

## 5. GENERAL COURSE: CORE SUBJECTS

### 5.1 GEO-G-CC-1-01-TH – Physical Geography ✧ 60 Marks\* / 4 Credits

#### Unit I: Geotectonics

1. Earth's interior with special reference to seismology [3]
2. Plate Tectonics as a unified theory of global tectonics. Formation of major relief features of the ocean floor and continents according to Plate Tectonics [7]
3. Folds and faults: Classification and surface expressions [6]

#### Unit II: Geomorphology

4. Degradational processes: Weathering, mass wasting, and resultant landforms [4]
5. Principal geomorphic agents. Classification and evolution of fluvial, coastal, aeolian, and glacial landforms [12]
6. Basic models of slope evolution: Decline, replacement, and retreat. Systems approach and its significance in geomorphology [6].

#### Unit III: Hydrology

7. Global hydrological cycle: Its physical and biological role [2]
8. Run off: Controlling factors. Concept of ecological flow [3]
9. Drainage basin as a hydrological unit. Principles of watershed management [3]

#### Unit IV: Oceanography

10. Physical and chemical properties of ocean water. Distribution and determinants of temperature and salinity [4]
11. Ocean circulation, wave, and tide [7]
12. Marine resources: Classification and sustainable utilisation [3]

#### References

##### Books:

- Billings, M.P. 1971. Structural Geology, Pearson.
- Goudie, A.S. (Ed) 2004. Encyclopaedia of Geomorphology, vol. 1 & 2, Routledge.
- Gregory, K.J., Lewin, J. 2014. The Basics of Geomorphology: Key Concepts, Sage.
- Harvey, A. 2012. Introducing Geomorphology: A Guide to Landforms and Processes, Dunedin Academic Press.
- Kale, V.S., Gupta, A. 2001. Introduction to Geomorphology, Orient Longman.
- Kearey, P., Klepeis, K.A., Vine, F.J. 2011. Global Tectonics, 3rd ed, Wiley-India.
- Monkhouse, F.J. 1974. Principles of Physical Geography (2009-reprint), Platinum Publishers.
- Selby, M.J. 1986. Earth's Changing Surface, Oxford University Press.

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\* Excluding 10 marks for attendance

Strahler, A. 2016. *Introducing Physical Geography*, 6th ed, Wiley.

Summerfield, M.J. 2003. *Global Geomorphology: An Introduction to the Study of landforms*, Longman.

WEBSITES:

British Society for Geomorphology: [geomorphology.org.uk](http://geomorphology.org.uk)

Geological Survey of India: [www.gsi.gov.in](http://www.gsi.gov.in)

Indian Institute of Geomorphologists: [www.indiageomorph.org](http://www.indiageomorph.org)

International Association of Geomorphologists: [www.geomorph.org](http://www.geomorph.org)

Plaleomap Project: [www.scotese.com](http://www.scotese.com) & [www.youtube.com/user/cscotese](http://www.youtube.com/user/cscotese)

'This Dynamic Earth' (USGS): [pubs.usgs.gov/gip/dynamic/dynamic.html](http://pubs.usgs.gov/gip/dynamic/dynamic.html)

## 5.2 GEO-G-CC-1-01-P – Physical Geography Lab ✧ 30 Marks / 2 Credits

*A laboratory notebook, comprising class assignments of the following, is to be prepared and submitted. The exercises are to be drawn in pencil with photocopied representation of source materials where necessary. All texts are to be handwritten.*

1. Megascopic identification of *mineral samples*: Bauxite, calcite, chalcopyrite, feldspar, galena, hematite, mica, quartz, talc, tourmaline [8]
2. Megascopic identification of *rock samples*: Granite, basalt, laterite, limestone, shale, sandstone, conglomerate, slate, phyllite, schist, gneiss, quartzite [12]
3. Extraction of physiographic information from Survey of India 1:50k topographical maps of plateau region: Construction and interpretation of relief profiles (superimposed, projected and composite), Construction and interpretation of relative relief map (c. 5'×5') [20]
4. Extraction of drainage information from Survey of India topographical maps of plateau region: Extraction and interpretation of channel features and drainage patterns, Construction of channel profiles [20]
5. Viva-voce based on laboratory notebook (5 Marks)

### References

Farndon, J. 2012. *The Illustrated Guide to Rocks & Minerals*, Southwater.

