



University of Gour Banga

Syllabus for
Choice Based Credit System(CBCS)
(Semester System)
Semester (I+II+III+IV+V+VI)

SUBJECT: GEOGRAPHY(HONOURS)

University of Gour Banga
P.O. – Mokdumpur,
Dist. – Malda
West Bengal
PIN - 732103



Descriptive Type Question pattern

For Discipline Core (DC) and Discipline Specific Elective (DSE)

Theory (Semester End Written Examination)

Full Marks = 25

(10 Marks x 1 Question) + (5 Marks x 3 Questions)

Internal Assessment

Full Marks = 10

(As mentioned in corresponding syllabus)

Practical (Semester End Laboratory based Test)

Full Marks = 15

(07 Marks x 1 Practical) + (05 Marks x 1 Practical) + (03 Marks for
Laboratory Note Book & Viva-voce)

Word limits for descriptive type questions (Theory)

10 marks: 600 - 700

5 marks: 300 - 350

For Skill Enhancement Course (SEC)

Theory (Semester End Written Examination)

Full Marks = 40

(10 Marks x 2 Question) + (5 Marks x 4 Questions)

**Duration of Examination**

Theory paper of 25 marks: 1.5 hours

Theory paper of 40 marks: 2 hours

Practical paper of 15 marks: 1.5 hours

Practical paper of 50 marks: 4 hours

**Semester wise Course Structure under CBCS
For B.A. /B.Sc. / B.Com. (Hons.) Courses**

Academic Semesters	C O U R S E S					Credits	Marks
	Discipline Core (DC)	Discipline Specific Elective (DSE)	Generic Elective (GE)	Ability Enhancement Compulsory (AEC)	Skill Enhancement Course (SEC)		
SEM-I	DC1(6) DC2(6)	--	GE-1 (6)	ENVS (2)	--	20	200
SEM-II	DC3(6) DC4(6)	--	GE-2 (6)	Communicative English/Communicative Bengali/MIL (2)	--	20	200
SEM-III	DC5(6) DC6(6) DC7(6)	--	GE-3 (6)	--	--	24	200
SEM-IV	DC8(6) DC9(6) DC10(6)	--	GE-4 (6)	--	--	24	200
SEM-V	DC11(6) DC12(6)	DSE-1 (6) DSE-2 (6)	--	--	SEC-1 (2)	26	250
SEM-VI	DC13(6) DC14(6)	DSE-3 (6) DSE / DP -4(6)	--	--	SEC-2 (2)	26	250
Total	--	--	--	--	--	140	1300



Marks & Question type Distribution for Hons. Courses

No. Of courses	Total credit	Total marks	Division of marks of each course				Marks for question type	
			Full marks of each course	Internal	End semester examination		MCQ	Written
					Theoretical	Practical		
14 DC	14x6 =84	14x50=700	50 (non practical based)	10	40	nil	nil	40
			50 (practical based)	10	25	15	nil	40
04 DSE	04x6=24	4x50=200	50 (non practical based)	10	40	nil	nil	40
			50 (practical based)	10	25	15	nil	40
04GE	04x6=24	4x50=200	50 (non practical based)	10	40	nil	nil	40
			50 (practical based)	10	25	15	nil	40
02 SEC	02x2=04	2x50=100	50	10	40	nil	nil	40
AEC-1 (ENVS)	01x2=-02	1x50=50	50	10 (Project) to be internally assessed	40	nil	40	nil
AEC-2 (Communica tive Bengali/Engl ish)	01x2=02	1x50=50	50	10	40	nil	40	nil
Grand Total	140	1300	--	--	--	--	--	--



Semester wise Course Structure under CBCS
For B.Sc. (Hons.) in Geography

	Discipline Core (DC)		Discipline Specific Elective (DSE) [Optional Papers]		Generic Elective (GE)		Skill Enhancement (SEC)
	Theory	Practical	Theory	Practical	Theory	Practical	
SEM-I	DC1A: Geotectonic and Geomorphology	DC1B: Practical	--		GE1A- Geotectonic and Geomorphology	GE1B: Practical	--
	DC2A: Cartographic Techniques	DC2B: Practical					
SEM-II	DC3A: Population and Settlement Geography	DC3B: Practical	--		GE2A: Climatology, Soil & Bio-geography	GE2B: Practical	--
	DC4A: Cartograms and Thematic Mapping	DC4B: Practical					
SEM-III	DC5A: Climatology	DC5B: Practical	--		GE3A: Social and Cultural Geography	GE3B: Practical	--
	DC6A: Statistical Methods in Geography	DC6B: Practical					
	DC7A: Geography of India	DC7B: Practical					
SEM-IV	DC8A: Regional Planning and Development	DC8B: Practical	--		GE4A: Economic Geography	GE4B: Practical	--
	DC9A: Economic Geography	DC9B: Practical					
	DC10A: Environmental Geography	DC10B: Practical					
SEM-V	DC11A: Soil & Bio Geography	DC11 B:Practical	DSE1A: Remote Sensing and Geographical Information System/ Political Geography	DSE1B: Practical			SEC1: Geography of Tourism
	DC12A: Hydrology and Oceanography	DC12 B: Practical	DSE2A: Fluvial Geomorphology/ Social and Cultural Geography	DSE2B: Practical			
SEM-VI	DC13A: Disaster Management	DC13 B: Practical	DSE3A: Applied Geomorphology/ Human Geography	DSE3B: Practical			SEC2: Climate Change: Vulnerability and Adaptations
	DC14A: Evolution of Geographical Thought	DC14 B: Practical		DP4: Field Report			
Total	--		--				--

**Semester Wise Distribution of Credits / Marks****Semester-I**

Course Type	Course Detail		Credits	Marks
	Theory	Practical		
Discipline Core (DC)	DC1A: Geotectonic and Geomorphology (04)	DC1B: Practical (02)	06	50
	DC2A: Cartographic Techniques(04)	DC2B: Practical (02)	06	50
Generic Elective-1 (GE)	GE1A-Geotectonic and Geomorphology (04)	GE1B: Practical (02)	06	50
Ability Enhancement Compulsory (AEC)	AEC1: Environment (02)		02	50
			20	200

Note: Generic Elective (GE) of this discipline will be opted by other discipline and students of this discipline will have to opt Generic Elective(GE) from other discipline as per availability of the college and staying within the periphery of University guideline

Semester-II

Course Type	Course Detail		Credits	Marks
	Theory	Practical		
Discipline Core (DC)	DC3A: Population and Settlement Geography (04)	DC3B: Practical (02)	06	50
	DC4A: Cartograms and Thematic Mapping (04)	DC4B: Practical (02)	06	50
Generic Elective-2 (GE)	GE2A: Climatology, Soil & Bio-geography (04)	GE2B: Practical (02)	06	50
Ability Enhancement Compulsory (AEC)	AEC2: Communicative English/Communicative Bengali/MIL (02)		02	50
			20	200

Note: Generic Elective (GE) of this discipline will be opted by other discipline and students of this discipline will have to opt Generic Elective(GE) from other discipline as per availability of the college and staying within the periphery of University guideline

Semester-III

Course Type	Course Detail		Credits	Marks
	Theory	Practical		
Discipline Core (DC)	DC5A: Climatology (04)	DC5B: Practical (02)	06	50
	DC6A: Statistical Methods in Geography (04)	DC6B: Practical (02)	06	50
	DC7A: Geography of India (04)	DC7B: Practical (02)	06	50
Generic Elective-3 (GE)	GE3A: Social and Cultural Geography (04)	GE3B: Practical (02)	06	50
			24	200

Note: Generic Elective (GE) of this discipline will be opted by other discipline and students of this discipline will have to opt Generic Elective(GE) from other discipline as per availability of the college and staying within the periphery of University guideline



Semester-IV

Course Type	Course Detail		Credits	Marks
	Theory	Practical		
Discipline Core (DC)	DC8A: Regional Planning and Development (04)	DC8B:Practical (02)	06	50
	DC9A: Economic Geography (04)	DC9B:Practical (02)	06	50
	DC10A: Environmental Geography (04)	DC10B:Practical (02)	06	50
Generic Elective-4 (GE)	GE4A: Economic Geography (04)	GE4B:Practical (02)	06	50
			24	200

Note: Generic Elective (GE) of this discipline will be opted by other discipline and students of this discipline will have to opt Generic Elective(GE) from other discipline as per availability of the college and staying within the periphery of University guideline

Semester-V

Course Type	Course Detail		Credits	Marks
	Theory	Practical		
Discipline Core (DC)	DC11A: Soil & Bio Geography (04)	DC11B:Practical (02)	06	50
	DC12A: Hydrology and Oceanography (04)	DC12B:Practical (02)	06	50
Discipline Specific Elective (DSE) [Optional]	DSE1A: Remote Sensing and Geographical Information System/ Political Geography (04)	DSE1B:Practical (02)	06	50
	DSE2A: Fluvial Geomorphology/ Social and Cultural Geography (04)	DSE2B:Practical (02)	06	50
Skill Enhancement (SEC)	SEC1: Geography of Tourism (02)		02	50
			26	250

Semester-VI

Course Type	Course Detail		Credits	Marks
	Theory	Practical		
Discipline Core (DC)	DC13A: Disaster Management(04)	DC13B: Practical (02)	06	50
	DC14A: Evolution of Geographical Thought(04)	DC14B: Practical (02)	06	50
Discipline Specific Elective (DSE) [Optional]	DSE3A: Applied Geomorphology /Human Geography (04)	DSE3B: Practical (02)	06	50
		DP4: Field Report (06)	06	50
Skill Enhancement (SEC)	SEC2: Climate Change: Vulnerability and Adaptations (02)		02	50
			26	250

Note: DP4 will focus on preparation of field report on specific topic on Physical or Human Geography



DETAILED SYLLABUS

SEMESTER-I

Course Type	Course Detail		Credits	Marks
	Theory	Practical		
Discipline Core (DC)	DC1A: Geotectonic and Geomorphology (04)	DC1B: Practical (02)	06	50
	DC2A: Cartographic Techniques(04)	DC2B: Practical (02)	06	50
Generic Elective-1 (GE)	GE1: Geotectonic and Geomorphology (04)	GE1B: Practical (02)	06	50
Ability Enhancement Compulsory (AEC)	Environment (02)		02	50
Total			20	200

Note:

Generic Elective (GE) of this discipline will be opted by other discipline and students of this discipline will have to opt Generic Elective (GE) from other discipline as per availability of the college and staying within the periphery of University guideline

DC1A: Geotectonics and Geomorphology (Theory)

Total Credit	04 Credits
Total Marks	35 Marks
• Semester End Examination	25 Marks Mode: Written Examination; Exam. Duration: 1.5 Hours; Question Pattern: Students have to answer One question carrying 10 marks out of Two given questions; Three questions carrying 5 marks each out of given Six questions. Question carrying 10 marks will have at least two parts.
• Internal Assessment	10 Marks Mode: Preparation of assignment on relevant theoretical aspects as directed by the Department

Part 1: Geotectonics

1. Earth's tectonic and structural evolution and geological time scale
2. Earth's interior with special reference to seismology; Isostasy: theory of Airy and Pratt
3. Mechanism of plate tectonics and resultant landforms, origin and types of Folds and Faults and consequent landforms

Part 2: Geomorphology

1. Fundamental concepts in Geomorphology; Denudation processes (weathering, mass movement and erosion) and resultant landforms, Models on landscape evolution: Views of Davis, Penck, King and Hack
2. Development of river network and landforms on uniclinal and folded structures; slope development and evolution of slope (Davis and King)
3. Surface and subsurface flow in Karst region, fluvial processes and landforms, glacial and fluvio-glacial processes and landforms, aeolian and fluvio-aeolian processes and landforms

References

1. Bloom, A. L. (2001): Geomorphology - A Systematic Analysis of Late Cenozoic Landforms, Prentice-Hall of India, New Delhi.
2. Bridges, E. M. (1990): World Geomorphology, Cambridge University Press, Cambridge.



3. Christopherson, Robert W. (2011): Geosystems - An Introduction to Physical Geography, 8 Ed., Macmillan Publishing Company
4. Kale, V. S. and Gupta A. (2001): Introduction to Geomorphology, Orient Longman, Hyderabad.
5. Knighton, A. D. (1984): Fluvial Forms and Processes, Edward Arnold Publishers, London.
6. Selby, M.J. (2005): Earth's Changing Surface, Indian Edition, OUP
7. Skinner, Brian J. and Stephen C. Porter (2000): The Dynamic Earth: An Introduction to physical Geology, 4th Edition, John Wiley and Sons.
8. Thornbury, W. D. (1969): Principles of Geomorphology, Wiley.

DC1B: Geotectonics and Geomorphology (Practical)

Total Credit	02 Credits
Total Marks	15 Marks
<ul style="list-style-type: none"> • Semester End Examination 15 Marks 	Mode: Laboratory based Examination; Exam. Duration: 1.5 Hours Question Pattern: : Students have to perform One Practical carrying 7 marks; Another One Practical carrying 5 marks. 3 marks for submission of Laboratory Note Book duly signed by the Teacher followed by the performance in a viva-voce.

List of Practical

1. Relief profile analysis (representative profile, serial, composite, super imposed, projected, long and cross profile)
2. Geological maps: Horizontal, Uniclinal and Folded structures
3. Identification of rocks and minerals (megascopic) (Basalt, granite, gneiss, sandstone, quartzite, limestone, mica, talc, calcite and feldspar)

References:

1. Billings, M.P. (1971). Structural Geology, Pearson.
2. Bennisson, G.M. (1990): An Introduction to Geological Structures and Maps (5th Ed.), Springer.
3. Bolton, T. (1989): Geological Maps – Their Solution and Interpretation, Cambridge University Press.
4. Borradaile, Graham (2014): Understanding Geology through Maps, Elsevier, Inc.
5. Maltman, A. (1990): Geological Map: An Introduction, Open University Press.
6. Platt, J.I., Selected Exercises upon Geological Map, Part I, Unwin, London.
7. Roy, A. K. (1966): Introduction to the study of geological maps, World Press Private Ltd.
8. Sarkar, A. (2015) Practical geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi
9. Singh, R.L. (1979): Elements of Practical Geography, Kalyani Pub.
10. Spencer, Edger W. (2006): Geologic Maps – A Practical Guide to Preparation and Interpretation, Waveland Press, Inc.

DC2A: Cartographic Techniques (Theory)

Total Credit	04 Credits
Total Marks	35 Marks
<ul style="list-style-type: none"> • Semester End Examination 25 Marks 	Mode: Written Examination; Exam. Duration: 1.5 Hours; Question Pattern: Students have to answer One question carrying 10 marks out of Two given questions; Three questions carrying 5 marks each out of given Six questions. Question carrying 10 marks will have at least two parts.
<ul style="list-style-type: none"> • Internal Assessment 10 Marks 	Mode: Preparation of assignment on relevant theoretical aspects as directed by the Department)

**Cartographic Techniques**

1. Concept and application of scale: Plain, comparative, diagonal and Positive Vernier
2. Coordinate systems and Map: Grid, concept of geoid, spheroid, rectangular and geographical coordinate system, concept of map, classification of map, components of a map
3. Bearing: Magnetic and true, whole-circle and quadrantal
4. Map projections: Classification, properties and uses; Concept and significance of UTM projection.
5. Basic concepts of surveying and leveling : Prismatic compass, Dumpy level, theodolite, Abney level and Clinometer.
6. Survey of India topographical maps: Reference scheme of old and open series. Information on the margin of maps

References

1. Anson R. and Ormelling F. J. (1994): International Cartographic Association: Basic Cartographic Vol. Pregmen Press.
2. Gupta K.K. and Tyagi, V. C. (1992): Working with Map, Survey of India, DST, New Delhi.
3. Kennedy, M., Kopp, S. (2001): Understanding Map Projections, Esri Press
4. Mishra R.P. and Ramesh, A. (1989): Fundamentals of Cartography, Concept, New Delhi.
5. Monkhouse F. J. and Wilkinson H. R. (1973): Maps and Diagrams, Methuen, London.
6. Rhind D. W. and Taylor D. R. F. (eds.) (1989): Cartography: Past, Present and Future, Elsevier, International Cartographic Association.
7. Robinson A. H. (2009): Elements of Cartography, John Wiley and Sons, New York.
8. Singh R. L. and Singh R. P. B. (1999): Elements of Practical Geography, Kalyani Publishers.
9. Sarkar, A. (2015): Practical geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi

DC2B: Cartographic Techniques (Practical)

Total Credit	02 Credits
Total Marks	15 Marks
<ul style="list-style-type: none"> • Semester End Examination 	15 Marks Mode: Laboratory based Examination; Exam. Duration: 1.5 Hours Question Pattern: : Students have to perform One Practical carrying 7 marks; Another One Practical carrying 5 marks. 3 marks for submission of Laboratory Note Book duly signed by the Teacher followed by the performance in a viva-voce.

