R. (2006): *Fundamentals of Practical Geography*, Sharda Pustak Bhawan, Allahabad.
- Singh, Gopal (1996): *Mapwork and Practical Geography*, Vikas Publishing House Pvt. Ltd., New Delhi.
- Singh, R.L. and Singh, Rana P.B. (2012): *Elements of Practical Geography*, Kalyani Publishers, Ludhiana.

**Course: Core – 18 Course Code: GG 804**

**Section – A: Theory**

**Course Title: Geography of Tourism**

**4 Credits 100 Marks**

**Unit-I** Meaning, scope, nature, and development of tourism geography; Tourism, recreation, and leisure interrelations; Geographical parameters of tourism of Robinson; Geography and tourism. **20 Marks**

**Unit-II** Classification of tourism; Trends and patterns of nature tourism, cultural tourism, medical tourism, pilgrimage, and geo-tourism. **20 Marks**

**Unit- III** Recent Trends of Tourism – International and regional, domestic (India), eco-tourism, sustainable tourism, meetings, incentives, conventions, and exhibitions. **20 Marks**

**Unit - IV** Impact of Tourism – Economy, environment, and society; Sustainable tourism development. **20 Marks**

**Unit- V** Tourism in India: Tourism infrastructure; Case studies of Himalaya, desert and coastal areas; India's world heritage sites and national geological monuments; National tourism policy. Future of tourism. **20 Marks**

**Recommended Books:**

- Dileep, M.R. (2019): *Tourism – Concepts, Theory and Practice*, Dreamtech Press, New Delhi.
- Dixit, N.K. (2010): *Tourism Geography*, Vista International, New Delhi.
- Dogra, Ankur (2020): *Geography of Tourism*, Akinik Publications, New Delhi.
- Hall, M, and Stephen, R (2006): *Geography of Tourism and Recreation – Environment, Place and Space*, Routledge, London.

- Kadam, KCK Rakesh et al (2014): *A Text Book of Tourism and Hospitality Management*, UDH Publishers & Distributors (P) Ltd., New Delhi.
- Kamra, K.K. and Chand, M. (2007): *Basics of Tourism – Theory, Operation and Practice*, Kanishka Publishers, Pune.
- Nelson, Velvet (2021): *An Introduction to the Geography of Tourism*, Rowman & Littlefield, Lanham, Maryland.
- Rao, Dr. P. Padmanabha et al (2019): *Tourism Geography*, Telugu Academy, Hyderabad.
- Robinson, H. (1976): *A Geography of Tourism*, Mac Donald & Evans, New York.
- Sharma, Shailja (2021): *Introduction to Tourism*, Sage Publications India Pvt. Ltd., New Delhi.

**Course: Core –18 Course Code: GG 804**

**Section-B: Practical**

**Course Title: Maps and Diagrams of Tourism and Field Visit 2 Credits 50 Marks**

Unit- I	Information technology in tourism planning and management; Preparation of line, bar, and pie diagrams of tourism data and analysis.	<b>20 Marks</b>
Unit-II	(i) Preparation of flow, proportional circle and choroschematic maps by using tourism data and interpretation.	<b>10 Marks</b>
	(ii) Visit a tourist site and prepare a report. Submit the report to the department.	<b>10 Marks</b>
		<b>Record Book 5 Marks</b>
		<b>Viva-Voce 5 Marks</b>

**Recommended Books:**

- Kadam, KCK Rakesh et al (2014): *A Textbook of Tourism and Hospitality Management*, UDH Publishers & Distributors (P) Ltd., New Delhi.
- Khullar, D.R. (2018): *Essentials of Practical Geography*, New Academic Publishing Co., Jalandhar.
- Mason, Peter (2003): *Tourism Impacts, Planning and Management*, Butterworth Heinemann, Amsterdam.
- Page, Stephen J. (2009): *Tourism Management*, 3<sup>rd</sup> Edition, Elsevier, Amsterdam.
- Rao, Dr. P. Padmanabha et al (2019): *Tourism Geography*, Telugu Academy, Hyderabad.

- Richards, Greg and Wilson, Julie (2007): *Tourism, Creativity and Development*, Routledge, Oxon.

