UNIVERSITY OF CALCUTTA

Notification No.CSR/22/2023

It is notified for information of all concerned that in terms of the provisions of Section 54 of the Calcutta University Act, 1979, (as amended), and, in exercise of her powers under 9(6) of the said Act, the Vice-Chancellor has, by an order dated 31.07.2023 approved the syllabus of the under mentioned subjects semester wise Four-year (Honours & Honours with Research) /Three-year (Multidisciplinary) /Four-year (Honours with core Vocational) programme of U.G. courses of studies, as applicable under CCF,2022, under this University, as laid down in the accompanying pamphlet.

1. **Geography**
2. **Physical Education**
3. **Film Studies**
4. **Fine Arts**
5. **History (Revised syllabus after incorporating some amendments, in the syllabus published in CSR/13/23, dt.12.7.23)**
6. **Islamic History & Culture (Revised syllabus after incorporating some amendments, in the syllabus published in CSR/13/23,dt.12.7.23)**
7. **Persian (Revised syllabus after incorporating some amendments, in the syllabus published in CSR/20/23, dt.28.7.23)**
8. **Computer Application. (Honours with core Vocational)**

The above shall take effect from the academic session 2023-2024.

SENATE HOUSE
Kolkata-700073
The 2nd August ,2023

2/8/2023
Prof.(Dr.) Debasis Das
Registrar

Curriculum & Credit Framework for Undergraduate Courses in Geography

v.1

TO BE EFFECTIVE FROM THE ACADEMIC SESSION 2023-24

University of Calcutta
July, 2023

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Curriculum & Credit Framework for Undergraduate Courses in Geography under National Education Policy of 2020

INTRODUCTION: In compliance with directives on the Curriculum & Credit Framework from the University Grants Commission, the undergraduate syllabus for Geography is reframed under the National Education Policy of 2020. In a major deviation from its previous versions, the current syllabus uniquely caters to the students' requirement of education levels that would help them to balance between their professional and educational aspirations.

The four-year curriculum has four exit options that are hierarchically related to the level of education at the end of second, fourth, sixth, and eighth semesters — i.e., at the completion of the first, second, third, and fourth years of the course. These would relate to the award of • certificates, • diplomas, • BA/BSc degrees, and • BA/BSc with honours degrees, respectively. The course would also provide an opportunity to do research in the final year (Semester- 7 & -8) for the meritorious students.

The present curriculum of Geography is designed to give the students a holistic understanding of the subject at every year of exit from the second year onwards, putting equal weightage to the core content and techniques used in Geography. The syllabus also tried to give similar importance to the two main branches of Geography: Physical and Human. Its principal goal of is to enable the students to secure a job at the end of the undergraduate programme. Keeping this in mind and in tune with the changing nature of Geography, adequate emphasis is rendered on applied aspects of the subject such as emerging techniques of mapping and field-based data generation, especially in the honours course.

LEARNING OUTCOMES: The syllabus is designed to impart basic knowledge on geography as a spatial science and train the undergraduates to secure employment in the sectors like geospatial analysis, developmental planning, and environment management.

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Curriculum Structure

Papers & Courses

Honours (H) **Papers**: **25** in 8 Semesters of H-CC-Major (Mj) **4** in 6 Semesters of H-CC-Minor (Mn)	**Multidisciplinary** (MD) **Papers**: **8** in 8 Semesters of MD-CC-Major (Mj) **6** in 4 Semesters of MD-CC-Minor (Mn)	**Semesters**				**Subjects / Subdisciplines:** **25** in 8 Semesters of H-CC-Major (Mj) **4** in 6 Semesters of H-CC-Minor (Mn) **8** in 8 Semesters of MD-CC-Major (Mj) **6** in 4 Semesters of MD-CC-Minor (Mn)	**Paper Components:** Th / P / Tu *	
		H-CC-Mj	H-CC-Mn	MD-CC-Mj	MD-CC-Mn			
GEOG-H-CC**01**	GEOG-MD-CC**01**	1	1/3	1	3	Physical Geography	Th	P
GEOG-H-CC**02**	GEOG-MD-CC**02**	2	2/4	2	4	Human Geography	Th	P
GEOG-H-CC**03**	—	3	—	—	—	Geotectonics	Th	P
GEOG-H-CC**04**	GEOG-MD-CC**03**	3	5	3	5	Economic Geography	Th	P
GEOG-H-CC**05**	GEOG-MD-CC**04**	4	6	4	5	Geomorphology	Th	P
GEOG-H-CC**06**	GEOG-MD-CC**05**	4	—	4	6	Climatology	Th	P
GEOG-H-CC**07**	—	4	—	—	—	Social Geography	Th	P
GEOG-H-CC**08**	—	4	—	—	—	Cartographic Techniques	Th	P
GEOG-H-CC**09**	GEOG-MD-CC**06**	5	—	5/6		Hydrology and Oceanography	Th	P
GEOG-H-CC**10**	GEOG-MD-CC**07**	5	—	5	6	Cultural and Settlement Geography	Th	P
GEOG-H-CC**11**	—	5	—	—	—	Hazard Management	Th	Tu
GEOG-H-CC**12**	—	5	—	—	—	Cartograms, Thematic Mapping and Surveying	Th	P
GEOG-H-CC**13**	—	6	—	—	—	Soil and Biogeography	Th	P
GEOG-H-CC**14**	GEOG-MD-CC**08**	6	—	6	—	India and West Bengal	Th	P
GEOG-H-CC**15**	—	6	—	—	—	Remote Sensing, GIS, and GNSS	Th	P
GEOG-H-CC**16**	—	7	—	—	—	Philosophy of Geography	Th	P
GEOG-H-CC17	—	7	—	—	—	Resource Geography	Th	P
GEOG-H-CC18	—	7	—	—	—	Environmental Issues in Geography	Th	P
GEOG-H-CC19	—	7	—	—	—	Statistical Methods in Geography	Th	P
GEOG-H-CC20	—	7	—	—	—	Research Methodology and Fieldwork	Th	P
GEOG-H-CC21	—	8	—	—	—	Watershed and Coastal Management	Th	P
GEOG-H-CC**22**	—	8	—	—	—	Historical and Political Geography	Th	Tu
GEOG-H-CC**23**	—	8	—	—	—	Population and Welfare Geography	Th	P
GEOG-H-CC**24**	—	8	—	—	—	Rural and Urban Geography	Th	P
GEOG-H-CC**25**	—	8	—	—	—	Regional Development and Planning	Th	P
GEOG-H-SEC**01**	GEOG-MD-SEC**01**	1	1	1/2/3		Methods in Geography	Th	—
GEOG-H-SEC**02**		3	—	—	—	Environmental Impact Assessment and Environment Management Planning	Th	—
GEOG-H-IDC**01**	GEOG-MD-IDC**01**	—	1/2/3	—	—	Geomatics and Spatial Analysis	Th	P

* Paper Components with marks, credits, and minimum number of periods to be allotted:

Th : Theory – 75 Marks / 3 Credits (DSC/CC Papers): [45] Periods; 100 Marks / 4 Credits (SEC Papers): [60] periods; 50 Marks / 2 Credits (IDC Papers): [30] periods

P : Practical – 25 Marks / 1 Credit: [30] Periods

Tu : Tutorial – 25 Marks / 1 Credit: [30] Periods

Papers & Credits: Honours (H) Course [1]

Semester ⇩	**Major Discipline Specific Course** (H-DSC/CC Major)	**Minor Discipline Specific Course** (H-DSC/CC Minor) [2]	**Interdisciplinary Course** (IDC) [3]	**Ability Enhancement Course** (AEC)	**Skill Enhancement Course** (SEC)	**Common Value Added Course** (CVAC)	**Summer internship**	**Dissertation / Research work**	**Total Credit** (incl 2nd DSC Minor course)[2]
	25 papers × 4 credits = 100 credits	4 papers × 4 credits = 16 credits	3 papers × 3 credits = 9 credits	4 papers × 2 credits = 8 credits	3 papers × 4 credits = 12 credits	4 papers × 2 credits = 8 credits	1 paper × 3 credits = 3 credits	(1 × 4 = 4) + (1 × 8 = 8) = 12 credits	172
1	GEOG-H-CC**01**-1-Th & P Physical Geography	GEOG-H-CC**01**-1-Th & P Physical Geography (as 1st minor subject)	GEOG-IDC**01**-Th & P Geomatics and Spatial Analysis	1 × 2 = 2 From central pool	GEOG-H-SEC**01**-1-Th Methods in Geography	2 × 2 = 4 From central pool	—	—	21
2	GEOG-H-CC**02**-2-Th & P Human Geography	GEOG-H-CC**02**-2-Th & P Human Geography (as 1st minor subject)	GEOG-IDC**01**-Th & P Geomatics and Spatial Analysis	1 × 2 = 2 From central pool	1 × 4 = 4 From central pool	2 × 2 = 4 From central pool	Summer Internship to be completed by students exiting after Semester-2	—	21
3	GEOG-H-CC**03**-3-Th & P Geotectonics GEOG-H-CC**04**-3-Th & P Economic Geography	GEOG-H-CC**01**-3-Th & P Physical Geography (as 2nd minor subject)	GEOG-IDC**01**-Th & P Geomatics and Spatial Analysis	1 × 2 = 2 From central pool	GEO-SEC**02**-3-Th EIA & EMP	—	—	—	21
4	GEOG-H-CC**05**-4-Th & P Geomorphology GEOG-H-CC**06**-4-Th & P Climatology GEOG-H-CC**07**-4-Th & P Social Geography GEOG-H-CC**08**-4-Th & P Cartographic Techniques	GEOG-H-CC**02**-4-Th & P Human Geography (as 2nd minor subject)	—	1 × 2 = 2 From central pool	—	—	Summer Internship to be completed by students exiting after Semester-4	—	22
5	GEOG-H-CC**09**-5-Th & P Hydrology and Oceanography GEOG-H-CC**10**-5-Th & P Cultural and Settlement Geography GEOG-H-CC**11**-5-Th & P Hazard Management GEOG-H-CC**12**-5-Th & P Thematic Mapping and Surveying	GEOG-H-CC**04**-5-Th & P Economic Geography	—	—	—	—	—	—	24

NOTES: 1. *Exit Options*: • At the end of Semester 2 for award of *Certificate* (45 credits). • At the end of Semester 4 for award of *Diploma* (88 credits). • At the end of Semester 6 for award of *BA/BSc Single Major Degree* (128 credits)• At the end if Semester-8 for *BA / BSc Honours* degree (172 credits). • Candidates obtaining ≥75% of total credits / marks at the end of Semester 6 may opt for pursuing *BA / BSc Honours with Research* degree — see notes in Semester-7 and -8 rows in the next page. See note 5 in page viii for completion requirement of the 3-credit Summer Internship.

2. Two DSC/CC minor subjects are to be selected from the central pool for Geography Honours students. For students having honours in other subjects, Geography may be selected as 1st minor subject or 2nd minor subject. The first two papers of the minor course are to be taught in Semesters-1 & 2 (Semesters 3 & 4) if Geography is opted as 1st (2nd) minor subject.

3. Three IDC papers are to be selected from a pool of subjects. 'Geomatics and Spatial Science' can be taken in any of the Semesters 1, 2, and 3 by students who do not have Geography as DSC/CC.

Abbreviations: **Th**: Theory, **P**: Practical, **Tu**: Tutorial

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Semester ⇩	**Major Discipline Specific Course** (H-DSC/CC Major)	**Minor Discipline Specific Course** (H-DSC/CC Minor)	**Interdisciplinary Course** (IDC)	**Ability Enhancement Course**(AEC)	**Skill Enhancement Course** (SEC)	**Common Value Added Course** (CVAC)	**Summer internship** (SI)	**Dissertation / Research work**	**Total Credit** (incl 2nd DSC Minor course)[2]
6	GEOG-H-CC**13**-6-Th & P Soil and Biogeography GEOG-H-CC**14**-6-Th & P India and West Bengal GEOG-H-CC**15**-6-Th & P Remote Sensing, GIS, and GNSS	GEOG-H- CC**05**-6-Th & P Geomorphology	–	–	–	–	Summer Internship to be completed by students exiting after Semester-6	–	23
7	GEOG-H-CC**16**-7-Th & P Philosophy of Geography GEOG-H-CC**17**-7-Th & P Resource Geography GEOG-H-CC**18**-7-Th & P Environmental Issues in Geography GEOG-H-CC**19**-7-Th & P Statistical Methods in Geography GEOG-H-CC**20**-7-Th & P Research Methodology and Fieldwork	–	–	–	–	–	–	1 × 4* NOTE: Candidates who pursue Dissertation / Research Work need not study one DSC Major paper of 4 credits —they will study four DSC papers in all	20
8	GEOG-H-CC**21**-8-Th & P Watershed and Coastal Management GEOG-H-CC**22**-8-Th & Tu Historical and Political Geography GEOG-H-CC**23**-8-Th & P Population and Welfare Geography GEOG-H-CC**24**-8-Th & P Rural and Urban Geography GEOG-H-CC**25**-8-Th & P Regional Development and Planning	–	–	–	–	–	Summer Internship to be completed by students exiting after Semester-8	1 × 8* NOTE: Candidates who pursue Dissertation / Research Work need not study two DSC Major papers of 4 credits each — they will study three DSC papers in all	20
Credits	25 × 4 = 100 / * 22 × 4 = 88	8 × 4 = 32	3 × 3 =9	4 × 2 =8	3 × 4 = 12	4 × 2 =8	1 × 3 = 3	*(1 × 4) + (1 × 8) = 12	172
Marks	25 × 100 = 2500 * 22 × 100 = 2200	8 × 100 = 800	3 × 75 = 225	4 × 50 = 200	3 × 100 = 300	4 × 50 = 200	1 × 75 = 75	*1 × 100 + 1 × 200 = 300	Total Marks: 4300

Papers & Credits: Multidisciplinary (MD) Course [1]

