B.A. /B.Sc. Geography (Honors)

Semester	**Paper**	Prescribed core COURSE	Recommended by UGC
1	**C1**	Geomorphology	Geomorphology
	C2	Climatology	Cartographic techniques(practical)
2	**C3**	Human Geography	Human Geography
	C4	Geography of India	Thematic cartography (practical)
3	**C5**	Cartography	Climatology
	C6	Regional Geography of World	Statistical methods in Geography(practical)
	C7	Statistical methods in Geography	Geography of India
4	**C8**	Economic Geography	Economic Geography
	C9	Environmental geography and Biogeography	Environmental geography
	C10	Remote sensing and GIS	Field work and research methodology (practical)
5	**C11**	Regional planning and Development	Regional planning and Development
	C12	Population geography	Remote sensing and GIS (practical)
6	**C13**	Evolution of geographic thought	Evolution of geographic thought
	C14	Disaster management and field visit	Disaster management and field visit (practical)

SKILL ENHANCEMENT COURSE (SEC) (2c) General Structure: (As per recommendations)

Semester	Paper Structure	Papers available for selection
III	**SEC 1.1 (2c)**	• Remote sensing (practical) • Advanced spatial statistical techniques
IV	**SEC 1.2 (2c)**	• Geographical information system (practical**)** • Research methods (practical)

ELECTIVE DISCIPLINE SPECIFIC (DSE) (4c) General Structure:

Semester	Paper	Papers available for selection
V	**DSE – 1**	1. Settlement Geography (changed) 2. Resource geography (unchanged) 3. Urban geography(unchanged) 4. Agricultural geography (unchanged) 5. Geography of Health and well being(unchanged) 6. Political geography(unchanged) 7. Hydrology and oceanography (unchanged) 8. Social geography(unchanged)
	DEE – 2	
VI	**DSE – 3**	
	DSE – 4	

ELECTIVE GENERIC (GE) (4c) General Structure:

Semester	Paper	
I	**GE – 1:**	1. Disaster management(unchanged) 2. Geography of tourism(unchanged)
II	**GE – 2:**	3. Spatial information technology(unchanged) 4. Regional development(unchanged)
III	**GE – 3:**	5. Climate change: vulnerability and adaptation (unchanged) 6. Rural development (unchanged)
IV	**GE – 4:**	7. Industrial geography (unchanged) 8. Sustainable development (unchanged)

SEMESTER WISE DISTRIBUTION OF COURSES IN BA/B. Sc HONOURS IN GEOGRAPHY (CBCS)

Sem	Core Course (14)	Course code	AECC (2)	Course code	SEC (2)	Course code	DSE (4)	Course code	GE (4)	Course code
1	C1		AECC1-2C						GE-1	
	C2		AECC2-2C							
2	C3		AECC3-4C						GE-2	
	C4									
3	C5				SEC 1				GE-3	
	C6									
	C7									
4	C8				SEC 2				GE4	
	C9									
	C10									
5	C11						DSE 1			
	C12						DSE 2			
6	C13						DSE3			
	C14						DSE4			

SEMESTER I

	Course	Paper code	Title of the Course	Credit			Marks Distribution				
				Th	Prac	Total	Theory		Practical		Total
							End Sem	In- Sem	End Sem	In-Sem	
1st Sem	C1	GGRM 101T4	Geomorphology	4		6	48	12			100
		GGRM 101P2	Geomorphic techniques		2				32	8	
	C2	GGRM 102T4	Climatology	4		6	48	12			100
		GGRM 102P2	Practical's based on climatic data		2				32	8	
	GE 1(6C)	GGRM GE101AT6	Disaster management	6		6	80	20			100
		GGRM GE101BT6	Geography of Toursim	6			80	20			
		Total				18					300

SEMESTER II

	Course	Paper code	Title of the Course	Credit			Marks Distribution				
				Th	Prac	Total	Theory		Practical		Total
							End Sem	In- Sem	End Sem	In-Sem	
2nd Sem	C3	GGRM 201T6	Human geography	6		6	80	20			100
	C4	GGRM 202T4	Geography of India	4		6	48	12			100
		GGRM 202P2	Practical		2				32	8	
	GE2 (6C)	GGRM GE201 AT6	Spatial information technology	6		6	80	20			100
		GGRM GE201 BT6	Regional development	6			80	20			
	Total					18					300

SEMESTER III

	Course	Paper code	Title of the Course	Credit			Marks Distribution				
				Th	Prac	Total	Theory		Practical		Total
							End Sem	In- Sem	End Sem	In-Sem	
3rd Sem	C5	GGRM 301T4	Cartography	4		6	48	12			100
		GGRM 301P2	Cartographic Techniques		2				32	8	
	C6	GGRM 302T6	Regional Geography of World	6		6	80	20			100
	C7	GGRM 303T6	Statistical methods in geography	6		6	80	20			100
	GE3 (6C)	GGRM GE301 AT6	Climate change: vulnerability and adaptation	6		6	80	20			100
		GGRM GE301 BT6	Rural development	6			80	20			
	SEC 1-2C	GGRM SEC301AP2	Remote sensing (practical)	2		2	24	6			30
		GGRM SEC301BP2	Advanced spatial statistical techniques	2			24	6			
	Total					26					430

SEMESTER IV

	Course	Paper code	Title of the Course	Credit			Marks Distribution				
				Th	Prac	Total	Theory		Practical		Total
							End Sem	In- Sem	End Sem	In-Sem	
4th Sem	C8	GGRM 401T6	Economic Geography	6		6	80	20			100
	C9	GGRM 402T6	Environmental Geography and Biogeography	6		6	80	20			100
	C 10	GGRM 403T4	Remote Sensing and GIS	4		6	48	12			100
		GGRM 403P2	Remote Sensing and GIS Practical		2				32	8	
	GE4 (6C)	GGRM GE401 AT6	Industrial Geography	6		6	80	20			100
		GGRM GE401 BT6	Sustainable Development	6			80	20			
	SEC 2-2C	GGRM SEC401 AP2	Geographical Information System (Practical)	2		2	24	6			30
		GGRM SEC401 BP2	Research Methods Practical	2			24	6			
	Total					26					430

SEMESTER V

	Course	Paper code	Title of the Course	Credit			Marks Distribution				
				Th	Prac	Total	Theory		Practical		Total
							End Sem	In- Sem	End Sem	In-Sem	
5th Sem	C11	GGRM 501T4	Regional Planning and Development	4		6	48	12			100
		GGRM 501P2	Regional Planning and Development-Practical		2				32	8	
	C12	GGRM 502T4	Population Geography	4		6	48	12			100
		GGRM 502P2	Population Geography-Practical		2				32	8	
	DSE1 (6C)	GGRM DSE501 AT6	Settlement Geography	6		6	80	20			100
		GGRM DSE501 BT6	Resource Geography	6			80	20			
	DSE 2 (6C)	GGRM DSE502 AT6	Urban Geography	6		6	80	20			100
		GGRM DSE502 BT6	Agricultural Geography	6			80	20			
	Total					24					400