List of Practical

1. Scale conversion: Statement, RF, Graphical (Linear, Diagonal, Positive vernier; enlargement and reduction of scale)
2. Construction of projections: Polar Zenithal Stereographic, Simple conical with standard parallels, Bonne's, Cylindrical Equal Area and Mercator's.
3. Surveying: Prismatic compass (closed traverse), dumpy level (along a line), and theodolite (base accessible and inaccessible with same vertical plain)

References

1. Kennedy, M., Kopp, S. (2001): Understanding Map Projections, Esri Press.
2. Kimerling, A.J., Buckley, A.R., Muehrcke, P.C., Muehrcke, J.O. (2011): Map Use: Reading, Analysis, Interpretation, 7th ed, Esri Press.
3. Monkhouse, F.J., Wilkinson, H.R. (1971): Maps and Diagrams: Their Compilation and Construction, 3rd ed (2017 reprint), Alphaneumera-Kolkata. Pearson II,
4. Pearson, F. (1990): Map Projections: Theory and Applications 2nd ed, CRC Press.
5. Robinson, A.H., Morrison, J.L., Phillip, C.M., Kimerling, A.J., Guptill, S.C. (1995): Elements of Cartography, 6th ed, Wiley.
6. Sarkar, A. (2015): Practical Geography: A Systematic Approach, 3rd ed, Orient Blackswan Private Ltd.
7. Singh, R.L., Singh, R.P.B. (2008): Elements of Practical Geography, Kalyani Publishers.



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

GE1A: Geotectonic & Geomorphology (Theory)

[This will be opted by the students of other discipline only]

Total Credit	04 Credits
Total Marks	35 Marks
• Semester End Examination	25 Marks Mode: Written Examination; Exam. Duration: 1.5 Hours; Question Pattern: Students have to answer One question carrying 10 marks out of Two given questions; Three questions carrying 5 marks each out of given Six questions. Question carrying 10 marks will have at least two parts.
• Internal Assessment	10 Marks Mode: Preparation of assignment on relevant theoretical aspects as directed by the Department)

Geotectonic & Geomorphology

1. Origin of the Earth: Tidal Hypothesis, Continental Drift Theory, Interior of the earth, earthquakes causes and consequences, Plate tectonics
2. Rocks: origin, classification, characteristics, influence of rocks on landforms and topography.
3. Processes of erosion, deposition and resulting landforms: river, wind, glacier, Concept of fluvial cycle of erosion and its interruption.
4. Weathering, mass wasting and topographic expression.

References

1. Khullar, D. R. (2014): Physical Geography, Kalyani Publishers, Delhi
2. Singh, Savindra (2012): Physical Geography, Prayag Pustak Bhavan, Allahabad
3. Mitra, Sen and Sengupta (21012): Prakritik Bhugol- Vol. 1 & Vol. 2
4. Basu and Maity (2010): Adhunik Bhumirup Bigyan
5. Bandopadhyay, Tarun, Kumar (2010): Adhunik Bhu-Porichoy
6. Basu, partha, (2010): Prokriya Sankranta Bhumirup Bidya
7. Bloom A. L. (2001): Geomorphology: A Systematic Analysis of Late Cenozoic Landforms, Prentice-Hall of India, New Delhi.
8. Bridges E. M. (1990): World Geomorphology, Cambridge University Press, Cambridge.
9. Kale V. S. and Gupta A. (2001): Introduction to Geomorphology, Orient Longman, Hyderabad.
10. Thornbury W. D. (1969): Principles of Geomorphology, Wiley

GE1B: Practical

[This will be opted by the students of other discipline only]

Total Credit	02 Credits
Total Marks	15 Marks
• Semester End Examination	15 Marks Mode: Laboratory based Examination; Exam. Duration: 1.5 Hours Question Pattern: : Students have to perform One Practical carrying 7 marks; Another One Practical carrying 5 marks. 3 marks for submission of Laboratory



Note Book duly signed by the Teacher followed by the performance in a viva-voce.

List of practical

1. Concept of scale, Principles & Types, Scale Conversion.
2. Simple Linear Scale calculation and construction
3. Sol, Topographical Map of Plateau areas (1:50,000): Broad Physiographic divisions and drainage.
4. Profile (Serial), Transect Chart for relating physical and cultural features
5. Identification of rocks and minerals (megascopic) (Basalt, granite, gneiss, sandstone, quartzite, limestone, mica, talc, calcite and feldspar)

References

1. Singh, R.L. and Singh R.P.B. (1972): Elements of Practical Geography; Kalyani Publishers.
2. Khan, MD.Z.A. (1998): Text Book of Practical Geography: Concept Publishing Company.
3. Monkhouse F. J and Wilkinson, H.R. (1971): Maps and Diagrams B.I. publications private limited, new Delhi
4. Ahmed, I. 1994: Practical Geography, Jawahar Publishers and Distributors, New Delhi
5. Sarkar, A. (1997): Practical Geography: A systematic approach, Orient Longman Ltd, Hyderabad
6. Singh, Gopal, (1998): Map Work and Practical Geography
7. Adhikari, sankar, (2015): Honours Baboharik Bhugol, Dove Publication
8. Ahamed, Asik, (2018): Baboharik Bhugol, ABJ Publisher
9. Ahmed, I, 1989: A Text Book of Practical Geography, Heritage Publishers, New Delhi.

SEMESTER-II

Course Type	Course Detail		Credits	Marks
	Theory	Practical		
Discipline Core (DC)	DC3A Population and Settlement Geography (04)	DC3B-Practical (02)	06	50
	DC4A Cartograms and Thematic Mapping (04)	DC4B-Practical (02)	06	50
Generic Elective-2 (GE)	GE2A Climatology, Soil and Bio-Geography (04)	GE2B-Practical (02)	06	50
Ability Enhancement Compulsory (AEC)	AEC2 Communicative English/Communicative Bengali/MIL (02)		02	50
Total			20	200

Note:

Generic Elective (GE) of this discipline will be opted by other discipline and students of this discipline will have to opt Generic Elective (GE) from other discipline as per availability of the college and staying within the periphery of University guideline

DC3A: Population and Settlement Geography (Theory)

Total Credit	04 Credits
Total Marks	35 Marks

- Semester End Examination 25 Marks
Mode: Written Examination;
Exam. Duration: 1.5 Hours;
Question Pattern: Students have to answer **One** question



carrying 10 marks out of **Two** given questions; **Three** questions carrying 5 marks each out of given **Six** questions. Question carrying 10 marks will have at least two parts.

- Internal Assessment

10 Marks

Mode: Ms. PowerPoint presentation of assignment on relevant theoretical aspects as directed by the Department)

Part 1: Population Geography

1. Definition, scope and contents of Population Geography, Population Geography and Demography and Sources of population data.
2. Components of population change: fertility, mortality and migration; Demographic transition model, Concept of under population, optimum population and over population.
3. Population distribution and density; Pattern of population growth in India; and Population policies in India (post-independence).

Part 2: Settlement Geography

1. Definition, scope and contents of Settlement Geography
2. Definition, nature and characteristics of rural settlements, Morphology (layout-internal and external) of rural settlements, site and situation, rural house types with reference to India, Census categories of rural settlements.
3. Census definition (Temporal) and categories of Urban Settlements in India; Urban morphology and theories (Classical Models-Burgess, Homer Hoyt, Harris and Ullman); Concept of Metropolis, City-region, Conurbation and Smart city; Functional classification of cities according to Harris.

References

1. Banerjee Guha, S. ed (2004): Space, Society & Geography, Rawat Publication, Delhi.
2. Bardhan, P. (2003): Poverty, Age Structure & Political Economy in India, Oxford University Press.
3. Barrett H. R. (1995): Population Geography, Oliver and Boyd.
4. Bhende A. & Kanitkar T. (2000): Principles of Population Studies, Himalaya Publishing House.
5. Biswas, A.K., Jortajada, C. (2006): Appraising Sustainable Development, Oxford University.
6. Chandna R. C. & Sidhu M. S. (1980): An Introduction to Population Geography, Kalyani Publishers.
7. Clarke, J. I. (1965): Population Geography, Pergamon Press, Oxford.
8. Dhanagare, D.N. (2004): Themes and Perspectives in Indian Sociology, Rawat Publication, Delhi.
9. Dohrs, I. & Sommers, L. (1967): Cultural Geography. Thomas Crowell Company.
10. Fellmann, J. D., Getis, A., & Getis, J. (2000): Human Geography- Landscape of Human Activity, McGraw Hill.
11. Fern, R.L. (2002): Nature, God and Humanity, Cambridge University Press.
12. Gadgil, M., & Guha, R. (2000): The Use and Abuse of Nature, Oxford University Press.
13. Gregory, D., & Urry, J. (1985): Social Relation and Spatial Structure, MacMillan.
14. Herbert, D.T., & Johnston, R.J. (1982): Geography and Urban Environment. John Wiley & Sons.
15. Hussain, M. (2007): Models in Geography, Rawat Publication.
16. Jones, H. R. (2000): Population Geography, 3rd ed. Paul Chapman, London.
17. Jordan, T., & Rowntree, L. (1990): Human Mosaic, Harper Collins Publishers.
18. Knox, P., & Pinch, S. (2000): Urban Social Geography, Pearson Education.
19. Lutz W., Warren C. S. & Scherbov S. (2004): The End of the World Population Growth in the 21st Century, Earthscan.
20. Mitchell, D. (2000): Cultural Geography-A Critical Introduction, Black Well.
21. Newbold, K. B. (2009): Population Geography- Tools and Issues, Rowman and Littlefield Publishers.
22. Pacione, M. (1986): Population Geography- Progress and Prospect, Taylor and Francis.
23. Wilson, M. G. A. (1968): Population Geography, Nelson.

DC3B: Population and Settlement Geography (Practical)

Total Credit	02 Credits
Total Marks	15 Marks

- Semester End Examination 15 Marks



Mode: Laboratory based Examination;
Exam. Duration: 1.5 Hours
Question Pattern: : Students have to perform **One** Practical carrying 7 marks; Another **One** Practical carrying 5 marks. 3 marks for submission of Laboratory Note Book duly signed by the Teacher followed by the performance in a viva-voce.

List of Practical

1. Population data analysis: Decadal growth, population density (Arithmetic and Agricultural) and Age-sex pyramid
2. Spatial Distribution and Interactions: Nearest-Neighbour Analysis (Clerk and Evans) and Rank-Size Rule (Zipf)

References

1. Alvi, Z. Statistical Geography (2002): Methods and Applications, Rawat Pub.
2. Anson R. and Ormelling F. J., (1994): International Cartographic Association: Basic Cartographic Vol. Pregmen Press.
3. Dent B. D., Torguson J. S., & Holder T. W. (2008): Cartography: Thematic Map Design (6th Edition), Mcgraw-Hill Higher Education.
4. Robinson, Arthur H. & Morrison, Joel L. (2009): Elements of Cartography, Wiley.
5. Sarkar, A. (2015): Practical geography - A systematic approach. Orient Black Swan Private Ltd., New Delhi
6. Singh, L.R. (2010): Fundamentals of Practical Geography, Sarada Pustak Bhavan, Alahabad.
7. Singh, R. L. & Singh R. P. B. (2005): Elements of Practical Geography, Kalyani Publishers.
8. Mahmood, A. (1999): Statistical Methods in Geographical Studies: Student Edition, Rajesh; New Edition.
9. Monkhouse F. J. and Wilkinson H. R., (1973): Maps and Diagrams, Methuen, London.

DC4A: Cartograms and Thematic Mapping (Theory)

Total Credit	04 Credits
Total Marks	35 Marks
• Semester End Examination	25 Marks Mode: Written Examination; Exam. Duration: 1.5 Hours; Question Pattern: Students have to answer One question carrying 10 marks out of Two given questions; Three questions carrying 5 marks each out of given Six questions. Question carrying 10 marks will have at least two parts.
• Internal Assessment	10 Marks Mode: Ms. PowerPoint presentation of assignment on relevant theoretical aspects as directed by the Department)

Cartograms and Thematic Mapping

1. Concepts of rounding, scientific notation, logarithm and anti-logarithm, natural and log scales
2. Concept, use, advantages and disadvantages of the representation of geographical data: Line, Bar, Dot and Sphere, Proportional circles, Isopleths and choropleth
3. Preparation and interpretation of large scale thematic maps: Geomorphological maps, climatological maps, Landuse/land cover maps and Thematic Maps
4. Application of GIS in thematic mapping, concept of Cadastral Map.

References

1. Cuff J. D. & Mattson M. T. (1982): Thematic Maps: Their Design and Production, Methuen Young Books.
2. Dent, B. D., Torguson, J. S., & Holder T. W. (2008): Cartography: Thematic Map Design (6th Edition), Mcgraw-Hill Higher Education.
3. Gupta, K. K. & Tyagi, V. C. (1992): Working with Maps, Survey of India, DST, New Delhi.



4. Kraak, M. J. & Ormeling, F. (2003): Cartography: Visualization of Geo-Spatial Data, Prentice-Hall.
5. Mishra, R. P., & Ramesh, A. (1989): Fundamentals of Cartography, Concept, New Delhi.
6. Monkhouse, F. J. & Wilkinson, H.R. (1952): Maps and Diagrams, Alphanumerica.
7. Singh, R. L. & Singh, R. P. B. (1999): Elements of Practical Geography, Kalyani Publishers.
8. Slocum, T. A., McMaster, R. B., & Kessler, F. C. (2008): Thematic Cartography and Geovisualization (3rd Edition), Prentice Hall.
9. Tyner, J. A. (2010): Principles of Map Design, The Guilford Press.
10. Sarkar, A. (2015): Practical geography: A systematic approach, Orient Black Swan Private Ltd., New Delhi.

DC4B: Cartograms and Thematic Mapping (Practical)

Total Credit	02 Credits
Total Marks	15 Marks
<ul style="list-style-type: none"> • Semester End Examination 15 Marks 	Mode: Laboratory based Examination; Exam. Duration: 1.5 Hours Question Pattern: : Students have to perform One Practical carrying 7 marks; Another One Practical carrying 5 marks. 3 marks for submission of Laboratory Note Book duly signed by the Teacher followed by the performance in a viva-voce.

List of Practical

1. Cartograms: Proportional squares, pie diagram, proportional divided circle, dots and spheres
2. Preparation of thematic maps: Choropleth, Isoline and Chorochromatic map

References:

1. Dent B. D., Torguson J. S., & Holder T. W. (2008): Cartography: Thematic Map Design (6th Edition), Mcgraw-Hill Higher Education.
2. Monkhouse, F. J. & Wilkinson, H.R. (1952): Maps and Diagrams, Alphanumerica.
3. Robinson, Arthur H. & Morrison, Joel L. (2009): Elements of Cartography, Wiley.
4. Sarkar, A. (2015). Practical geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi.
5. Singh, L.R. (2010). Fundamentals of Practical Geography, Sarada Pustak Bhavan, Alahabad.
6. Singh, R. L. & Singh R. P. B. (2005). Elements of Practical Geography, Kalyani Publishers.

