DIAMOND HARBOUR WOMEN'S UNIVERSITY

REVISED

POST GRADUATE SYLLABUS 2020

M. Sc./M.A. COURSE IN GEOGRAPHY

UNDER

COICE BASED CREDIT SYSTEM-CBCS

DEPARTMENT OF GEOGRAPHY
Diamond Harbour Women's University
Sarisha, South 24 Parganas, West Bengal-743368

The basic elements of CBCSS are Semester system, Credit system, Credit transfer, Comprehensive and continuous evaluation and Grading. CBCSS aims multi-disciplinary approach (Ravi, 2011) to undergraduate and post-graduate curriculum. Students can select courses from a wide range of disciplines to gain mastery of a subject of their choice. Uniformity and parity between Indian higher educational institutions and international institutions can be established. CBCSS helps a student to enroll with in a particular course, to opt for and earn elective credits in other subjects of choice. UGC made CBCS mandatory for all 400 public universities at the undergraduate and postgraduate level beginning in the academic year 2015-2016. Under CBCS, the students are exposed to various subjects at the same time. In the 11th plan under the new initiative of academic reforms in the higher education institutions, UGC reiterates that universities are autonomous institutions and have necessary freedom to experiment new ideas and adopt practices which they consider appropriate for promoting relevance, quality and excellence within the framework of national policy.

Core Courses:
Every student will take only 11 theoretical core papers comprising 55 credits and 4 practical core papers in two years Post Graduate Degree Course in the semester I, II, III and IV.

Discipline Centric Elective Courses (Specialization):
All the students of the department of Geography will opt one out of the five Major Electives in Semester IV comprising two theoretical papers of 10 credits and one practical paper of 4 credit.
A. Fluvial Geomorphology
B. Gender Geography
C. Urban and Rural Planning and Development
D. Fluvial Geomorphology
E. Soil Geography and Land use
F. Coastal Geomorphology

Open Elective Courses (CBCS Course for other discipline):
MA / M.Sc. Geography students will opt two Open Elective Courses of 10 credits in the Semester III offered by other allied PG Departments under faculty of Science.

Field Report and Dissertation Project:
Students will submit one Field Report in Semester – III and one Dissertation project based on Discipline centric Elective Course in the Semester–IV comprising 5 credit.

Definitions of Key Words
1. **Semester:** Each semester will consist of at least 15 Teaching Weeks as per UGC guidelines in an academic year.
2. Academic Year: Two consecutive (one odd + one even) semesters constitute one academic year. The odd semester may be scheduled from July to December and even semester from January to June.
3. Course: Usually referred to, as 'papers' is a component of a programme. All courses need not carry the same weight. The courses should define learning objectives and learning outcomes. A course may be designed to comprise lectures/tutorials/laboratory work/field work/outreach activities/ project work/vocational training/viva/seminars/term papers/assignments/presentations/self-study etc. or a combination of some of these.
4. Credit: A unit by which the course work is measured. It determines the number of hours of instructions required per week or semester. One credit is equivalent to one hour of teaching (lecture or tutorial) or two hours of practical work/field work per week. Each theory paper consist of 5 credits and practical paper consists of 4 credits. But, in case of each theory paper instruction hours is 75/semester and in case of practical paper it is 120 hours.

STRUCTURE OF M.Sc./M.A. SYLLABUS UNDER CBCS

SEMESTER WISE DIVISION OF MARKS AND CREDITS

SEMESTER	Theoretical (Core)	Practical (Core)	Discipline Centric Elective		Open Elective (Theory)	Total Marks	Total Credits
			Theory	Practical and dissertation project			
SEMESTER-I	200 (20)	50 (4)	-	-	-	250	24
SEMESTER-II	200 (20)	50 (4)	-	-	-	250	24
SEMESTER-III	100 (10)	100 (8)	-	-	100 (10)	300	28
SEMESTER-IV	50 (5)	-	100 (10)	100 (9)		250	24
Total	**550 (55)**	**200 (16)**	**100 (10)**	**100 (9)**	**100 (10)**	**1050**	**100**