Semester ⇩	Major Discipline Specific Course (MD-DSC/CC Major) [2]	Minor Discipline Specific Course (MD-DSC/CC Minor) [2]	Interdisciplinary Course (IDC) [3]	Ability Enhancement Course (AEC)	Skill Enhancement Course (SEC) [4]	Common Value Added Course (CVAC)	Summer internship [5]	Total Credit (including 2nd DSC Major course) [2]
	8 papers × 4 credits = 32 credits	6 papers × 4 credits = 24 credits	3 papers × 3 credits = 9 credits	4 papers × 2 credits = 8 credits	3 papers × 4 credits = 12 credits	4 papers × 2 credits = 8 credits	1 paper × 3 credits = 3 credits	124
1	GEOG-MD-CC**01**-1-Th & P Physical Geography	—	GEOG-IDC**01**-Th & P Geomatics and Spatial Analysis	1 × 2 = 2 From central pool	GEOG-MD-SEC**01**-1-Th Methods in Geography	2 × 2 = 4 From central pool	—	21
2	GEOG-MD-CC**02**-2-Th & P Human Geography	—	GEOG-IDC**01**-Th & P Geomatics and Spatial Analysis	1 × 2 = 2 From central pool	GEOG-MD-SEC**01**-1-Th Methods in Geography	2 × 2 = 4 From central pool	Summer Internship to be completed by students exiting after Semester-2	21
3	GEOG-MD-CC**03**-3-Th & P Economic Geography	GEOG-MD-CC**01**-3-Th & P Physical Geography	GEOG-IDC**01**-Th & P Geomatics and Spatial Analysis	1 × 2 = 2 From central pool	GEOG-MD-SEC**01**-1-Th Methods in Geography	—	—	21
4	GEOG-MD-CC**04**-4-Th & P Geomorphology GEOG-MD-CC**05**-4-Th & P Climatology	GEOG-MD-CC**02**-4-Th & P Human Geography	—	—	—	—	Summer Internship to be completed by students exiting after Semester-4	22
5	GEOG-MD-CC**06**-5-Th & P Hydrology and Oceanography [6] GEOG-MD-CC**07**-5-Th & P Cultural and Settlement Geography	GEOG-MD-CC**03**-5-Th & P Economic Geography GEOG-MD-CC**04**-5-Th & P Geomorphology	—	—	—	—	—	20
6	GEOG-MD-CC**08**-6-Th & P India and West Bengal	GEOG-MD-CC**05**-6-Th & P Climatology GEOG-MD-CC**07**-6-Th & P Cultural and Settlement Geography	—	—	—	—	Summer Internship to be completed by students exiting after Semester-6	
Credits	8 × 4 = 32	6 × 4 =24	3 × 3 =9	4 × 2 = 8	3 × 4 =12	4 × 2 = 8	3	128
Marks	8 × 100 = 800	6 × 100 = 600	3 × 75 = 225	4 × 50 = 200	3 × 100 = 300	4 × 50 = 200	—	3200

NOTES: 1. *Exit Options*: • At the end of Semester 2 for award of *Certificate* (45 credits). • At the end of Semester 4 for award of *Diploma* (88 credits). • At the end of Semester 6 for award of *BA/BSc Degree* (128 credits).

2. Geography may be selected as one of the three DSC (Core) subjects, as major (eight papers: CC-1 or CC-2) or as minor (six papers: CC-3).
3. Three IDC papers are to be selected from a pool of subjects. 'Geomatics and Spatial Science' can be taken in any of the Semesters 1, 2, and 3 by students who do not have Geography as CC.
4. Three different SEC papers are to be selected in Semester-1, -2, or -3 against the three major and minor subjects
5. The 3-credit Summer Internship is to be completed by the end of the Semester-2, -4, and -6 for the students opting for Certificate Course, Diploma Course, and BA/BSC Degree Course, respectively.
6. If Geography is selected as CC-2 subject, GEOG-MD-CC**6** is to be studied in Semester 6 besides GEOG-MD-CC**8**

Abbreviations: **Th**: Theory, **P**: Practical

DISCIPLINE SPECIFIC COURSES (CC): HONOURS & MULTIDISCIPLINARY

SEMESTERS – 1/3 (for H & MD)

GEOG-H-CC01/MD-CC01-1/3-Th – Physical Geography – 75 Marks / 3 Credits

Unit I: Cartography

1. Concept and applications of scales and projections. Components and classification of maps [5]

Unit II: Geotectonics

2. Seismic waves and internal structure of the earth [3]

Unit III: Geomorphology

3. Classification of weathering and agents of erosion [5]
4. Fluvial processes and landforms [5]

Unit IV: Climatology

5. Nature, composition, and layering of the atmosphere [4]
6. Circulation in the atmosphere: Planetary winds, jet streams, and index cycle [5]

Unit V: Soil Geography

7. Factors of soil formation [4]
8. Evolution of an ideal soil profile [4]

Unit VI: Biogeography

9. Plant adaptation and distribution in relation to water availability [5]

Unit VII: Geography of Hazards

10. Nature and classification of hazards and disasters in Indian context [5]

References

Ahrens, C.D. 2023. 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.

Coch, N.K. 1994. Geohazards: Natural and Human, Pearson College.

Critchfield, H. J. 1983. General Climatology. Prentice Hall India Ltd (2010 Reprint).

Franzmeier, D.P., McFee, W.W., Graveel, J.G., Kohnke, H. 2016. Soil Science Simplified, 5th ed, Waveland Press.

Hyndman, D., Hyndman, D. 2016. Natural Hazards & Disasters, 5th ed, Cengage Learning.

Huggett, R., Shuttleworth, E., 2022. Fundamentals of Geomorphology, 5th ed, Routledge.

Kale, V.S., Gupta, A. 2001. Introduction to Geomorphology, Orient Blackswan.

Kapur, A. 2010. Vulnerable India: A Geographical Study of Disasters, Sage.

Lal, D.S. 2012. Climatology. Sharda Pustak Bhawan.

Lomolino, M.V., Riddle, B.R., Whittaker, R.J. 2016. Biogeography, 5th ed, Oxford University Press.

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

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

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

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

Smith, K. 2013. Environmental Hazards: Assessing Risk and Reducing Disaster, 6th ed, Routledge.

Strahler, A. 2013. Introducing Physical Geography, 6th ed., Wiley.

Weil, R.R., Brady, N.C. 2022. The Nature and Properties of Soils, 15th ed, Pearson Education.

GEOG-H-CC01/MD-CC01-1/3-P – Physical Geography Lab – 25 Marks / 1 Credit

An A3- or tabloid-size 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, comparative, diagonal, and vernier [10]
2. Delineation of drainage basins on Survey of India 1:50k topographical maps. Determining stream ordering (Strahler), and bifurcation ratio in a drainage basin (c. 5' x 5') [10]
3. Identification of drainage and channel patterns from Survey of India 1:50k topographical maps [6]
4. Construction and interpretation of wind rose diagram [4]
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.

Basu, P. 2021. Advanced Practical Geography — a Laboratory Manual, 4 ed, Books and Allied.

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.

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

SEMESTERS – 2 /4 (for H & MD)

GEOG-H-CC02/MD-CC02-2/4-Th – Human Geography – 75 Marks / 3 Credits

Unit I: Scope and Approaches

1. Elements of human geography: Nature, scope, and recent trends [4]
2. Human geography schools of thought: Resource, locational, landscape, environment [6]

Unit II: Social Geography

3. Evolution of human societies: Hunting and food gathering, pastoral nomadism, subsistence farming, and industrial society [6]
4. Human adaptation to the environment: Chenchu, Toda, and Gond [6]
5. Evolution and characteristics of post-industrial urban societies [2]

Unit III: Population Geography

6. Demographic transition. Significance of demographic dividend [3]
7. Distribution, density, and growth of population in India [4]

Unit IV: Settlement Geography

8. Characteristics of settlements: Urban and rural [4]
9. Site, situation, types, and patterns of rural settlements [6]

Unit V: Urban Geography

10. Size-class classification of urban settlements after Census of India [4]

References

Ashok, A., Lakshmaiah, P.V. 2018. Tribes of India, vol. 1 &2, Telugu Akademi.

Bose, N.K. 2020. Tribal Life In India, 5th ed (updated by Tripathi, C.B.), National Book Trust.

Chandna R.C. 2022. Geography of Population, Part 1: Concepts, Determinants and World Patterns, Kalyani Publishers.

Dorrel, D., Henderson, P. 2018. Introduction to Human Geography. University of Georgia Press.

Fouberg, E.H., Nash, A.B., Murphy, A.B., de Blij, H., 2015. Human Geography: People, Place, and Culture, 11th ed, Wiley.

Ghosh S. 1998. An Introduction to Settlement Geography, Sangam Books Ltd.

Gregory, D., Johnston, R., Pratt, G., Watts, K., Whatmore, S. (Eds) 2009. The Dictionary of Human Geography, 5th ed, Wiley-Blackwell.

Knox, P.L., Marston, S.A. 2014. Human Geography, Places and Regions in Global Context, 6th ed, Pearson Education.

Majumdar, P.K. 2013. India's Demography: Changing Demographic Scenario in India, Rawat Publications.

Mercier, M., Norton, W. 2019. Human Geography, 10th ed, Oxford University Press.

Paul, C., Crang, P., Goodwine, M.G. 2014, Introducing Human Geographies, 3rd ed, Routledge.

Rubenstein J.M., 2018, Contemporary Human Geography, 4th ed, Pearson.

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

Sing, R.Y. 2009, A Geography of Settlements, Rawat Publications.

GEOG-H-CC02/MD-CC02-2/4-P – Human Geography Lab – 25 Marks / 1 Credit

An A3- or tabloid-size laboratory notebook, comprising class assignments of the following is to be prepared and submitted. Census of India data are to be used where applicable. The exercises are to be drawn in pencil with photocopied representation of source materials where necessary. All texts are to be handwritten.

1. Growth rate of population: Arithmetic growth comparing two decadal datasets [6]
2. Representation and interpretation of population density of Indian states or West Bengal districts by choropleth method [8]
3. Identification of types of settlements according to sites from Survey of India 1:50k topographical maps [8]
4. Construction of proportional squares depicting number of houses [8]
5. Viva voce based on laboratory notebook (5 Marks)

References

BOOKS:

Basu, P. 2021. Advanced Practical Geography — a Laboratory Manual, 4 ed, Books and Allied.

Monkhouse F.J., Wilkinson H.R. 1971. Maps and Diagrams, their compilation and construction, 3rd ed (2017 reprint), Alphaneumera.

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.

WEBSITE:

Census of India: https://censusindia.gov.in/census.website/data/census-tables

SEMESTERS – 3/5 (for H & MD)

GEOG-H-CC03-3-Th – Geotectonics – 75 Marks / 3 Credits

1. Relative and absolute dating of rocks [4]
2. The geological time scale with special reference to the events of the Pleistocene[4]
3. Formation and structural differentiation of the earth [4]
4. Isostasy: Models of Airy, Pratt, and their applicability [5]
5. Plate Tectonics as a unified theory of global tectonics. Processes and landforms at plate margins and hotspots [7]
6. Genetic classification of mountains. Types of volcanic eruptions [4]
7. Major relief features of the ocean floor: Characteristics and origin according to Plate Tectonics [5]
8. Folds: Formation and classification [4]
9. Faults: Formation and classification [4]
10. Morphometric indices of tectonic activity: Basin asymmetry factor, transverse topographic symmetry factor, and mountain front sinuosity [4]

References

BOOKS:

Billings, M.P. 1971. Structural Geology, Pearson India.

Burbank, D.W. 2011. Tectonic Geomorphology, 2nd ed, Wiley India.

Frisch, W., Meschede, M., Blakey, R.C. 2022. Plate Tectonics: Continental Drift and Mountain Building, 2nd ed, Springer.

Fossen, H. 2016. Structural Geology, 2nd ed, Cambridge University Press.

Kearey, P., Klepeis, K.A., Vine, F.J. 2011. Global Tectonics, 3rd ed, Wiley-India

Knoll, A.H. 2021. A Brief History of Earth: Four Billion Years in Eight Chapters, Custom House.

Lutgens, F., Tarbuck, E., Tasa, D. 2017. Essentials of Geology, 13th ed, Pearson.

Schumm, S.A., Dumont, J.F., Holbrook, J.M. 2002. Active Tectonics and Alluvial Rivers, Cambridge University Press.

Strahler, A. 2013. Introducing Physical Geography, 6th ed, Wiley.

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

WEBSITES:

Geological Survey of India: https://www.gsi.gov.in

Geological Society of India: https://www.geosocindia.org

Plaleomap Project: www.scotese.com & www.youtube.com/user/cscotese

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

GEOG-H-CC03-3-P – Geotectonics Lab – 25 Marks / 1 Credit

An A3- or tabloid-size 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. Measurement of dip and strike using clinometer [5]
2. Megascopic identification of mineral samples: Bauxite, calcite, chalcopyrite, feldspar, galena, gypsum, hematite, magnetite, mica, quartz, talc, and tourmaline

   Megascopic identification of rock samples: Granite, dolerite, basalt, laterite, limestone, shale, sandstone, conglomerate, quartzite, slate, marble, schist, phyllite, and gneiss [6]
3. Analysis of tectonic activity from Survey of India 1:50k topographical maps: Basin asymmetry factor and transverse topographic symmetry factor [4]
4. Interpretation of geological maps with uniclinal structure, folds, unconformity, and intrusions [15]
5. Viva voce based on laboratory notebook (5 Marks)

References

Basu, P. 2021. Advanced Practical Geography — a Laboratory Manual, 4 ed, Books and Allied.

Bolton. T. 2009 (reprint). Geological Maps: Their Solution and Interpretation, Cambridge Univ. Press.

Burbank, D.W. 2011. Tectonic Geomorphology, 2nd ed, Wiley India.

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.

GEOG-H-CC04/MD-CC03-3/5-Th – Economic Geography – 75 Marks / 3 Credits

Unit I: Concepts

1. Economic Geography: Scope and approaches [4]
2. Concepts in economic geography: Goods and services, production, exchange and consumption; concept of economic man [5]

Unit II: Economic Activities

3. Classification of economic activities: Primary, secondary, tertiary, quaternary, and quinary [4]
4. Location of economic activities: Agriculture (after von Thünen) and industry (after Weber) [6]
5. Primary activities: Agriculture, forestry, fishing, and mining [6]
6. Secondary activities: Classification of manufacturing industries, special economic zones and technology parks [6]
7. Tertiary activities: Transport, trade and services [6]
8. Economic globalisation: Concepts and contemporary issues [2]
9. International trade, role of WTO [2]
10. Emergence of economic blocs (Post WW-II). BRICS: Evolution and significance [4]

References

BOOKS:

Adams, F.G., 2011. Globalization: Today and Tomorrow, Routledge.

Anderson, W.P. 2012. Economic Geography, Routledge.