GE2A: Climatology, Soil and Bio-Geography (Theory)

[This will be opted by the students of other discipline only]

Total Credit	04 Credits
Total Marks	35 Marks
<ul style="list-style-type: none"> • Semester End Examination 25 Marks 	Mode: Written Examination; Exam. Duration: 1.5 Hours; Question Pattern: Students have to answer One question carrying 10 marks out of Two given questions; Three questions carrying 5 marks each out of given Six questions. Question carrying 10 marks will have at least two parts.
<ul style="list-style-type: none"> • Internal Assessment 10 Marks 	Mode: Preparation of assignment on relevant theoretical aspects as directed by the Department)

**Climatology, Soil and Bio-Geography**

1. Concepts of weather and climate, controlling factors of climate, Atmospheric layers, Atmospheric Temperature, Planetary and periodic winds, Monsoon, local winds. insolation and heat budget
2. Atmospheric moisture: Humidity, types of precipitation, evaporation, condensation, Greenhouse effect and its impact
3. Factors of soil formation, Soil profiles, soil erosion and conservation.
4. Factors responsible for plant growth; Adaptation mechanism, characteristics of mangrove and xerophytes.

Reference

1. Barry R. G. and Corley R. J. (1998): Atmosphere, Weather and Climate, Routledge, New York.
2. Critchfield H. J. (1987): General Climatology, Prentice-Hall of India, New Delhi
3. Trewartha G. T. and Horne L. H. (1980): An Introduction to Climate, McGraw-Hill.
4. Lal, D S (2006): Climatology, Prayag Pustak Bhavan, Allahabad
5. Rafik Ahamed (2000): Abohawa o Jalbayu Bigyan

GE2B: Practical

[This will be opted by the students of other discipline only]

Total Credit	02 Credits
Total Marks	15 Marks
• Semester End Examination	15 Marks Mode: Laboratory based Examination; Exam. Duration: 1.5 Hours Question Pattern: : Students have to perform One Practical carrying 7 marks; Another One Practical carrying 5 marks. 3 marks for submission of Laboratory Note Book duly signed by the Teacher followed by the performance in a viva-voce.

List of Practical

1. Handling Rain Gauge, Maximum and Minimum Thermometer and Hygrometer
2. Preparation of Climograph and Hythergraph
3. Prismatic compass survey, plain table (radiation method)

Reference

1. Monkhouse F. J and Wilkinson, H.R. (1971): Maps and Diagrams B.I. publications private limited, new Delhi
2. Khan, MD.Z.A. (1998): Text Book of Practical Geography: Concept Publishing Company.
3. Ahmed, I. 1994: Practical Geography, Jawahar Publishers and Distributors, New Delhi
4. Sarkar, A. (1997): Practical Geography: A systematic approach, Orient Longman Ltd, Hyderabad
5. Khullar, D 2014: King's Practical Geography, Educational Publisher, Delhi

SEMESTER-III

Course Type	Course Detail		Credits	Marks
	Theory	Practical		
Discipline Core (DC)	DC5A Climatology (04)	DC5B-Practical (02)	06	50
	DC6A Statistical Methods in Geography (04)	DC6B-Practical (02)	06	50
	DC7A Geography of India (04)	DC7B-Practical (02)	06	50
Generic Elective-3 (GE)	GE3A Social and Cultural Geography (04)	GE3B-Practical (02)	06	50
Total			24	200

**Note:**

Generic Elective (GE) of this discipline will be opted by other discipline and students of this discipline will have to opt Generic Elective (GE) from other discipline as per availability of the college and staying within the periphery of University guideline

DC5A: Climatology (Theory)

Total Credit	04 Credits
Total Marks	35 Marks
• Semester End Examination	25 Marks Mode: Written Examination; Exam. Duration: 1.5 Hours; Question Pattern: Students have to answer One question carrying 10 marks out of Two given questions; Three questions carrying 5 marks each out of given Six questions. Question carrying 10 marks will have at least two parts.
• Internal Assessment	10 Marks Mode: Preparation of Term Paper on relevant theoretical aspects as directed by the Department)

Climatology

1. Structure and composition of the atmosphere, Insolation and heat budget
2. Horizontal and vertical distribution of temperature, concept and types of inversion of temperature: its causes and consequences, Ozone layer and green house effects
3. Condensation and precipitation process and forms; mechanism of precipitation: Bergeron-Flindeisen theory, Collision and coalescence theory
4. Air mass: typology, origin, characteristics and modification; Fronts: warm and cold; frontogenesis and frontolysis; weather: stability and instability; barotropic and baroclinic conditions
5. Circulation in the atmosphere: Planetary winds, jet stream, index cycle; tropical and mid-latitude cyclones; monsoon circulation and mechanism with reference to India
6. Climatic classification after Köppen and Thornthwaite

References

1. Ahrens, C.D. (2012): Essentials of Meteorology: An Invitation to the Atmosphere. 9th Ed, Cengage Learning.
2. Barry R. G. and Carleton A. M. (2001): Synoptic and Dynamic Climatology, Routledge, UK.
3. Barry R. G. and Corley R. J. (1998): Atmosphere, Weather and Climate, Routledge, New York.
4. Critchfield H. J. (1987): General Climatology, Prentice-Hall of India, New Delhi.
5. Lal, D.S. (2012): Climatology. Sharda Pustak Bhawan. Lutgens,
6. Lutgens F. K., Tarbuck E. J. and Tasa D. (2009): The Atmosphere: An Introduction to Meteorology, Prentice-Hall, Englewood Cliffs, New Jersey.
7. Oliver J. E. and Hidore J. J. (2002): Climatology: An Atmospheric Science, Pearson Education, New Delhi.
8. Siddharth, K (2016): A Climatology Atmosphere, Weather & Climate, Kitab Mahal,
9. Tarbuck, E.J. (1998): The Atmosphere: An Introduction to Meteorology, 9th Ed, PrenticeHall Inc.
10. Trewartha G. T. and Horne L. H. (1980): An Introduction to Climate, McGraw-Hill.

DC5B: Climatology (Practical)

Total Credit	02 Credits
Total Marks	15 Marks
• Semester End Examination	15 Marks Mode: Laboratory based Examination; Exam. Duration: 1.5 Hours Question Pattern: : Students have to perform One



Practical carrying 7 marks; Another **One** Practical carrying 5 marks. 3 marks for submission of Laboratory Note Book duly signed by the Teacher followed by the performance in a viva-voce.

List of Practical

1. Measurement of weather elements by Meteorological Instruments: Hygrometer, Maximum-Minimum Thermometer, Barometer, Rain gauge (Simon's)
2. Preparation of Climatic Graphs and Charts: Taylor's Climograph, Hythergraph, Star Diagram and Ergograph

References:

1. Singh, R.L. and Singh, R.P.B. (1972): Elements of Practical Geography; Kalyani Publishers.
2. Khan, Md. Z.A. (1998): Text Book of Practical Geography: Concept Publishing Company.
3. Monkhouse, F. J and Wilkinson, H.R. (1971): Maps and Diagrams B.I. publications private limited, new Delhi
4. Sarkar, A. (1997): Practical Geography: A systematic approach, Orient Longman Ltd, Hyderabad
5. Saha, P.K. and Basu P. (2004): Advanced Practical Geography: Books and Allied Kolkata

DC6A: Statistical Methods in Geography (Theory)

Total Credit	04 Credits
Total Marks	35 Marks
<ul style="list-style-type: none"> • Semester End Examination • Internal Assessment 	<p>25 Marks Mode: Written Examination; Exam. Duration: 1.5 Hours; Question Pattern: Students have to answer One question carrying 10 marks out of Two given questions; Three questions carrying 5 marks each out of given Six questions. Question carrying 10 marks will have at least two parts.</p> <p>10 Marks Mode: Preparation of Term Paper on relevant theoretical aspects as directed by the Department)</p>

Statistical Methods in Geography

1. Concept and significance of Statistics; Concept of data, sources of data, methods of data collection, discrete and continuous data, population and samples and scales of measurement (nominal, ordinal, interval and ratio)
2. Sampling: Need, types, and significance and methods of random sampling
3. Theoretical distribution: frequency, cumulative frequency, normal and probability distribution
4. Central tendency: Mean, median, mode and other partitioned values
5. Measures of dispersion: range, quartile deviation, mean deviation, standard deviation; coefficient of variation and coefficient of quartile deviation
6. Correlation: Rank correlation, product moment correlation; Regression (linear and non-linear) and time series analysis (moving average)

References

1. Berry B. J. L. and Marble D. F. (eds.) (1968): Spatial Analysis – A Reader in Statistical Geography, Prentice Hall.
2. Ebdon D. (1977): Statistics in Geography: A Practical Approach.
3. Gupta, S.P. (2003): Statistical Methods (31st Edition), S. Chand & Sons.
4. Hammond P. and McCullagh P. S. (1978): Quantitative Techniques in Geography: An Introduction, Oxford University Press
5. King L. S. (1969): Statistical Analysis in Geography, Prentice-Hall.
6. Mahmood A. (1977): Statistical Methods in Geographical Studies, Concept Publishing Company, Delhi.
7. Pal S. K. (1998): Statistics for Geoscientists, Tata McGraw Hill, New Delhi.
8. Sarkar, A. (2013): Quantitative Geography: Techniques and Presentations. Orient Black Swan Private Ltd., Orient Blackswan Pvt. Ltd, New Delhi



9. Silk J. (1979): Statistical Concepts in Geography, Allen and Unwin, London.
10. Spiegel M., Lindstorm, D. (1999): Statistics, Schaum's Outline Series.
11. Yeats M. (1974): An Introduction to Quantitative Analysis in Human Geography, McGraw Hill, New York.

DC6B: Statistical Methods in Geography (Practical)

Total Credit	02 Credits
Total Marks	15 Marks
• Semester End Examination	15 Marks Mode: Laboratory based Examination; Exam. Duration: 1.5 Hours Question Pattern: : Students have to perform One Practical carrying 7 marks; Another One Practical carrying 5 marks. 3 marks for submission of Laboratory Note Book duly signed by the Teacher followed by the performance in a viva-voce.

List of Practical

1. Construction of histograms and frequency curve; measures of central tendency; computation of mean (arithmetic and geometric), median and mode;
2. Measures of dispersions: standard deviation and coefficient of variation
3. Computation of correlation (Pearson); Regression and graphical plotting

References

1. Alvi, Z., 1995. Statistical Geography, Rawat Publishers, Jaipur.
2. Gupta, S.P. (2003): Statistical Methods (31st Edition), S. Chand & Sons.
3. Ishtiaque, M., 1994. Practical Geography, Jawahar Pub., New Delhi.
4. Khullar & Rastogi, King's Practical Geography, Educational Publisher, Delhi.
5. Khan, Z, A, 1998. Text Book of Practical Geography, Concept Publishing Company, Delhi.
6. Monkhouse, F.J. and Wilkinson, H., 1963. Maps and Diagrams, Methuen & Co., London.
7. Mahmood, A., 1986. Statistical Methods in Geographical Studies, Rajesh Pub., New Delhi.
8. Sarkar, A. (1997): Practical Geography: A systematic approach, Orient Longman Ltd, Hyderabad

DC7A: Geography of India (Theory)

Total Credit	04 Credits
Total Marks	35 Marks
• Semester End Examination	25 Marks Mode: Written Examination; Exam. Duration: 1.5 Hours; Question Pattern: Students have to answer One question carrying 10 marks out of Two given questions; Three questions carrying 5 marks each out of given Six questions. Question carrying 10 marks will have at least two parts.
• Internal Assessment	10 Marks Mode: Preparation of Term Paper on relevant theoretical aspects as directed by the Department)

Geography of India

1. Tectonic and stratigraphic provinces, physiographic divisions
2. Climate, soil and vegetation: Characteristics and classification
3. Agricultural regions. Green revolution and its consequences; mineral and power resources distribution and utilisation of iron ore, coal, petroleum and gas
4. Industrial development: Automobile and information technology



5. Regionalisation of India: Physiographic (R. L. Singh), Socio-cultural (Sopher) and Economic (Sengupta)
6. Contemporary population issues: Poverty, Illiteracy, Malnutrition and unemployment

References

1. Deshpande C. D. (1992): India - A Regional Interpretation, ICSSR, New Delhi.
2. Johnson, B. L. C., ed. (2001): Geographical Dictionary of India. Vision Books, New Delhi.
3. Khullar, D. R. (2018): India a Comprehensive Geography. Kalyani Publishers, New Delhi
4. Mandal R. B. ed. (1990): Patterns of Regional Geography – An International Perspective. Vol. 3 – Indian Perspective.
5. Pathak, C. R. (2003): Spatial Structure and Processes of Development in India. Regional Science Assoc., Kolkata.
6. Sdyasuk Galina and P Sengupta (1967): Economic Regionalisation of India, Census of India
7. Sharma, T.C. (2013): Economic Geography of India. Rawat Publication, Jaipur .
8. Singh R. L. (1971): India: A Regional Geography, National Geographical Society of India.
9. Singh, Jagdish (2003): India - A Comprehensive & Systematic Geography, GyanodayaPrakashan, Gorakhpur.
10. Spate O. H. K. and Learmonth A. T. A. (1967): India and Pakistan: A General and Regional Geography, Methuen.
11. Tirtha, Ranjit (2002): Geography of India, Rawat Pubs., Jaipur & New Delhi.
12. Tiwari, R.C. (2007): Geography of India. Prayag Pustak Bhawan, Allahabad

DC7B: Geography of India (Practical)

Total Credit	02 Credits
Total Marks	15 Marks
• Semester End Examination	15 Marks
	Mode: Laboratory based Examination; Exam. Duration: 1.5 Hours Question Pattern: : Students have to perform One Practical carrying 7 marks; Another One Practical carrying 5 marks. 3 marks for submission of Laboratory Note Book duly signed by the Teacher followed by the performance in a viva-voce.

List of Practical

1. Interpretation of Indian daily weather Map: Temperature, pressure, sky condition, wind direction and speed, sea condition and other weather phenomena (Pre-monsoon, Monsoon and Post-monsoon)
2. Identification of rocks and minerals: Sandstone, Limestone, Shale, Basalt, Granite, Gneiss, Marble, Quartzite, Conglomerate; Quartz, Chalcopryrite, Feldspar, Galena, Calcite, Haematite, Magnetite, Mica and Talc

References:

1. Singh, R.L. and Singh R.P.B. (1972): Elements of Practical Geography; Kalyani Publishers.
2. Khan, MD.Z.A. (1998): Text Book of Practical Geography: Concept Publishing Company.
3. Monkhouse F. J and Wilkinson, H.R. (1971): Maps and Diagrams B.I. publications private limited, new Delhi
4. Sarkar, A. (1997): Practical Geography: A systematic approach, Orient Longman Ltd, Hyderabad
5. Saha, P.K. and Basu P. (2004): Advanced Practical Geography: Books and Allied Kolkata

GE3A: Social & Cultural Geography (Theory)

[This will be opted by the students of other discipline only]

Total Credit	04 Credits
Total Marks	35 Marks
• Semester End Examination	25 Marks
	Mode: Written Examination; Exam. Duration: 1.5 Hours;



Question Pattern: Students have to answer **One** question carrying 10 marks out of **Two** given questions; **Three** questions carrying 5 marks each out of given **Six** questions. Question carrying 10 marks will have at least two parts.