SEMESTER VI

	Course	Paper code	Title of the Course	Credit			Marks Distribution				
				Th	Prac	Total	Theory		Practical		Total
							End Sem	In- Sem	End Sem	In-Sem	
6th Sem	C13	GGRM 601T6	Evolution of Geographical Thought	6		6	80	20			100
	C14	GGRM 602T6	Disaster Management based Project Work	6		6	80	20			100
	DSE3 (6C)	GGRM DSE 601AT 6	Geography of Health and Well being	6		6	80	20			100
		GGRM DSE 601BT 6	Political Geography	6			80	20			
	DSE 4 (6C)	GGRM DSE 602AT 6	Hydrology and Oceanography	6		6	80	20			100
		GGRM DSE 602BT 6	Social Geography	6			80	20			
	Total					24					400

SEMESTER I

COURSE C1 (Theory)
GGRM 101T4: GEOMORPHOLOGY **48 (Lectures)**

1. Geomorphology: Nature and Scope.
2. Recent trends in Geomorphology.
3. Earth: Interior Structure and Isostasy.
4. Earth Movements: Plate Tectonics, Types of Folds and Faults, Earthquakes and Volcanoes.
5. Basic concept of Geomorphology (Concept 1, concept 2 and concept 3)
6. Geomorphic Processes: Weathering, Mass Wasting, Cycle of Erosion (Davis and Penck).
7. Evolution of Landforms (Erosional and Depositional): Fluvial, Karst, Aeolian, Glacial, and Coastal.

Reading List

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

Course C1

GGRM 101P2 : GEOMORPHIC TECHNIQUES (PRACTICAL) 48 Lectures

1. Scales – Concept and application; Graphical Construction of Plain, Comparative and Diagonal Scales.
3. Topographical Map – Interpretation of a Mountain area with the help of Cross and Longitudinal Profiles.
4. Morphometric Analysis: Drainage ordering, basin area demarcation, drainage density, bifurcation ratio.
5. Slope Analysis – Wentworth's method and Smith's Method.

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

Reading List

1. Anson R. and Ormelling F. J., 1994: International Cartographic Association: BasicCartographic Vol. Pregmen Press.
2. Gupta K.K. and Tyagi, V. C., 1992: Working with Map, Survey of India, DST, New Delhi.
3. Mishra R.P. and Ramesh, A., 1989: Fundamentals of Cartography, Concept, New Delhi.
4. Monkhouse F. J. and Wilkinson H. R., 1973: Maps and Diagrams, Methuen, London.
5. Singh R. L. and Singh R. P. B., 1999: Elements of Practical Geography, Kalyani Publishers.
6. Sarkar, A. (2015) Practical geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi

Course C2

GGRM 102T4 CLIMATOLOGY (Theory) 48 (Lectures)

1. Atmospheric Composition and Structure – Variation with Altitude, Latitude and Season.
2. Insolation and Temperature – Factors and Distribution, Heat Budget, Temperature Inversion.
3. Atmospheric Pressure and Winds – Planetary Winds, Forces affecting Winds, General Circulation, Jet Streams.
4. Atmospheric Moisture – Evaporation, Humidity, Condensation, Fog and Clouds, Precipitation Types,Stability and Instability; Climatic Regions (Koppen)
5. Cyclones – Tropical Cyclones, Extra Tropical Cyclones, Monsoon - Origin and Mechanism.

Reading List

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

Course C2

GGRM 102P2: PRACTICALS BASED ON CLIMATIC DATA 48 Lectures

1. Study of weather symbols
2. Indian daily weather map interpretation for the summer and winter seasons.
3. Representation of climatic data:
   (a) Preparation of climograph, hythergraph and ergograph and their interpretation
   (b) Preparation of rainfall variability map of Assam

Course C3
GGRM201T6 : HUMAN GEOGRAPHY (Theory) 48 Lectures

1. Introduction: Defining Human Geography; Major Themes; Contemporary Relevance
2. Space and Society: Cultural Regions; Race; Religion and Language
3. Population: Population Growth and Distribution; Population Composition; Demographic Transition Theory
4. Settlements: Types of Rural Settlements; Classification of Urban Settlements; Trends and Patterns of World Urbanization
5. Population-Resource Relationship

Reading List

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

Course C4

GGRM 202T4: GEOGRAPHY OF INDIA (Theory) 48 Lectures

1. Physical: Physiographic Divisions, soil and vegetation, climate (characteristics and classification)
2. Population: Distribution and growth, Structure; Social: Distribution of population by race, caste, religion, language, tribes and their correlates
3. Economic: Mineral and power resources distribution and utilisation of iron ore, coal, petroleum, gas; agricultural production and distribution of rice and wheat, industrial development : automobile and Information technology
4. Physical Geography of North East India.
5. Resource- agriculture, mineral, forest and Industries of Assam.

Reading List

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. Mandal R. B. (ed.), 1990: *Patterns of Regional Geography – An Intenational Perspective. Vol. 3 –Indian Perspective*.
4. Sdyasuk Galina and P Sengupta (1967): *Economic Regionalisation of India*, Census of India
5. Sharma, T. C. 2003: India - Economic and Commercial Geography. Vikas Publ., New Delhi.
6. Singh R. L., 1971: *India: A Regional Geography*, National Geographical Society of India.
7. Singh, Jagdish 2003: *India - A Comprehensive & Systematic Geography*, Gyanodaya Prakashan,Gorakhpur.
8. Spate O. H. K. and Learmonth A. T. A., 1967: *India and Pakistan: A General and Regional Geography*, Methuen.
9. Tirtha, Ranjit 2002: *Geography of India*, Rawat Publs., Jaipur & New Delhi.
10. Pathak, C. R. 2003: *Spatial Structure and Processes of Development in India*. Regional Science Assoc., Kolkata.
11. Tiwari, R.C. (2007) Geography of India. Prayag Pustak Bhawan, Allahabad
12. Sharma, T.C. (2013) Economic Geography of India. Rawat Publication, Jaipur

Course C4

GGRM 202P2: PRACTICAL **48 Lectures**

Unit – I Thematic mapping and shape index analysis of India

1. Preparation of maps showing geographical themes – minerals, forest, agriculture etc.
2. Shape index analysis – comparison of shapes of Pre and Post Independent India

Unit – II Thematic mapping of NE India

Preparation of maps showing geographical themes – soil, industries, population minerals, forest, agriculture etc

Unit- III Age- sex pyramid

Develop and developing countries.