**Course: DSE – 4 Course Code: GG 813**

**Section – A: Theory**

**Course Title: Research Methodology in Geography          2 Credits    50 Marks**

Unit-I      Meaning, significance, types, and approach to research in geography; Literature review; Field work in Geographical studies – Defining the field and identifying the case study; Research design; Research problem; Research question; Data Collection – Type and sources of data, methods of collection, data analysis, and data representation techniques. **25 Marks**

Unit- II Field Techniques: Merits, demerits, and selection of the appropriate technique; Observation (participant / non-participant), questionnaire (open / closed/ structured/ non- structured); Interview with special focus group discussion; Report writing. **25 Marks**

**Recommended Books:**

- Clifford, Nicholas and Valentine, Gill (2003): *Key Methods in Geography*, Sage Publications, London.
- Gerber, Rod and Chuan, G.K. eds. (2000): *Fieldwork in Geography – Reflection, Perspective and Action*, Kluwer Academic Publishers, Dordrecht.
- Gomez, Basil and Jones, J.P. eds. (2010): *Research Methods in Geography*, Wiley BlackWell, Sussex.
- Kothari, C.R. and Garg, Gaurav (2019): *Research Methodology – Methods and Techniques*, 4<sup>th</sup> Multi Colour Edition, New Age International Publications, New Delhi.
- Misra, H.N. and Singh, V.P. (2019): *Research Methodology in Geography*, Rawat Publications, Jaipur.
- Murthy, K.L.N. (2014): *Research Methodology in Geography – A Textbook*, Concept Publishing Company, New Delhi.
- Sarma, Mukunda (2021): *Research Methodology*, EBH Publishers (India), Guwahati.
- Stoddard, R.H. (2010): *Field Techniques and Research Methods in Geography*, National Council for Geographic Education and Digital Common @ University of Nebraska, Lingol, Nebraska.

**Course: DSE – 4 Course Code: GG 813**

**Section-B: Practical**

**Course Title: Submission of Dissertation**

**4 Credits 100 Marks**

1. Each student will prepare an individual report based on primary and secondary data collected during fieldwork.
2. The duration of the fieldwork should not exceed 10 days and the fieldwork should be done within the Manipur State.
3. The word count of the report should be about 8000 to 12,000 excluding figures, tables, photographs, maps, references and appendices.
4. Figures, tables, photographs and maps should be included in the report.
5. One copy of the report printed on A4 size paper with one and half space between lines and margins of 2.5 centimetres (1 inch) on the up, down and right sides and 4 centimetres ( 1.5 Inches) on the left side should be submitted in soft /hard binding.

**Field Report 80 Marks**

**Viva- Voce 20 Marks**

**(OR)**

**Course: DSE – 4 Course Code: GG 814**

**Section-A: Theory**

**Course Title: Geography of Energy**

**4 Credits 100 Marks**

**Unit-I** Introduction: Nature and scope; concepts, definitions and types of energy resources; energy system. **20 Marks**

**Unit-II** Energy development and environment: Concept of entropy; historical background of energy use and development; issue related to energy use and environment, case studies of developed and developing countries. **20 Marks**

**Unit-III** Geopolitics of Energy: Global trends of energy production and consumption; issues related to trade, energy crises and various related treatise and agreements. **20 Marks**

**Unit-IV** Energy in India: Sectorial and temporal pattern of energy consumption: in agriculture, transport and industries; Spatial pattern of energy use with reference to different State and rural and urban areas, metropolitan cities; energy needs.

Planning: Various energy related agreements of India with others countries; Institutional arrangement, policy models and energy management process in India. **20 Marks**

**Unit-V** Energy Conservation: Future prospects and protections of global energy trends and

problems; methods of energy conservation; traditional vs. modern, energy management and sustainable development; potential zones of energy conservation. **20 Marks**