- Internal Assessment

10 Marks

Mode: Preparation of assignment on relevant theoretical aspects as directed by the Department)

Social & Cultural Geography

1. Social Geography: Scope and content, concept of class and caste with reference to India.
2. Factors affecting growth and development of human habitat. Man's adaptation to the environment- Mountains: Gujjar, Hot: Bushman, Foothills: Toto and Cold: Eskimo.
3. Concept of culture, cultural groups, cultural region, cultural hearth.
4. Cultural landscape, Language, religion.

References

1. Ahmed, A (2004) : Social Geography, Rawat Publication, New Delhi
2. Chapman, K. (1979): People, Pattern and Process – An Introduction to Human
3. Jones, E. and Eyles, J. (1977): An Introduction to Social Geography, Oxford University Press, Oxford.
4. Pal, Alok, () : Samajik o Rajnoitik bhugoler Ruprekha
5. Rubenstein, J. M. and Becon, J. M. (1990): Cultural Geography, John Wiley and Sons Inc., New York.
6. Spencer, J. E. and Thomas, W. L. (1969): Cultural Geography, John Wiley and Sons Inc., New York.
7. Sen, Jotirmoy, () : Samajik o rajnoitik Bhugol
8. Sen, Jotirmoy, 2011: A Text Book Of Social and Cultural Geography, Kalyani Publisher, Delhi

GE3B: Practical

[This will be opted by the students of other discipline only]

Total Credit	02 Credits
Total Marks	15 Marks
• Semester End Examination	15 Marks
	Mode: Laboratory based Examination; Exam. Duration: 1.5 Hours Question Pattern: : Students have to perform One Practical carrying 7 marks; Another One Practical carrying 5 marks. 3 marks for submission of Laboratory Note Book duly signed by the Teacher followed by the performance in a viva-voce.

List of practical

1. Age-sex pyramid, choropleth technique and traffic flow diagram
2. Lorenz curve

Reference

1. Mahmood A., 1977: Statistical Methods in Geographical Studies, Concept.
2. Ahmed, I. 1994: Practical Geography, Jawahar Publishers and Distributors, New Delhi
3. Sarkar, A. (1997): Practical Geography: A systematic approach, Orient Longman Ltd, Hyderabad
4. Khullar, D 2014: King's Practical Geography, Educational Publisher, Delhi



SEMESTER-IV

Course Type	Course Detail		Credits	Marks
	Theory	Practical		
Discipline Core (DC)	DC8A Regional Planning and Development (04)	DC8B-Practical (02)	06	50
	DC9A Economic Geography (04)	DC9B-Practical (02)	06	50
	DC10A Environmental Geography (04)	DC10B-Practical (02)	06	50
Generic Elective-4 (GE)	Economic Geography (04)	GE4-Practical (02)	06	50
Total			24	200

Note:

Generic Elective (GE) of this discipline will be opted by other discipline and students of this discipline will have to opt Generic Elective (GE) from other discipline as per availability of the college and staying within the periphery of University guideline

DC8A: Regional Planning and Development (Theory)

Total Credit	04 Credits
Total Marks	35 Marks
<ul style="list-style-type: none"> Semester End Examination 	25 Marks Mode: Written Examination; Exam. Duration: 1.5 Hours; Question Pattern: Students have to answer One question carrying 10 marks out of Two given questions; Three questions carrying 5 marks each out of given Six questions. Question carrying 10 marks will have at least two parts.
<ul style="list-style-type: none"> Internal Assessment 	10 Marks Mode: Participation in Group Discussion on given theoretical topics as directed by the Department)

Regional Planning and Development

1. Concept, Types and delineation of regions.
2. Types of planning, tools and techniques of planning, principles, needs and objectives of regional planning and multi- level planning in India
3. Concepts of metropolitan areas and urban agglomerations
4. Development: Meaning and Concept of regional development with reference to India, Indicators (Economic, social and environmental) of development, growth versus development
5. Growth pole model of Perroux, growth centre model and Cumulative causation (Myrdal) and core periphery (Hirschman, Rostov and Friedman) theories for regional development
6. Strategies of regional development with reference to India, Need and measures for balanced development in India, Regional inequality, disparity and diversity

References

1. Berry, B.J.L. and Horton, F.F. (1970): Geographic Perspectives on Urban Systems. Prentice Hall, New Jersey.
2. Bhat L.S. (1972): Regional Planning In India, Statistical Publishing Society
3. Blij H. J. De (1971): Geography: Regions and Concepts, John Wiley and Sons.
4. Chand, M and Puri V.K. (1983) : Regional planning In India , allied publishers , New Delhi
5. Claval P.I. (1998): An Introduction to Regional Geography, Blackwell Publishers, Oxford and Massachusetts.
6. Dickinson, R.E. (1964): City and Region, Rutledge, London.



7. Friedmann J. and Alonso W. (1975): Regional Policy - Readings in Theory and Applications, MIT Press, Massachusetts.
8. Gore C. G. (1984): Regions in Question: Space, Development Theory and Regional Policy, Methuen, London.
9. Gore C. G., Köhler G., Reich U-P. and Ziesemer T. (1996): Questioning Development; Essays on the Theory, Policies and Practice of Development Intervention, Metropolis- Verlag, Marburg.
10. Hall, P. (1992): Urban and Regional Planning, Routledge, London.
11. Haynes J. (2008): Development Studies, Polity Short Introduction Series.
12. Johnson E. A. J. (1970): The Organization of Space in Developing Countries, MIT Press, Massachusetts.
13. KulshetraS.K, (2012) : Urban and Regional Planning in India : A hand book for Professional Practioners , Sage Publication , New Delhi
14. Kundu, A. (1992): Urban Development Urban Research in India, Khanna Publ. New Delhi.
15. Misra , R.P. Sundaram K.V. Prakash Rao , VLS (1974): Regional Development Planning in India , Vikas Publication , New Delhi
16. Misra, R.P. (1992): Regional Planning: Concepts , techniques , Policies and Case Studies , Concept , New Delhi
17. Peet R. (1999): Theories of Development, The Guilford Press, New York.
18. UNDP (Different Years): Human Development Report 2001-2018, Oxford University Press.
19. World Bank (Different Years): World Development Report 2001 - 2015, Oxford University Press, New Delhi

DC8B: Regional Planning and Development (Practical)

Total Credit	02 Credits
Total Marks	15 Marks
<ul style="list-style-type: none"> • Semester End Examination 15 Marks 	Mode: Laboratory based Examination; Exam. Duration: 1.5 Hours Question Pattern: : Students have to perform One Practical carrying 7 marks; Another One Practical carrying 5 marks. 3 marks for submission of Laboratory Note Book duly signed by the Teacher followed by the performance in a viva-voce.

List of Practical

1. Delineation of formal region: Weighted index number
2. Delineation of functional region: Gravity Analysis (Reilly's)
3. Measuring regional disparity: Lorenz curve, Gini Coefficient and Simson's method

References

1. Reilly, W.J. (1931): The Law of Retail Gravitation, Knickerbocker Press, New York.
2. Rodrigue J. P. (2017): The Geography of Transport System, Routledge, New York.
3. Mahmood, A. (1998): Statistical methods in Geographical Studies
4. Mishra, R.P. (2002): Regional Planning: Concepts, Techniques, Policies and Case Studies, Concept, New Delhi
5. Sarkar, A. (2013): Quantitative Geography, Orient BlackSwan

DC9A: Economic Geography (Theory)

Total Credit	04 Credits
Total Marks	35 Marks
<ul style="list-style-type: none"> • Semester End Examination 25 Marks • Internal Assessment 10 Marks 	Mode: Written Examination; Exam. Duration: 1.5 Hours; Question Pattern: Students have to answer One question carrying 10 marks out of Two given questions; Three questions carrying 5 marks each out of given Six questions. Question carrying 10 marks will have at least two parts.



Mode: Participation in Group Discussion on given theoretical topics as directed by the Department)

Economic Geography

1. Meaning, Concepts and approaches of Economic Geography, concepts of goods, services, production, exchange and consumption, GATT, OPEC
2. Concept of economic man, theories of choices
3. Economic distance, transport costs, Transnational sea-routes, railways and highways with reference to India
4. Concept and classification of economic activities, factors affecting location of economic activity with special reference to agriculture (Von Thunen), and industry (Weber).
5. Primary activities: Subsistence (paddy) and commercial agriculture (tea), forestry (lumbering), fishing (India: inland and coastal) and mining (coal, iron in India); Secondary activities: Manufacturing (cotton textile and iron and steel), Special economic zones (SEZ) and technology parks (India); Tertiary activities: transport-types and importance, trade (e-commerce) Quaternary and Quinary-concept
6. Liberalization, privatization, globalization and Indian economy

References

1. Alexander J. W. (1963): Economic Geography, Prentice-Hall Inc., Englewood Cliffs, New Jersey.
2. Bagchi-Sen S. and Smith H. L. (2006): Economic Geography: Past, Present and Future, Taylor and Francis.
3. Clark, Gordon L.; Feldman, M.P. and Gertler, M.S., eds. (2000): The Oxford
4. Coe N. M., Kelly P. F. and Yeung H. W. (2007): Economic Geography: A Contemporary Introduction, Wiley-Blackwell.
5. Combes P., Mayer T. and Thisse J. F. (2008): Economic Geography: The Integration of Regions and Nations, Princeton University Press.
6. Dhilon, S.S. (2004): Agricultural Geography, Tata McGraw-Hill Education.
7. Durand L. (1961): Economic Geography, Crowell.
8. Hodder B. W. and Lee Roger (1974): Economic Geography, Taylor and Francis.
9. Shafi, M (1993): Agricultural Geography, Dorling Kindersley (India) Pvt. Ltd.
10. Singh, J. (1984): Agricultural Geography, Tata McGraw-Hill Education.
11. Wheeler J. O. (1998): Economic Geography, Wiley.
12. Willington D. E. (2008): Economic Geography, Husband Press.

DC9B: Economic Geography (Practical)

Total Credit	02 Credits
Total Marks	15 Marks
• Semester End Examination	15 Marks Mode: Laboratory based Examination; Exam. Duration: 1.5 Hours Question Pattern: : Students have to perform One Practical carrying 7 marks; Another One Practical carrying 5 marks. 3 marks for submission of Laboratory Note Book duly signed by the Teacher followed by the performance in a viva-voce.

List of Practical

1. Agricultural Efficiency Analysis: Kendal's Method
2. Measuring transport accessibility: Konig and Shimbil index
3. Comparison of spatial industrial development: Location quotient and Geographical association

References

1. Latham, W.R. (1976): Locational Behaviour in Manufacturing Studies, Springer, Boston.



2. Mahmood, A. (1998): Statistical methods in Geographical Studies
3. Raja, M and Aggarwal, Y. (1999): Transport Geography of India, Concept.
4. Rodrigue J. P. (2017): The Geography of Transport System, Routledge, New York.
5. Saxena, H.M. (2005): Transport Geography, Rawat.

DC10A: Environmental Geography (Theory)

Total Credit	04 Credits
Total Marks	35 Marks
<ul style="list-style-type: none"> • Semester End Examination 	25 Marks Mode: Written Examination; Exam. Duration: 1.5 Hours; Question Pattern: Students have to answer One question carrying 10 marks out of Two given questions; Three questions carrying 5 marks each out of given Six questions. Question carrying 10 marks will have at least two parts.
<ul style="list-style-type: none"> • Internal Assessment 	10 Marks Mode: Participation in Group Discussion on given theoretical topics as directed by the Department)

Environmental Geography

1. Geographers' approach to environmental studies, concept of holistic environment and system approach
2. Perception of environment in different stages of civilization
3. Concept, structure and functions of ecosystem
4. Environmental pollution and degradation (Land, water and air), Space-time hierarchy of environmental problems (Local, regional and global)
5. Urban environmental issues with special reference to waste management
6. Environmental programmes and policies – Global, national and local levels

References

1. Chandna R. C. (2002): Environmental Geography, Kalyani, Ludhiana.
2. Cunningham W. P. and Cunningham M. A. (2004): Principals of Environmental Science: Inquiry and Applications, Tata Macgraw Hill, New Delhi.
3. Goudie A. (2001): The Nature of the Environment, Blackwell, Oxford.
4. Miller G. T. (2004): Environmental Science: Working with the Earth, Thomson BrooksCole, Singapore.
5. MOEF (2006): National Environmental Policy-2006, Ministry of Environment and Forests, Government of India.
6. Odum, E. P. et al. (2005): Fundamentals of Ecology, Ceneage Learning India.
7. UNEP (2007): Global Environment Outlook: GEO4: Environment For Development, United Nations Environment Programme.
8. Singh, M., Singh, R.B. and Hassan, M.I. (Eds.) (2014): Climate change and biodiversity: Proceedings of IGU Rohtak Conference, Volume 1. Advances in Geographical and Environmental Studies, Springer
9. Singh, R.B. (1998): Ecological Techniques and Approaches to Vulnerable Environment, New Delhi, Oxford & IBH Pub.
10. Singh, R.B. (Eds.) (2009) Biogeography and Biodiversity. Rawat Publication, Jaipur
11. Singh, R.B. and Hietala, R. (Eds.) (2014) Livelihood security in Northwestern Himalaya: Case studies from changing socio-economic environments in Himachal Pradesh, India. Advances in Geographical and Environmental Studies, Springer
12. Singh S. (1997): Environmental Geography, Prayag Pustak Bhawan. Allahabad.

DC10B: Environmental Geography (Practical)

Total Credit	02 Credits
Total Marks	15 Marks
<ul style="list-style-type: none"> • Semester End Examination 	15 Marks



Mode: Laboratory based Examination;
Exam. Duration: 1.5 Hours
Question Pattern: : Students have to perform **One** Practical carrying 7 marks; Another **One** Practical carrying 5 marks. 3 marks for submission of Laboratory Note Book duly signed by the Teacher followed by the performance in a viva-voce.

List of Practical

1. Preparation of check-list for Environmental Impact Assessment of an urban / industrial project
2. Determination of soil type by ternary diagram textural plotting
3. Quality assessment of water using lab kit: pH and TDS

References

1. Anjaneyulu, Y and Manickam, Valli, (2007): Environmental Impact Assessment Methodologies, BS Publication, Hyderabad
2. Gilpin. A. (1994) Environmental Impact Assessment (EIA): Cutting Edge for the 21st Century : Cutting Edge for the Twenty-First Century, Cambridge University Press.
3. Leo, M. L. et. al (2011): Handbook of Water Analysis, CRC Press
4. Weil, R.R. and Brady, N.C. (2006): The Nature and Properties of Soils (15th Ed.), Pearson.
5. Yuncong Lio, Kati, Migliaccio (2010): Water Quality: Concepts, Sampling and Analysis, CRC Press.

GE4A: Economic Geography (Theory)

[This will be opted by the students of other discipline only]

Total Credit	04 Credits
Total Marks	35 Marks
• Semester End Examination	25 Marks Mode: Written Examination; Exam. Duration: 1.5 Hours; Question Pattern: Students have to answer One question carrying 10 marks out of Two given questions; Three questions carrying 5 marks each out of given Six questions. Question carrying 10 marks will have at least two parts.
• Internal Assessment	10 Marks Mode: Preparation of assignment on relevant theoretical aspects as directed by the Department)

Economic Geography

1. Concept of economic activities and sectors of economy: primary, secondary, tertiary, quaternary and quinary; Resource: Definition, classification, resource conservation.
2. Forest Resource: Importance, conservation; Concept of social forestry and agro-forestry.
3. Agriculture: Intensive rice cultivation (Asia); Plantation agriculture: Tea (India).
4. Power: Coal, Petroleum (distribution and use); Non-conventional: Wind, Solar (distribution and use); Industries: Iron and Steel (India) ; Cotton Textile (India).