Course C5
GGRM 301T4: CARTOGRAPHY (Theory) 48 Lectures

1. Nature and scope of cartography, history and development of cartography, traditional versus modern cartography.
2. Definition of map, types of maps, map design and layout.
3. Map projections- Definition, classification, history and development of map projections.
4. Choice of map projection for various regions of the World and India.
5. Basic principles of constructing zenithal projection- Gnomonic, Stereographic, Orthographic, Equidistant, Equal-area (polar case).
6. Surveying- Definition, object of surveys, primary division of surveying, classification of surveys, principles of surveying, uses of surveys, instruments used in different surveys (plane table, prismatic compass, Dumpy's level, theodolite).
7. Levelling- Definition, types of levelling.

Books Suggested:

1. Kanetkar, T.P. and Kulkarni: Surveying and Levelling, Part-I.
2. Zamir, A.: A Text book of Surveying.
3. Steer, J.A.: An Introduction to the study of Map Projection
4. Singh, R.L.: Fundamentals of Practical Geography, DVS Publication, Ghy.
5. Singh, G.: Map work and Practical Geography, DVS Publication, Ghy.
6. Robinson, A.H., et al: Elements of Cartography, John Wiley & Sons, New York.
7. Campbell, J.,: Introductory Cartography, Prentice Hall Inc., Englewood Cliff.
8. Misra, R.P. and Ramesh, A., Fundamentals of Cartography, Concept Publishing Company, New Delhi.
9. Raisz, E.,: Principles of Cartography, McGraw Hills, London.
10. Bygott, J.,: An Introduction to Map work and Practical Geography.

C5

GGRM 302P2: CARTOGRAPHIC TECHNIQUES (PRACTICAL) 48 Lectures

Projection: Conical One Standard, Bonne's and Polyconic Cylindrical; Equal Area, Equidistant, Galls Stereography and Mercator Projection.

RECOMMENDED TEXT BOOKS:

1. Singh, R.L.: Fundamentals of Practical Geography, DVS Publication, Ghy
2. Singh, G.: Map Work & Practical Geography, DVS Publication, Ghy
3. Singh, R.L.: Elements of Practical Geography, DVS Publication, Ghy
4. George P. Kellaway : Map Projection
5. J.A. Steers : Map Projection

Course C6

GGRM302T6: REGIONAL GEOGRAPHY OF WORLD (Theory) 48 Lectures

1. Physiography, climate, soil and vegetation of Asia, Africa, Europe, North America
2. Mineral resources and industrial development of the developed, developing and the underdeveloped countries
3. Distribution of population of World
4. Regional studies of Middle East and South East Asia and the Mediterranean region

Reading Lists:

1. Manku, D.S. : A Regional Geography of World, Kalyani Publishers
2. Gautam, A : World Geography, Sarda Pushtak Bhawan, Allahabad
3. Bradshaw, M : World Regional Geography
4. Gourou, P. (1980) : The Tropical World, Longman, London
5. Cole, J. (1996) : A Geography of World's Major Regions, Routledge, London

Course C7
GGRM 303T6: STATISTICAL METHODS IN GEOGRAPHY (Theory) 48 Lectures

1. Use of Data in Geography: Geographical Data Matrix, Significance of Statistical Methods in Geography;Sources of Data, Scales of Measurement (Nominal, Ordinal, Interval, Ratio).

2. Tabulation and Descriptive Statistics: Frequencies (Deciles, Quartiles), Cross Tabulation, Central Tendency (Mean, Median and Mode, Centro-graphic Techniques, Dispersion (Standard Deviation,Variance and Coefficient of Variation).

3. Sampling: Purposive, Random, Systematic and Stratified.

4. Theoretical Distribution: Probability and Normal Distribution.

5. Association and Correlation: Rank Correlation, Product Moment Correlation, and Simple Regression, Residuals from regression

Reading List

1. Berry B. J. L. and Marble D. F. (eds.): *Spatial Analysis – A Reader in Geography*.
2. Ebdon D., 1977: *Statistics in Geography: A Practical Approach*.
3. Hammond P. and McCullagh P. S., 1978: *Quantitative Techniques in Geography: An Introduction,* Oxford University Press.
4. King L. S., 1969: *Statistical Analysis in Geography*, Prentice-Hall.
5. Mahmood A., 1977: *Statistical Methods in Geographical Studies,* Concept.
6. Pal S. K., 1998: *Statistics for Geoscientists*, Tata McGraw Hill, New Delhi.
7. Sarkar, A. (2013) Quantitative geography: techniques and presentations. Orient Black Swan Private Ltd., New Delhi
8. Silk J., 1979: *Statistical Concepts in Geography*, Allen and Unwin, London.
9. Spiegel M. R.: Statistics, *Schaum's Outline Series.*
10. Yeates M., 1974: *An Introduction to Quantitative Analysis in Human Geography*, McGraw Hill, New York.
11. Shinha, Indira (2007) Sankhyiki bhugol. Discovery Publishing House, New Delhi

Course C8
GGRM401T6 : ECONOMIC GEOGRAPHY (Theory) 48 Lectures

1. Introduction: Concept and classification of economic activity

2. Factors Affecting location of Economic Activity with special reference to Agriculture (Von Thunen theory), Industry (Weber's theory).

3. Primary Activities: Subsistence and Commercial agriculture, forestry, fishing and mining.

4. Secondary Activities: Manufacturing (Cotton Textile, Iron and Steel), Concept of Manufacturing Regions, Special Economic Zones and Technology Parks.