Pillent, C. 2002. *Smithsonian Handbooks: Rocks & Minerals*, Dorling Kindersley.

Sarkar, A. 2015. *Practical Geography: A Systematic Approach*, 3rd ed, Orient Blackswan Private Ltd.

Sen, P.K. 1989. *Geomorphological Analysis of Drainage Basin: An Introduction to Morphometric and Hydrological Parameters*, University of Burdwan.

Sorrell, C.A. *Rocks and Minerals: A Guide to Field Identification*, St. Martin's Press.

**5.3 GEO-G-CC-2-02-TH – Environmental Geography** ✧ 60 Marks / 4 Credits**Unit I: Climatology**

1. Insolation and Heat Budget. Horizontal and vertical distribution of atmospheric temperature and pressure [5]
2. Overview of planetary wind systems. Indian Monsoons: Mechanisms and controls [6]
3. Atmospheric disturbances: Tropical and temperate cyclones. Thunderstorms [7]
4. Overview of global climatic change: Greenhouse effect. Ozone depletion [5]
5. Scheme of world climatic classification by Köppen [2]

**Unit II: Soil Geography**

6. Factors of soil formation [4]
7. Soil profile development under different climatic conditions: Laterite, Podsol, and Chernozem [6]
8. Physical and chemical properties of soils: Texture, structure, pH, salinity, and NPK status [6]
9. USDA classification of soils. Soil erosion and its management [4]

**Unit III: Biogeography**

10. Ecosystem and Biomes. Distribution and characteristics of tropical rainforest; Savannah, and hot desert biomes [6]
11. Plant types, occurrence and ecological adaptations: Halophytes, xerophytes, hydrophytes, and mesophytes [5]
12. Biodiversity: Types, threats and management with special reference to India [4]

**References**

## BOOKS:

- Ahrens, C.D. 2012. Essentials of Meteorology: An Invitation to the Atmosphere. 9th Ed, Cengage Learning.
- Barry, R.G, Chorley R.J. 2009. Atmosphere Weather and Climate. 9th Ed, Routledge.
- Chapman J.L., Reiz, M.J. 1993. Ecology: Principle and Applications, Cambridge University Press.
- Cox, B., Moore, P.D., Ladle, R. 2016. Biogeography: An Ecological and Evolutionary Approach, 9th ed, Wiley-Blackwell.
- Daji, J.A., Kadam, J.R., Patil, N.D. 1996. A Textbook of Soil Science, Media Promoters and Publishers Pvt Ltd.
- Dash, M.C., 2001. Fundamental of Ecology, 2nd edition, Tata McGraw-Hill, New Delhi
- Dey, N. K., Ghosh. P. 1993. India: A Study in Soil Geography, Sribhumi Publishing Company.
- Lal, D.S. 2012. Climatology. Sharda Pustak Bhawan.
- Lutgens, F.K., Tarbuck, E.J., Tasa, D.G. 2015. The Atmosphere: An Introduction to Meteorology, 13th Ed, Pearson

MacDonald, G. 2001. Biogeography: Introduction to Space, Time, and Life, Wiley

Morgan, R.P.C. 1995. Soil Erosion and Conservation, 2nd edition, Longman.

Sharma, P.D. 2011. Ecology and Environment, Rastogi Publications.

Singer, M., Munns, D.N. 2005. Soils: An Introduction, 6th ed, Pearson.

Weil, R.R. and Brady, N.C. 2016. The Nature and Properties of Soil, 15th edition, Pearson.