**Recommended Books:**

- Blowers, Andrews, (1993): Planning for a Sustainable Environment, Earthscan Publication, London.
- Chapman, J.D. (1989): Geography and Energy – Commercial energy systems and National Policies, Longman Scientific & Technical Publication, USA.
- Dhupper, Renu (2015): Textbook on Energy Resources and Management, CBS New Delhi.
- Dubey, DR Shree Raman (2015): Energy Crisis in India, Partridge India, Delhi.
- Essam EL. Hinnawi (1981): The Environmental Impacts of Productions and use of Energy: Nairobi: U.N. Environmental Programme (UNEP).
- Goldemberd, Jose (1996): Energy Environment and Development; Earthscan publications, U.K.
- Ion, D.C. (1980): Availability of World Energy Resources, Great and Tretnon Lts. London.
- Kanoglu, Mehmet et al eds. (2020): Fundamentals and Applications of Renewable Energy, McGraw Hill Education (India), Noida.
- Kursunoglu, B.N. et. Al. ed. (1982): A Global View of Energy, Lexington Books.
- Mahajan, V.S. ed. (1991): National Energy, Policies, Crisis and Growth; Ashish Publication, New Delhi.
- O'Dell, P.R. (1977): Energy Needs and Resources, McMillan, London.
- Pachauri, R.K. ed. (1985): Energy Policy in India – An Interdisciplinary Analysis, Mac Millan, London.
- Planning Commission (1997): Ninth Five Year Plan, New Delhi
- Read, P (1994): Responding to Global Warming: The Technology, Economics and Politics of Sustainable Energy, Zed book Ltd., London and New Jersey.
- Schumacher, D (1985): Energy Crisis or Opportunity – An Introduction to Energy Studies; Mac Millian, London.
- Soussan, J (1998): Primary Resources and Energy in the Third World; Routledge Publications, London.

**Course: DSE – 4 Course Code: GG 814**

**Section-B: Tutorial (5 Lecturers)      1 Credits      25 Marks**

**Course: GEC – 6 Course Code: GG 832**

**Section – A: Theory**

**Course Title: Sustainable Resource Development**

**4 Credits    100 Marks**

**Unit- I** Sustainable Resource Development: Definition, components, and limitations.

**20 Marks**

**Unit- II** The Millennium Development Goals: National strategies and international experiences.

**II**

**20 Marks**

**Unit- III** Sustainable Regional Development: Need and examples from different ecosystems.

**20 Marks**

**Unit-IV** Inclusive Development: Poverty and inequality; Education, health, and climate change;

The role of higher education in sustainable resource development; The challenges of universal health coverage. **20 Marks**

**Unit- V** Sustainable Development Policies and Programmes: The proposal for SDGs at Rio + 20; SDGs; Goal-based development; Financing for sustainable development; Principles of good governance; National environmental policy, CDM. **20 Marks**

### **Recommended Books:**

- Agyeman, Julian, Robert D. Bullard and Bob, Evans., Eds. (2003): *Just Sustainabilities- Development in an Unequal World*, London: Earthscan. (Introduction and conclusion).
- 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.
- Baker, Susan (2006): *Sustainable Development*, Routledge Milton Park, Abingdon, Oxon; New York.
- Brosius, Peter (1997): *Endangered forest, endangered people – Environmentalist representations of indigenous knowledge*, Human Ecology 25: 47-69.
- Lohman, Larry., (2003): *Re-imagining the population debate*, Corner House Briefing.
- Martinez-Alier, Joan.,(2010): *Sustainable de-growth – Mapping the context, criticisms and future prospects of an emergent paradigm*, Ecological Economics 69: 1741-1747.
- Marchant, Carolyn.,(ed.) (1994): *Ecology Atlantic Highlands*, Humanities Press, N.J. (Introduction, pp 1-25)
- Martin J. Ossewaarde (2018): *Introduction to Sustainable Development*, Sage Publications Pvt. Ltd., New Delhi.
- Osorio, Leonardo., et al., (2005): *Debates on sustainable development - towards a holistic view of reality*, Environment, Development and Sustainability 7:501-518.
- Robbins, Paul.,(2004): *Political Ecology – A Critical Introduction*, BlackWell Publishing, Oxford.
- Singh, R.B. ed. (2001): *Urban Sustainability in the Context of Global Change*, Science Pub., Inc., Enfield (NH), USA and Oxford & IBH Pub., New Delhi.
- Martin J. Ossewaarde (2018): *Introduction to Sustainable Development*, Sage Publications Pvt. Ltd., New Delhi.

**Course: GEC – 6 Course Code: GG 832**

**Section-B: Tutorial (5 Lectures) 1 Credit**

**25 Marks**