5. Tertiary Activities: Transport, Trade and Services.

Reading List

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

Course C 9
GGRM402T6: ENVIRONMENTAL GEOGRAPHY AND BIOGEOGRAPHY (Theory)
48 Lectures

1. Environmental Geography – Concept and Scope
2. Human-Environment Relationships – Historical Progression, Adaptation in different Biomes.
3. Ecosystem – Concept, Structure and Functions
4. Environmental Problems in Tropical, Temperate and Polar Ecosystems
5. Environmental Programmes and Policies – Global, National and Local levels
   Definition, scope and significance of Bio Geography
7. World distribution of plants animals in relation to geographical environment.
8. Soil – soil forming processes, classification and distribution of soil, soil horizon and profile, soil erosion and conservation. Importance of soil, major soil types of India and Assam

Reading List

1. Chandna R. C., 2002: Environmental Geography, Kalyani, Ludhiana.
2. Cunninghum W. P. and Cunninghum M. A., 2004: Principals of EnvironmentalScience: Inquiry and Applications, Tata Macgraw Hill, New Delhi.
3. Goudie A., 2001: The Nature of the Environment, Blackwell, Oxford.
4. Singh, R.B. (Eds.) (2009) Biogeography and Biodiversity. Rawat Publication, Jaipur
5. Miller G. T., 2004: Environmental Science: Working with the Earth, Thomson Brooks Cole, Singapore.
6. MoEF, 2006: National Environmental Policy-2006, Ministry of Environment andForests, Government of India.
7. 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
8. Odum, E. P. et al, 2005: Fundamentals of Ecology, Ceneage Learning India.
9. Singh S., 1997: Environmental Geography, PrayagPustak Bhawan. Allahabad.
10. UNEP, 2007: Global Environment Outlook: GEO4: Environment For Development, United Nations Environment Programme.
11. 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
12. Singh, R.B. (1998) Ecological Techniques and Approaches to Vulnerable Environment, New Delhi, Oxford & IBH Pub..
13. Bhattacharyya, N.N. : Biogeography.
14. Mahanta, A. P. : Biogeography.
15. Singh, S. :Biogeography, PrayagPustak Bhawan. Allahabad.
16. Robinson, H., 1982: Biogeography, ELBS, Mc Donald & Evans, London.

Course C10

GGRM403T4: REMOTE SESING AND GIS (Theory) 48 Lectures

1. Historical Development of remote sensing as a technology-Relevance of remote sensing in Geography.
2. Concept and basics: Energy source, energy and radiation principles
3. Energy interactions in the atmosphere and earth surface features.
4. Remote sensing systems: platforms, sensors and radiations records.

Course C10

GGRM403P2: REMOTE SENSING AND GIS (PRACTICAL) 48 Lectures

1. Remote Sensing and GIS: Definition and Components, Development, Platforms and Types
2. Aerial Photography and Satellite Remote Sensing: Principles, Types and Geometry of Aerial Photograph; Principles of Remote Sensing, EMR Interaction with Atmosphere and Earth Surface; Satellites (Landsat and IRS) and Sensors.
3. GIS Data Structures: Types (spatial and Non-spatial), Raster and Vector Data Structure
4. Image Processing (Digital and Manual) and Data Analysis: Pre-processing (Radiometric and Geometric Correction), Enhancement (Filtering); Classification (Supervised and Un-supervised), Geo-Referencing; Editing and Output; Overlays
5. Interpretation and Application of Remote Sensing and GIS: Land use/ Land Cover, Urban Sprawl Analysis; Forests Monitoring

Practical Record: A project file consisting of two exercises will be done from aerial photos and satellite images (scale, orientation and interpretation) and 3 exercises on using any GIS Software on above mentioned themes.

Reading List

1. Campbell J. B., 2007: *Introduction to Remote Sensing*, Guildford Press.
2. Jensen J. R., 2004: *Introductory Digital Image Processing: A Remote Sensing Perspective*, Prentice Hall.
3. Joseph, G. 2005: *Fundamentals of Remote Sensing*, United Press India.
4. Lillesand T. M., Kiefer R. W. and Chipman J. W., 2004: *Remote Sensing and Image Interpretation*, Wiley. (Wiley Student Edition).
5. Nag P. and Kudra, M., 1998: *Digital Remote Sensing*, Concept, New Delhi.
6. Rees W. G., 2001: *Physical Principles of Remote Sensing*, Cambridge University Press.
7. Singh R. B. and Murai S., 1998: *Space-informatics for Sustainable Development*, Oxford and IBH Pub.
8. Wolf P. R. and Dewitt B. A., 2000: *Elements of Photogrammetry: With Applications in GIS*, McGraw- Hill.
9. Sarkar, A. (2015) Practical geography: A systematic approach. Orient Black Swan Private Ltd.,New Delhi
10. Chauniyal, D.D. (2010) Sudur Samvedan evam Bhogolik Suchana Pranali, Sharda Pustak Bhawan, Allahabad

Course C11
GGRM 501T4: REGIONAL PLANNING AND DEVELOPMENT (Theory) 48 Lectures

1. Definition of Region, Evolution and Types of Regional planning: Formal, Functional, and Planning Regions and Regional Planning; Need for Regional Planning; Types of regional Planning.
2. Choice of a Region for Planning: Characteristics of an Ideal Planning Region; Delineation of Planning Region; Regionalization of India for Planning (Agro Ecological Zones)

3. Theories and Models for Regional Planning: Growth Pole Model of Perroux; Growth Centre Model in Indian Context; Myrdal, Hirschman, Rostow and Friedmann; Village Cluster

4. Changing Concept of Development, Concept of underdevelopment; Efficiency-Equity Debate

5. Measuring development: Indicators (Economic, Social and Environmental); Human development.

Reading List

1. Blij H. J. De, 1971: *Geography: Regions and Concepts*, John Wiley and Sons.
2. Claval P.l, 1998: *An Introduction to Regional Geography*, Blackwell Publishers, Oxford and Massachusetts.
3. Friedmann J. and Alonso W. (1975): *Regional Policy - Readings in Theory and Applications*, MIT Press, Massachusetts.
4. Gore C. G., 1984: *Regions in Question: Space, Development Theory and Regional Policy*, Methuen, London.
5. 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.
6. Haynes J., 2008: *Development Studies*, Polity Short Introduction Series.
7. Johnson E. A. J., 1970: *The Organization of Space in Developing Countries*, MIT Press, Massachusetts.
8. Peet R., 1999: *Theories of Development*, The Guilford Press, New York.
9. UNDP 2001-04: *Human Development Report*, Oxford University Press.
10. World Bank 2001-05: *World Development Report*, Oxford University Press, New

Course C11

GGRM 501P2: REGIONAL PLANNING AND DEVELOPMENT (Practical) 48 Lectures

1. Methods of regionalization:
   a) Simple ranking method
   b) Mean method
   c) Z- score standardization.
2. Resource disparity map:
   a) Power resource (Hydel, Thermal, Nuclear)
   b) Mineral resources (coal, iron ore)

Course C12
GGRM502T4: POPULATION GEOGRAPHY(Theory) 48 Lectures

1. Defining the Field – Nature and Scope; Sources of Data with special reference to India (Census, Vital Statistics and NSS).

2. Population Size, Distribution and Growth – Determinants and Patterns; Theories of Growth –Malthusian Theory and Demographic Transition Theory.