WEBSITES:

India Meteorological Department: [www.imd.gov.in](http://www.imd.gov.in)

Intergovernmental Panel on Climate Change: [www.ipcc.ch](http://www.ipcc.ch)

World Bank Climate Change Knowledge Portal: [sdwebx.worldbank.org/climateportal/index.cfm](http://sdwebx.worldbank.org/climateportal/index.cfm)

World Meteorological Organization: [public.wmo.int/en](http://public.wmo.int/en)

United Nations Environment Programmes: [www.unep.org](http://www.unep.org)

#### 5.4 **GEO-G-CC-2-02-P – Environmental Geography Lab** ✧ 30 Marks / 2 Credits

*A laboratory notebook, comprising class assignments of the following, is to be prepared and submitted. The exercises are to be drawn in pencil with photocopied representation of source materials where necessary. All texts are to be handwritten.*

1. Interpretation of daily weather map of India (any one): Pre-Monsoon or Monsoon or Post-Monsoon [20]
2. Construction and interpretation of hythergraph, climograph (G. Taylor) and wind rose (seasonal) [20]
3. Determination of soil type by ternary diagram textural plotting [10]
4. Preparation of peoples' biodiversity register [10]
5. Viva-voce based on laboratory notebook (5 Marks)

#### References

Monkhouse, F.J., Wilkinson, H.R. 1971. Maps and Diagrams: Their Compilation and Construction, 3rd ed (2017 reprint), Alphaneumera-Kolkata.

Sarkar, A. 2015. Practical Geography: A Systematic Approach, 3rd ed, Orient Blackswan.

Singh, R.L., Singh, R.P.B. 2008. Elements of Practical Geography, Kalyani Publishers.

USDA: United States Department of Agriculture. 2014. Soil Survey and Laboratory Methods Manual, Soil Survey Investigations Report No. 51.

**5.5 GEO-G-CC-3-03-TH – Human Geography** ✧ 60 Marks / 4 Credits**Unit I: Economic Geography**

1. Sectors of the economy: Primary, Secondary, Tertiary and Quaternary. Factors affecting location of economic activities [5]
2. Location of economic activities: Theories of von Thünen, Lösch, and Weber [5]
3. Location of industries with special reference to India: Cotton, Iron and Steel [5]
4. Globalisation and integration of world economies [5]

**Unit II: Social Geography**

5. Human Society: Structure, functions, social systems. Population and migration: overview, causes and effects [5]
6. Types and characteristics of social organisations: Primitive, hunting–gathering, agrarian, industrial [5]
7. Race, Language and Religion: Origin, characteristics and spatial variations [6]
8. Social Issues: Diversity, conflict and transformation [5]

**Unit III: Cultural Geography**

1. Carl Sauer: cultural landscape and its elements [6]
2. Rural and urban settlements: Differentiation in cultural landscapes [5]
3. Cultural regions and cultural realms [5]
4. Diffusion of culture and innovations [4]

**References:**

- Aoyama, Y., Murphy, J.T., Hanson, S. 2010. *Key Concepts in Economic Geography*, Sage.
- Chandna, R.C. 2016. *Geography of Population: Concepts, Determinants and Patterns*, Kalyani Publishers.
- Coe N. M., Kelly P. F. and Yeung H. W., 2007: *Economic Geography: A Contemporary Introduction*, Wiley-Blackwell.
- Fouberg, E.H., Murphy, A.B., de Blij H.J. 2015. *Human Geography: People, Place, and Culture*, 11th ed, Wiley.
- Ghosh, S. 1998. *Introduction to Settlement Geography*, Sangam Books Ltd.
- Gregory, D., Johnston, R., Pratt, G., Watts, M., Whatmore, S. (Eds) 2009. *The Dictionary of Human Geography*, 5th ed, Wiley.
- Knox, P.L., Marston, S.A. 2014. *Human Geography: Places and Regions in Global Context*, 6th ed, Pearson Education Limited.
- Knox, P.L., McCarthy, L.M. 2011. *Urbanization: An Introduction to Urban Geography*, 3rd ed, Pearson Education Ltd.
- Moseley, W.G., Perramond, E., Hapke, H.M., Laris, P. 2013. *An Introduction to Human-Environment Geography: Local Dynamics and Global Processes*, Wiley-Blackwell.
- Norton, W. 2014. *Human Geography*, 8th ed, Oxford University Press.