Reference

1. Alexander J. W., 1963: Economic Geography, Prentice-Hall Inc., Englewood Cliffs, New Jersey.
2. Coe N. M., Kelly P. F. and Yeung H. W., 2007: Economic Geography: A Contemporary Introduction, Wiley-Blackwell.
3. Goh Cheng Leong, Elizabeth Martin, 1982: Human & Economic Geography, Oxford Press



4. Hodder B. W. and Lee Roger, 1974: Economic Geography, Taylor and Francis.
5. Combes P., Mayer T. and Thisse J. F., 2008: Economic Geography: The Integration of Regions and Nations, Princeton University Press.
6. Wheeler J. O., 1998: Economic Geography, Wiley
7. Durand L., 1961: Economic Geography, Crowell.
8. Bagchi-Sen S. and Smith H. L., 2006: Economic Geography: Past, Present and Future, Taylor and Francis.
9. Willington D. E., 2008: Economic Geography, Husband Press.

GE4B: Practical

[This will be opted by the students of other discipline only]

Total Credit	02 Credits
Total Marks	15 Marks
• Semester End Examination	15 Marks
	Mode: Laboratory based Examination; Exam. Duration: 1.5 Hours Question Pattern: : Students have to perform One Practical carrying 7 marks; Another One Practical carrying 5 marks. 3 marks for submission of Laboratory Note Book duly signed by the Teacher followed by the performance in a viva-voce.

List of practical

1. Cartograms showing statistical data: Simple and compound Bar Diagram, Proportional circles, pie and proportional divided circle and proportional squares.
2. Map Projection: Simple conical projection with one standard parallel, Cylindrical equal area projection and Gnomonic projection (polar case)

Reference

1. Monkhouse F. J and Wilkinson, H.R. (1971): Maps and Diagrams B.I. publications private limited, new Delhi
2. Khan, MD.Z.A. (1998): Text Book of Practical Geography: Concept Publishing Company.
3. Ahmed, I. 1994: Practical Geography, Jawahar Publishers and Distributors, New Delhi
4. Sarkar, A. (1997): Practical Geography: A systematic approach, Orient Longman Ltd, Hyderabad
5. Khullar, D. 2014: King's Practical Geography, Educational Publisher, Delhi

SEMESTER-V

Course Type	Course Detail		Credits	Marks
	Theory	Practical		
Discipline Core (DC)	DC11A- Soil & Bio Geography (04)	DC11B-Practical (02)	06	50
	DC12A- Hydrology and Oceanography (04)	DC12B-Practical (02)	06	50
Discipline Specific Elective (DSE) [Optional]	DSE1A- Remote Sensing and Geographical Information System/ Political Geography (04)	DSE1B-Practical (02)	06	50
	DSE2A- Fluvial Geomorphology/ Social and Cultural Geography (04)	DSE2B-Practical (02)	06	50
Skill Enhancement (SEC)	SEC1- Geography of Tourism (02)		02	50
Total			26	250

**DC11A: Soil & Biogeography (Theory)**

Total Credit	04 Credits
Total Marks	35 Marks
• Semester End Examination	25 Marks Mode: Written Examination; Exam. Duration: 1.5 Hours; Question Pattern: Students have to answer One question carrying 10 marks out of Two given questions; Three questions carrying 5 marks each out of given Six questions. Question carrying 10 marks will have at least two parts.
• Internal Assessment	10 Marks Mode: Written Test on given theoretical topics as directed by the Department)

Part 1: Soil Geography

1. Definition and classification (Genetic & USDA) of soil, Factors of soil formation, Physical (structure and texture) and chemical soil properties (pH and NPK)
2. Origin and profile characteristics of Lateritic, Podzol and Chernozem soils
3. Factors and processes of Soil erosion, degradation and mitigation measures

Part 2: Biogeography

1. Definition of Biogeography, Concepts of biosphere, ecosystem, biome, ecotone, community, ecology, trophic structure, food chain and food web and biodiversity
2. Energy flow in ecosystems, Bio-geochemical cycles with special reference to carbon dioxide and nitrogen
3. Geographical extent and characteristic features of Tropical rain forest and Taiga biomes; Causes, consequences of deforestation and management; Wetland: concept and significance

References

1. Biswas, T.D. and Mukherjee, S.K. (1997): Textbook of Soil Science, Tata McGraw Hill,
2. Brady, N.C. and Weil, R.R. (1996): The Nature and Properties of Soil, 11th edition, Cambridge University Press, Cambridge.
3. Chairas, D.D. Reganold, J.P. and Owen, O.S. (2002): National Resource Conservation and management for a Sustainable Future, 8th edition, Prentice Hall.
4. Chapman, J.L. and Reiss, M.J. (1992): Ecology Principles and Applications, Cambridge
5. Chapman J.L. and Rens, M.J. (1993): Ecology: Principle and Applications, Cambridge University Press, Cambridge.
6. Dash, M.C. (2001): Fundamental of Ecology, 2nd edition, Tata McGraw-Hill, New Delhi.
7. Floth, H.D. (1990): Fundamentals of Soil science, 8th edition, John Wiley and Sons, New York.
8. Huggett, R. (1998): Fundamentals of Biogeography, Routledge, London:
9. Joy, T. et al. (1989): Human Impact on The Ecosystem, Oliver and Boyd, London.
10. Kendeigh, S.C. (1975): Ecology with Special Reference to Man and animals, Prentice Hall,
11. Khinchi, Shyam S. (editor) (2015): Biodiversity Distribution and Conservation, Pointer
12. Kormondy, E.J. (1991): Concepts of Ecology, Prentice Hall India, New Delhi.
13. Kormondy, E.J. (1996): Concept of Ecology, 4th edition, Prentice- Hall, India, New Delhi
14. Morgan, R.P.C. (1995): Soil Erosion and Conservation, 2nd edition, Longman, London
15. Myers, A. A. and Giller, P.S. (editors) (1988): Analytical Biogeography: an Integrated Approach to the Study of Animal and Plant Distribution. Chapman and Hall, London
16. Nebel, J.B. (1981): Environmental Science, Prentice Hall, New York.
17. Odum, E.P. (1971): Fundamentals of Ecology, W.B. Sanders, Philadelphia.
18. Schwab, G.O., Fangmer, D.D. and Elliot, W.J. (1996): Soil and Water Management Systems, 4th edition, John Eiley and sons Inc., New York.
19. Sharma, P. D. (1996): Ecology and Environment, 7th edition, Rastogi Publications, Meerut.
20. Shukla, R.S. and Chandel, P.S. (1930): Plant Ecology and Soil Science, S Chand, New Delhi.
21. Simmons, I. G. (1981): The Ecology of Natural Resources, ELBS/ Edward Arnold, London.
22. Simmons, I.G. (1980): Bio-geographical Processes, George Allen and Unwin, London.



23. Spellerberg, I. F. and Sarwyer, J. W. D. (1999): An Introduction to Applied Biogeography, University Press, Cambridge.
24. Weddell, B. J. (2002): Conserving Living Natural Resources in the Context of a Changing World, Cambridge University Press, and Cambridge.
25. Young, A. (2000): Land Resource: Now and Future, Cambridge University Press, Cambridge.

DC11B: Soil and Biogeography (Practical)

Total Credit	02 Credits
Total Marks	15 Marks
<ul style="list-style-type: none"> • Semester End Examination 	15 Marks Mode: Laboratory based Examination; Exam. Duration: 1.5 Hours Question Pattern: : Students have to perform One Practical carrying 7 marks; Another One Practical carrying 5 marks. 3 marks for submission of Laboratory Note Book duly signed by the Teacher followed by the performance in a viva-voce.

List of Practical

1. Particle size distribution analysis by sieving method
2. Measurement of soil nutrient (NPK) and Soil pH by using soil kit
3. Time series analysis of biogeography data

References

1. Biswas, T.D. and Mukherjee, S.K. (1997): Textbook of Soil Science, Tata McGraw Hill.
2. Brady, N.C. and Weil, R.R. (1996): The Nature and Properties of Soil, 11th edition, Longman, London : Cambridge University Press, Cambridge.
3. Burt, R. (ed.) (2004): Soil Survey Laboratory Methods Manual: Soil Survey Investigations Report No. 42 Version 4.0, USDA, USA
4. Huggett, R. (1998): Fundamentals of Biogeography, Routledge, London:
5. Joy, T. et al. (1989): Human Impact on The Ecosystem, Oliver and Boyd, London.
6. McKenzie, N.J., Grundy, M.J., Webster, R. and Ringrose-Voase, A.J. (2008): Guidelines for Surveying Soil and Land Resources; CSIRO Publishing, Melbourne
7. Rowell, D.L. (1995): Soil Science- Methods and Applications; Longman Scientific & Technical, UK
8. United States Bureau of Plant Industry, Soils, and Agricultural Engineering (1951): Soil Survey Manual, United States Dept. of Agriculture Handbook No. 18, U.S. Government Printing Office, New York.

DC12A: Hydrology and Oceanography (Theory)

Total Credit	04 Credits
Total Marks	35 Marks
<ul style="list-style-type: none"> • Semester End Examination 	25 Marks Mode: Written Examination; Exam. Duration: 1.5 Hours; Question Pattern: Students have to answer One question carrying 10 marks out of Two given questions; Three questions carrying 5 marks each out of given Six questions. Question carrying 10 marks will have at least two parts.
<ul style="list-style-type: none"> • Internal Assessment 	10 Marks Mode: Written Test on given theoretical topics as directed by the Department)

**Part 1: Hydrology**

1. Definition of hydrology; Concept, Characteristics, Significance and Interpretation of Hydrological Cycles
2. Definitions and Characteristics of Precipitation, Evaporation, Evapo-Transpiration, Infiltration, Rainfall Recharge Relationship and Runoff Characteristics
3. Flood Analysis of a drainage basin, Concept of Micro Watershed Planning, Water Management in Tropical Cities and Rainwater Harvesting

Part 2: Oceanography

1. Origin, Characteristics of major Structural and Morphological features of Pacific, Atlantic and Indian Ocean
2. Origin and evolution of coral reefs and atolls; Origin and Classification of oceanic sediments
3. Temperature and Salinity characteristics of ocean water and marine resources

References:

1. Affholder, M. and Valiron, F. (2001): Descriptive Physical Oceanography, CRC Press.
2. Apel, J. (1987): Principles of Ocean Physics, Academic Press, London.
3. Black, P.E. (1991): Watershed Hydrology, Prentice Hall, London
4. Black, Peter E. (1996): Watershed Hydrology, Lewis Publishers.
5. Chorley, R.J. (1969): Water, Earth and Man, Methuen, London.
6. Chow, V. T., Maidment, D.R. and Mays, L.W. (1988): Applied Hydrology, McGraw Hill, New York
7. Cundy, A. and Kershaw, S. (2013): Oceanography: an Earth Science Perspective, Routledge.
8. Davis, R.J.A. (1986): Oceanography - An Introduction of the Marine Environment, Win C. Brown, Iowa
9. Day, T. (2006): Oceans, Chelsea House, New York
10. Erickson, J. (2003): Marine Geology: Exploring the New Frontiers of the Ocean, Facts on File, Inc., New York
11. Fetter, C.W. (1990): Applied Hydrology, CBS Publisher and Distributors, New Delhi.
12. Garrison, T. (2009): Essentials of Oceanography, Brooks/Cole, Belmont, California
13. Ilyin, A.V. (2003): Evolution of the Ocean Floor Morphostructure - Actualistic Model, in Evans, I.S., Dikau, James, A. (2011): Watershed Modeling, Island Press, Andrew Ford.
14. King, C.A. (1962): Oceanography for Geographers, Edward Arnold, New York
15. King, C.A.M. (1972): Beaches and Coasts, Arnold, London.
16. Law, B. C. (Ed.) (1968): Mountains and Rivers of India, IGU National Committee for Geography, Calcutta.
17. Linsley, K., Kohler, M. and Paulhus, J.L. 1975: Applied Hydrology, Tata McGraw Hill, New Delhi.
18. Meinzer, O.E. 1942: Hydrology, Dover Publication Inc. New York.
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20. Pinet, P.R. (2009): Invitation to Oceanography, Jones and Bartlett Publishers, Sudbury, Massachusetts
21. Robert, C.M. (2009): Global Sedimentology of the Ocean: An Interplay between Geodynamics and the Palaeoenvironment, Elsevier, Amsterdam
22. Sharma, R.C. & Vatal, M., 1992: Oceanography for Geographers, Chaitanya Publishing House, Allahabad.
23. Shepard, F.P., 1963: Submarine Geology, Harper and Row, New York.
24. Siddharth, K., 1999: Oceanography: A brief introduction, Kishalaya Publisher, Noida.
25. Singh, V.P., 1989: Hydrologic System, Prentice-Hall, Englewood Cliffs.
26. Small, R.J. 1989: Geomorphology and Hydrology, Longman Group Ltd, London.
27. Stahler, A.N. and Stahler A.N. (1997): Geography and Man's Environment, John Wiley and Sons, New York
28. Steers, J.A. 1953: The Sea Coast, Collins, London.
29. Sverdrup, H.U. 1942: The Oceans, their Physics, Chemistry and General Biology, Prentice-
30. Thorpe, S.A., Steele, J.H., Turekian, K.K. (eds.) (2009): Elements of Physical Oceanography, Academic Press, London.
31. Thurman, H.V. (1978): Introduction to Oceanography, Charles E. Merrill Pub. Co., London
32. Todd, D.K. 1959: Ground Water Hydrology, John Wiley and Sons, New York
33. Walters, D. 2010: Physical Hydrology, Routledge.
34. Walton, W.C. 1970: Ground Water Resource Evaluation, McGraw Hill, Tokyo.
35. Ward, A.D. and Trimble, S.W. 2004: Environmental Hydrology: Lewis Publishers.
36. Weyl, P.K. (1970): Oceanography: An Introduction of the Marine Environment, John Wiley and Sons Ltd., London.

**DC12B: Hydrology and Oceanography (Practical)**

Total Credit	02 Credits
Total Marks	15 Marks
<ul style="list-style-type: none"> Semester End Examination 	15 Marks Mode: Laboratory based Examination; Exam. Duration: 1.5 Hours Question Pattern: : Students have to perform One Practical carrying 7 marks; Another One Practical carrying 5 marks. 3 marks for submission of Laboratory Note Book duly signed by the Teacher followed by the performance in a viva-voce.

List of practical

1. Annual Hydrograph analysis and rating curve
2. Runoff estimation: Float method
3. Preparation of temperature-salinity (TS) diagram

References:

1. Black, P.E. (1991): Watershed Hydrology, Prentice Hall, London
2. Black, Peter E. (1996): Watershed Hydrology, Lewis Publishers.
3. Cundy, A. and Kershaw, S. (2013): Oceanography: an Earth Science Perspective, Routledge.
4. Fetter, C.W. (1990): Applied Hydrology, CBS Publisher and Distributors, New Delhi.
5. James, A., (2011): Watershed Modeling, Island Press, Andrew Ford.
6. Sharma, R.C. & Vatal, M. (1992): Oceanography for Geographers, Chaitanya Publishing House, Allahabad.
7. Siddharth, K. (1999): Oceanography: A brief introduction, Kishalaya Publisher, Noida.
8. Singh, V.P. (1989): Hydrologic System, Prentice-Hall, Englewood Cliffs
9. Small. R.J. (1989): Geomorphology and Hydrology, Longman Group Ltd, London.
10. Thorpe, S.A., Steele, J.H., Turekian, K.K. (eds.) (2009): Elements of Physical Oceanography, Academic Press, London.
11. Thurnman, H.V. (1978): Introduction to Oceanography, Charles E. Merrill Pub. Co., London
12. Ward, A.D. and Trimble, S.W. (2004): Environmental Hydrology: Lewis Publishers.
13. Weyl, P.K. (1970): Oceanography: An Introduction of the Marine Environment, John Wiley and Sons Ltd., London.