3. Population Dynamics: Fertility, Mortality and Migration – Measures, Determinants and Implications.

4. Population Composition and Characteristics – Age-Sex Composition; Rural and Urban Composition; Literacy.

5. Contemporary Issues – Ageing of Population; Declining Sex Ratio; HIV/AIDS.

Reading List

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

Course C12

GGRM 502P2: POPULATION GEOGRAPHY (Practical) 48 Lectures

1. **Statistical Data representation Part I** **Marks- 16**
   1. Near neighbour analysis
   2. Principle component analysis – Water, Fisher and Nelson
   3. Traffic flow and isochronic cartograms

2. **Statistical Data representation Part II**

   1. Location quotient analysis
   2. Lorenz curve

3. Distribution of population
   a) India, Assam(by simple dot method)
4. Density of population
   a) India and Assam (choropleth method)

Course C 13
GGRM601T6: EVOLUTION OF GEOGRAPHICAL THOUGHT (Theory) 48 Lectures

1. Paradigms in Geography

2. Pre-Modern – Early Origins of Geographical Thinking with reference to the Classical and Medieval Philosophies.

3. Modern – Evolution of Geographical Thinking and Disciplinary Trends in Germany, France, Britain, United States of America.

4. Debates – Environmental Determinism and Possibilism, Systematic and Regional, Ideographic and Nomeothetic.

5. Trends – Quantitative Revolution and its Impact, Behaviouralism, Systems Approach, Radicalism, Feminism; Towards Post Modernism – Changing Concept of Space in Geography, Future of Geography.

Reading List

1. Arentsen M., Stam R. and Thuijis 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. Hartshone 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.): *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.

Course C14
GGRM602T6: DISASTER MANAGEMENT BASED PROJECT WORK 48 Lectures

Unit –I: Disaster Management based Project work(Practical)

Unit- II : Geographical Excursion

Reading List

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

SKILL ENHANCEMENT COURSE (Any 2)

SEC 1(2C)
GGRM SEC301AP2: REMOTE SENSING (PRACTICAL) 20 Lectures

1. Remote Sensing: Definition and Development; Platforms and Types; Photogrammetry.
2. Satellite Remote Sensing: Principles, EMR Interaction with Atmosphere and Earth Surface; Satellites (Landsat and IRS); Sensors
3. Image Processing (Digital and Manual): Pre-processing (Radiometric and Geometric Correction); Enhancement (Filtering); Classification (Supervised and Un-supervised)
4. Satellite Image Interpretation.
5. Application of Remote Sensing: Land Use Land Cover.

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

Reading List

1. Bhatta , B. (2008) Remote Sensing and GIS, Oxford University Press, New Delhi.
2. Campbell J. B., 2007: *Introduction to Remote Sensing*, Guildford Press
3. Chauniyal, D. (2010) Sudur SamvedanaAvam Bhaugolik Suchna Pranali, Sharda Pustak Bhawan, Allahabad.
4. Jensen, J. R. (2005) Introductory Digital Image Processing: A Remote Sensing Perspective, Pearson Prentice-Hall.
5. Joseph, G. 2005: *Fundamentals of Remote Sensing*, United Press India.
6. Lillesand T. M., Kiefer R. W. and Chipman J. W., 2004: *Remote Sensing and Image Interpretation*, Wiley. (Wiley Student Edition).
7. Li, Z., Chen, J. and Batsavias, E. (2008) Advances in Photogrammetry, Remote Sensing and Spatial Information Sciences CRC Press, Taylor and Francis, London
8. Mukherjee, S. (2004) Textbook of Environmental Remote Sensing, Macmillan, Delhi.
9. Nag P. and Kudra, M., 1998: *Digital Remote Sensing*, Concept, New Delhi.
10. Singh R. B. and Murai S., 1998: *Space-informatics for Sustainable Development*, Oxford and IBH Pub.

GGRM SEC301BP2: **ADVANCED SPATIAL STATISTICAL TECHNIQUES 20 Lectures**

1. Statistics and Statistical Data: Spatial and non-spatial; indices of inequality and disparity.

2. Probability theory, probability density functions with respect to Normal, Binomial and Poisson distributions and their geographical applications.

3. Sampling: Sampling plans for spatial and non-spatial data, sampling distributions; sampling estimates for large and small samples tests involving means and proportions.

4. Correlation and Regression Analysis: Rank order correlation and product moment correlation; linear regression, residuals from regression, and simple curvilinear regression; Introduction to multi-variate analysis.

5. Time Series Analysis: Time Series processes; Smoothing time series; Time series components.

Note: Any Statistical Software Package (SPSS, MS Excel, R, etc.) may be used for practice.
Reading List

1. Bart James E and Gerld M.Barber, 1996: Elementary Statistics for Geographers, The Guieford Press, London.
2. Eldon, D., 1983: Statistics in Geography: A Practical Approach, Blackwell, London.
3. Cressie, N.A.C., 1991: Statistics for Spatial Analysis, Wiley, New York.
4. Gregory, S., 1978: Statistical Methods and the Geographer (4th Edition), Longman, London.
5. Haining, R.P., 1990: Spatial Data Analysis in the Social and Environmental Science, Cambridge University Press, Cambridge.
6. Mc Grew, Jr. and Cahrles, B. M., 1993: An Introduction to Statistical Problem Solving in Geography, W.C. Brocan Publishers, New Jersey.
7. Mathews, J.A., 1987: Quantitative and Statistical Approaches to Geography: A Practical Manual Pergamon, Oxford.
8. S.K., 1998: Statistics for Geoscientists : Techniques and Applications, Concept Publishing Company, New Delhi.
9. Wei, W.S.,1990: Time Series Analysis: Variate and Multivariate Methods , Addison Wesley Publishing.
10. Yeates, Mauris, 1974: An Introduction to Quantitative Analysis in Human Geography, Mc Grawhill, New York.