Aoyama, Y., Murphy, J.T., Hanson, S. 2010. Key Concepts in Economic Geography, Sage.

Coe N. M., Kelly P.F. and Yeung H.W. 2019. Economic Geography: A Contemporary Introduction, 3rd ed, Wiley-Blackwell.

Combes P., Mayer T., Thisse J.F. 2008. Economic Geography: The Integration of Regions and Nations, Princeton University Press.

MacKinnon, D., Cumbers, A. 2019. An Introduction to Economic Geography: Globalisation, Uneven Development and Place, 3rd ed, Routledge.

Waters M. 2001. Globalization, Routledge.

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

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

WEBSITES:

BRICS: http://infobrics.org

World Trade Organisation: https://www.wto.org

United Nations: www.un.org/en

GEOG-H-CC04/MD-CC03-3/5-P – Economic Geography Lab – 25 Marks / 1 Credit

An A3- or tabloid-size laboratory notebook, comprising class assignments of the following is to be prepared and submitted. Census of India data are to be used where applicable. The exercises are to be drawn in pencil with photocopied representation of source materials where necessary. All texts are to be handwritten.

1. Construction and interpretation of gender-wise bar showing work participation rate [8] SS
2. Construction and interpretation of proportional divided circles showing state-wise variation in occupational structure [8] SS
3. Preparation of crop calendar. Construction and interpretation of ergograph [6] SG
4. Time series analysis of industrial production of India using moving average [8] SS
5. Viva voce based on laboratory notebook (5 Marks)

References

BOOKS:

Khullar, D.R. 2011. India: A Comprehensive Geography, Kalyani Publishers

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

Sharma, T.C. 2012. Economic Geography of India, Rawat Publications.

Saxena, H.M. 2005. Transport Geography, Rawat Publications.

WEBSITES:

Census of India: www.censusindia.gov.in

Government of India Data Platform: https://data.gov.in

Planning Commission (West Bengal Development Report 2010): https://www.scribd.com/document/433016798/sdr-wb1909-pdf

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

West Bengal District Statistical Handbooks: http://wbpspm.gov.in/publications/District%20Statistical%20Handbook

Wikipedia (Hierarchy of states): https://en.wikipedia.org/wiki/List_of_Indian_states_and_union_territories_by_GDP_per_capita

SEMESTERS – 4/6 (for H) & 4/5 (for MD)

GEOG-H-CC05/MD-CC04-4/5/6-Th – Geomorphology – 75 Marks / 3 Credits

1. Time and space in geomorphology: Schumm and Lichty's model. Landform ordering: Ga Scale of Tricart and Haggett [4]
2. Degradational processes: Classification of mass wasting, and resultant landforms [4]
3. Processes of entrainment, transportation, and deposition by different geomorphic agents [5]
4. Development of river network and landforms on uniclinal and folded structures. Surface expression of faults [6]
5. Development of river network and landforms on granites, basalts, and limestones [6]
6. Coastal processes and landforms [4]
7. Glacial and glacio-fluvial processes and landforms [4]
8. Aeolian and fluvio-aeolian processes and landforms [4]
9. Models on landscape evolution: Views of Davis, Penck, King, and Hack. Significance of systems approach [6]
10. Role of humans in landform development [2]

References

BOOKS:

Bierman, P.R., Montgomery, D.R., 2019. Key Concepts in Geomorphology, 2nd ed, W. H. Freeman.

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.

Gupta, A. 2011. Tropical Geomorphology, Cambridge University Press.

Harvey, A. 2022. Introducing Geomorphology: A Guide to Landforms and Processes, 2nd ed, Dunedin Academic Press.

Huggett, R., Shuttleworth, E., 2022. Fundamentals of Geomorphology, 5th ed, Routledge.

Kale, V.S., Gupta, A. 2001. Introduction to Geomorphology, Orient Blackswan (2018 reprint).

Knighton, A.D. 1998. Fluvial Forms and Processes: A New Perspective, Edward Arnold.

McCullagh, P. 1978. Modern Concepts in Geomorphology, Oxford University Press.

Szabó, J., Dávid, L., Lóczy, D. (Eds) 2010. Anthropogenic Geomorphology: A Guide to Man-made Landforms, Springer.

Selby, M.J. 1986. Earth's Changing Surface, Oxford University Press.

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

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

Thornbury, W.D. 1969. Principles of Geomorphology, 2nd ed, Wiley-India / CBS.

WEBSITES:

British Society for Geomorphology: www.geomorphology.org.uk

Indian Institute of Geomorphologists: www.indiageomorph.org

International Association of Geomorphologists: www.geomorph.org

GEOG-H-CC05/MD-CC04-4/5/6-P – Geomorphology Lab – 25 Marks / 1 Credit

An A3- or tabloid-size 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. Extraction and interpretation of geomorphic information from Survey of India 1:50k topographical maps of plateau region: Construction of relief profiles (superimposed, projected, and composite) [7]
2. Construction of relative relief map, slope map (after Wentworth), drainage density map on a delineated drainage basin (c. 5' x 5') [9]
3. Construction of hypsometric curve and derivation of hypsometric integer of a drainage basin (c. 5' x 5') of a plateau region [7]
4. Determination of channel sinuosity index (channel length/valley length measured through straight line) and braiding index of rivers from topographical maps (c. 10-km reach) [7]
5. Viva voce based on laboratory notebook (5 Marks)

References

Basu, P. 2021. Advanced Practical Geography — a Laboratory Manual, 4 ed, Books and Allied.

McCullagh, P. 1978. Modern Concept in Geomorphology, Oxford University Press.

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

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

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

GEOG-H-CC06/MD-CC05-4/5/6-Th – Climatology – 75 Marks / 3 Credits

Unit I: Elements of the Atmosphere

1. Insolation: Controlling factors. Heat budget of the atmosphere [3]
2. Temperature: horizontal and vertical distribution. Inversion of temperature: Types, causes and consequences [4]
3. Overview of climate change: Causes, trends, and predictions of global temperature rise since 1850 CE. Formation, depletion, restoration, and significance of the ozone layer [6]

Unit II: Atmospheric Phenomena and Climatic Classification

4. Condensation: Process and forms. Mechanism of precipitation: Bergeron-Findeisen theory, and collision & coalescence theory. Forms of precipitation [5]
5. Air mass: Typology, origin, characteristics, and modification [4]
6. Types of fronts. Frontogenesis and frontolysis [5]
7. Weather: Stability and instability, barotropic and baroclinic conditions [4]
8. Atmospheric disturbances: Tropical cyclones and thunderstorms [6]
9. Monsoon circulation and mechanism with reference to India [4]
10. Climatic classification after Köppen (1936) and Thornthwaite (1948) [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.

Critchfield, H. J. 1983. General Climatology. Prentice Hall India (2010 Reprint).

Dessler, A.E. 2021. Introduction to Modern Climate Change, 3rd ed, Cambridge University Press.

Hidore, J.J., Oliver, J.E., Snow, M., Snow, R. 2020. Climatology: An Atmospheric Science, 3rd ed, Pearson.

Lal, D.S. 2012. Climatology. Sharda Pustak Bhawan.

Lutgens, F.K., Tarbuck, E.J. 1998. The Atmosphere: An Introduction to Meteorology, 9th ed, Prentice-Hall.

Oliver, J.E., Hidore J.J. 2002. Climatology: An Atmospheric Science, Pearson Education India.

Rohli, R.V., Vega, A.J., 2017. Climatology, 4th ed, Jones & Bartlett Learning.

WEBSITES:

India Meteorological Department: https://mausam.imd.gov.in

Intergovernmental Panel on Climate Change: https://www.ipcc.ch

World Bank Climate Change Knowledge Portal: https://climateknowledgeportal.worldbank.org

World Meteorological Organization: https://public.wmo.int/en

GEOG-H-CC06/MD-CC05-4/5/6-P – Climatology Lab – 25 Marks / 1 Credit

An A3- or tabloid-size laboratory notebook, comprising class assignments of the following is to be prepared and submitted. India Meteorological Department data are to be used where applicable. The exercises are to be drawn in pencil with photocopied representation of source materials where necessary. All texts are to be handwritten.

1. Measurement of weather elements using analogue instruments: Mean daily temperature, air pressure, relative humidity, and rainfall [6]
2. Interpretation of a daily weather map of India (any two): Pre-Monsoon, monsoon, and post-monsoon [12]
3. Construction and interpretation of monthly rainfall dispersion diagram (quartile method). Climatic water budget [6]
4. Construction and interpretation of hythergraph and climograph (after Taylor) [6]
5. Viva voce based on laboratory notebook (5 Marks)

References

BOOKS:

Basu, P. 2021. Advanced Practical Geography — a Laboratory Manual, 4 ed, Books and Allied.

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.

WEBSITES:

India Meteorological Department: https://mausam.imd.gov.in

Climatological tables of observatories of India: https://www.imdpune.gov.in/library/public/Climatological%20Tables%201991-2020.pdf

GEOG-H-CC07-4-Th –Social Geography – 75 Marks / 3 Credits

Unit I: Concepts

1. Nature, scope, and content of Social Geography [4]
2. Social structure: caste and class. Social process: Urbanisation, industrialisation, and migration [6]
3. Social differentiation and region formation [3]

Unit II: Social Issues

4. Social indicators of development: Education and health [3]
5. Concepts of social justice and social security with examples from India [6]
6. Contemporary social issues: Gender related problems [4]
7. Social problems in urban areas: Poverty and crime [4]
8. Social problems in rural areas: Marginalisation and deprivation [4]
9. Social welfare schemes for tribes, women, and children [6]
10. Social segregation: A comparison between cities of global north and south [5]

References

Chandna, R.C. 2016. Geography of Population: Concepts, Determinants and Patterns, Kalyani Publishers.

Fouberg, E.H., Murphy, A.B., de Blij H.J. 2015. Human Geography: People, Place, and Culture, 11th ed, Wiley.

Gould, W.T.S. 2015. Population and Development, Routledge.

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.

Mandal, R.B. 2001. Introduction to Rural Settlement, 2nd ed, Concept Pub Co.

Majumdar, P.K. 2013. India's Demography: Changing Demographic Scenario in India, Rawat Publications.

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.

Pickering K. and Owen A. A. (1997): An Introduction to Global Environmental Issues, 2nd edition Rutledge, London.

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.

GEOG-H-CC07-4-P –Social Geography Lab – 25 Marks / 1 Credit

An A3- or tabloid-size 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. Preparation of human development index (after UNDP) [8]
2. Preparation of gender development index (after UNDP) [10]
3. Construction and interpretation of cartograms showing distribution of people living below poverty line in India [5]
4. Preparation of a questionnaire on socio-economic status / access to amenities in slum areas (rural or urban, as applicable) [7]
5. Viva voce based on laboratory notebook (5 Marks)

References

Books:

Basu, R., Bhaduri, S. (Eds) 2007. Contemporary Issues and Techniques in Geography, Progressive Publishers.

Basu, P. 2021. Advanced Practical Geography — a Laboratory Manual, 4 ed, Books and Allied.

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

Knowles, R., 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.

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

WEBSITE:

UNDP Human Development Report on India (2016):

https://hdr.undp.org/data-center/specific-country-data#/countries/IND
https://hdr.undp.org/data-center/country-insights#/ranks

GEOG-H-CC08-4-Th – Cartographic Techniques – 75 Marks / 3 Credits

1. Coordinate systems: Polar and rectangular [3]
2. Grids: Angular and linear systems of measurement [3]
3. Bearing: Magnetic and true, whole-circle and reduced [2]
4. Concept of geoid and spheroid with special reference to Everest and WGS-84. Conversion of angular distance to linear distance [4]
5. Map projections: Classification, properties and uses [10]
6. Properties, uses and limitations of projections: Polar Zenithal Stereographic, Simple Conic with one standard parallel, Bonne's, Cylindrical Equal Area, and Mercator's [5]
7. Concept and significance of UTM projection [3]
8. Representation of data using dots, spheres, and divided proportional circles [6]
9. Representation of data using isopleth, choropleth, and chorochromatic maps [6]
10. Survey of India topographical maps: Reference scheme of old and open series. Information on the margin of maps [3]

References

BOOKS

Kennedy, M., Kopp, S. 2001. Understanding Map Projections, Esri Press.

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.

Pearson II, F. 1990. Map Projections: Theory and Applications, 2nd ed, CRC Press.

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.

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

WEBSITES

Indian National Cartographic Association: www.incaindia.org

Survey of India: www.surveyofindia.gov.in

GEOG-H-CC08-4-P – Cartographic Techniques Lab – 25 Marks / 1 Credit

An A3- or tabloid-size 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. Construction of projections: Polar Zenithal Stereographic, Simple Conic with one standard parallel, Bonne's [8]
2. Construction of projections: Cylindrical Equal Area and Mercator's[6]
3. Construction and interpretation of thematic maps: Simple and composite line and bar graphs bar. Dots and spheres[8]
4. Construction and interpretation of thematic maps: Dasymetric density, isopleth, and chorochromatic maps[8]
5. Viva voce based on laboratory notebook (5 Marks)

References

Basu, P. 2021. Advanced Practical Geography — a Laboratory Manual, 4 ed, Books and Allied.

Kennedy, M., Kopp, S. 2001. Understanding Map Projections, Esri Press.

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.

Pearson II, F. 1990. Map Projections: Theory and Applications, 2nd ed, CRC Press.

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.

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

SEMESTERS – 5 (for H) & 5/6 (for MD)

GEOG-H-CC09/MD-CC06-5-Th – Hydrology and Oceanography – 75 Marks / 3 Credits

Unit-I: Hydrology

1. Systems approach in hydrology. Global hydrological cycle: Its physical and biological role [5]
2. Run off: controlling factors. Infiltration and evapotranspiration. Run off cycle [5]
3. Drainage basin as a hydrological unit. Principles of water harvesting and watershed management [5]
4. Groundwater: Occurrence and storage. Factors controlling groundwater recharge, discharge, and movement [5]

Unit-II: Oceanography

5. Physical and chemical properties of ocean water [4]
6. Ocean temperature and salinity: Distribution and determinants [4]
7. Water mass, T–S diagram [3]
8. Ocean circulation, wave, and tide [6]
9. Sea level change: Types, causes, and implications [4]
10. Marine resources: Classification and sustainable utilisation. Issues related to pollution of the ocean [4]

References

Dingman, S.L. 2015. Physical Hydrology, 3rd ed, Macmillan Publishing Co.