DSE1A: Remote Sensing and GIS (Theory)

Total Credit	04 Credits
Total Marks	35 Marks
<ul style="list-style-type: none"> Semester End Examination 	25 Marks Mode: Written Examination; Exam. Duration: 1.5 Hours; Question Pattern: Students have to answer One question carrying 10 marks out of Two given questions; Three questions carrying 5 marks each out of given Six questions. Question carrying 10 marks will have at least two parts.
<ul style="list-style-type: none"> Internal Assessment 	10 Marks Mode: Written Test on given theoretical topics as directed by the Department)

Part 1: Remote Sensing

1. Concept, Principles, Stages, Types and Methods of RS, types of RS satellites and sensors



2. Sensor resolutions and their applications with reference to IRS and Landsat missions, image referencing schemes and data acquisition; Concept of False Colour Composites from IRS LISS-3 and Landsat TM and OLI data.
3. Principles of image interpretation. Preparation of inventories of land use/land cover (LULC) features from satellite images.

Part 2: Geographical Information Systems

1. Concepts, Components, Developments, Functions and Advantages of GIS, raster and vector
2. Principles of preparing attribute tables, data manipulation and overlay analysis
3. Principles of GNSS positioning and waypoint collection

References

1. Burrough, P.A. (1998): Principles of Geographical Information system for land resources assessment, 2nd edition, Oxford University press, New York.
2. Campbell J. B. (2007): Introduction to Remote Sensing, Guildford Press.
3. Campbell, J.B. (1996): Introduction to Remote Sensing, 2nd Edition, Taylor & Francis, London.
4. Curram, P.J. (1980): Multispectral remote sensing of vegetation amount, progress in Physical
5. Curram, P.J. (1988): Principles of Remote Sensing, FIBS Edn., Longman group, U.K. Ltd.Delhi
6. Demers, M.N. (1997): Fundamentals of geographic information system, Wiley, New York.Geography.
7. Guha, P.K. (2003): Remote Sensing for the Beginner, Affiliated East-West Press Pvt. Ltd., Hyderabad.
8. Jensen J. R. (2004): Introductory Digital Image Processing: A Remote Sensing Perspective, Prentice Hall.
9. Joseph George (2003): Fundamental of Remote Sensing, University Press (India) Pvt. Ltd.,
10. Joseph, G. (2005): Fundamentals of Remote Sensing, United Press India.
11. Laurini, R. And Thompson. D. (1992): Fundamentals of Spatial Information System, London, Academy Press.
12. Lillesand T. M., Kiefer R. W. and Chipman J. W. (2004): Remote Sensing and Image Interpretation, Wiley. (Wiley Student Edition), Wiley, New York.
13. Nag P. and Kudra, M. (1998): Digital Remote Sensing, Concept, New Delhi.
14. Narayan, L.R.A. (1999): Remote Sensing and Its Application, Universities Press (India) Ltd., Prentice Hall, upper saddle river, N.J.
15. Rajan, M.S. (1995): Space Today, 2nd edition, National Book Trust, New Delhi.
16. Rao, U.R. (1996): Space Technology for Sustainable Development, Tata McGraw Hill, New
17. Rees W. G. (2001): Physical Principles of Remote Sensing, Cambridge University Press.
18. Sarkar, A. (2015) Practical geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi
19. Singh R. B. and Murai S. (1998): Space-informatics for Sustainable Development, Oxford and IBH Pub.
20. Wolf P. R. and Dewitt B. A. (2000): Elements of Photogrammetry: With Applications in GIS, McGraw- Hill.

DSE1B: Remote Sensing and GIS (Practical)

Total Credit	02 Credits
Total Marks	15 Marks
<ul style="list-style-type: none"> • Semester End Examination 	15 Marks Mode: Laboratory based Examination; Exam. Duration: 1.5 Hours Question Pattern: : Students have to perform One Practical carrying 7 marks; Another One Practical carrying 5 marks. 3 marks for submission of Laboratory Note Book duly signed by the Teacher followed by the performance in a viva-voce.

List of practical

1. Geo-referencing of scanned maps/ images and assigning projection
2. Digitization: Point, Line & Polygon
3. Preparation of thematic maps

Note: Works will be performed using QGIS software

References



- Burrough, P.A. (1998): Principles of Geographical Information system for land resources assessment, 2nd edition, Oxford University press, New York.
- Cuff J. D. and Mattson M. T. (1982): Thematic Maps: Their Design and Production, Methuen Young Books
- Demers, M.N. (1997): Fundamentals of geographic information system, Wiley, New York.
- Dent B. D., Torguson J. S., and Holder T. W. (2008): Cartography: Thematic Map Design (6th Edition), Mcgraw-Hill Higher Education
- Laurini, R. And Thompson. D. (1992): Fundamentals of Spatial Information System, London, Academy Press.
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- Nag P. and Kudra, M. (1998): Digital Remote Sensing, Concept, New Delhi.
- Narayan, L.R.A. (1999): Remote Sensing and Its Application, Universities Press (India) Ltd.,
- Prentice Hall, upper saddle river, N.J.
- Sarkar, A. (2015) Practical geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi
- Sarkar, Ashis (2013). Quantitative Geography—Techniques And Presentations, Orient Black Swan Pvt. Ltd.: New Delhi.
- Singh R. L. and Singh R. P. B. (1999): Elements of Practical Geography, Kalyani Publishers.
- Singh, Gopal (2008): Map work and Practical Geography, Vikas Publishing House Pvt. Ltd.: New Delhi.
- Singh, R. L. and Singh, Rana P. B. (2001): Elements of Practical Geography, kalyani Publishers: New Delhi.
- Slocum T. A., McMaster R. B. and Kessler F. C. (2008): Thematic Cartography and Geovisualization (3rd Edition), Prentice Hall.

DSE1A: Political Geography (Theory)

Total Credit	04 Credits
Total Marks	35 Marks
<ul style="list-style-type: none"> Semester End Examination 	25 Marks Mode: Written Examination; Exam. Duration: 1.5 Hours; Question Pattern: Students have to answer One question carrying 10 marks out of Two given questions; Three questions carrying 5 marks each out of given Six questions. Question carrying 10 marks will have at least two parts.
<ul style="list-style-type: none"> Internal Assessment 	10 Marks Mode: Written Test on given theoretical topics as directed by the Department)

Political Geography

- Nature and scope Political Geography
- Concept of State, Nation and Nation State, Attributes of State – Frontiers, Boundaries, Enclave and exclave, Territory and Sovereignty and Emergence of new states
- Geopolitics and geopolitical theories: Heartland and Rimland
- Geography of Voting, Geographic Influences on voting pattern and Gerrymandering
- Conflicts of resources– Oil, water and emission of greenhouse gases, Inter-state dispute on water resources of India,
- Issues of relief, compensation and rehabilitation: with reference to Dams of India

References

- Agnew J. (2002): Making Political Geography, Arnold.
- Agnew J., Mitchell K. and Toal G. (2003): A Companion to Political Geography, Blackwell.
- Cox K. R., Low M. and Robinson J. (2008): The Sage Handbook of Political Geography, Sage Publications.
- Cox K. (2002): Political Geography: Territory, State and Society, Wiley-Blackwell
- Gallaher C., et al. (2009): Key Concepts in Political Geography, Sage Publications.
- Glassner M. (1993): Political Geography, Wiley.
- Jones M. (2004): An Introduction to Political Geography: Space, Place and Politics, Routledg.
- Mathur H M and M Cernea (eds.) (1998): Development, Displacement and Resettlement – Focus on Asian Experience, Vikas, Delhi
- Painter J. and Jeffrey A. (2009): Political Geography, Sage Publications.
- Taylor P. and Flint C. (2000): Political Geography, Pearson Education.



11. Verma M. K. (2004): Development, Displacement and Resettlement, Rawat Publications, Delhi
12. Hodder Dick, Sarah J. Llyod and Keith S. McLachlan (1998): Land Locked States of Africa and Asia (vo.2), Frank Cass

DSE1B: Political Geography (Practical)

Total Credit	02 Credits
Total Marks	15 Marks
<ul style="list-style-type: none"> • Semester End Examination 	15 Marks Mode: Laboratory based Examination; Exam. Duration: 1.5 Hours Question Pattern: : Students have to perform One Practical carrying 7 marks; Another One Practical carrying 5 marks. 3 marks for submission of Laboratory Note Book duly signed by the Teacher followed by the performance in a viva-voce.

List of Practical

1. Index of democracy and autocracy
2. Failed State Index
3. Happiness Index
4. Measuring voting behavior

References:

1. Cuff J. D. and Mattson M. T., 1982: Thematic Maps: Their Design and Production, Methuen Young Books
2. Dent B. D., Torguson J. S., and Holder T. W., 2008: Cartography: Thematic Map Design (6th Edition), Mcgraw-Hill Higher Education
3. Gupta K. K. and Tyagi V. C., 1992: Working with Maps, Survey of India, DST, New Delhi.
4. Kraak M.-J. and Ormeling F., 2003: Cartography: Visualization of Geo-Spatial Data, Prentice-Hall.
5. Mishra R. P. and Ramesh A., 1989: Fundamentals of Cartography, Concept, New Delhi.
6. Saha, P. and Basu P. 2010. Advanced Practical Geography—A Laboratory Manual, books & Allied Pvt. Ltd.: Kolkata.
7. Sarkar, Ashis 2013. Practical Geography—A Systematic Analysis, Orient Black Swan Pvt. Ltd.: New Delhi.
8. Sarkar, Ashis 2013. Quantitative Geography—Techniques And Presentations, Orient Black Swan Pvt. Ltd.: New Delhi.
9. Singh R. L. and Singh R. P. B., 1999: Elements of Practical Geography, Kalyani Publishers.
10. Singh, Gopal 2008. Map work and Practical Geography, Vikas Publishing House Pvt. Ltd.: New Delhi.
11. Singh, R. L. and Singh, Rana P. B. 2001. Elements of Practical Geography, kalyani Publishers: New Delhi.
12. Slocum T. A., McMaster R. B. and Kessler F. C., 2008: Thematic Cartography and Geovisualization (3rd Edition), Prentice Hall.
13. Tyner J. A., 2010: Principles of Map Design, The Guilford Press.

DSE2A: Fluvial Geomorphology (Theory)

Total Credit	04 Credits
Total Marks	35 Marks
<ul style="list-style-type: none"> • Semester End Examination 	25 Marks Mode: Written Examination; Exam. Duration: 1.5 Hours; Question Pattern: Students have to answer One question carrying 10 marks out of Two given questions; Three questions carrying 5 marks each out of given Six questions. Question carrying 10 marks will have at least two parts.
<ul style="list-style-type: none"> • Internal Assessment 	10 Marks Mode: Written Test on given theoretical topics as directed



by the Department)

Fluvial Geomorphology

1. Scope and components of Fluvial Geomorphology; Rivers as a hydro system; Models of channel initiation and network development
2. Flow measurement and characteristics assessment: Area velocity approach; laminar and turbulent flow
3. Fluvial processes and forms; tectonic and modification and interruptions; adjustment with altered state
4. Morphometric aspects of a drainage basin: Stream ordering (Strahler and Shreve), bifurcation ratio, Sinuosity indices, Hypsometry (percentage hypsometry)
5. Consequences of Human interventions on fluvial systems
6. Processes, management and impact on land use of River bank erosion and river degeneration, Principles and significance of Integrated watershed management

References

1. Bloom, A. L. (1998): Geomorphology: A Systematic Analysis of Late Cenozoic Landforms, 3rd Ed, Prentice Hall, Upper Saddle River, New Jersey
2. Bridges, E. M. (1990): World Geomorphology, Cambridge University Press, Cambridge.
3. Charlton, R. (2016): Fundamentals of Fluvial Geomorphology, 2nd Ed., Routledge, London
4. Chorley, R., Schumm, S. and Sugden, D.E. (1994): Geomorphology, Methuen, London
5. Chorley, R.J. and Kennedy, B.A. (1971): Physical Geography: A Systems Approach, Prentice Hall, Upper Saddle River, New Jersey
6. Faniran, A. and Jeje, L.K. (1983): Humid Tropical Geomorphology, Longman, London
7. Goudie, A.S. (ed) (2004): Encyclopaedia of Geomorphology, vol. 1 & 2, Routledge, London
8. Gupta, A. (2011): Tropical Geomorphology, Cambridge University Press, Cambridge
9. Gupta, A. (ed) (2008): Large Rivers, Wiley, New York
10. Huggett, R.J. (2011): Fundamentals of Geomorphology, Routledge, New York
11. Kale V.S. and Gupta A. (2001). Introduction to Geomorphology, Orient Longman, Hyderabad
12. Knighton, D. (1998): Fluvial Forms and Processes: A New Perspective, Arnold, London
13. Morisawa, M. (1985): Rivers, Longman, London
14. Petts, G.E. and Amoros, C (eds). (1996): Fluvial Hydrosystems, Chapman and Hall, London
15. Selby, M.J. (1985): Earth's Changing Surface, Oxford University Press, London

DSE2B: Fluvial Geomorphology (Practical)

Total Credit	02 Credits
Total Marks	15 Marks
• Semester End Examination	15 Marks
	Mode: Laboratory based Examination;
	Exam. Duration: 1.5 Hours
	Question Pattern: : Students have to perform One Practical carrying 7 marks; Another One Practical carrying 5 marks. 3 marks for submission of Laboratory Note Book duly signed by the Teacher followed by the performance in a viva-voce.

List of practical

1. Stream ordering, Bifurcation ratio, Stream sinuosity indices, Drainage density, Stream frequency and Dissection Index based on Survey of India Toposheet

References

1. Dent B. D., Torguson J. S., and Holder T. W. (2008): Cartography: Thematic Map Design (6th Edition), Mcgraw-Hill Higher Education.
2. Doornkamp, Jhon C. and King, Cuchlaine A.M. (1971). Numerical Analysis in Geomorphology—An Introduction, Edward Arnold: London.
3. Gupta K. K. and Tyagi V. C. (1992): Working with Maps, Survey of India, DST, New Delhi.



4. Kraak M.-J. and Ormeling F. (2003): Cartography: Visualization of Geo-Spatial Data, Prentice-Hall.
5. Mishra R. P. and Ramesh A., (1989): Fundamentals of Cartography, Concept, New Delhi.
6. Saha, P. and Basu P. (2010). Advanced Practical Geography—A Laboratory Manual, books & Allied Pvt. Ltd.: Kolkata. Cuff J. D. and Mattson M. T. (1982): Thematic Maps: Their Design and Production, Methuen Young Books.
7. Saha, P. and Basu P. (2010): Advanced Practical Geography—A Laboratory Manual, books & Allied Pvt. Ltd.: Kolkata.
8. Sarkar, Ashis (2013): Practical Geography—A Systematic Analysis, Orient Black Swan Pvt. Ltd.: New Delhi. Sarkar, Ashis (2013): Quantitative Geography—Techniques And Presentations, Orient Black Swan Pvt. Ltd.: New Delhi.
9. Singh R. L. and Singh R. P. B. (1999): Elements of Practical Geography, Kalyani Publishers.
10. Singh, Gopal (2008): Map work and Practical Geography, Vikas Publishing House Pvt. Ltd.: New Delhi.
11. Singh, R. L. and Singh, Rana P. B. (2001): Elements of Practical Geography, Kalyani Publishers: New Delhi.
12. Slocum T. A., McMaster R. B. and Kessler F. C. (2008): Thematic Cartography and Geovisualization (3rd Edition), Prentice Hall.
13. Tyner J. A. (2010): Principles of Map Design, The Guilford Press.