SEC 2 (2 C)
GGRMSEC401AP2: GEOGRAPHICAL INFORMATION SYSTEM (PRACTICAL)
20 Lectures

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

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

Reading List

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

GGRM SEC401BP2: RESEARCH METHODS (PRACTICAL) 20 Lectures

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

Reading List

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

ELECTIVE DISCIPLINE SPECIFIC (ANY FOUR)
DSE 1 (6 C)

GGRM DSE501AT6: SETTLEMENT GEOGRAPHY **48 lecture**

1. Settlement: Concept, classification, distribution and the changing relationship with the environment.
2. Rural settlement: evolution, site and situational factors and patterns and types.
3. Urban settlement: growth, functional classification of Towns.
4. Hierarchy of settlement.
5. Christaller's and August Losch Theory of Market Center

Reading List

1. Chorley , R.J. and Haggett, P.,1967: Models in Geography , Methuen, London.
2. Gregory , D.,1978: Ideology ,Science and Human Geography ,Hutchin, Londan
3. Huntington,E,1951 Princples in Human Geography ,John Wiley & Sons, Lnc, New York
4. Johnstone,R.J.et.(eds)1981,Dictionary of Human Geography ,Basil Blackwell Oxford.
5. Johnston,R.J. 1983 : Philosophy and Human Geography ,Edward Arnold ,London.
8. Chandana,R.C. 1986,A Geography of Population,Kakani Publishers,New Delhi
9. Ahmed,A,et,al(eds) 1997,Demographic Transition,The Third world Scenarior,Rawat Publications,Jaipur and New Delhi
10. Clarke J.I. 1972 Population Geography ,Pergamon Press,Oxford
11. Carter.H.1972,The Story of Urban Geography ,Edward Arnold, London

DSE 1

GGRM DSE501B T6: RESOURCE GEOGRAPHY 48 Lectures

1. Natural Resource: Concept, Classification and Techniques
2. Distribution, Utilization, Problems and Management of Land Resources and Water Resources
3. Distribution, Utilization, Problems and Management of Forests and Energy Resources
4. Appraisal and Conservation of Natural Resources
5. Sustainable Resource Development

Reading List

1. Cutter S. N., Renwich H. L. and Renwick W., 1991: *Exploitation, Conservation, Preservation: A Geographical Perspective on Natural Resources Use*, John Wiley and Sons, New York.
2. Gadgil M. and Guha R., 2005: *The Use and Abuse of Nature: Incorporating This Fissured Land: An Ecological History of India and Ecology and Equity*, Oxford University Press. USA.
3. Holechek J. L. C., Richard A., Fisher J. T. and Valdez R., 2003: *Natural Resources: Ecology, Economics and Policy*, Prentice Hall, New Jersey.
4. Jones G. and Hollier G., 1997: *Resources, Society and Environmental Management*, Paul Chapman,London.
5. Klee G., 1991: *Conservation of Natural Resources*, Prentice Hall, Englewood.
6. Mather A. S. and Chapman K., 1995: *Environmental Resources*, John Wiley and Sons, New York.
7. Mitchell B., 1997: *Resource and Environmental Management*, Longman Harlow, England.
8. Owen S. and Owen P. L., 1991: *Environment, Resources and Conservation*, Cambridge University Press, New York.
9. Rees J., 1990: *Natural Resources: Allocation, Economics and Policy*, Routledge.London

DSE 2 (6 C)
GGRM DSE 502AT6 : URBAN GEOGRAPHY **48 Lectures**

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

Reading List

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

DSE 2 (6 C)
GGRM DSE502BT6: **AGRICULTURAL GEOGRAPHY** **48 Lectures**

1. Defining the Field: Introduction, nature and scope; Land use/ land cover definition and classification.
2. Determinants of Agriculture: Physical, Technological and Institutional
3. Agricultural Regions of India: Agro-climatic, Agro-ecological & Crop Combination Regions.
4. Agricultural Systems of the World (Whittlesey's classification) and Agricultural Land use model (Von Thuenen, modification and relevance).
5. Agricultural Revolutions in India: Green, White, Blue, Pink

Reading List

1. Basu, D.N., and Guha, G.S., 1996: *Agro-Climatic Regional Planning in India*, Vol.I & II, Concept Publication, New Delhi.
2. Bryant, C.R., Johnston, T.R, 1992: *Agriculture in the City Countryside*, Belhaven Press, London.
3. Burger, A., 1994: *Agriculture of the World*, Aldershot, Avebury.
4. Grigg, D.B., 1984: *Introduction to Agricultural Geography*, Hutchinson, London.
5. Ilbery B. W., 1985: *Agricultural Geography: A Social and Economic Analysis*, Oxford University Press.
6. Mohammad, N., 1992: *New Dimension in Agriculture Geography*, Vol. I to VIII, Concept Pub., New Delhi.
7. Roling, N.G., and Wageruters, M.A.E.,(ed.) 1998: *Facilitating Sustainable Agriculture*, Cambridge University Press, Cambridge.
8. Shafi, M., 2006: *Agricultural Geography*, Doring Kindersley India Pvt. Ltd., New Delhi
9. Singh, J., and Dhillon, S.S., 1984: Agricultural Geography, Tata McGraw Hill, New Delhi.
10. Tarrant J. R., 1973: *Agricultural Geography*, David and Charles, Devon.

DSE 3 (6 C)
GGRM DSE 601AT6: GEOGRAPHY OF HEALTH AND WELLBEING 48 Lectures

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

Reading List:

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

DSE 4 (6 C)
GGRM DSE 602AT6: HYDROLOGY AND OCEANOGRAPHY 48 Lectures

1. Hydrological Cycle: Systems approach in hydrology, human impact on the hydrological cycle; Precipitation, interception, evaporation, evapo-transpiration, infiltration, ground-water, run off and over land flow; Hydrological input and output.

2. River Basin and Problems of Regional Hydrology: Characteristics of river basins, basin surface run-off, measurement of river discharge; floods and droughts.

3. Ocean Floor Topography and Oceanic Movements – Waves, Currents and Tides.

4. Ocean Salinity and Temperature – Distribution and Determinants.

5. Coral Reefs and Marine Deposits and Ocean Resources: Types and Theories of Origin; Biotic, Mineral.

Reading List

1. Andrew. D. ward and Stanley, Trimble (2004): Environmental Hydrology, 2nd edition, Lewis Publishers, CRC Press.
2. Karanth, K.R., 1988 : Ground Water: Exploration, Assessment and Development, Tata-McGraw Hill, New Delhi.
3. Ramaswamy, C. (1985): Review of floods in India during the past 75 years: A Perspective. Indian National Science Academy, New Delhi.
4. Rao, K.L., 1982 : India's Water Wealth 2nd edition, Orient Longman, Delhi,.
5. Singh, Vijay P. (1995): Environmental Hydrology. Kluwar Academic Publications, The Netherlands.
6. Anikouchine W. A. and Sternberg R. W., 1973: *The World Oceans: An Introduction to Oceanography*, Prentice-Hall.
7. Garrison T., 1998: *Oceanography*, Wordsworth Company, Belmont.
8. Kershaw S., 2000: *Oceanography: An Earth Science Perspective*, Stanley Thornes, UK.
9. Pinet P. R., 2008: *Invitation to Oceanography* (Fifth Edition), Jones and Barlett Publishers, USA, UK and Canada.
10. Sharma R. C. and Vatal M., 1980: *Oceanography for Geographers*, Chaitanya Publishing House, Allahabad.
11. Sverdrup K. A. and Armbrust, E. V., 2008: *An Introduction to the World Ocean*, McGraw Hill, Boston.
12. Singh, M., Singh, R.B. and Hassan, M.I. (Eds.) (2014) Landscape ecology and water management. Proceedings of IGU Rohtak Conference, Volume 2. Advances in Geographical and Environmental Studies, Springer

DSE 4 (6 C)
GGRM DSE 602BT6: SOCIAL GEOGRAPHY **48 Lectures**

1. Social Geography: Concept, Origin, Nature and Scope.
2. Peopling Process of India: Technology and Occupational Change; Migration.
3. Social Categories: Caste, Class, Religion, Race and Gender and their Spatial distribution
4. Geographies of Welfare and Well being: Concept and Components – Healthcare, Housing and Education.
5. Social Geographies of Inclusion and Exclusion, Slums, Gated Communities, Communal Conflicts and Crime.