Rubenstein, J.M. 2016. *The Cultural Landscape: An Introduction to Human Geography*, 12th ed, Pearson Education Limited.

Short, R.J. 2017. *Human Geography: A Short Introduction*, 2nd ed, Oxford University Press.

Wheeler, J.O., Muller, P.O., Thrall, G.I., Fik, T.J. 1998. *Economic Geography*, 3rd ed, Wiley.

Willington D. E., 2008: *Economic Geography*, Husband Press.

Wood, A., Roberts, A. 2010. *Economic Geography: Places, Networks and Flows*, Routledge.

## 5.6 GEO-G-CC-3-03-P– Human Geography Lab ✧ 30 Marks / 2 Credits

*A laboratory notebook, comprising class assignments of the following, is to be prepared and submitted. The exercises are to be drawn in pencil with photocopied representation of source materials where necessary. All texts are to be handwritten.*

1. State-wise variation in occupational structure by proportional divided circles [15]
2. Time series analysis of industrial production using any two manufactured goods from India [20]
3. Measuring arithmetic growth rate of population comparing two datasets [15]
4. Nearest neighbour analysis: Rural example from Survey of India 1:50k topographical maps [10]
5. Viva-voce based on laboratory notebook (5 Marks)

### References

#### BOOKS:

Hassan, M.I. 2005. *Population Geography*, Rawat publications.

Knowles, R. and Wareing, J. 1990. *Economic and Social Geography*, Made Simple Books.

Mahmood, A. 1998. *Statistical Methods in Geographical Studies*, Rajesh Publication.

Monkhouse, F.J., Wilkinson, H.R. 1971. *Maps and Diagrams: Their Compilation and Construction*, 3rd ed (2017 reprint), Alphaneumera-Kolkata.

Singh, R.L., Singh, R.P.B. 2008. *Elements of Practical Geography*, Kalyani Publishers.

Sarkar, A. 2015. *Practical Geography: A Systematic Approach*, 3rd ed, Orient Blackswan Private Ltd.

#### WEBSITES:

Census of India: [censusindia.gov.in](http://censusindia.gov.in)

Open Government of India Data Platform: [data.gov.in](http://data.gov.in)

Trending Economics (India's industrial production): [tradingeconomics.com/india/industrial-production](http://tradingeconomics.com/india/industrial-production)

**5.7 GEO-G-CC-4-04-TH – Cartography** ✧ 60 Marks / 4 Credits**Unit I: Scale and Projections**

1. Maps: Classification and types. Scales: Types, significance, and applications [3]
2. Coordinate systems: Polar and rectangular. Bearing: Magnetic and true, whole-circle and reduced [3]
3. Map projections: Classification, properties and uses. Concept and significance of UTM projection [8]

**Unit II: Topographic and Thematic Maps**

4. Survey of India topographical maps: Reference scheme of old and open series. Information on the margin of maps [4]
5. Representation of data by dots and proportional circles [4]
6. Representation of data by isopleth and choropleth [4]
7. Principal national agencies producing thematic maps in India: GSI, NATMO, NBSSLUP, NHO, and NRSC. Acquaintance with Bhuvan platform [5]

**Unit III: Remote Sensing and Geographical Information System**

8. Basics of Remote Sensing: Types of satellites, sensors, bands, and resolutions with special reference to the ISRO missions [10]
9. Principles of preparing standard FCCs and classified raster images [5]
10. Principles of Geographical Information System: Concepts of vector types, attribute tables, buffers, and overlay analysis [6]

**Unit IV: Surveying**

11. Basic concepts of surveying and survey equipment: Prismatic compass [6]
12. Basic concepts of surveying and survey equipment: Dumpy level [6]