SEMESTER-I

Duration: July to December

Course Code	Paper name	Paper Type	Module	Marks			Credit
				Semester-end Examination	Internal Assessment	Total Marks	
GEO/CC/TH/101	Philosophy of Geography	Theory	101	40	10	50	5
GEO/CC/TH/102	Geomorphology	Theory	102	40	10	50	5
GEO/CC/TH/103	Climatology	Theory	103	40	10	50	5
GEO/CC/TH 104	Economic Geography	Theory	104	40	10	50	5
GEO/CC/PR/105	Geospatial Analysis	Practical	105	40	10	50	4
				Total Marks - 250			**24**

SEMESTER-II Duration: January to June

Course Code	Paper name	Paper Type	Module	Marks			Credit
				Semester-end Examination	Internal Assessment	Total Marks	
GEO/CC/TH/201	Hydrology and Oceanography	Theory	201	40	10	50	5
GEO/CC/TH/202	Soil and Biogeography	Theory	202	40	10	50	5
GEO/CC/TH/203	Population and Settlement Geography	Theory	203	40	10	50	5
GEO/CC/TH 204	Social and Cultural Geography	Theory	204	40	10	50	5
GEO/CC/PR/205	GNSS, RS & GIS	Practical	205	40	10	50	4
				Total Marks - 250			**24**

SEMESTER-III Duration: July to December

Course Code	Paper name	Paper Type	Module	Marks			Credit
				Semester-end Examination	Internal Assessment	Total Marks	
GEO/CC/TH/301	Historical and Political Geography	Theory	301	40	10	50	5
GEO/CC/TH/302	Regional Planning and Development	Theory	302	40	10	50	5
GEO/CC/PR/303	Statistical Techniques	Practical	303	40	10	50	4
GEO/CC/PR/304	Quantitative Techniques and Field Report	Practical	304	50	5	50	4
Open Elective Paper (CBCS Paper for other discipline)							
GEO/OE/TH/305	**Environmental Science (CBCS)**	**Theory**	305	40	10	50	5
GEO/OE/TH/306	**Resource Management (CBCS)**	**Theory**	306	40	10	50	5
				Total Marks-300			**28**

SEMESTER-IV Academic Year-Second, January to June

Course Code	Paper name	Paper Type	Module	Marks		Credit
				Semester-end Examination	Internal Assessment	
GEO/CC/TH/401	Environment and Regional Geography	Theory	**401**	**40**	**10**	**5**
Discipline Centric Elective Paper (Special Paper)						
GEO/DCE/TH/402A	**Fluvial Geomorphology-I**	**Theory**	**402A**	**40**	**10**	**5**
GEO/DCE/TH/402B	**Gender Geography-I**		**402B**	**40**	**10**	
GEO/DCE/TH/402C	**Urban and Rural Planning and Development -I**		**402C**	**40**	**10**	
GEO/DCE/TH/402D	**Advanced Geomorphology-I**		**402D**			
GEO/DCE/TH/402E	**Soil Geography and Landuse-I**		**402E**	**40**	**10**	
GEO/DCE/TH/402F	**Coastal Geomorphology-I**		**402F**	**40**	**10**	
GEO/DCE/TH/403A	**Fluvial Geomorphology-II**	**Theory**	**403A**	**40**	**10**	**5**
GEO/DCE/TH/403B	**Gender Geography-II**		**403B**	**40**	**10**	
GEO/DCE/TH/403C	**Urban and Rural Planning and Development-II**		**403C**	**40**	**10**	
GEO/DCE/TH/403D	**Advanced Geomorphology-II**		**403D**	**40**	**10**	
GEO/DCE/TH/403E	**Soil Geography and Land use-II**		**403E**	**40**	**10**	
GEO/DCE/TH/403F	**Coastal Geomorphology-II**		**403F**	**40**	**10**	
GEO/DCE/PR/404A	**Fluvial Geomorphology-III**	**Practical**	**404A**	**40**	**10**	**4**
GEO/DCE/PR/404B	**Gender Geography-III**		**404B**	**40**	**10**	
GEO/DCE/PR/404C	**Urban and Rural Planning and Development-III**		**404C**	**40**	**10**	
GEO/DCE/PR/404D	**Advanced Geomorphology-III**		**404D**	**40**	**10**	
GEO/DCE/PR/404E	**Soil Geography and Landuse-III**		**404E**	**40**	**10**	
GEO/DCE/PR/404F	**Coastal Geomorphology-III**		**404F**	40 Exam. & 10 Note book and viva-voce		
GEO/DCE/DP/405	**Fluvial Geomorphology**	**(Dissertation Project)**	**405A**	**Total Marks- 50** i. Dissertation Project-15 ii. Presentation-10 iii. Internal-10 iv. Viva-voce 15		**5**
	Gender Geography		**405B**			
	Urban and Rural Planning and Development		**405C**			
	Advanced Geomorphology		**405D**			
	Soil Geography and Land use		**405E**			
	Coastal Geomorphology		**405F**	**Total Marks-250**		**24**