Reading List

1. Ahmed A., 1999: *Social Geography*, Rawat Publications.
2. Casino V. J. D., Jr., 2009) *Social Geography: A Critical Introduction*, Wiley Blackwell.
3. Cater J. and Jones T., 2000: *Social Geography: An Introduction to Contemporary Issues*, Hodder Arnold.
4. Holt L., 2011: *Geographies of Children, Youth and Families: An International Perspective*, Taylor & Francis.
5. Panelli R., 2004: *Social Geographies: From Difference to Action*, Sage.
6. Rachel P., Burke M., Fuller D., Gough J., Macfarlane R. and Mowl G., 2001: *Introducing Social Geographies*, Oxford University Press.
7. Smith D. M., 1977: *Human geography: A Welfare Approach*, Edward Arnold, London.
8. Smith D. M., 1994: *Geography and Social Justice*, Blackwell, Oxford.
9. Smith S. J., Pain R., Marston S. A., Jones J. P., 2009: *The SAGE Handbook of Social Geographies*, Sage Publications.
10. Sopher, David (1980): *An Exploration of India*, Cornell University Press, Ithasa
11. Valentine G., 2001: *Social Geographies: Space and Society*, Prentice Hall.

ELECTIVE GENERIC PAPERS

GE 1 (6 C)

GGRM GE 101AT6: DISASTER MANAGEMENT **48 Lectures**

1. Disasters: Definition and Concepts: Hazards, Disasters; Risk and Vulnerability; Classification
2. Disasters in India: (a) Flood: Causes, Impact, Distribution and Mapping; Landslide: Causes, Impact, Distribution and Mapping; Drought: Causes, Impact, Distribution and Mapping
3. Disasters in India: (b) Earthquake and Tsunami: Causes, Impact, Distribution and Mapping; Cyclone: Causes, Impact, Distribution and Mapping.
4. Manmade disasters: Causes, Impact, Distribution and Mapping
5. Response and Mitigation to Disasters: Mitigation and Preparedness, NDMA and NIDM; Indigenous Knowledge and Community-Based Disaster Management; Do's and Don'ts During and Post Disasters

Reading List

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

GE 1

GGRM GE 101BT6: GEOGRAPHY OF TOURISM **48 Lectures**

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

Reading List

1. Dhar, P.N. (2006) International Tourism: Emerging Challenges and Future Prospects. Kanishka, New Delhi.
2. Hall, M. and Stephen, P. (2006) Geography of Tourism and Recreation – Environment, Place and Space, Routledge, London.
3. Kamra, K. K. and Chand, M. (2007) Basics of Tourism: Theory, Operation and Practise, Kanishka Publishers, Pune.
4. Page, S. J. (2011) Tourism Management: An Introduction, Butterworth-Heinemann-USA. Chapter 2.
5. Raj, R. and Nigel, D. (2007) Morpeth Religious Tourism and Pilgrimage Festivals Management: An International perspective by, CABI, Cambridge, USA, www.cabi.org.
6. Tourism Recreation and Research Journal, Center for Tourism Research and Development, Lucknow
7. Singh Jagbir (2014) “Eco-Tourism” Published by - I.K. International Pvt. Ltd. S-25, Green Park Extension, Uphaar Cinema Market, New Delhi, India (www.ikbooks.com).

GE 2 (6 C)
GGRM GE 201AT6: SPATIAL INFORMATION TECHNOLOGY 48 Lectures

1. Introduction: Definitions, Concept and Historical Development
2. Spatial Information/Data: Web data sources; Registration and projection; Data structures; Data interpolation and modeling.
3. Working of spatial information system
4. Functions of Spatial information system: Information retrieval; Topological modeling; Networks; Overlay; Data output.
5. Application of Spatial Information Technology

Reading List

1. C. Esperança and H. Samet, An overview of the SAND spatial database system, to appear in Communications of the ACM, 1997. http://www.cs.umd.edu/~hjs/pubs/sandprog.ps.gz
2. G. Hjaltason and H. Samet, Ranking in Spatial Databases in Advances in Spatial Databases — 4th Symposium, SSD'95, M. J. Egenhofer and J. R. Herring, Eds., Lecture Notes in Computer Science 951, Springer-Verlag, Berlin, 1995, 83-95. http://www.cs.umd.edu/~hjs/pubs/incnear.ps
3. H. Samet, Spatial Data Structures in Modern Database Systems: The Object Model, Interoperability, and Beyond, W. Kim, Ed., Addison-Wesley/ACM Press, 1995, 361-385. http://www.cs.umd.edu/~hjs/pubs/kim.ps
4. H. Samet, Applications of Spatial Data Structures: Computer Graphics, Image Processing, and GIS, Addison-Wesley, Reading, MA, 1990. ISBN 0-201- 50300-0.
6. H. Samet, The Design and Analysis of Spatial Data Structures, Addison-Wesley, Reading, MA, 1990. ISBN 0-201-50255-0.
7. H. Samet and W. G. Aref, Spatial Data Models and Query Processing in Modern Database Systems: The Object Model, Interoperability, and Beyond, W. Kim, Ed., Addison-Wesley/ACM Press, 1995, 338-360. http://www.cs.umd.edu/~hjs/pubs/kim2.ps
8. C. D. Tomlin, Geographic Information Systems and Cartographic Modeling, Prentice-Hall, Englewood Cliffs, NJ, 1990. ISBN 0-13-350927-3.

GE 2
GGRM GE201BT6 : REGIONAL DEVELOPMENT **48 Lectures**

1. Definition of Region, Evolution, Types and Need of Regional planning: Formal, Functional, and Planning Regions and Regional Development.
2. Regional Imbalances and Problems of Functional Regions.
3. Choice of a Region for Planning: Characteristics of an Ideal Planning Region; Delineation of Planning Region; Regionalization of India for Planning (Agro Ecological Zones)
4. Strategies/Models for Regional Planning: Growth Pole Model of Perroux; Growth Centre Model in Indian Context; Village Cluster
5. Problem Regions and Regional Planning: Backward Regions and Regional Plans- Special Area Development Plans in India; DVC-The Success Story and the Failures.