DSE2A: Social and Cultural Geography (Theory)

Total Credit	04 Credits
Total Marks	35 Marks
<ul style="list-style-type: none"> • Semester End Examination • Internal Assessment 	<p>25 Marks</p> <p>Mode: Written Examination; Exam. Duration: 1.5 Hours; Question Pattern: Students have to answer One question carrying 10 marks out of Two given questions; Three questions carrying 5 marks each out of given Six questions. Question carrying 10 marks will have at least two parts.</p> <p>10 Marks</p> <p>Mode: Written Test on given theoretical topics as directed by the Department)</p>

Part 1: Social Geography

1. Nature and Scope of Social Geography
2. Concept of Space, Social differentiation and stratification; social processes
3. Social Categories: Caste, Class, Religion, Race and Gender and their Spatial distribution
4. Basis of Social region formation, Evolution of social-cultural regions of India, Social groups, social behaviour and contemporary social issues (dowry, delinquency, child labour, gender discrimination) with special reference to India

Part 2: Cultural Geography

1. Scope and content of Cultural Geography
2. Concepts of Cultural Hearth and Realm, Cultural diffusion, Cultural segregation, cultural diversity
3. Races and racial groups of the world, Cultural regions of India

References

1. Banerjee Guha, S. ed (2004): Space, Society & Geography, Rawat Publication, Delhi
2. Bardhan, P. (2003): Poverty, Age Structure & Political Economy in India, Oxford University Press
3. Biswas, A.K., Jortajada, C. (2006): Appraising Sustainable Development, Oxford University
4. Dhanagare, D.N. (2004): Themes and Perspectives in Indian Sociology, Rawat Publication, Delhi
5. Dohrs, I., Sommers, L. (1967): Cultural Geography. Thomas Crowell Company
6. Fellmann, J.D., Getis, A., Getis, J. (2000): Human Geography- Landscape of Human Activity, McGraw Hill
7. Fern, R.L. (2002): Nature, God and Humanity, Cambridge university Press
8. Gadhil, M., Guha, R. (2000): The Use and Abuse of Nature, Oxford University Press
9. Gregory, D., Urry, J. (1985): Social Relation and Spatial Structure, MacMillan
10. Herbert, D.T., Johnston, R.J. (1982): Geography and Urban Environment. John Wiley & Sons



11. Hussain, M., 2007, Models in Geography, Rawat Publication
12. Jordan, T., Rowntree, L., 1990, Human Mosaic, Harper Collins Publishers
13. Knox, P., Pinch, S., 2000, Urban Social Geography, Pearson Education
14. Mitchell, D. 2000, Cultural Geography-A Critical Introduction, Black Well.

DSE2B: Social and Cultural Geography (Practical)

Total Credit	02 Credits
Total Marks	15 Marks
• Semester End Examination	15 Marks
	Mode: Laboratory based Examination; Exam. Duration: 1.5 Hours Question Pattern: : Students have to perform One Practical carrying 7 marks; Another One Practical carrying 5 marks. 3 marks for submission of Laboratory Note Book duly signed by the Teacher followed by the performance in a viva-voce.

List of Practical

1. Mapping of composition of social/cultural group of Indian population in any Indian states (district wise) following choropleth technique, bar diagram/proportional divided circle
2. Calculation of Human Poverty Index (HPI)
3. Gender parity index

Note: Practical in Sl. No. (1) above will be performed both by Software and manually

References

1. Cuff J. D. and Mattson M. T. (1982): Thematic Maps: Their Design and Production, Methuen Young Books
2. Dent B. D., Torguson J. S., and Holder T. W. (2008): Cartography: Thematic Map Design (6th Edition), Mcgraw-Hill Higher Education
3. Gupta K. K. and Tyagi V. C. (1992): Working with Maps, Survey of India, DST, New Delhi.
4. Kraak M.-J. and Ormeling F. (2003): Cartography: Visualization of Geo-Spatial Data, Prentice-Hall.
5. Mishra R. P. and Ramesh A. (1989): Fundamentals of Cartography, Concept, New Delhi.
6. Saha, P. and Basu P. (2010): Advanced Practical Geography—A Laboratory Manual, books & Allied Pvt. Ltd.: Kolkata.
7. Sarkar, Ashis (2013): Practical Geography—A Systematic Analysis, Orient Black Swan Pvt. Ltd.: New Delhi.
8. Sarkar, Ashis (2013): Quantitative Geography—Techniques And Presentations, Orient Black Swan Pvt. Ltd.: New Delhi.
9. Singh R. L. and Singh R. P. B. (1999): Elements of Practical Geography, Kalyani Publishers.
10. Singh, Gopal (2008): Map work and Practical Geography, Vikas Publishing House Pvt. Ltd.: New Delhi.
11. Singh, R. L. and Singh, Rana P. B. (2001): Elements of Practical Geography, kalyani Publishers: New Delhi.
12. Slocum T. A., McMaster R. B. and Kessler F. C. (2008): Thematic Cartography and Geovisualization (3rd Edition), Prentice Hall.
13. Tyner J. A. (2010): Principles of Map Design, The Guilford Press.

SEC1: Geography of Tourism (Theory)

Total Credit	02 Credits
Total Marks	50 Marks
• Semester End Examination	40 Marks
	Mode: Written Examination; Exam. Duration: 2 Hours; Question Pattern: Students have to answer Two question carrying 10 marks out of Four given questions; Four



questions carrying 5 marks each out of given **Eight** questions. Question carrying 10 marks will have at least two parts.

- Internal Assessment 10 Marks
Mode: Submission of assignment as instructed by the Department)
-

Geography of Tourism

1. Concept, scope and nature of Geography of Tourism, types of Tourism, Recreation and Leisure Inter-Relations Geographical Parameters of Tourism by Robinson.
2. Factors (historical, natural, socio-cultural and economic) influencing tourism, Spatial pattern of tourism
3. Physical, economic and social impacts of tourism
4. Environmental laws and tourism: current trends, spatial patterns and recent changes
5. Recent Trends of Tourism: International and Regional; Domestic (India); Sustainable Tourism, Meeting Incentives Conventions and Exhibitions (MICE), Role of foreign capital and impact of globalization on tourism
6. Tourism Infrastructure, regional dimensions of tourist attraction in India, National Tourism Policy;

References

1. Arora, R.K.(2007): Tourism Planning and Human Resource Development, Mohit Publication, New Delhi
2. Ashworth, G.(1990): Marketing in the Tourism Industry, Routledge, London
3. Bhatia, A.K(1997): Tourism Management and Marketing, Sterling Publisher Pvt Ltd, New Delhi
4. Bhatia, A.K(2002): Tourism Development, Sterling Publisher Pvt Ltd, New Delhi
5. Dhar, P.N. (2006) International Tourism: Emerging Challenges and Future Prospects. Kanishka, New Delhi.
6. Ghosh, B.(2002): Tourism and Travel Management, Vikash Publishing House Pvt Ltd
7. Gill, P.S. (2002): Dynamics of Tourism (4 Vols.) Anmol Publication, New Delhi
8. Hall, M. and Stephen, P. (2006) Geography of Tourism and Recreation – Environment, Place and Space, Routledge, London. Page 68
9. Jayapalan, N.(2001): An Introduction to Tourism, Atlantic Publishers
10. Kamra, K. K. and Chand, M. (2007) Basics of Tourism: Theory, Operation and Practise, Kanishka Publishers, Pune.
11. Mill and Morrison (1992): The Tourism system an Introductory Text (1992) Prentice Hall
12. Padam, S.(1990): Bus Transport in India, Ajanta Publications, Delhi.
13. Page, S. J. (2011) Tourism Management: An Introduction, Butterworth-Heinemann- USA. Chapter 2.
14. Raj, R. and Nigel, D. (2007) Morpeth Religious Tourism and Pilgrimage Festivals Management: An International perspective by, CABI, Cambridge, USA, www.cabi.org.
15. Seth, P. (1985): Successful Tourism Management, Sterling Publishers, Cornell University.
16. Singh, J. (2014) "Eco-Tourism" Published by - I.K. International Pvt. Ltd. S-25, Green Park Extension, Uphaar Cinema Market, New Delhi, India (www.ikbooks.com).
17. Singh, S. (2011): Studies in Tourism, APH Publishing Corporation, New Delhi
18. Singha, P.C.(1999): Tourism Transport and Travel Management, Anmol Publication Pvt Ltd, New Delhi.
19. Sinha, P. C (2001) Tourism Management. Anmol Publication, New Delhi
20. Sinha, P.C. (2003): Geography and Structure of Tourism and Travel, Anmol Publication.
21. Sinha, P.C. (2003): Geography and Structure of Tourism and Travel, Anmol Publication, New Delhi
22. Stephen Williams; Tourism Geography A new synthesis, Second edition, Routledge, Taylor & Francis Group, London and New York
23. Tourism Recreation and Research Journal, Center for Tourism Research & Development, Lucknow
24. Williams, S. (1986) Tourism Geography A new synthesis, Second edition, Routledge, Taylor & Francis Group, London and New York



SEMESTER-VI

Course Type	Course Detail		Credits	Marks
	Theory	Practical		
Discipline Core (DC)	DC13A: Disaster Management(04)	DC13B: Practical (02)	06	50
	DC14A: Evolution of Geographical Thought(04)	DC14B: Practical (02)	06	50
Discipline Specific Elective (DSE) [Optional]	DSE3A: Applied Geomorphology / Human Geography (04)	DSE3B: Practical (02)	06	50
		DP4: Field Report (06)	06	50
Skill Enhancement (SEC)	SEC2: Climate Change: Vulnerability and Adaptations (02)		02	50
Total			26	250

Note: DP4 will focus on preparation of field report on specific topic on Physical or Human Geography

DC13A: Disaster Management (Theory)

Total Credit	04 Credits
Total Marks	35 Marks
<ul style="list-style-type: none"> Semester End Examination 	25 Marks Mode: Written Examination; Exam. Duration: 1.5 Hours; Question Pattern: Students have to answer One question carrying 10 marks out of Two given questions; Three questions carrying 5 marks each out of given Six questions. Question carrying 10 marks will have at least two parts.
<ul style="list-style-type: none"> Internal Assessment 	10 Marks Mode: Preparation of supervised Term Paper on given theoretical topics as directed by the Department)

Disaster Management

1. Classification of hazards and disasters approaches to hazard study
2. Risk perception and vulnerability assessment, hazard paradigms
3. Responses to hazards: Preparedness, trauma and aftermath. Resilience and capacity building.
4. Factors, vulnerability, consequences and management of hydrologic disasters (Flood & Drought)
5. Factors, vulnerability, consequences and management of Geologic disasters (Earthquake & Landslide)
6. Factors, vulnerability, consequences and management of Atmospheric disasters (Cyclones)

References

1. Government of India. (1997): Vulnerability Atlas of India. New Delhi, Building Materials & Technology Promotion Council, Ministry of Urban Development, Government of India.
2. Kapur, A. (2010): Vulnerable India: A Geographical Study of Disasters, Sage Publication, New Delhi.
3. Modh, S. (2010): Managing Natural Disaster: Hydrological, Marine and Geological Disasters, Macmillan, Delhi.
4. Singh, R.B. (2005): Risk Assessment and Vulnerability Analysis, IGNOU, New Delhi. Chapter 1, 2 and 3



5. Singh, R. B. (ed.), (2006): Natural Hazards and Disaster Management: Vulnerability and Mitigation, Rawat Publications, New Delhi.
6. Sinha, A. (2001): Disaster Management: Lessons Drawn and Strategies for Future, New United Press, New Delhi.
7. Stoltman, J.P. et al. (2004): International Perspectives on Natural Disasters, Kluwer Academic Publications, Dordrecht.
8. Singh Jagbir (2007): Disaster Management Future Challenges and Opportunities, I.K. International Pvt. Ltd. S-25, Green Park Extension, Uphaar Cinema Market, New Delhi, India (www.ikbooks.com).
9. Smith, K. (2013): Environmental Hazards: Assessing Risk and Reducing Disaster, Routledge

DC13B: Disaster Management (Practical)

Total Credit	02 Credits
Total Marks	15 Marks
<ul style="list-style-type: none"> • Semester End Examination 	15 Marks Mode: Laboratory based Examination; Exam. Duration: 1.5 Hours Question Pattern: : Students have to perform One Practical carrying 7 marks; Another One Practical carrying 5 marks. 3 marks for submission of Laboratory Note Book duly signed by the Teacher followed by the performance in a viva-voce.

List of practical

1. Flood Frequency Analysis (Time series)
2. Flood year determination based on peak flow data in reference to danger and extreme danger level
3. Hydrological Drought Analysis: Standardized Precipitation Index (SPI)

References

1. Basu, R and Bhaduri, S. (2011): Contemporary Issues and Techniques in Geography, Progressive Publishers, Kolkata
2. Saha, P.K. and Basu, P. (2009): Advanced Practical Geography, Books and Allied (P) Ltd., Kolkata
3. Singh, R.B. (2005) Risk Assessment and Vulnerability Analysis, IGNOU, New Delhi. Chapter 1, 2 and 3
4. Singh, R. B. (ed.), (2006) Natural Hazards and Disaster Management: Vulnerability and Mitigation, Rawat Publications, New Delhi.
5. Sinha, A. (2001). Disaster Management: Lessons Drawn and Strategies for Future, New United Press, New Delhi.
6. Stoltman, J.P. et al. (2004) International Perspectives on Natural Disasters, Kluwer Academic Publications, Dordrecht.
7. Singh Jagbir (2007) "Disaster Management Future Challenges and Opportunities", 2007. Publisher- I.K. International Pvt. Ltd. S-25, Green Park Extension, Uphaar Cinema Market, New Delhi, India (www.ikbooks.com).

DC14A: Evolution of Geographical Thought (Theory)

Total Credit	04 Credits
Total Marks	35 Marks
<ul style="list-style-type: none"> • Semester End Examination 	25 Marks Mode: Written Examination; Exam. Duration: 1.5 Hours; Question Pattern: Students have to answer One question carrying 10 marks out of Two given questions; Three questions carrying 5 marks each out of given Six questions. Question carrying 10 marks will have at least two parts.
<ul style="list-style-type: none"> • Internal Assessment 	10 Marks Mode: Preparation of supervised Term Paper on given theoretical topics as directed by the Department)

**Evolution of Geographical Thought**

1. Definition, nature, scope and contents of Geography, Development of Geography and contributions of Greek, Roman and Indian geographers; Impact of 'Dark Age' on Geography and Arab contributions
2. Transition from Cosmography to Scientific Geography (Contributions of Bernard Varenius and Immanuel Kant); Dualism and Dichotomies (General vs. Particular, Physical vs. Human, Regional vs. Systematic, Determinism vs. Possibilism, Ideographic vs. Nomothetic)
3. Evolution of Geographical thoughts after pre-modern phase, contribution of German, French, British and America school of thought, Contributions of Humboldt and Ritter
4. Quantitative Revolution and its impact, behaviouralism, systems approach, radicalism, feminism in geography
5. Concept of hypothesis, theory, law and model, Changing concept of space in geography, Geography in the 21st Century

References

1. Arentsen M., Stam R. and Thuijss R. (2000): Post-modern Approaches to Space, ebook.
2. Bhat, L.S. (2009): Geography in India (Selected Themes). Pearson
3. Bonnett A. (2008): What is Geography? Sage.
4. Dikshit R. D. (1997): Geographical Thought: A Contextual History of Ideas, Prentice– Hall India.
5. Hartshorn R. (1959): Perspectives of Nature of Geography, Rand MacNally and Co.
6. Holt-Jensen A.(2011): Geography: History and Its Concepts: A Students Guide, SAGE.
7. Johnston R. J.(Ed.) (2010): Dictionary of Human Geography, Routledge.
8. Johnston R. J. (1997): Geography and Geographers, Anglo-American Human Geography since 1945, Arnold, London.
9. Kapur A. (2001): Indian Geography Voice of Concern, Concept Publications.
10. Martin Geoffrey J. (2005): All Possible Worlds: A History of Geographical Ideas, Oxford.
11. Soja, Edward (1989): Post-modern Geographies, Verso, London. Reprinted 1997: Rawat Publ., Jaipur and New Delhi.