STRUCTURE OF SYLLABUS UNDER CBCS 2020

Semester	Paper Name	Module No.	Course Code	Type of Course	Marks	Credits
	Semester-I					
I	Philosophy of Geography	101	GEO/CC/TH/101	Theory	**50**	**5**
	Geomorphology	102	GEO/CC/TH/102	Theory	**50**	**5**
	Climatology	103	GEO/CC/TH/103	Theory	**50**	**5**
	Economic Geography	104	GEO/CC/TH 104	Theory	**50**	**5**
	Geospatial Analysis	105	GEO/CC/PR/105	Practical	**50**	**4**
	Semester-II					
II	Hydrology and Oceanography	201	GEO/CC/TH/201	Theory	**50**	**5**
	Soil and Biogeography	202	GEO/CC/TH/202	Theory	**50**	**5**
	Population and Settlement Geography	203	GEO/CC/TH/203	Theory	**50**	**5**
	Social and Cultural Geography	204	GEO/CC/TH 204	Theory	**50**	**5**
	GNSS, RS & GIS	205	GEO/CC/PR/205	Practical	**50**	**4**
	Semester-III					
III	Historical and Political Geography	301	GEO/CC/TH/301	Theory	**50**	**5**
	Regional Planning and Development	302	GEO/CC/TH/302	Theory	**50**	**5**
	Statistical Techniques	303	GEO/CC/PR/303	Theory	**50**	**4**
	Quantitative Techniques & Field Project	304	GEO/CC/PR/304	Practical	**50**	**4**
	Open Elective Paper (CBCS, For other discipline)					
	Environmental Science (CBCS)	305	GEO/OE/TH/305	Theory	**50**	**5**
	Resource Management (CBCS)	306	GEO/OE/TH/306	Theory	**50**	**5**
	Semester-IV					
IV	Environment and Regional Geography	401	GEO/CC/TH/401	Theory	**50**	**5**
	Optional Special Paper-I**	402	GEO/DCE/TH/402	Theory	**50**	**5**
	Optional Special Paper-II**	403	GEO/DCE/TH/403	Theory	**50**	**5**
	Optional Special Paper-III**	404	GEO/DCE/PR/404	Practical	**50**	**4**
	Optional Special Paper-IV, Dissertation Project**	405	GEO/DCE/DP/405	Dissertation Project	**50**	**5**
					1050	**100**

Note: All theoretical papers would contain 40 marks for written exam and 10 marks for internal assessment. Internal assessment can be made in the form of term paper, laboratory work, viva, assignments, seminar presentation, field work, outreach activities and mid-semester test. Practical paper contains 40 marks for written exam and 10 marks for laboratory note book and viva-voce.