Fitts, C.R. 2002. Groundwater Science, Elsevier.

Garrison, T., Ellis, R. 2021. Oceanography: An Invitation to Marine Science, 10th ed, Cengage Learning.

Karanth, K.R., 1988: Ground Water: Exploration, Assessment and Development, Tata- McGraw Hill.

Nicolas, R. 2020. Introducing Hydrogeology, 2nd ed, Dunedin Academic Press.

Pinet, P.R. 2019. Invitation to Oceanography. 8th ed, Jones and Barlett Learning.

Pinneker, E.V. 2010. General Hydrogeology, Cambridge University Press.

Pugh, D., Woodworth, P. 2014. Sea-Level Science: Understanding Tides, Surges, Tsunamis and Mean Sea-Level Changes, 2nd ed, Cambridge University press.

Raghunath, H.M. 2006. Hydrology: Principles, Analysis, Design, 3rd ed, New Age International Publishers.

Reddy, P.J.R. 2014. A Textbook of Hydrology, University of Science Press.

Subramanya, K. 2013. Engineering Hydrology, McGraw Hill Education.

Sverdrup, K.A., Armbrust, E.V. 2008. An Introduction to the World's Oceans, 10th ed, McGraw Hill.

Todd, D.K., Larry, W.M. 2004. Groundwater Hydrology, John Wiley & Sons.

Ward, A.D., Trimble, S.W., Burckhard, S.R., Lyon, J.G. 2016. Environmental Hydrology, 3rd ed, CRC Press.

GEOG-H-CC09/MD-CC06-5-P – Hydrology and Oceanography Lab – 25 Marks / 1 Credit

An A3- or tabloid-size laboratory notebook, comprising class assignments of the following is to be prepared and submitted. Central Water Commission and India Meteorological Department data are to be used where applicable. The exercises are to be drawn in pencil with photocopied representation of source materials where necessary. All texts are to be handwritten.

1. Construction and interpretation of rating curves [3]
2. Construction and interpretation of hydrographs and unit hydrographs. Derivation of phi index and W index [11]
3. Construction and interpretation of ombrothermic graph and hyetograph [10]
4. Construction of Thiessen polygon from precipitation data [6]
5. Viva voce based on laboratory notebook (5 Marks)

References

BOOKS:

Basu, P. 2021. Advanced Practical Geography — a Laboratory Manual, 4 ed, Books and Allied.

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

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

Raghunath, H.M. 2006. Hydrology: Principles, Analysis, Design, 3rd ed, New Age International Publishers.

WEBSITES:

India Meteorological Department: https://mausam.imd.gov.in

Central Water Commission: https://cwc.gov.in

GEOG-H-CC10/MD-CC07-5/6-Th – Cultural and Settlement Geography – 75 Marks/3 Credits

Unit I: Cultural Geography

1. Definition, scope, and content of cultural geography [2]
2. Components and structure of culture [4]
3. Cultural hearths and realms: Distribution and characteristics [3]
4. Cultural diffusion: Types of cultural diffusion, innovation diffusion, Hagerstrand's model [6]
5. Diffusion of major world religions and languages [6]
6. Cultural segregation, diversity, and integration [4]

Unit II: Settlement Geography

7. Rural settlements: Evolution and morphology [5]
8. Rural house types with reference to India, social segregation in rural areas [5]
9. Urban settlements: Evolution; concepts of metropolis, megalopolis, conurbation, and agglomeration [3]
10. Urban morphology: Models of Burgess, Hoyt, and Harris & Ullman [7]

References

Banerjee Guha, S. (Ed.) 2004. Space, Society and Geography, Rawat Publication.

Bjelland, M.D., Montello, D.R., Fellmann, J.D., Getis, A., Getis, J. 2000. Human Geography: Landscape of Human Activity, McGraw Hill.

Carter, H. 1995. The Study of Urban Geography, 4th ed, Arnold.

Dhanagare, D.N. 2004. Themes and Perspectives in Indian Sociology, Rawat Publication.

Fern, R.L. 2002. Nature, God and Humanity, Cambridge University Press.

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.

Gottdiener, M., Budd, M. Lehtovuori, P. 2016. Key Concepts in Urban Studies, 2nd ed, Sage.

Gregory, D., Johnston, R., Pratt, G., Watts, M., Whatmore, S. (Eds) 2009. The Dictionary of Human Geography, 5th ed, Wiley.

Haggett, P. 1975. Geography: A Modern Synthesis, Harper and Row Publishers.

Hudson, F.S. 1970. Geography of Settlements, Macdonald and Evans Ltd.

Hussain, M. 2007. Models in Geography, Rawat Publication.

Jordan, T., Rowntree, L. 1990. Human Mosaic, Harper Collins Publishers.

Knox, P., Pinch, S. 2000. Urban Social Geography, Pearson Education.

Mandal, R.B. 2001. Introduction to Rural Settlement, 2nd ed, Concept Publishing Company.

Mitchell, D. 2000. Cultural Geography: A Critical Introduction, Blackwell.

Singh, R.Y. 2000. Geography of Settlements, Rawat Publication.

GEOG-H-CC10/MD-CC07-5/6-P – Cultural and Settlement Geography Lab– 75 Marks / 3 Credits

An A3- or tabloid-size laboratory notebook, comprising class assignments of the following, is to be prepared and submitted. Census of India data are to be used where applicable. The exercises are to be drawn in pencil with photocopied representation of source materials where necessary. All texts are to be handwritten.

1. Mapping state-wise distribution of major Indian languages of any census year using pie graphs [5]
2. Cartograms representing roof materials used in rural houses of any state of India in the census years 1991, 2001, and 2011 [5]
3. Accessibility mapping using detour index from Survey of India 1:50k topographical maps [10]
4. Nearest neighbour analysis from Survey of India 1:50k topographical maps of plain region (c. 5' x 5') [10]
5. Viva voce based on laboratory notebook (5 Marks)

References

Basu, P. 2021. Advanced Practical Geography — a Laboratory Manual, 4 ed, Books and Allied.

Census of India: 1991 (H2A), 2001 and 2011 (Table H-3A): Census Houses by Predominant Material of the Roof

Monkhouse F.J., Wilkinson H.R. 1971. Maps and Diagrams, their compilation and construction, 3rd ed (2017 reprint), Alphaneumera.

Sarkar, A. 2015. Practical Geography: A Systematic Approach, Orient Blackswan Pvt. Ltd.

WEBSITE:

Census of India: https://censusindia.gov.in

GEOG-H-CC-11-5-Th – Hazard Management – 75 Marks / 3 Credits

Unit I: Concepts

1. Approaches to hazard study: Risk perception and vulnerability assessment. Hazard paradigms and continuum [7]
2. Responses to hazards: Preparedness, trauma, and aftermath. Resilience, capacity building [7]
3. Hazard mapping: Data and geospatial techniques (for hazards enlisted in Unit II and GEOG-H-CC-11-5-Tu) [3]

Unit II: Hazard-specific Study with Focus on West Bengal and India

4. Earthquake: Factors, vulnerability, consequences, and management [4]
5. Landslide: Factors, vulnerability, consequences, and management [4]
6. Land subsidence: Factors, vulnerability, consequences, and management [4]
7. Tropical cyclone: Factors, vulnerability, consequences, and management [4]
8. Riverbank and coastal erosion: Factors, vulnerability, consequences, and management [4]
9. Fire: Factors, vulnerability, consequences, and management [4]
10. Biohazard: Classification, vulnerability, consequences, and management [4]

References

BOOKS:

Basu, R., Bhaduri, S. (Eds) 2007. Contemporary Issues and Techniques in Geography, Progressive Pub.

Coenraads, R. (Ed.) 2006. Natural Disasters and How We Cope, Millennium House.

Coch, N.K. 1994. Geohazards: Natural and Human, Pearson College.

Cutter, S.L. 2006. Hazards Vulnerability and Environmental Justice, Routledge

Government of India. 1997. Vulnerability Atlas of India, Revised ed, Building Materials & Technology Promotion Council, Ministry of Urban Development.

Gupta, H.K. 2013. Disaster Management, University Press.

Hyndman, D., Hyndman, D. 2016. Natural Hazards and Disasters, 5th ed, Cengage Learning.

Kapur, A. 2010. Vulnerable India: A Geographical Study of Disasters, Sage.

Keller. E.A., DeVecchio, D.E. 2014. Natural Hazards: Earth's Processes as Hazards, Disasters, and Catastrophes, 4th ed, Routledge.

Paul, B.K. 2011. Environmental Hazards and Disasters: Contexts, Perspectives and Management, Wiley-Blackwell.

Pine, J.C. 2014. Hazards Analysis: Reducing the Impact of Disasters, 2nd ed, CRC Press.

Robbins, P., Hintz, J., Moore, S.A. 2014. Environment and Society: A Critical Introduction 2nd ed, Wiley.

Smith, K. 2013. Environmental Hazards: Assessing Risk and Reducing Disaster, 6th ed, Routledge.

WEBSITES:

AGU landslide Blog: https://blogs.agu.org/landslideblog

Dartmouth Flood Observatory: https://floodobservatory.colorado.edu

Disaster News Network: http://www.disasternews.net

India Meteorological Department Cyclone Page: https://mausam.imd.gov.in/imd_latest/contents/cyclone.php

USGS Earthquake Hazards Programme: https://www.usgs.gov/programs/earthquake-hazards

GEOG-H-CC-11-5-Tu – Hazard Management Report – 25 Marks / 1 Credit

A Group Project Report is to be prepared and submitted based on any one case study among the following hazards from India, incorporating a preparedness plan:

1. Earthquake
2. Landslide
3. Land subsidence
4. Thunderstorm
5. Tropical Cyclone
6. Flood
7. Riverbank / Coastal erosion
8. Fire
9. Industrial accident
10. Road / Railway accident
11. Structural collapse
12. Environmental pollution
13. Biohazard

One case study will be done by a group of five to ten students. Different groups may choose different case studies from any one or different types of disasters. The report should be prepared on secondary data and handwritten on A4- or letter-size pages in candidates' own words not exceeding 2,000 words excluding references. The report should contain a proper title. The report should incorporate relevant tables, maps, diagrams, and references, not exceeding ten pages. Photographs are optional and should not exceed three. A copy of the stapled / spiral-bound report in a transparent cover, duly signed by the concerned teacher, is to be submitted during examination. Without the report the candidates will not be evaluated for GEOG-H-CC-11-5-Tu.

Marks division: 20 on report + 5 on viva-voce = 25

GEOG-H-CC12-5-Th – Thematic Mapping and Surveying – 75 Marks / 3 Credits

1. Concepts of rounding and scientific notation, logarithm and anti-logarithm, natural and log scales. [4]
2. Preparation and interpretation of geological maps [5]
3. Preparation and interpretation land use land cover maps [5]
4. Preparation and interpretation of socio-economic maps [5]
5. Principal national agencies producing thematic maps in India: NATMO, GSI, NBSSLUP, NHO, and NRSC / Bhuvan [4]
6. Basic concepts of surveying and survey equipment: Prismatic compass [5]
7. Basic concepts of surveying and survey equipment: Dumpy level [5]
8. Basic concepts of surveying and survey equipment: Theodolite [5]
9. Basic concepts of surveying and survey equipment: Abney level [2]
10. Basic concepts of surveying and survey equipment: Total Station & Echosounder [5]

References

BOOKS:

Basak, N.N. 2017. Surveying and Levelling, 2nd ed, McGraw Hill Education.

Basu, P. 2021. Advanced Practical Geography — a Laboratory Manual, 4 ed, Books and Allied.

Kanetkar, T.P., Kulkarni, 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.

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

WEBSITES:

Geological Survey of India: www.gsi.gov.in

Indian Naval Hydrographic Department: www.hydrobharat.nic.in

ISRO Bhuvan 2D Platform: https://bhuvan.nrsc.gov.in/home/index.php

National Atlas and Thematic Mapping Organisation: https://portal.natmo.gov.in/en

National Bureau of Soil Survey and Land Use planning: https://nbsslup.in

National Remote Sensing Centre: https://www.nrsc.gov.in

Survey of India: https://www.surveyofindia.gov.in

GEOG-H-CC12-5-P – Thematic Mapping and Surveying Lab – 25 Marks / 1 Credit

An A3- or tabloid-size 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. Traverse survey using prismatic compass [8]
2. Profile survey using dumpy level [8]
3. Profile survey using Abney level [4]
4. Height determination of base accessible and inaccessible objects by theodolite (same vertical plane method) [10]
5. Viva voce based on laboratory notebook (5 Marks)

References

Basak, N.N. 2017. Surveying and Levelling, 2nd ed, McGraw Hill Education.

Basu, P. 2021. Advanced Practical Geography — a Laboratory Manual, 4 ed, Books and Allied.

Kanetkar, T.P., Kulkarni, S.V. 1988. Surveying and Levelling, Part I, Pune Vidyarthi Griha Prakashan.

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.

Subramanian, R. 2012. Surveying and Levelling, 2nd ed, Oxford University Press

SEMESTER – 6 (for H & MD)

GEOG-H-CC13-6-Th – Soil and Biogeography – 75 Marks / 3 Credits

Unit I: Soil Geography

1. Definition and significance of soil properties: Texture, structure, and moisture [5]
2. Definition and significance of soil properties: pH, organic matter, and NPK [5]
3. Origin and profile characteristics of lateritic, podsol, and chernozem soils [3]
4. Principles of soil classification: Genetic and USDA. Concept of land capability and its classification [4]
5. Soil erosion and degradation: Factors, processes and management measures. Humans as active agents of soil transformation [4]

Unit II: Biogeography

6. Concepts of biosphere, ecosystem, biome, ecotone, community, and ecology [5]
7. Concepts of trophic structure, food chain and food web. Energy flow in ecosystems [5]
8. Classification of world biomes (after Whittaker). Geographical extent and characteristics of tropical rain forest, savanna, hot desert, taiga, and coral reef biomes [7]
9. Bio-geochemical cycles with special reference to carbon dioxide and nitrogen [3]
10. Deforestation: Causes, consequences, and management [4]

References

Chapman J.L., Reiz, M.J. 1993. Ecology: Principle and Applications, Cambridge University Press.

Chiras, D.D., Reganold, J.P. 2009. Natural Resource Conservation: Management for a Sustainable Future, 10th ed, Pearson.

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.