DC14B: Evolution of Geographical Thought (Practical)

Total Credit	02 Credits
Total Marks	15 Marks
• Semester End Examination	15 Marks
	Mode: Laboratory based Examination; Exam. Duration: 1.5 Hours Question Pattern: : Students have to perform One Practical carrying 7 marks; Another One Practical carrying 5 marks. 3 marks for submission of Laboratory Note Book duly signed by the Teacher followed by the performance in a viva-voce.

List of practical

1. Hypothesis testing: t test, z test, chi square test (data base computation, testing and inferences)

References

1. Ebdon, D. (1985): Statistics in Geography: A Practical Approach, John Wiley & Sons, New York
2. Gomes, B., Jones III, J.P. (Eds) (2010): Research Methods in Geography: A Critical Introduction, Wiley-Blackwell.
3. Hammond P. and McCullagh P. S. (1978): Quantitative Techniques in Geography: An Introduction, Oxford University Press.
4. Joseph, Jr. F.H., Black, C.W., Babin, B.J., Anderson, R.E. and Tatham, R.L. (2011): Multivariate Data Analysis, Pearson Prentice Hall, New Delhi
5. Khan, N. (1998): Quantitative Methods in Geographical Research, Concept Publishing Company, New Delhi
6. Mahmood A., (1977): Statistical Methods in Geographical Studies, Concept.
7. Pal S. K., (1998): Statistics for Geoscientists, Tata McGraw Hill, New Delhi.
8. Rogerson, P.A. (2010): Statistical Methods for Geography: A Student's Guide, SAGE Publications Ltd., London
9. Sarkar, A. (2013): Quantitative Geography: Techniques and Presentations, Orient BlackSwan, New Delhi
10. Walford, N. (2011): Practical Statistics for Geographers and Earth Scientists, John Wiley & Sons, New York

**DSE3A: Applied Geomorphology (Theory)**

Total Credit	04 Credits
Total Marks	35 Marks
<ul style="list-style-type: none"> Semester End Examination 	25 Marks Mode: Written Examination; Exam. Duration: 1.5 Hours; Question Pattern: Students have to answer One question carrying 10 marks out of Two given questions; Three questions carrying 5 marks each out of given Six questions. Question carrying 10 marks will have at least two parts.
<ul style="list-style-type: none"> Internal Assessment 	10 Marks Mode: Preparation of supervised Term Paper on given theoretical topics as directed by the Department)

Applied Geomorphology

1. Anthropogenic Geomorphology: Subject and System;
2. Human Impact in a Systems Approach; Some Characteristics of Physical Systems, direct and indirect impacts of human activities on Geomorphology (processes and forms)
3. Geomorphic impacts of human society; Anthropogenic landforms
4. Stages of Intensifying Human Impact on the Landscape: natural, slightly modified, semi-natural landscape, Formation of alien landscape over natural landscape and anthropogenic landscapes
5. Societal problems and benefits associated with rivers and modification of rivers; damming, water diversion for irrigation purposes, embankment effects and river linking
6. Geomorphic impacts on urbanization, resource concentration, resource mining and cropping practices

References

1. Basu, R., Bhaduri, S. (Eds) (2007): Contemporary Issues and Techniques in Geography, Progressive Publishers.
2. Gardiner, V., Dacombe, R.V. (1982): Geomorphological Field Manual, George Allen & Unwin
3. Bierman, P.R. and Montgomery D.R. (2014): Key Concepts in Geomorphology, WH Freeman
4. Bird, E. (2008): Coastal Geomorphology: An Introduction, John Wiley & Sons, Chichester
5. Bridges, E. M. (1990): World Geomorphology, Cambridge University Press.
6. Goudie, A.S. (Ed) (2004): Encyclopaedia of Geomorphology, vol. 1 & 2, Routledge.
7. Goudie, A.S. and Viles, H.A. (2016): Geomorphology in the Anthropocene, Cambridge University Press, Cambridge
8. Gupta, A. (2011): Tropical Geomorphology, Cambridge University Press
9. Lindholm, R. (1987): A Practical Approach to Sedimentology, Allen & Unwin. Morisawa, M. 1985. Rivers,
10. Longman. Mukolwe, M.M. 2016): Flood Hazard Mapping: Uncertainty and its Value in the Decision-making Process, CRC Press. Migon, P. (2010): Geomorphological Landscapes of the World, Springer, Dordrecht
11. Pearl, R.M. (1955): How to know the Minerals and Rocks, McGraw-Hill, New York
12. Petts, G.E., Amoros, C (Eds). (1996): Fluvial Hydrosystems, Chapman and Hall.
13. Rosgen, D. (1996): Applied River Morphology, Wildland Hydrology, Fort Collins, Colorado
14. Sen, P.K. (1989): Geomorphological Analysis of Drainage Basin: An Introduction to Morphometric and Hydrological Parameters, University of Burdwan.
15. Szabo, J., David, L. and Loczy, D. (eds.) (2010): Anthropogenic Geomorphology: A Guide to Man-Made Landforms, Springer

DSE3B: Applied Geomorphology (Practical)

Total Credit	02 Credits
Total Marks	15 Marks
<ul style="list-style-type: none"> Semester End Examination 	15 Marks



Mode: Laboratory based Examination;
Exam. Duration: 1.5 Hours
Question Pattern: : Students have to perform **One** Practical carrying 7 marks; Another **One** Practical carrying 5 marks. 3 marks for submission of Laboratory Note Book duly signed by the Teacher followed by the performance in a viva-voce.

List of practical

1. Hypsometric curve and long profile
2. Morphological mapping from toposheet

References:

1. Goudie, A.S. (Ed) (2004): Encyclopaedia of Geomorphology, vol. 1 & 2, Routledge.
2. Goudie, A.S. and Viles, H.A. (2016): Geomorphology in the Anthropocene, Cambridge University Press, Cambridge
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4. Lindholm, R. 1987. A Practical Approach to Sedimentology, Allen & Unwin. Morisawa, M. (1985): Rivers, Longman.
5. Mukolwe, M.M. (2016): Flood Hazard Mapping: Uncertainty and its Value in the Decision-making Process, CRC Press.
6. Pearl, R.M. (1955): How to know the Minerals and Rocks, McGraw-Hill, New York
7. Petts, G.E., Amoros, C (Eds). (1996): Fluvial Hydrosystems, Chapman and Hall.
8. Rosgen, D. (1996): Applied River Morphology, Wildland Hydrology, Fort Collins, Colorado
9. Sarkar, A. (2008): Practical Geography: A Systematic Approach, Orient BlackSwan, Kolkata
10. Sen, P.K. (1989): Geomorphological Analysis of Drainage Basin: An Introduction to Morphometric and Hydrological Parameters, University of Burdwan.
11. Vaidyanadhan, R., Subbarao, K.V. (2014): Landforms of India from Topomaps and Images, Geological Society of India
12. Yang, X, (2009): Introduction to Mathematics for Earth Scientists, Dunedin Academic Press, London

DSE3A: Human Geography (Theory)

Total Credit	04 Credits
Total Marks	35 Marks
• Semester End Examination	25 Marks Mode: Written Examination; Exam. Duration: 1.5 Hours; Question Pattern: Students have to answer One question carrying 10 marks out of Two given questions; Three questions carrying 5 marks each out of given Six questions. Question carrying 10 marks will have at least two parts.
• Internal Assessment	10 Marks Mode: Preparation of supervised Term Paper on given theoretical topics as directed by the Department)

Human Geography

1. Nature, scope, approaches and recent trends; elements of Human Geography
2. Evolution of humans, concept of race and ethnicity
3. Space, society and cultural regions (language and religion), evolution of human societies- hunting and food gathering, pastoral nomadism, subsistence farming, industrial and urban societies
4. Human adaptation to environment: Eskimo, Masai, Jarwa, Gaddi, Santhals.
5. Population–Resource regions (Ackerman)
6. Human population and environment with special reference to development–environment conflict

**References**

1. Bergman, E.F (1995): Human Geography-Culture, Connections and Landscape, Prentice Hall, New Jersey
2. Chisholm. (1975): Human Geography, Penguin Books, Hermondsworth.
3. Daniel, P.A. and Hopkinson, M.F. (1989) The Geography of Settlement, Oliver & Boyd, London.
4. Johnston R; Gregory D, Pratt G. et al. (2008) The Dictionary of Human Geography, Blackwell Publication.
5. Jordan-Bychkov et al. (2006) The Human Mosaic: A Thematic Introduction to Cultural Geography. W. H. Freeman and Company, New York. Page 11
6. Norton. W. (2001): Human Geography, 4th Edition Oxford University press, Oxford
7. Pearce D. (1995): Tourism Today: A Geographical Analysis, 2nd edition, Longman Scientific & Technical, London
8. Pickering K. and Owen A. A. (1997): An Introduction to Global Environmental Issues, 2nd edition Rutledge, London.
9. Raw, M. (1986): Understanding Human Geography: A Practical Approach, Bell and Hyman. London
10. Rubenstein, J.M. (2002), The Cultural Landscape, 7th edition, Prentice Hall, Englewood Cliffs
11. Smith D M (1982): Human Geography: A Welfare Approach, Edward Arnold, London

DSE3B: Human Geography (Practical)

Total Credit	02 Credits
Total Marks	15 Marks
<ul style="list-style-type: none"> • Semester End Examination 	15 Marks Mode: Laboratory based Examination; Exam. Duration: 1.5 Hours Question Pattern: : Students have to perform One Practical carrying 7 marks; Another One Practical carrying 5 marks. 3 marks for submission of Laboratory Note Book duly signed by the Teacher followed by the performance in a viva-voce.

List of practicals

1. Population Potential and Mean Centre of Population
2. Computation of Human Development Index (HDI)

References

1. Raw, M. (1986): Understanding Human Geography: A Practical Approach, Bell and Hyman. London
2. Rubenstein, J.M. (2002), The Cultural Landscape, 7th edition, Prentice Hall, Englewood Cliffs
3. Smith D M (1982): Human Geography: A Welfare Approach, Edward Arnold, London
4. Sarkar, A. (2008): Practical Geography: A Systematic Approach, Orient BlackSwan, Kolkata
5. Saha, P. and Basu,P. (2010), Advanced Practical Geography, Books & Allied (P) Ltd, Kolkata

DP4- Field Report

Total Credit	06 Credits
Total Marks	50 Marks
<ul style="list-style-type: none"> • Field Report preparation • Viva-voce • Internal Assessment 	30 Marks Mode: Field visit, measurement, data collection and report preparation under the supervision of a Faculty Member of the Department Exam. Duration: 4 Hours; 10 Marks 10 Marks (05 marks will be given based on their field performances and 05 marks will allotted for his/her sincere devotion in due course of report preparation)

**Field Report Preparation**

- **General Guidelines:**

1. Field report will be conducted using any relevant topic from Physical and Human Geography. Any specific issue could be addressed.
2. The report is to be prepared for a C.D. Block /P.S./ Mouza/ G. P./ Municipality/ Sub-division/ Drainage Basin area or any other physical units primarily on the basis of field survey.
3. Participation of each student in the Field Work is mandatory & Certificate of field coordinator regarding the participation in Field Work is to be attached in the Report.
4. Field report is to be prepared by the student in his/her own hand writing but maps and diagrams may be prepared with the aid of software.
5. No part of the report should contain any photocopied or Printed/typed material.
6. Length of the report not to exceed 3000 words.
7. The Field Report should contain up to 10 pages for diagrams and maximum of 4 pages for photographs.
8. Questionnaire(s)/ schedule(s) are to be prepared for collection of primary data and one of the same as filled in during the field work, duly signed by the concerned teacher, be annexed with the field report.
9. The report should be prepared normally with primary data collected by field survey.
10. Incorporation of secondary data should not exceed 1/5th of the total report.

Viva-voce on Field Report

Duration of viva-voce: not to exceed 10 minutes.

References

1. Clifford, N., Cope, M., Gillespie, T.W., French, S. (Eds) (2016): Key Methods in Geography, 3rd ed, Sage.
2. Gardiner, V., Dacombe, R.V. (1982): Geomorphological Field Manual, George Allen & Unwin
3. Lindholm, R. (1987): A Practical Approach to Sedimentology, Allen & Unwin.
4. Monkhouse, F.J., Wilkinson, H.R. (1971): Maps and Diagrams: Their Compilation and Construction, 3rd ed (2017 reprint), Alphaneumera-Kolkata
5. 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.
6. Saha, P.K. and Basu, P. (2009): Advanced Practical Geography, Books and Allied (P) Ltd., Kolkata

SEC2: Climate Change: Vulnerability and Adaptations (Theory)

Total Credit	02 Credits
Total Marks	50 Marks
<ul style="list-style-type: none"> • Semester End Examination 	40 Marks Mode: Written Examination; Exam. Duration: 2 Hours; Question Pattern: Students have to answer <i>Two</i> question carrying 10 marks out of <i>Four</i> given questions; <i>Four</i> questions carrying 5 marks each out of given <i>Eight</i> questions. Question carrying 10 marks will have at least two parts.
<ul style="list-style-type: none"> • Internal Assessment 	10 Marks Mode: Submission of assignment as instructed by the Department)



Climate Change: Vulnerability and Adaptations

1. Scope and trends of subject, Understanding Climate Change with reference to the Geological Time Scale
2. Evidences and factors of climate change, Green House Gases and Global Warming
3. Electromagnetic spectrum, Atmospheric window, heat balance of the earth
4. Economic and social impact of climate Change, impacts on Agriculture and Water; Flora and Fauna; Human Health and morbidity
5. Global initiatives to climate change mitigation: Kyoto Protocol, Carbon trading, Clean development mechanism, COP, Climate fund
6. Climate change vulnerability assessment and adaptive strategies with particular reference to South Asia, IPCC reports, National Action Plan (of India) on Climate Change

References

1. Andrew E. Dessler, Edward A. Parson (2006): *The Science and Politics of Global Climate Change: A Guide to the Debate*; Cambridge University Press (2006); Burroughs, W.J. 2007. *Climate Change: A Multidisciplinary Approach*; Cambridge University Press.
2. *Climate Change Science: An Analysis of Some Key Questions* (2001): National Research Council, Division on Earth and Life Studies, Committee on the Science of Climate Change; National Academies Press, 2001
3. Fleming, J.R. (2005): *Historical Perspectives on Climate Change*, Oxford University Press.
4. Hardy, J.T. (2003): *Climate Change: Causes, Effects, and Solutions*, John Wiley & Sons,
5. Houghton, J. (2015): *Global Warming*; Cambridge University Press.
6. Hulme, M. (2009): *Why We Disagree about Climate Change: Understanding Controversy, Inaction and Opportunity*; Mike Hulme, Cambridge University Press, 2009
7. Maréchal, M.A.C. (2015): *Climate Change: Past, Present, and Future*; John Wiley & Sons.
8. Maslin, M. (2014): *Climate Change: A Very Short Introduction*.
9. Maslin, M. (2008): *Global Warming: A Very Short Introduction*; Edition 2, Oxford University Press, Oxford.
10. Frank P. Incropera (2015): *Climate Change: A Wicked Problem: Complexity and Uncertainty at the Intersection of Science, Economics, Politics, and Human Behavior*, Cambridge University Press.
11. Spencer R. Weart (2008): *The Discovery of Global Warming*; Harvard University Press.
12. United Nations Environmental Programme (UNEP) (2007): *Global Environment Outlook: GEO4: Environment for Development*, United Nations.