[GEO-Geography; OE-Open Elective; DCE-Discipline Centric Elective; CC-Core Course; Th-Theory; PR-Practical; DP-Dissertation Project].

****Optional Special Papers (402, 403, 404 & 405):**

1. Fluvial Geomorphology
2. Gender Geography
3. Urban and Rural Planning and Development
4. Advanced Geomorphology
5. Soil Geography and Land Use
6. Coastal Geomorphology
7. Population and Development

SEMESTER-I

GEO/CC/TH/101

PHILOSOPHY OF GEOGRAPHY

[Theoretical: Written Exam: 40 marks + Internal Assessment: 10 marks]

Unit-1: Genesis of Geographical Thought

1.1 History of development of geography; Place of geography in the classification of knowledge

1.2 Ancient geography: Contributions of Greek, Roman and Arab Geographers

1.3 Pre-scientific ideas in the ancient and medieval periods; Emergence of modern geography Environmental determinism of Ratzel and Huntington

1.4 Contemporary Geography since 1950; Impact of World Wars

Unit-2: Trends in Geography

2.1 Dualism and dichotomies in Geography

2.2 Positivism, Marxism, post structuralism and post colonialism.

2.3 Critique of modernism: Post modernism

2.4 Deconstruction and spatiality

Unit-3: Geography and Inequality

3.1 Critical theory and its implications: Habermas, Harvey and Peet.

3.2 Geography of inequality, social wellbeing and welfare approach

3.3 Structuralism and post-structuralism

3.4 Geography of Gender

Unit-4: Changing Face of Geography

4.1 Redefining geography, revival of classical ideas

4.2 Changing nature of man-environment relations and revival of ecological approach

4.3 Development of radical geography; Paradigms in contemporary geography: Sustainability and globalization.

4.4 Contemporary research trend in geography and use of modern techniques

GEO/CC/TH/102
GEOMORPHOLOGY

[Theoretical: Written Exam: 40 marks + Internal Assessment: 10 marks]

Unit-I: Concepts in Geomorphology

1.1 Spatial scale, temporal scale and related concepts: Systems, feedback, equilibrium and threshold

1.2 Plate tectonics in evolution of landforms

1.3 Morphogenetic regions; Models of slope evolution

1.4 Theories and concepts on landform development

Unit-II: Rivers and River Basins

2.1 River hydraulics: flow and energy, hydraulic geometry of streams

2.2 Catchment processes and fluvial processes; Factors regulating entrainment, transportation and deposition of sediments

2.3 Adjustment of channel forms and patterns to morphodynamic variables

2.4 Fluvial landforms: genetic classification, ordering, formation and evolution

Unit-III: Evolution of Landforms

3.1 Coastal morphodynamic variables and their influence on evolution of coastal forms

3.2 Classification and evolution of periglacial landforms

3.3 Quaternary geomorphology, impact of Pleistocene on landform evolution

3.4 Planetary geomorphology with special reference to Moon and Mars.

Unit-IV: Applied Geomorphology

4.1 Application of geomorphology in feasibility assessment of engineering and industrials projects; geomorphic approaches to hazard studies

4.2 Factors, vulnerability, consequences and management of earthquakes, tsunamis and landslides

4.3 Factors, vulnerability, consequences and management of coastal erosion, storm surges and floods

4.4 Principles of integrated hazards management

GEO/CC/TH/103
CLIMATOLOGY

[Theoretical: Written Exam: 40 marks + Internal Assessment: 10 marks]