**References**

## Books:

- Basak, N.N. 2017. Surveying and Levelling, 2nd ed, McGraw Hill Education.
- Bhatta, B. 2011. Remote Sensing and GIS, 2nd ed, Oxford Univ. Press.
- Joseph, G. and Jegannathan, C. 2018. Fundamentals of Remote Sensing, 3rd ed, Universities Press.
- Kanetkar, T.P., Kulkatni, S.V. 1988. Surveying and Levelling, Part I, Pune Vidyarthi Griha Prakashan.
- Kimerling, A.J., Buckley, A.R., Muehrcke, P.C., Muehrcke, J.O. 2011. Map Use: Reading, Analysis, Interpretation, 7th ed, Esri Press.
- Monkhouse, F.J., Wilkinson, H.R. 1971. Maps and Diagrams: Their Compilation and Construction, 3rd ed (2017 reprint), Alphaneumera-Kolkata.
- Sarkar, A. 2015. Practical Geography: A Systematic Approach, 3rd ed, Orient Blackswan Private Ltd.
- Singh, R.L., Singh, R.P.B. 2008. Elements of Practical Geography, Kalyani Publishers.

Vaidyanadhan, R., Subbarao, K.V. 2014. Landforms of India from Topomaps and Images, Geological Society of India.

WEBSITES:

Geological Survey of India: [www.gsi.gov.in](http://www.gsi.gov.in)

Indian Naval Hydrographic Department: [www.hydrobharat.nic.in](http://www.hydrobharat.nic.in)

National Bureau of Soil Survey and Land Use planning: [www.nbsslup.in](http://www.nbsslup.in)

Survey of India: [www.surveyofindia.gov.in](http://www.surveyofindia.gov.in)

International Society for Photogrammetry and Remote Sensing: [www.isprs.org](http://www.isprs.org)

ISRO Bhuvan 2D Platform: [bhuvan.nrsc.gov.in/map/bhuvan/bhuvan2d.php](http://bhuvan.nrsc.gov.in/map/bhuvan/bhuvan2d.php)

NASA Landsat Science: [www.landsat.gsfc.nasa.gov](http://www.landsat.gsfc.nasa.gov)

National Remote Sensing Centre: [www.nrsc.gov.in](http://www.nrsc.gov.in)

USGS Global Visualization Viewer: [www.glovis.usgs.gov](http://www.glovis.usgs.gov)

## 5.8 GEO-G-CC-4-04-P – Cartography Lab ✧ 30 Marks / 2 Credits

*A laboratory notebook, comprising class assignments of the following, is to be prepared and submitted. The exercises are to be drawn in pencil with photocopied representation of source materials where necessary. All texts are to be handwritten.*

1. Graphical construction of scales: Plain and comparative [10]
2. Construction of projections: Simple Conic with one standard parallel, Cylindrical Equal Area,, and Polar Zenithal Stereographic [20]
3. Construction of thematic maps: Proportional squares, proportional circles, choropleths, and isopleths [20]
4. Preparation of annotated thematic overlays from satellite standard FCCs of 1:50k [10]
5. Viva-voce based on laboratory notebook (5 Marks)

### References

- Basak, N.N. 2017. Surveying and Levelling, 2nd ed, McGraw Hill Education.
- Kanetkar, T.P., Kulkatni, S.V. 1988. Surveying and Levelling, Part I, Pune Vidyarthi Griha Prakashan.
- Monkhouse, F.J., Wilkinson, H.R. 1971. Maps and Diagrams: Their Compilation and Construction, 3rd ed (2017 reprint), Alphaneumera-Kolkata.
- Robinson, A.H., Morrison, J.L., Phillip, C.M., Kimerling, A.J., Guptill, S.C. 1995. Elements of Cartography, 6th ed, Wiley.
- Sarkar, A. 2015. Practical Geography: A Systematic Approach, 3rd ed, Orient Blackswan Private Ltd.
- Singh, R.L., Singh, R.P.B. 2008. Elements of Practical Geography, Kalyani Publishers.
- Subramanian, R. 2012. Surveying and Levelling, 2nd ed, Oxford University Press