Dash, M.C. 2001. Fundamental of Ecology, 2nd ed, Tata McGrawHill.

De, N. K., Ghosh. P. 1993. India: A Study in Soil Geography, Sribhumi Pub Co.

Franzmeier, D.P., McFee, W.W., Graveel, J.G., Kohnke, H. 2016. Soil Science Simplified, 5th ed, Waveland Press.

Gerrard, J. 2000. Fundamentals of Soils, Routledge.

Huggett, R. 1998. Fundamentals of Biogeography, Routledge.

Lomolino, M.V., Riddle, B.R., Whittaker, R.J. 2016. Biogeography, 5th ed, Oxford University Press.

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

Morgan, R.P.C. 2005. Soil Erosion and Conservation, 3rd ed, Wiley-Blackwell.

Santra. A. 2006. Handbook on Wild and Zoo Animals, International Book Distributing Co.

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. 2022. The Nature and Properties of Soil, 15th ed, Pearson.

White, R. 2006. Principles and Practice of Soil Science: The Soil as a Natural Resource, Blackwell.

Whittaker, R.H. 1975. Communities and Ecosystems, McMillan.

GEOG-H-CC13-6-P – Soil and Biogeography Lab – 25 Marks / 1 Credit

An A3- or tabloid-size 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. Determination of soil pH, organic matter, and NPK using field kit [8]
2. Determination of soil type by ternary diagram textural plotting [7]
3. Plant species diversity determination by matrix method [8]
4. Time series analysis of biogeography data [7]
5. Viva voce based on laboratory notebook (5 Marks)

References

Stohlgren, T.J. 2007. Measuring Plant Diversity: Lessons from the Field. Oxford University Press.

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

Walters, M., Scholes, R.J. (Eds.) 2017. The GEO Handbook on Biodiversity Observation Networks, Springer International Publishing.

Weil, R.R. and Brady, N.C. 2022. The Nature and Properties of Soil, 15th ed, Pearson.

Xiao, M. 2009. Soil Testing Laboratory Manual, Bent Tree Press.

GEOG-H-CC14/MD-CC08-6-Th – India and West Bengal – 75 Marks / 3 Credits

Unit I: India

1. Physiographic divisions with reference to tectonic provinces [4]
2. Climate, soil, and vegetation regions [6]
3. Green revolution (Phases I and II), white revolution, and their impacts [4]
4. Industrial development: Automobile and information technology sectors [4]
5. Regionalisation of India: Basis of classification with reference to economic regions (after P. Sengupta) [4]

Unit II: West Bengal

6. Physiographic divisions: Tectonic and geomorphic evolution [4]
7. Drainage system. Water resources and related issues [5]
8. Changing pattern of industrialisation in West Bengal. Development of SEZs [4]
9. Population: Growth, distribution, migration, and human development [4]
10. Darjiling Himalaya as a physiographic region, Sundarban as an ecological region, and Haldia as an industrial region [6]

References

BOOKS:

Chand, M. and Puri, V.K. 2013 (*reprint*) Regional Planning in India, Allied Publishers.

Johnson, B.L.C. (Ed) 2001. Geographical Dictionary of India, Vision Books.

Khullar, D.R. 2011. India: A Comprehensive Geography, Kalyani Publishers.

Rudra, K. 2018. Rivers of the Ganga-Brahmaputra-Meghna Delta: A Fluvial Account of Bengal, Springer.

Sharma, T.C. 2012. Economic Geography of India, Rawat Publications.

Singh, J. 2003. India: A Comprehensive & Systematic Geography, Gyanodaya Prakashan.

Singh, R.L. 1971. India: A Regional Geography, National Geographical Society of India.

Spate, O.H.K., Learmonth, A.T.A. 1967. India and Pakistan: A General and Regional Geography, Methuen.

Tiwari, R.C. 2007. Geography of India, Prayag Pustak Bhawan.

Vaidyanadhan, R. (Ed) Rejuvenation of Surface Water Resources of India: Potential, Problems and Prospects, Geological Society of India Special Publication.

Valdiya, K.S. 2010. The Making of India: Geodynamic Evolution, Macmillan India.

Wadia. D.N. 1926. Geology of India, Macmillan and Co. Ltd.

West Bengal Pollution Control Board. 2021. State of Environment Report: West Bengal, Vol I and II, GoWB.

WEBSITES:

Census of India: https://censusindia.gov.in/census.website

Geological Survey of India: https://www.gsi.gov.in

Indian Council of Agricultural Research: https://icar.org.in

National Atlas and Thematic Mapping Organisation: https://portal.natmo.gov.in/en

National Bureau of Soil Survey and Land Use planning: https://www.nbsslup.in

GEOG-H-CC14/MD-CC08-6-P – India and West Bengal Lab – 25 Marks / 1 Credit

An A3- or tabloid-size 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. Monthly temperature and rainfall graphs of five select stations from different physiographic regions of India [8]
2. Graphical representation of annual trends of production: Manufacturing goods over any two decades from India or West Bengal [8]
3. Preparation of composite index (Kendall's Method): Comparison of developed and less-developed states of India [7]
4. Change in mean centre of population of West Bengal over any three census years [7]
5. Viva voce based on laboratory notebook (5 marks)

References

BOOKS:

Datt, R. and Sundharam, K.P.M. 2015. Indian Economy, 50th ed, S. Chand.

Khullar, D.R. 2011. India: A Comprehensive Geography, Kalyani Publishers.

Mahmood, A. 1977. Statistical Methods in Geographical Studies, Rajesh Publications.

WEBSITES:

Census of India: https://censusindia.gov.in/census.website

Government of India Data Platform: https://data.gov.in

Hierarchy of states:
https://en.wikipedia.org/wiki/List_of_states_and_union_territories_of_India_by_population
https://en.wikipedia.org/wiki/List_of_Indian_states_and_union_territories_by_GDP_per_capita
https://en.wikipedia.org/wiki/List_of_Indian_states_and_union_territories_by_Human_Development_Index

India Meteorological Department: https://mausam.imd.gov.in

India Meteorological Department Climatological Tables:
https://www.imdpune.gov.in/library/public/Climatological%20Tables%201991-2020.pdf

ISRO Bhuvan 2D Platforms: https://bhuvan-app1.nrsc.gov.in/bhuvan2d/bhuvan/bhuvan2d.php

Planning Commission (West Bengal Development Report 2010):
https://www.scribd.com/document/433016798/sdr-wb1909-pdf

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

UNDP Human Development Report on India (2016):
https://hdr.undp.org/data-center/specific-country-data#/countries/IND
https://hdr.undp.org/data-center/country-insights#/ranks

West Bengal District Statistical Handbooks:
http://wbpspm.gov.in/publications/District%20Statistical%20Handbook

GEOG-H-CC15-6-Th – Remote Sensing, GIS, and GNSS – 75 Marks / 3 Credits

Unit I: Remote Sensing

1. Types of remote sensing platforms, satellites, and sensors [5]
2. Sensor resolutions and their applications with reference to IRS and Landsat missions [4]
3. Image referencing schemes and acquisition procedure of free geospatial data from NRSC / Bhuvan and USGS [3]
4. Preparation of standard and other types of FCCs from IRS LISS-3 and Landsat TM / OLI data [5]
5. Principles of image interpretation. Preparation of inventories of land use land cover (LULC) features from standard FCCs [6]

Unit II: Geographical Information Systems and Global Navigation Satellite System

6. GIS data structures types: Spatial and non-spatial, raster and vector [5]
7. Principles of preparing attribute tables, data manipulation, and query [6]
8. Principles and significance of buffer preparation [2]
9. Principles and significance of overlay analysis [4]

Unit III: Global Navigation Satellite System (GNSS)

10. Principles of GNSS positioning and waypoint collection [5]

References

BOOKS:

Bhatta, B. 2011. Global Navigation Satellite Systems: Insights into GPS, GLONASS, Galileo, Compass and Others, CRC Press.

Bhatta, B. 2020. Remote Sensing and GIS, 3rd ed, Oxford Univ. Press.

Bolstad, P. 2016. GIS Fundamentals: A First Text on Geographic Information Systems, 5th ed, XanEdu Publishing.

Brewer, C.A. 2015. Designing Better Maps: A Guide for GIS Users, 2nd ed, Esri Press.

Harvey, F. 2015. A Primer of GIS: Fundamental Geographic and Cartographic Concepts, 2nd ed, The Guilford Press.

Jensen, J.R., 2013. Remote Sensing of the Environment: An Earth Resource Perspective, Pearson Education India.

Joseph, G. and Jegannathan, C. 2018. Fundamentals of Remote Sensing, 3rd ed, Orient Blackswan.

Lillesand, T.M., Kiefer, R.W., Chipman, J.W. 2015. Remote Sensing and Image Interpretation, 7th ed, Wiley.

Indian Space Research Organisation. 2017. Effective Use of Space Technology.

Sarkar, A. 2015. Practical Geography: A Systematic Approach, 2nd ed, Orient Blackswan.

WEBSITES:

Indian Society of Remote Sensing: https://www.isrs-india.org

International Society for Photogrammetry and Remote Sensing: https://www.isprs.org

ISRO Bhuvan 2D and 3D Platforms:
https://bhuvan-app1.nrsc.gov.in/bhuvan2d/bhuvan/bhuvan2d.php
https://bhuvan-app1.nrsc.gov.in/globe/3d.php

National Remote Sensing Centre: www.nrsc.gov.in

National Remote Sensing Centre Bhoonidhi: https://bhoonidhi.nrsc.gov.in/bhoonidhi/index.html

Space Applications Centre: https://www.sac.gov.in/Vyom

USGS Earth Explorer: https://earthexplorer.usgs.gov

USGS Global Visualization Viewer: https://glovis.usgs.gov

USGS Landsat Missions: https://www.usgs.gov/landsat-missions

GEOG-H-CC15-6-P – Remote Sensing, GIS, and GNSS Lab – 25 Marks / 1 Credit

An A4- or letter-size laboratory notebook, comprising class assignments of the following is to be prepared and submitted. The exercises are to be represented as computer prints from Q-GIS / Garmin Basecamp / MS Excel software as applicable. Methods and interpretations are to be handwritten.

1. Image georeferencing and enhancement. Preparation of spectral reflectance libraries of LULC features across different image bands of IRS L3 or Landsat OLI data [8]
2. Supervised image classification, class editing, and post-classification analysis [8]
3. Digitisation of features and administrative boundaries. Data attachment, vector overlay, and preparation of annotated thematic maps [8]
4. Waypoint collection from GNSS receivers, exporting to GIS database and plotting [6]
5. Viva voce based on laboratory notebook (5 Marks)

References

BOOKS:

Bhatta, B. 2011. Global Navigation Satellite Systems: Insights into GPS, GLONASS, Galileo, Compass and Others, CRC Press.

Bhatta, B. 2020. Remote Sensing and GIS, 3rd ed, Oxford Univ. Press.

Bolstad, P. 2016. GIS Fundamentals: A First Text on Geographic Information Systems, 5th ed, XanEdu Publishing.

Brewer, C.A. 2015. Designing Better Maps: A Guide for GIS Users, 2nd ed, Esri Press.

Chang, K-t. 2015. Introduction to Geographical Information System, McGraw-Hill Education.

Harvey, F. 2015. A Primer of GIS: Fundamental Geographic and Cartographic Concepts, 2nd ed, The Guilford Press.

Jensen, J.R., 2013. Remote Sensing of the Environment: An Earth Resource Perspective, Pearson Education India.

Joseph, G. and Jegannathan, C. 2018. Fundamentals of Remote Sensing, 3rd ed, Universities Press.

Lillesand, T.M., Kiefer, R.W., Chipman, J.W., 2015. Remote Sensing and Image Interpretation, 7th ed, Wiley.

Sarkar, A. 2015. Practical Geography: A Systematic Approach. 2nd ed, Orient Blackswan.

WEBSITES:

Garmin: https://support.garmin.com/en-US/?productID=52801&tab=manuals

ISRO Bhuvan 2D and 3D Platforms:

https://bhuvan-app1.nrsc.gov.in/bhuvan2d/bhuvan/bhuvan2d.php
https://bhuvan-app1.nrsc.gov.in/globe/3d.php

National Remote Sensing Centre: www.nrsc.gov.in

National Remote Sensing Centre Bhoonidhi: https://bhoonidhi.nrsc.gov.in/bhoonidhi/index.html

Q-GIS: https://www.qgis.org/en/site

USGS Earth Explorer: https://earthexplorer.usgs.gov

USGS Global Visualization Viewer: https://glovis.usgs.gov

SEMESTER – 7 (for H)

GEOG-H-CC16-7-Th – Philosophy of Geography – 75 Marks / 3 Credits

Unit I: Nature of Geography

1. Development of Ancient Geography: Contributions of Greek, Roman, and Indian geographers [5]
2. Development of Medieval Geography: Arab geographers [2]
3. Contributions of Varenius and Kant [2]
4. Contributions of Humboldt and Ritter [2]
5. Contributions of Richthofen, Ratzel, Hettner, de la Blaché, and Hartshorne [5]
6. Dualism and Dichotomies: General vs. Particular, Physical vs. Human, Regional (Ideographic) vs. Systematic (Nomothetic), and Determinism vs. Possibilism [5]

Unit II: Geography in the 20th Century

7. Trends of geography in the post-World War-II period: Positivism, Hartshorne-Schaefer debate, quantitative revolution [6]
8. Philosophical basis of radicalism: Historical and dialectical materialism, structuralism [5]
9. Behavioural, humanistic, and critical approaches in Geography [7]
10. Concept of space: Absolute, relative, and relational with special reference to Lefebvre [6]

References

Adhikari, S. 2015. Fundamentals of Geographical Thought, Orient Blackswan.

Clifford, N. Holloway S.L., Rice, S.P., Valentine, G. 2009. Key Concepts in Geography, 2nd ed, Sage.

Couper, P. 2015. A Student's Introduction to Geographical Thought: Theories, Philosophies, Methodologies, Sage.

Cresswell, T. 2013. Geographic Thought: A Critical Introduction, Wiley-Blackwell.

Dickinson, R.E. 2015. The Makers of Modern Geography, Routledge

Dikshit, R.D. 2004. Geographical Thought: A Contextual History of Ideas, Prentice Hall India.

Holt-Jensen, A. 2018. Geography: History and Concepts: A Student's Guide, 5th ed, Sage.