Unit-I: Concepts of Weather and Climate

1.1 The climate system: Micro, Meso and Macro; Linkages of climate with other environmental systems

1.2 Role of heat and moisture in the atmosphere; Adiabatic processes and instabilities

1.3 The wind circulation systems: Primary, Secondary and Tertiary

1.4 Clouds: Formation and Classification; Precipitation: Forms and functions

Unit-II: Tropical Climates and Weather Hazards

2.1 Tropical circulations: Hadley and Walker, ENSO phenomena

2.2 Tropical air mass; Convergence and divergence

2.3 The Asian Monsoon: Importance, characteristics, and prediction

2.4 Weather hazards- Heat and cold waves, thunderstorm, tornado and tropical cyclone: Formation, distribution, and forecasting

Unit-III: Climate Change

3.1 Evidences of climate change; Reconstruction of past climates

3.2 Anthropogenic interferences on climate prognostication

3.3 The climate cycle; Climate trends in the Holocene period

3.4 Recent trends of global climates: impact on society and economy

Unit-IV: Applied Climatology

4.1 Approaches and techniques of weather forecasting: short, medium and long range

4.2 Climate and agriculture: Agro-climatology-water budget and crop calendar

4.3 Climate and settlements: Urban climatology-Urban Heat Island

4.4 Climate and health: Bio-climatology-Human comfort and health aspects

GEO/CC/TH/104
ECONOMIC GEOGRAPHY

[Theoretical: Written Exam: 40 marks + Internal Assessment: 10 marks]

Unit-I: Resources and Economy

1.1 Concept of resource; Resource adequacy and concept of scarcity; Economic systems

1.2 Ranking of world economies; Resource classification: Ackerman's scheme

1.3 Limits to growth: Classical, neo-classical and ecological economies

1.4 Resource inequality and sustainable development

Unit-II: Agricultural Economy

2.1 Agricultural regions: Concepts and Techniques of delineation

2.2 World agricultural systems; Agri-business

2.3 Green revolution and food security in India

2.4 Land tenure systems and land reforms in relation to Indian agriculture

Unit-III: Industrial Economy

3.1 Theories of industrial location as proposed by Palander, Hoover, Smith and Pred

3.2 Major industrial regions; Spatial distribution of manufacturing industries: Petroleum refining and textile

3.3 Emerging industries with special reference to food processing and ICT in India

3.4 Industrial policy of India; Role of liberalisation, privatisation and globalisation

Unit-IV: Trade and Commerce

4.1 Economics of global trade: Balance of payment, role of GATT and WTO.

4.2 Regional blocs in International Trade

4.3 Market network and linkages: Market centres, periodic and daily marketing, retailing and whole selling, E-commerce

4.4 Impact of information technology on trade in India

GEO/CC/PR/105

GEOSPATIAL ANALYSIS (PRACTICAL)

[Practical: Written Exam: 40 marks + Laboratory notebook and Viva-voce: 5+5 marks]

Unit-I: Analyses of Topographical Maps

1.1 Comparative utility of topographical maps and different types of remotely sensed images as sources of geographical data

1.2 Preparation of altimetric frequency curves and hypsometric curves of drainage basins

1.3 Extraction of radii of curvature and sinuosity and braiding indices of channels

1.4 Nearest neighbour index analysis

Unit-II: Analyses of Satellite Images

2.1 Common types of IRS and Landsat sensors and their suitability for analysis of geographical information; Indian referencing scheme of IRS sensors

2.2 Extraction of physical features from satellite images of various resolution and band combinations

2.3 Extraction of cultural features from satellite images of various resolution and band combinations

2.4 Detection of change from multi-dated maps and/or images (including images captured from web–based earth observation programmes)

Unit-III: Survey Techniques

3.1 Traversing using Theodolite

3.2 Height measurement using Theodolite

3.3 Use of Abney Level and Clinometer

3.4 Use of current meter

Laboratory Note book and Viva-voce.