Reading List

1. Adell, Germán (1999) Literature Review: Theories and Models Of The Peri-Urban Interface: A Changing Conceptual Landscape, Peri-urban Research Project Team, Development Planning Unit, University College London at
2. Bhatt, L.S. (1976) Micro Level Planning in India. KB Publication, Delhi
3. Deshpande C. D., 1992: *India: A Regional Interpretation*, ICSSR, New Delhi.
4. Dreze J. and A. Sen, Indian Development: Select Regional Perspectives (Oxford: Oxford University Press, 1996).
5. Ses, Amratya (2000) Development as Freedom. Random House, Toronto
6. Raza, M., Ed. (1988). Regional Development. Contributions to Indian Geography. New Delhi, Heritage Publishers.
7. Rapley, John (2007) Understanding Development: Theory and Practice in the 3rd World. Lynne Rienner, London.
8. Schmidt-Kallert, Einhard (2005) A Short Introduction to Micro-Regional Planning, Food and Agriculture Organization of the United Nations (FAO)
9. Sdyasuk Galina and P Sengupta (1967): *Economic Regionalisation of India*, Census of India

GE 3 (6 C)
GGRM GE 301AT6: CLIMATE CHANGE: VULNERABILITY AND ADAPTATION
48 Lectures

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

Further Readings

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

GE 3
GGRM GE301BT6: RURAL DEVELOPMENT **48 Lectures**

1.Defining Development: Inter-Dependence of Urban and Rural Sectors of the Economy; Need for Rural Development, Gandhian Approach of Rural Development.
2.Rural Economic Base: Panchayatiraj System, Agriculture and Allied Sectors, Seasonality and Need for Expanding Non-Farm Activities, Co-operatives, PURA.
3.Area Based Approach to Rural Development: Drought Prone Area Programmes, PMGSY.
4.Target Group Approach to Rural Development: SJSY, MNREGA, Jan Dhan Yojana and Rural Connectivity.
5.Provision of Services – Physical and Socio-Economic Access to Elementary Education and Primary Health Care and Micro credit

Reading List

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

GE 4 (6 C)

GGRM GE401AT6: INDUSTRIAL GEOGRAPHY 48 Lectures

1. Nature and Scope of Industrial Geography
2. Types, Geographical Characteristics and Location of Industries (Weber's Theory): Small and Medium Industries, Heavy Industries: Coal and Iron based industries, Rural based Industries, Footloose Industry.
3. Mega Industrial Complexes: National Capital Region, Mumbai-Pune Industrial Region, Bengaluru-Chennai Industrial Region and Chota Nagpur Industrial Region
4. Impact of Industrialisation in India: Environmental; Social and Economic
5. Industrial Policy of India

Reading List

1. Alexander J.W. (1979). Economic Geography, Printice Hall of India Pvt. Ltd., New Delhi.
2. Goh Cheng Leong (1997). "Human and economic geography", Oxford University Press, New York.
3. Thoman, R.S., Conkling E.C. and Yeates, M.H. (1968). Geography of Economic Activity, McGraw Hill Book Company, 1968.
4. Miller, E. (1962) Geography of Manufacturing Printice Hall - Englewood Cliff, New Jersey
5. Gunnar Alexandersson (1967). "Geography of Manufacturing, Prentice Hall, New Jersey

Truman, A. Harishorn, John W. Alexander (2000) " Economic Geography", Prentice Hall of India Ltd., New Delhi.

6. Singh, Jagdish 2003: *India - A Comprehensive & Systematic Geography*, Gyanodaya Prakashan, Gorakhpur.
7. Tirtha, Ranjit 2002: *Geography of India,* Rawat Publs., Jaipur & New Delhi.
8. Pathak, C. R. 2003: *Spatial Structure and Processes of Development in India*. Regional Science Assoc., Kolkata.
9. Tiwari, R.C. (2007) Geography of India. Prayag Pustak Bhawan, Allahabad
10. Sharma, T.C. (2013) Economic Geography of India. Rawat Publication, Jaipur

GE 4
GGRM GE 401BT6: SUSTAINABLE DEVELOPMENT **48 Lectures**

1. Sustainable Development: Definition, Components, Limitations and Historical Background.

2. The Millennium Development Goals: National Strategies and International Experiences

3. Sustainable Regional Development: Need and examples from different Ecosystems.

4. Inclusive Development: Education, Health; Climate Change: The role of higher education in sustainable development; The human right to health; Poverty and disease; The Challenges of Universal Health Coverage; Policies and Global Cooperation for Climate Change

5. Sustainable Development Policies and Programmes: The proposal for SDGs at Rio+20; Illustrative SDGs; Goal-Based Development; Financing for Sustainable Development; Principles of Good Governance; National Environmental Policy, CDM.

Reading List

1. Agyeman, Julian, Robert D. Bullard and Bob Evans (Eds.) (2003) Just Sustainabilities: Development in an Unequal World. London: Earthscan. (Introduction and conclusion.).
2. Ayers, Jessica and David Dodman (2010) "Climate change adaptation and development I: the state of the debate". Progress in Development Studies 10 (2): 161-168.
3. Baker, Susan (2006) Sustainable Development. Milton Park, Abingdon, Oxon; New York, N.Y.: Routledge. (Chapter 2, "The concept of sustainable development").
4. Brosius, Peter (1997) "Endangered forest, endangered people: Environmentalist representations of indigenous knowledge", Human Ecology 25: 47-69.
5. Lohman, Larry (2003) "Re-imagining the population debate". Corner House Briefing 28.
6. Martínez-Alier, Joan et al (2010) "Sustainable de-growth: Mapping the context, criticisms and future prospects of an emergent paradigm" Ecological Economics 69: 1741-1747.
7. Merchant, Carolyn (Ed.) (1994) Ecology. Atlantic Highlands, N.J: Humanities Press. (Introduction, pp 1- 25.)
8. Osorio, Leonardo et al (2005) "Debates on sustainable development: towards a holistic view of reality". Environment, Development and Sustainability 7: 501-518.
9. Robbins, Paul (2004) Political Ecology: A Critical Introduction. Blackwell Publishing.
10. Singh, R.B. (Eds.) (2001) Urban Sustainability in the Context of Global Change, Science Pub., Inc., Enfield (NH), USA and Oxford & IBH Pub., New Delhi.