Husain, M. 2015. Evolution of Geographical Thought, 6th ed, Rawat Publications.

Gregory, D., Johnston, R., Pratt, G., Watts, M., Whatmore, S. (Eds) 2009. The Dictionary of Human Geography, 5th ed, Wiley.

Jeffrey A. and Nayek, A. 2013. Geographical Thought: An Introduction to Ideas in Human Geography, Routledge.

Johnston, R. and Sidaway, J.D. 2015 Geography and Geographers: Anglo-American Human Geography since 1945, 7th ed, Routledge.

Peet, P. 1998. Modern Geographical Thought, Wiley-Blackwell.

GEOG-H-CC16-7-P – Philosophy of Geography Lab – 25 Marks / 1 Credit

An A3- or tabloid-size laboratory notebook, comprising class assignments of topics 1, 2, and 4 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. Posters related to topic 3 should be of 59.4 x 84.1 cm size (A1), approximately. Technique of preparing the posters can be manual, digital or blended. They should carry signatures of teacher(s) responsible for supervising their preparation.

1. Changing perception of maps of the world: Ptolemy and Mercator [5]
2. Mapping voyages: Columbus, Vasco da Gama, Magellan, and James Cook [5]
3. Group Presentation of five to ten students on any selected paradigm in geographical thought by using poster [10]
4. A Book Review within 1000 words to be selected from Couper, Dickinson, Johnston, and Sidaway [10]
5. Viva voce based on laboratory notebook (5 marks)

References

Black, J. 2003. Visions of the World: A History of Maps, Mitchell Beazley.

Couper, P. 2015. A Student's Introduction to Geographical Thought: Theories, Philosophies, Methodologies, Sage.

Holt-Jensen, A. 2011. Geography: History and Concepts: A Student's Guide, Sage.

Whitfield, P. 2017. Charting the Oceans, British Library.

GEOG-H-CC17-7-Th – Resource Geography – 75 Marks / 3 Credits

Unit I: Resource and Development

1. Natural resources: Concept, significance, and classification [4]
2. Approaches to resource utilization: Utilitarian, conservational, community based, and adaptive [5]
3. Crisis of resource availability: Global scenario of forest and water [4]
4. An overview on conservation of forest and water resources [4]

Unit II: Resource Conflict and Management

5. Agricultural resource conflicts: Issues of productivity and resilience of indigenous species and genetically modified crops [5]
6. Distribution, utilisation, problems, and management of metallic mineral resources: Iron ore, bauxite, and copper [5]
7. Distribution, utilisation, problems, and management of non-metallic mineral resources: Limestone, mica, and gypsum [5]
8. Distribution, utilisation, problems, and management of energy resources: Conventional and non-conventional [4]
9. Significance of human resource: Issues related to capability development[4]
10. Limits to growth and sustainable use of resources with reference to relevant sustainable development goals [5]

References

Chiras, D.D., Reganold, J.P. 2009. Natural Resource Conservation: Management for a Sustainable Future, 10th ed, Pearson.

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

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

Gregory, D., Johnston, R., Pratt, G., Watts, M., Whatmore, S. (Eds) 2009. The Dictionary of Human Geography, 5th ed, Wiley.

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

Jones, G., Hollier, G. 1997. Resources, Society and Environmental Management, Paul Chapman.

Klee, G. 1991. Conservation of Natural Resources, Prentice Hall.

Mather, A.S., Chapman, K. 1995. Environmental Resources, John Wiley and Sons.

Mitchell, B. 1997. Resource and Environmental Management, Longman Harlow.

Owen, S., Owen, P.L. 1991. Environment, Resources and Conservation, Cambridge University Press.

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

GEOG-H-CC17-7-Pr– Resource Geography Lab – 25 Marks / 1 Credit

An A3- or tabloid-size 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. Mapping and area estimate of changes in forest cover from maps and/or satellite images [8]
2. Mapping and number estimate of changes in water bodies from maps and/or satellite images [8]
3. Crop combination: Comparison of any two contrasting districts from West Bengal using Weaver's method [8]
4. Graphical representation of decadal changes in state-wise production of coal and iron ore [6]
5. Viva voce based on laboratory notebook (5 Marks)

References

Books:

Bhatta, B. 2020. Remote Sensing and GIS, 3rd ed, Oxford Univ. Press

Datta, R., Sundharam, K.P.M. 2015. Indian Economy, Chand.

Fukuda-Parr, S., Kumar, S.A.K. 2005. Readings in Human Development, Oxford University Press.

Khullar, D.R. 2011. India: A Comprehensive Geography, Kalyani Publishers

Lillesand, T.M., Kiefer, R.W., Chipman, J.W., 2015. Remote Sensing and Image Interpretation, 7th ed, Wiley.

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

Websites:

Government of India Data Platform: https://data.gov.in

West Bengal District Statistical Handbooks: http://wbpspm.gov.in/publications/District%20Statistical%20Handbook

GEOG-H-CC18-7-Th – Environmental Issues in Geography – 75 Marks / 3 Credits

1. Geographers' approach to environmental studies [3]
2. Concept of holistic environment and systems approach [3]
3. Ecosystems and their relationship with habitats [5]
4. Wetland ecosystem with special reference to East Kolkata Wetlands [4]
5. Rural environmental issues with special reference to sanitation and public health [6]
6. Urban environmental issues with special reference to waste management [4]
7. Ocean environmental issues with special reference to plastic pollution [5]
8. Environmental policies – Club of Rome, earth summits (special reference to Stockholm, Rio, and Johannesburg). National Action Plan on Climate Change [5]
9. Conference of the Parties: Global initiatives for environmental management (special reference to Montreal, Kyoto, and Paris) [5]
10. Overview of principal environment-related regulations of India. Review of their achievements [5]

References

BOOKS:

Basu, R., Bhaduri, S. (Eds) 2007. Contemporary Issues and Techniques in Geography, Progressive Publishers.

Chandna, R.C. 2002. Environmental Geography, Kalyani Press.

Chapman, J.L., Reiz, M.J. 1993. Ecology: Principle and Applications, Cambridge University Press.

Cunningham, W.P., Cunningham, M.A. 2004. Principals of Environmental Science: Inquiry and Applications, Tata McGraw Hill.

Goudie, A. 2001. 2013. The Human Impact on the Natural Environment: Past, Present, and Future, 7th ed, Wiley-Blackwell.

Gilpin, A., 1994. Environmental Impact Assessment: Cutting Edge for the 21st Century, Cambridge University Press.

Miller, G.T. 2004. Environmental Science: Working with the Earth, Thomson Brooks.

Odum, E.P., Barrett, G.W. 2005. Fundamentals of Ecology, Cengage Learning.

Raven, P.H., Hassenzahl, D.M., Hager, M.C., Gift, N.Y., Berg, L.R. 2015. Environment, 9th ed, Wiley.

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

Singh, S. 2013. Environmental Geography, Prayag Pustak Bhawan.

Withgott, J.H., Laposata, M. 2017. Environment: The Science behind the Stories, 6th ed, Pearson.

WEBSITES:

BBC – Science & Environment: https://www.bbc.com/news/science_and_environment

Central Pollution Control Board: https://cpcb.nic.in/

Centre for Science and Environment: https://www.cseindia.org

Ministry of Environment, Forest and Climate Change: https://moef.gov.in/en

The Energy and Resources Institute: https://www.teriin.org

The World Bank – Environment: https://www.worldbank.org/en/topic/environment

United Nations Environment:

https://unfccc.int/process/bodies/supreme-bodies/conference-of-the-parties-cop

West Bengal Pollution Control Board: https://www.wbpcb.gov.in/

GEOG-H-CC18-7-P– Environmental Issues in Geography Lab – 25 Marks / 1 Credit

An A4- or letter-size 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. Preparation of questionnaire for perception survey on environmental problems [7]
2. Preparation of check-list for Environmental Impact Assessment for urban / industrial development projects [7]
3. Quality assessment of water using portable tester: pH, salinity, and hardness [10]
4. Interpretation of changes in air quality using multi-seasonal and multi-city or multi locational (within a single city) CPCB / WBPCB data [6]
5. Viva voce based on laboratory notebook (5 marks)

References

BOOKS:

Clifford, N., Cope, M., Gillespie,.T.W., French, S. (Eds) 2016. Key Methods in Geography, 3rd ed, Sage

Gilpin, A., 1994. Environmental Impact Assessment: Cutting Edge for the 21st Century, Cambridge University Press.

Northey, N., Draper, D., Knight, D.B. 2015. Making Sense in Geography and Environmental Sciences: A Student's Guide to Research and Writing, 6th ed, Oxford University Press.

WEBSITES:

Central Pollution Control Board: https://cpcb.nic.in/indexeng.php

West Bengal Pollution Control Board: https://www.wbpcb.gov.in

GEOG-H-CC19-7-Th – Statistical Methods in Geography – 75 Marks / 3 Credits

Unit I: Frequency Distribution and Sampling

1. Discrete and continuous data, population and samples, scales of measurement (nominal, ordinal, interval and ratio) [4]
2. Collection of data and preparation of statistical tables [4]
3. Sampling: Need, types, significance, and methods of random sampling [4]
4. Theoretical distribution: Frequency, cumulative frequency, normal, and probability [5]

Unit II: Numerical Data Analysis

5. Central tendency: Mean, median, mode, and partition values [4]
6. Measures of dispersion range, mean deviation, standard deviation, and coefficient of variation [6]
7. Association and correlation: Product moment correlation and rank correlation [6]
8. Regression: Linear and non-linear. Residuals [4]
9. Time series analysis [4]
10. Hypothesis testing: Chi-square test and T-test [4]

References

Acevedo, M.F. 2012. Data Analysis and Statistics for Geography, Environmental Science and Engineering, CRC Press.

Harris, R., Jarvis, C. 2011. Statistics for Geography and Environmental Science, Prentice Hall.

Mahmood, A. 1999. Statistical Methods in Geographical Studies, Rajesh Publications.

McGrew Jr., J.C., Lembo Jr., A.J., Monroe, C.B. 2014. An Introduction to Statistical Problem Solving in Geography, 3rd ed, Waveland Press.

Pal, S.K. 1998. Statistics for Geoscientists: Techniques and Applications, Concept Pub Co.

Rogerson, P.A. 2015. Statistical Methods for Geography: A Student's Guide, 4th ed, Sage.

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

GEOG-H-CC19-7-P – Statistical Methods in Geography Lab – 25 Marks / 1 Credit

An A3- or tabloid-size 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. Construction of data matrix with each row representing an area unit (districts / blocks / *mouzas* / towns) and corresponding columns of relevant attributes [8]
2. Based on the above, a frequency table, measures of central tendency, and dispersion would be computed and interpreted using histogram and frequency curve [7]

3. From the data matrix, a sample set (20%) would be drawn using random, systematic, and stratified methods of sampling and the samples would be located on a map with an explanation of the methods used [8]
4. Based on the sample set and using two relevant attributes, a scatter diagram and linear regression line would be plotted and residual from regression would be mapped and interpreted [7]
5. Viva voce based on laboratory notebook (5 Marks)

References

Books:

Basu, P. 2021. Advanced Practical Geography — a Laboratory Manual, 4 ed, Books and Allied.

Acevedo, M.F. 2012. Data Analysis and Statistics for Geography, Environmental Science and Engineering, CRC Press.

Harris, R., Jarvis, C. 2011. Statistics for Geography and Environmental Science, Prentice Hall.

Mahmood, A. 1999. Statistical Methods in Geographical Studies, Rajesh Publications.

McGrew Jr., J.C., Lembo Jr., A.J., Monroe, C.B. 2014. An Introduction to Statistical Problem Solving in Geography, 3rd ed, Waveland Press.

Pal, S.K. 1998. Statistics for Geoscientists: Techniques and Applications, Concept Pub Co.

Rogerson, P.A. 2015. Statistical Methods for Geography: A Student's Guide, 4th ed, Sage.

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

Websites:

Government of India data platform: https://data.gov.in

Census of India: https://censusindia.gov.in/census.website

West Bengal District Statistical Handbooks: http://wbpspm.gov.in/publications/District%20Statistical%20Handbook

GEOG-H-CC20-7-Th – Research Methodology and Fieldwork – 75 Marks / 3 Credits

Unit I: Research Methodology

1. Research in geography: Meaning, types, and significance [4]
2. Literature review and formulation of research design, objectives, and hypothesis [4]
3. Research materials and methods [4]
4. Techniques of writing scientific reports: Preparing notes, references, bibliography, abstract, keywords, and sectioning [5]
5. Research ethics with special reference to plagiarism [4]

Unit II: Fieldwork

6. Fieldwork in Geographical studies: Role and significance. Selection of study area and objectives. Pre-field academic preparations. Ethics of fieldwork [5]
7. Field techniques and tools: Observation (participant, non-participant), questionnaires (open, closed, structured, non-structured), interview [5]
8. Field techniques and tools: Landscape survey using transects and quadrants, records through sketches, photo and videos. Field logistics and handling of emergencies [6]
9. Positioning and collection of samples. Preparation of inventory from field data [4]
10. Post-field tabulation, processing and analysis of quantitative and qualitative data [5]

References

Clifford, N., Cope, M., Gillespie,.T.W., French, S. (Eds) 2016. Key Methods in Geography, 3rd ed, Sage

Gomes, B., Jones III, J.P. (Eds) 2010. Research Methods in Geography: A Critical Introduction, Wiley-Blackwell.

Lenon, B., Cleves, P. 2015. Geography Fieldwork and Skills, Harper-Collins.

Montello, D.R, Sutton, P. 2012. An Introduction to Scientific Research Methods in Geography and Environmental Studies, 2nd ed, Sage.

Murthy, K.L.N. 2004. Research Methodology in Geography: A Text Book, Concept Publishing Co.

Northey, N., Draper, D., Knight, D.B. 2015. Making Sense in Geography and Environmental Sciences: A Student's Guide to Research and Writing, 6th ed, Oxford University Press.

Parsons, T., Knight, P.G. 2015. How To Do Your Dissertation in Geography and Related Disciplines, 3rd ed, Routledge.

Riordan, D. 2013. Technical Report Writing Today, 10th ed, Wadsworth Publishing.

Phillips, R., Johns, J. 2012. Fieldwork for Human Geography, Sage.

Thornbush, M.J., Allen, C.D., Fitzpatrick, F.A. (Eds) 2014. Geomorphological Fieldwork, Elsevier.