SEMESTER-II

GEO/CC/TH/201

HYDROLOGY & OCEANOGRAPHY

[Theoretical: Written Exam: 40 marks + Internal Assessment: 10 marks]

Unit-I: Hydrology- Concepts

1.1 Components, Source and measurement of hydrological data

1.2 Water in earth: forms, occurrences and properties

1.3 Significance of the global hydrological cycle with special reference to heat transfer

1.4 Groundwater contamination: types and consequences

Unit-II: Hydrology-Applications & Management

2.1 Water management in tropical farmlands: Approaches and techniques.

2.2 Water management in tropical cities: Approaches and Techniques

2.3 Principles of integrated basin management with reference to micro-watershed planning.

2.4 Issues related to large river impoundment

Unit-III: Oceanography-Concepts

3.1 Classification, characteristics and origin of the major structural and relief of ocean floor with reference to plate tectonics.

3.2 Bottom topography of Bay of Bengal: characteristics and evolution.

3.3 Waves and tides: Genetic classification and models of formation.

3.4 Ocean circulation: classification and significance.

Unit-IV: Oceanography-Resource & Utilisation

4.1 Water mass: origin, evolution, physical and chemical properties.

4.2 Sea-level changes: Nature and causes

4.3 Ocean as a resource: nature and extent of anthropogenic utilisation of the oceans.

4.4 UNCLOS, EEZ and CRZ: delimitation and significance

GEO/CC/TH/202

SOIL & BIOGEOGRAPHY

[Theoretical: Written Exam: 40 marks + Internal Assessment: 10 marks]

Unit-I: Soil Geography

1.1 Soil as a component of Biosphere; Concept of land and soil; Plant–water–soil relationship

1.2 Bio-functions of Soil; Soil organic matter, Soil organisms and their relation with soil fertility; macro and micro nutrients

1.3 Role of physic-chemical properties in soil fertility and productivity

1.4 Soil degradation and transformation: causes, processes and consequences; Preventive, ameliorative and conservation measures.

Unit-II: Plant Geography

2.1 Plant ecology: habitat factors and plant responses to environment; adaptation, and

Climax; domestication of plants.

2.2 Phyto-geographical regions; Concept of plant species, family and genera; taxonomy

2.3 Consequences of deforestation; Forest conservation: social forestry and participatory management of forest

2.4 Concept of degeneration and regeneration of plants

Unit-III: Zoogeography

3.1 Principles of animal ecology

3.2 Animals dispersal in different geological periods

3.3 Barriers for animals migration; Zoogeographical regions of the world.

3.4 Principles of animal ecology; Wild life management; Relevance of sanctuaries with special reference to India

Unit-IV: Ecosystem and Ecology

4.1 Principles of physical and human ecology; Ecosystem models

4.2 Population dynamics of organisms and problems of their abundance and extinction

4.3 Mangrove ecosystems: associated problems and management

4.4 Biodiversity conservation with special reference to humid tropics

GEO/CC/TH/203

POPULATION & SETTLEMENT GEOGRAPHY

[Theoretical: Written Exam: 40 marks + Internal Assessment: 10 marks]

Unit-I: Population Geography

1.1 Population geography: nature, trends and its relation with demography; Different schools of thoughts in population studies

1.2 Population Growth differentials: fertility, mortality, morbidity, migration

1.3 Stationary and Stable Population, age-sex structure, ageing population.

1.4 Population quality: literacy, occupation, physical and mental health.

Unit-II: Population Theories and Policies

2.1 Growth theories: Malthus and Marx, Dumont's hypothesis, theories of optimum population

2.2 Demographic transition and mobility transition models

2.3 Migration Theories: Models of Lee, Zelinsky, Spencer and Todaro

2.4 Population Policies: India and China, population-development debate, Ehrlich and Amartya Sen's view

Unit-III: Rural Settlement

3.1 Concept of Settlement: rural and urban differentials; Census categories of rural settlements

3.2 Theories of evolution of rural settlements: Models of Hudson and Green

3.3 Classification of rural settlement: Models of Champion and Gestalt

3.4 Rural house types: structure and forms under different geographical environment in India

Unit-IV: Urban Settlement

4.1 Definition of urban in India and world; classification of settlement by Census of India; Concept of metropolis, conurbation, megalopolis and megacities