GEOG-H-CC20-7-P – Research Methodology and Fieldwork Lab – 25 Marks / 1 Credit

Every student needs to participate in fieldwork and prepare a field report according to the following guideline, failing which he/she will not be evaluated for GEOG-H-CC20-7-P.

1. Each student will prepare a report based on primary data collected from field survey and secondary data collected from different sources.
2. Students will select either one rural area (*mouza*) or an urban area (municipal ward) for the study, with the primary objective of evaluating the relation between physical and cultural landscape.
3. A specific problem or a special feature should be identified based on which, the study area will be selected.
4. The report should be handwritten in English on A4 size paper in candidate's own words within 5000 words (Introductory Chapter: 1000 words; Physical Aspects: 1500 words; Socio-economic Aspects: 1500 words; Concluding Chapter: 500 words, approximately) excluding tables, photographs, maps, diagrams, references and appendices.
5. Photographs, maps and diagrams should not exceed 15 pages.
6. A copy of the bound report, duly signed by the concerned teacher, will be submitted during examination.
7. The field work and post-field work will include:
    a. Collection of primary data on physical aspects (relief and soil) of the study area. Students should use survey instruments like prismatic compass, dumpy level, Abney level or clinometer wherever necessary.
    b. Collection of soil samples from different land cover land use regions of the study area for determining pH and NPK values with help of a soil kit.
    c. Collection of socio-economic data, at the household level (with the help of a questionnaire) in the selected study area.
    d. Plot to plot land use survey for preparation of a land use map, covering whole or part of the selected area.
    e. Visit to different organisations and departments for collection of secondary data.
    f. Any other survey relevant to the objective of the study.
8. The Field Report should contain the following sections (a→e).
    a. Introduction: Study area extent and space relations, reasons for selection of the study area on the basis of a specific problem or special feature, objectives, methods of data collection, analyses and presentation, sources of information, etc.
    b. Physical aspects: Lithology and geological structure, relief, slope, drainage, climate, soil, vegetation, environmental issues, proneness to natural hazards, etc.
    c. Socio-economic aspects:
        i. Population attributes: Number, sex ratio, literacy, occupational structure, ethnic and religious composition, language, per capita income, etc.

ii. Settlement characteristics: Number of houses, building materials, number and size of rooms, amenities, etc.
iii. Agriculture: General land use, crop-combination, use of fertiliser and irrigational facilities, production and marketing etc.
iv. Other economic activities: Fishing, horticulture, brick-making, household and other industries, etc.

d. Conclusions: Relation between physical and cultural landscape. Evaluation of problems and prospects. General recommendations.

e. Bibliography.

9. The students will prepare (i) a chorochromatic land use land cover map on the basis of plot-to-plot survey; (ii) a profile of suitable length, surveyed and plotted, with different land use land cover superimposed on it.

10. All sections of the report should contain relevant maps, diagrams and photographs using primary and secondary data, clearly citing sources.

11. All surveys should pertain to the objective of the study. Surveys not relevant for establishing the relation between physical and cultural landscape should be avoided.

Marks division: 20 on report + 10 on viva voce = 30

SEMESTER –8 (for H)

GEOG-H-CC21-8-Th – Watershed and Coastal Management – 75 Marks / 3 Credits

Unit I: Watershed Management

1. Concept and demarcation of watersheds, their utility as units of hydrological, environmental, and landuse planning and management [4]
2. Water conservation: Micro-catchment water harvesting, evaporation suppression and seepage reduction, supplemental irrigation, groundwater recharge, afforestation [6]
3. Management of soil erosion: Overland flow and gullies [4]
4. Preparation of a watershed development plan, administrative arrangements and agency selection for plan implementation, monitoring and evaluation system [4]
5. Programmes on watershed management: Govt. of India guidelines on watershed development. Watershed-based rural development and the role of NGOs in watershed management [4]

Unit II: Coastal Planning and Management

6. Concept of coastal zone in the perspective of physical and human systems. Processes involved in a tropical coast. [4]
7. Coastal management issues: Resource exploitation, infrastructure, tourism and recreation, pollution, loss of biodiversity, shoreline retreat [5]
8. Concepts of coastal planning and management: Rational, incremental, adaptive and consensual planning approaches. Administrative arrangements and agency selection for plan implementation [6]
9. Components of coastal planning and management: Administrative, social, and technical [4]
10. Case studies of coastal management: Digha Sankarpur Development Authority area and Gangasagar Bakkhali Development Authority area [4]

References

Clark, J.R. 1998. Coastal Seas: The Conservation Challenge, Blackwell Science

Kay, R. and Alder, 1999. A. Coastal Planning and Management, E & FN Spon.

Mitchell, C.W. 2014. Terrain Evaluation, end ed, Routledge.

Morgan, R.P.C. 2005. Soil Erosion and Conservation, 3rd ed, Wiley-Blackwell.

Murthy, V.V.N. 2005. Land and Water Management, Kalyani Pub.

Pethick, J. 1984. An Introduction to Coastal Geomorphology. Arnold.

Tideman, E.M. 1996. Watershed Management, Omega Scientific Publishers.

Woodroffe, C.D. 2002. Coasts: Form, Process and Evolution, Cambridge University Press.

Yousuf, A. and Singh, M. 2021. Watershed Hydrology: Management and Modeling, CRC Press.

GEOG-H-CC21-8 -P – Watershed and Coastal Management Lab – 25 Marks / 1 Credit

An A3 or tabloid-size laboratory notebook, comprising class assignments of the following is to be prepared and submitted. Census of India data are to be used where applicable. The exercises are to be drawn in pencil with photocopied representation of source materials where necessary. All texts are to be handwritten.

1. Land capability analysis using additive parameters in a watershed demarcated from Survey of India 1:50k topographical map [6]
2. Calculation of velocity and discharge using Manning equation [8]
3. Flood frequency analysis from long-term discharge data [8]
4. Determination of breaker types by empirical equations [8]
5. Viva voce based on laboratory notebook (5 marks)

References

Mitchell, C.W. 2014. Terrain Evaluation, end ed, Routledge.

Murthy, V.V.N. 2005. Land and Water Management, Kalyani Pub.

Yousuf, A. and Singh, M. 2021. Watershed Hydrology, Management and Modeling, CRC Press.

GEOG-H-CC22-8-Th – Historical and Political Geography – 75 Marks / 3 Credits

Unit I: Historical Geography

1. Nature, scope, content, and approaches of historical geography [4]
2. Source materials and travel accounts: Huen Tsang, Ibn-Batuta, and Bernier [4]
3. Phases of development: Agricultural (medieval and modern India) and industrial (colonial and independent India) [5]
4. Trade, commerce, and transport: Development of gateway cities in colonial India [5]
5. Evolution of Indian societies. Tribes and castes in modern India [4]

Unit I: Political Geography

6. Nature, scope and approaches of political geography [4]
7. Concept of core–periphery: Wallerstein's World Systems Theory [4]
8. Concept of nation, nation-state, borders, boundaries, frontiers, buffer-zones, and landlocked states. Federalism and regional integration [6]
9. Post-colonialism, end of cold-war, disintegration of Soviet Union and East Europe; shift from bi-polar to multi-polar world [5]
10. Chinese strategy of expansionism: Belt and Road initiative and power sharing in South China Sea [4]

References

Adhikari, S. 1997. Political Geography, Rawat Pub.

Baker, A.R.H., Gregory, D. 1984. Explorations in Historical Geography: Interpretative Essays. Cambridge University Press.

Baker, A.R.H., Pacione, M. (Eds) 1982. Period and Place: Research Methods in Historical Geography, Cambridge University Press, Cambridge.

Benko, G, Stromayer, U. (Eds) 2004: Human Geography: A History for the 21st Century, Edward Arnold (Publishers) Ltd. London.

Cohn, S.B. 2003. Geopolitics of the World System, Lanham.

Dikshit, R.D. 1982. Political Geography: A Contemporary Perspective, Tata McGrow Hill.

Gibb, H. A. :1929: "Ebn-Batuta's Travels in Asia and Africa 1325-1354", Routledge and Kegan Paul Ltd. London.

McLeod, J. 2004. The History of India, Greenwood Press.

Mittal, P., Dua, G., Swarup, G. 2015. Historical Geography of India, Low Price Publications.

Morrissey, J., Nally, D., Strohmayer, U., Whelan, Y. 2014. Key Concepts in Historical Geography, Sage.

Peet, R. 1998. Modern Political Thought, Blackwell, Oxford.

Sanyal, S., Rajendran, S. 2015. The Incredible History of India's Geography, Penguin Books.

Tamaskar, B.G. 1985. Contributions to Historical Geography of India, Inter India Publication.

GEOG-H-CC22-8-Tu – Historical and Political Geography Report – 25 Marks / 1 Credit

One case study on historical geography or political geography will be done by a group of five to ten students. The report should be prepared on secondary data and handwritten on A4- / letter-size pages in candidates' own words not exceeding 2000 excluding references. The report should contain a proper title. The report should incorporate relevant tables, maps, diagrams, and references, not exceeding 10 pages. Photographs are optional and should not exceed three. A copy of the stapled / spiral-bound report in a transparent cover, duly signed by the concerned teacher, is to be submitted during examination. Without the report the candidates will not be evaluated for GEOG-H-CC22-8-Tu.

Marks division: 15 on report + 10 on viva-voce = 25

GEOG-H-CC23-8-Th – Population and Welfare Geography – 75 Marks / 3 Credits

1. Interdisciplinary nature of population geography. Relationship between demography and population studies [3]
2. Factors influencing spatial distribution and density of population [4]
3. Population growth: Global trends, patterns, and projections [4]
4. Theories of population growth: Malthus and Marx [4]
5. Population structure and composition: Age- and sex-specific, occupational and ethnic [5]
6. Determinants and measures of fertility, morbidity, and mortality [6]
7. Migration: types, causes, and impacts [4]
8. Population policies: Sweden, China, and India [5]
9. Welfare issues: Child labour, unemployment, and human trafficking [6]
10. Ageing population: issues and challenges [4]

References

Barrett, H.R. 1995. Population Geography, Oliver and Boyd.

Bhende, A.A., Kanitkar, T. 2008. Principles of Population Studies, Himalaya Publications.

Chandna, R.C. 2022a. Geography of Population Part-1: Concepts, Determinants and World Patterns, Kalyani Publications.

Chandna, R.C. 2022b. Geography of Population Part-2: India – Population and Patterns, Kalyani Publications.

Clarke, J. 1972. Population Geography, Elsevier.

Clarke, J.I. 1965. Population Geography and the Developing countries, Elsevier.

Hussain, M. 1994. Population Geography, Vol. 1 & 2, Anmol Publications.

Jones, H. 1990. Population Geography, SLE Pound.

Nag, P., Debnath, G.C. 2021. Population Geography, Bharati Prakashan.

Newbold, K.B. 2017. Population Geography: Tools and Issues, Rowman and Littlefield.

Srivastava, O.S. (Ed) 1994. Demography and Population Studies, Vikas Pub.

Trewartha, G.T. 1969. A Geography of Population: World Patterns, John Wiley & Sons.

Weeks, J.R. 2018. Population: An introduction to Concepts and Issues, Cengage.

William, F.H., 1993. An Introduction to Population Geography, Cambridge University Press.

Wood, R. 1979. Population Analysis in Geography. Longman.

Wood, R. 1982. Theoretical Population Geography. Longman.

GEOG-H-CC23-8-P – Population and Welfare Geography Lab – 25 Marks / 1 Credit

An A3- or tabloid-size laboratory notebook, comprising class assignments of the following is to be prepared and submitted. Census of India data are to be used where applicable. The exercises are to be drawn in pencil with photocopied representation of source materials where necessary. All texts are to be handwritten.

1. Linear and exponential trends of growth rate of population [6]
2. Construction and interpretation of age-sex pyramid: Progressive and regressive [8]
3. Construction and interpretation of choropleths showing distribution of infant mortality rates [8]
4. Graphical representation and interpretation of spatial distribution of total fertility rate [8]
5. Viva voce based on laboratory notebook (5 marks)

References

Books:

Basu, P. 2021. Advanced Practical Geography — a Laboratory Manual, 4 ed, Books and Allied.

Mahmood, A. 1999. Statistical Methods in Geographical Studies, Rajesh Publications.

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.

Website:

Census of India: https://censusindia.gov.in/census.website/data/census-tables

National Sample Survey: https://mospi.gov.in/national-sample-survey-officensso

GEOG-H-CC24-8-Th – Rural and Urban Geography – 75 Marks / 3 Credits

Unit I: Rural Geography

1. Paradigms of rural development: Modernisation paradigm, holistic development paradigm, Gandhian approach to rural development [5]
2. Approaches to Rural Development: Area-based (DPAP) and Target based (NFFWP) [6]
3. Rural Employment policies and programmes in India, PMGSY, SJSY, MNREGA, Jan Dhan Yojana [3]
4. 73rd Constitutional Amendment of India and its implications for governance [2]
5. Participatory rural planning and management with reference to JFM, Watershed Management, SHGs [5]

Unit II: Urban Geography

6. Approaches and recent trends in urban geography [6]
7. Origin of urban places in ancient, medieval, modern, and post-modern periods: Factors, stages, and characteristics [4]
8. Patterns of urbanisation in developed and developing countries [4]
9. Patterns and trends of urbanisation in India [4]
10. Urban issues: urban poverty and crime, housing, and civic amenities [6]

References

BOOKS:

Carter, H. 1995. The Study of Urban Geography, 4th ed, Arnold.

Gilg, A.W. 1985. An Introduction to Rural Geography, Edwin Arnold.

Gottdiener, M., Budd, M. Lehtovuori, P. 2016. Key Concepts in Urban Studies, 2nd ed, Sage.

Jonas, A.E.G., McCann, E., Thomas, M. 2015. Urban Geography: A Critical Introduction, Wiley-Blackwell.

Kaplan, D., Holloway, S. 2014. Urban Geography, 3rd ed, Wiley.

Knox, P.L., McCarthy, L.M. 2011. Urbanization: An Introduction to Urban Geography, 3rd ed, Pearson.

Krishnamurthy, J. 2000. Rural Development: Problems and Prospects, Rawat Publications.

Latham, A., McCormack, D., McNamara, K. McNeill, D. 2009. Key Concepts in Urban Geography, Sage.

Lee, D.A., Chaudhri, D.P. (Eds) 1983. Rural Development and State, Methuen Publishing.

LeGates, R.T., Stout, F. (Eds) 2015. The City Reader, 6th ed, Routledge.

Levy, J.M. 2016. Contemporary Urban Planning, 11th ed, Routledge.

Macionis, J.J., Parrillo, V.N. 2016. Cities and Urban Life, 7th ed, Pearson.

Misra, R.P. (Ed) 2002 (Reprint). Regional Planning: Concepts, Techniques, Policies and Case Studies, Concept Pub. Co.

Misra, R.P., Sundaram, K.V. (Eds) 1979. Rural Area Development: Perspectives and Approaches, Sterling Publishers.

Pacione, M. 2009. Urban Geography: A Global Perspective, Routledge.

Potter, R.B., Lloyd-Evans, S. 2014. The City in the Developing World, Routledge.

Ramachandran, H., Guimaraes, J.P.C. 1991. Integrated Rural Development in Asia: Leaning from Recent Experience, Concept Publishing.

Ramachandran, R. 1989. Urbanisation and Urban Systems in India, Oxford University Press.

Ramachandran, R., 1992: The Study of Urbanisation, Oxford University Press

Robb, P. (Ed) 1983. Rural South Asia: Linkages, Change and Development, Curzon Press.

Singh, K., Shishodia, A. 2016. Rural Development: Principles, Policies, and Management, 4th ed, Sage.

Singh, R.B. (Ed) 2015. Urban Development, Challenges, Risks and Resilience in Asian Megacities. Advances in Geographical and Environmental Studies, Springer

Wanmali, S. 1992. Rural Infrastructure, the Settlement System and Development of the Regional Economy in Southern India, International Food Policy Research Institute.

Yugandhar, B.N., Mukherjee, N. (Eds) 1991. Studies in Village India: Issues in Rural Development, Concept Pub Co.

GEOG-H-CC24-8-P – Rural and Urban Geography Lab – 25 Marks / 1 Credit

An A4- or letter-size laboratory notebook, comprising class assignments of the following is to be prepared and submitted. Census of India data are to be used where applicable. The exercises are to be drawn in pencil with photocopied representation of source materials where necessary. All texts are to be handwritten. In addition, a project report is to be submitted, as detailed under point 3, below.

1. Linear and exponential trends of growth rate of population [5]
2. Standardisation of data using Z Score [5]
3. A case study on evaluation of any selected programme in a village or ward using secondary and/or primary data to be done by a group of five to ten students. The report should be handwritten on A4 page in candidates' own words not exceeding 1000 excluding references. The report should contain a proper title and incorporate relevant tables, maps, diagrams, and references, not exceeding 8 pages. Photographs are optional and should not exceed three [20]

Marks division: 10 on topics 1 and/or 2 + 5 on topic 3 (project report) + 10 on viva-voce based on laboratory notebook and project report = 25

References

Basu, P. 2021. Advanced Practical Geography — a Laboratory Manual, 4 ed, Books and Allied.

Alvi, Z. 2002. Statistical Geography: Methods and Applications, Rawat Publications.

Croxton, F.E., Cowden, D.J. 1994. Applied General Statistics, Prentice Hall.

Mahmood, A., Reza, M. 1998. Statistical Methods in Geographical Studies, Rajesh Publications.

Pal, S.K. 1998. Statistics for Geoscientists: Techniques and Applications, Concept Pub Co.

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

GEOG-H-CC25-8-Th – Regional Development and Planning – 75 Marks / 3 Credits

Unit I: Regional Development

1. Regions: Concept, types, and delineation [4]
2. Concepts of growth and development. Indicators of development: Economic, demographic, and environmental [4]
3. Theories and models for regional development: Cumulative causation (after Myrdal), stages of development (after Rostow), and growth pole model (after Perroux) [5]
4. Underdevelopment: Concept and causes [2]
5. Regional disparities in India: Economic and social [4]

Unit I: Regional Planning

6. Regional planning: Principles, objectives, and approaches [4]
7. Types of planning: Temporal, sectoral, spatial, and non-spatial [6]
8. Centralised and decentralised planning. Multi-level planning in India [7]
9. Planning issues in hill area (as formal region) and city region (as functional region) [4]
10. Planning strategies: Participatory planning and governance [5]

References

Bhargava, G. 2001. Development of India's Urban, Rural, and Regional Planning in 21st Century: Policy Perspective, Gyan Publishing House.

Chand, M., Puri, V.K. 2000. Regional Planning In India, Allied Publishers Ltd.

Chandana, R.C. 2016. Regional Planning and Development, 6th ed, Kalyani Publishers.

Glasson, J. 2017. Contemporary Issues in Regional Planning, Routledge.

Gore, C. 2011. Regions in Question: Space, Development Theory, and Regional Policy, Routledge.

Gregory, D., Johnston, R., Pratt, G., Watts, M., Whatmore, S. (Eds) 2009. The Dictionary of Human Geography, 5th ed, Wiley.

Hall, P., Tewdwr-Jones, M. 2010. Urban and Regional Planning, Routledge.

Higgins, B., Savoie, D.J. 2017. Regional Development: Theories and Their Application, Routledge.

Kulshetra, S.K. 2012. Urban and Regional Planning in India: A Handbook for Professional Practitioners, Sage.

Kumar, A., Meshram, D.S., Gowda, K. (Eds) 2016. Urban and Regional Planning Education: Learning for India, Springer.

Misra, R.P. 1992. Regional Planning: Concepts, Techniques, Policies and Case Studies, Concept Pub Co.

Ray, J. 2001. Introduction to Development & Regional Planning, Orient Blackswan.

Combes P., Mayer T. and Thisse J. F., 2008: Economic Geography: The Integration of Regions and Nations, Princeton 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.

GEOG-H-CC25-8-P – Regional Development and Planning Lab – 25 Marks / 1 Credit

An A3- or tabloid-size 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. Delineation of formal regions by weighted index method [8]
2. Delineation of functional regions by breaking point analysis [8]
3. Measurement of inequality by location quotient [6]
4. Preparation of an interview schedule for any Gram Panchayat member on a relevant development issue [8]
5. Viva voce based on laboratory notebook (5 Marks)

References

Glasson, J. 2017. Contemporary Issues in Regional Planning, Routledge.

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

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.

SKILL ENHANCEMENT COURSE (SEC)

SEMESTERS – 1 (for H) & 1/2/3 (for MD)

GEOG-H-SEC01/MD-SEC01-1/2/3-Th – Methods in Geography – 100 Marks / 4 Credits

Unit I: Field Data Collection and Compilation

1. Designing of primary survey based on diverse research problems. Relevance of pilot survey [4]
2. Sampling types and strategy based on diverse research problems [4]
3. Preparation of questionnaire and interview schedule [4]
4. Data compilation into master table [4]
5. Computer-assisted field data entry; tabulation of data into frequency distribution tables [4]
6. Statistical analysis of data: measures of central tendency and dispersion [4]

Unit II: Methods in Physical Geography

7. Use of minor survey instruments: Brunton compass, distometer, smartphone levelling applications [4]
8. Textural analysis of grains using sieves [4]
9. Mapping and extraction of flooded areas from satellite images and digital elevation models [5]
10. Mapping areal and linear extents of riverbank and coastline shift from Survey of India 1:50k maps and/or satellite images [5]

Unit III: Methods in Human Geography

11. Dominant and distinctive functions [4]
12. Ternary diagram showing occupational patterns (after Ashok Mitra) [4]
13. Preparation of accessibility map [5]
14. Preparation of flowcharts using transportation data [5]

References

Clifford, N., Cope, M., Gillespie, T.W. (Eds) 2023. Key Methods in Geography, 4th ed, Sage.

Jones III, J.P., Gomez, B. (Eds) 2010. Research Methods in Geography: A Critical Introduction, Wiley.

Lenon B., Cleves, P. 2015. Geography of Fieldwork and Skills, Harper Collins.

Lindholm, R.C. 1987 A Practical Approach to Sedimentology, Springer.

Murthy, K.L.N. 2004. Research Methodology in Geography: A Text Book, Concept Pub Co.

Phillips, R., John J. 2012. Fieldwork for Human Geography, Sage

Mahmood, A. 1999, Statistical Methods in Geographical Studies, Rajesh Publication.

Sarkar, A. ,2015, Practical Geography, A systematic Approach, Orient Blackswan.

Singh, R.L., Singh, R.P.B., 2012. Elements of Practical Geography, Kalyani Publishers

SEMESTER –3 (for H)

GEOG-H-SEC02-3-Th – Environmental Impact Assessment and Environmental Management Planning – 100 Marks / 4 Credits

Unit I: Conceptual Framework

1. Definition and scope of Environmental Impact Assessment (EIA) and Environmental Management Planning (EMP) [4] FD
2. Legal and Policy Framework for Management: Air, Water, Forest. Environment Protection Act (EPA) [5] FD
3. Structure of governance and implementation strategies [4] FD

Unit II: Processes

4. Environmental appraisal: Concept and objectives [4] AM
5. Stages of conducting EIA: Scoping and screening using Environmental Information System (EIS) [5] AM
6. Preparation of inventory and matrices [4] AM

Unit III: Methods

7. Methodologies for EIA: Impact assessment, risk assessment, cost-benefit analysis [5] SG
8. Stakeholders' participation: Local bodies, citizens, relevant experts [4] SG
9. Prediction scenarios and mitigation, assessing alternatives [4] SG
10. Environmental Impact (EI) reporting [4] SG
11. EI monitoring and review [5] SS
12. Environmental audit: Relevance and process [4] SS
13. EIA/EMP case study of a metro rail project [4] SS
14. EIA/EMP case study of a highway project [4] SS

References

BOOKS:

Gilpin, A. 1994. Environmental Impact Assessment: Cutting Edge for the 21st Century, Cambridge University Press

Khandeshwar, S.R., Raman, N.S., Gajbhiye, A.R. 2019. Environmental Impact Assessment, Dreamtech Press

Tinsley, S. 2001. Environmental Management Plans Demystified, Rutledge.

Yerramilli, A., Manickam, V. 2020. Environmental Impact Assessment Methodologies, 3rd ed, BS Publication.

WEBSITES:

National Accreditation Board for Education & Training — EIA Accreditation: https://nabet.qci.org.in/eia_consultant

Example of an EIA report: Bengaluru Metro Rail Project:
https://www.adb.org/sites/default/files/project-documents/53326/53326-001-eia-en.pdf

Example of an EIA report: Vadodara–Mumbai Expressway Project:
https://www.mpcb.gov.in/sites/default/files/public_hearing/exe_summary/2021-01/nationalhighwayexesummmaryeng21012021.pdf

INTERDISCIPLINARY COURSE (IDC)

SEMESTERS – 1/2/3 (for H)

GEO-H-IDC01-1/2/3-Th – Geomatics and Spatial Analysis – 50 Marks / 2 Credits

Unit I: Cartography

1. Concept and applications of scales and projections. Components and classification of maps [4]
2. Bearing: Magnetic and true, whole-circle and reduced. Concept of geoid and spheroid with special reference to WGS-84. [3]
3. Map projections: Classification, properties and uses with special reference to simple conical projection and Universal Transverse Mercator (UTM) [5]

Unit II: Surveying

4. Basic concepts of surveying, survey equipment, and their capabilities: Dumpy level, theodolite, total station, and Global Navigation Satellite System (GNSS) [10]

Unit III: Remote Sensing and Geographical Information System

5. Principles of remote sensing (RS). Types of RS satellites and sensors with reference to IRS and Landsat missions [5]
6. Principles of • preparing standard false colour composites (FCCs) and • supervised image classification [4]
7. GIS data types: Spatial and non-spatial (attribute table and metadata), raster and vector [2]
8. Principles of preparing attribute tables, data manipulation, query, and overlay [7]

References

BOOKS:

Basu, P. 2021. Advanced Practical Geography — a Laboratory Manual, 4 ed, Books and Allied.

Bhatta, B. 2011. Global Navigation Satellite Systems: Insights into GPS, GLONASS, Galileo, Compass and Others, CRC Press.

Bhatta, B. 2020. Remote Sensing and GIS, 3rd ed, Oxford University Press.

Bolstad, P. 2016. GIS Fundamentals: A First Text on Geographic Information Systems, 5th ed, XanEdu Publishing.

Joseph, G., Jagannathan, C. 2018. Fundamentals of Remote Sensing, 3rd ed, Orient Blackswan.

Kennedy, M., Kopp, S. 2001. Understanding Map Projections, Esri Press.

Kimerling, A.J., Buckley, A.R., Muehrcke, P.C., Muehrcke, J.O. 2011. Map Use: Reading, Analysis, Interpretation, 7th ed, Esri Press.

Lillesand, T.M., Kiefer, R.W., Chipman, J.W., 2015. Remote Sensing and Image Interpretation, 7th ed, Wiley.

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

Pearson II, F. 1990. Map Projections: Theory and Applications 2nd ed, CRC Press.

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.

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

ISRO Bhuvan 2D and 3D Platforms:
https://bhuvan-app1.nrsc.gov.in/bhuvan2d/bhuvan/bhuvan2d.php
https://bhuvan-app1.nrsc.gov.in/globe/3d.php

National Remote Sensing Centre: www.nrsc.gov.in

Survey of India: https://www.surveyofindia.gov.in

USGS Global Visualization Viewer: https://glovis.usgs.gov

USGS Landsat Missions: https://www.usgs.gov/landsat-missions

GEO-H-IDC01-1/2/3-P – Geomatics and Spatial Analysis Lab – 25 Marks / 1 Credit

An A3- or tabloid-size 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. Construction of simple conical projection with one standard parallel [6]
2. Traverse survey and plotting UTM coordinates using smartphone GNSS application [8]
3. Identification of land use / land cover features from standard FCCs and preparation of inventories [8]
4. Change detection of riverbank or coastline shift from multi-dated maps and images [8]
5. Viva voce based on laboratory notebook (5 Marks)

References

Basu, P. 2021. Advanced Practical Geography — a Laboratory Manual, 4 ed, Books and Allied.

Basu, R., Bhaduri, S. (Eds) 2007. Contemporary Issues and Techniques in Geography, Progressive Pub.

Bhatta, B. 2020. Remote Sensing and GIS, 3rd ed, Oxford Univ. Press.

Kennedy, M., Kopp, S. 2001. Understanding Map Projections, Esri Press.

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.

Pearson II, F. 1990. Map Projections: Theory and Applications 2nd ed, CRC Press.

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.

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

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