4.2 Urban morphology: Models of Alonso, Sinclair and Mann

4.3 Theories of spacing of urban settlements; Urban hierarchy and primate city

4.4 Emerging urban problems in India: Policies and planning

GEO/CC/TH/204

SOCIAL & CULTURAL GEOGRAPHY

[Theoretical: Written Exam: 40 marks + Internal Assessment: 10 marks]

Unit-I: Concepts in Social Geography

1.1 Social Geography: definition, schools of thought, recent trends

1.2 Welfare Issues: Social Wellbeing, Social Pathology, Social Development Index

1.3 Social Security, Social Justice and Social Inequality

1.4 Development and Gender: Women Empowerment (GEM), Gender Disparity

Unit-II: Social System and Elements

2.1 Social stratification, Social Structure and Processes

2.2 Class, Caste, Power Ethnicity and Tribe

2.3 Religion and Language: Distribution and Classification

2.4 Social Problems: Food Security, Nutrition, Social Exclusion

Unit-III: Cultural Geography

3.1 Concept of Culture in Geography: definition and content

3.2 Cultural Hearth and Realm

3.3 Cultural System and Diffusion

3.4 Cultural Segregation, Cultural Diversity, Cultural Regeneration, Cultural Turn

Unit-IV: Social-cultural Relations

4.1 Cultural Landscape after Carl Sauer

4.2 Cultural Development: Eco centric, Techno centric

4.3 Role of Environment in the Development of Folk Culture and its Diversity

4.4 Acculturation, Impact of Neo–liberal paradigm on urban culture-Cultural Globalisation

GEO/CC/PR/205

GNSS, RS & GIS (PRACTICAL)

[Practical: Written Exam 40 marks + Viva-voce & Laboratory Notebook 10 marks]

Unit-I: Global Navigation Satellite System

1.1 Principles of GNSS positioning with special reference to GPS

1.2 Collection and retrieval of GNSS positions

1.3 Preparation of maps from GNSS data

1.4 Length and area measurements from GNSS data

Unit-II: Remote Sensing

2.1 Georeferencing using orthoimages and GNSS data

2.2 Generation of spectral library of LU/LC features from L3 and OLI data

2.3 Image classification: Unsupervised and supervised accuracy assessment

2.4 Change detection from mutilated maps and images

Unit-III: Geographical Information System

3.1 Raster to vector conversion

3.2 Spatial analysis through buffer generation and vector overlay

3.3 Preparation of DEM from spot heights, contours and SRTM data

3.4 Preparation of annotated thematic maps

Laboratory Note Book and Viva Voce

SEMESTER-III

GEO/CC/TH /301

HISTORICAL & POLITICAL GEOGRAPHY

[Theoretical: Written Exam: 40 marks + Internal Assessment: 10 marks]

Unit-I: Historical Geography-Conceptual Issues

1.1 Nature and Scope of historical geography as a discipline

1.2 Historical geography: Source materials

1.3 Major approaches to historical geography

1.4 Trends and issues in historical geography

Unit-II: Historical Geography of India

2.1 Development of the identity of India in ancient periods: Mythology and sacred space

2.2 Travel literature: Hiuen Tsang, Ibn–E–Batuta, Barnier

2.3 Mughal period: Social Fabric; Territorial Administration and Revenue Collection

2.4 Colonial India: Plantation Farming; Social and Educational Reforms; Industrial Policies; Land and Forest Policies; Famines; Trade and Transport

Unit-III: Political Geography-Conceptual Issues

3.1 Evolution of Political Geography: Theoretical influences of Ratzel, Taylor and Harvey

3.2 Geopolitical Perspective: State, Nation and Nation State, border, frontiers, buffer zones, core and periphery Conflicts

3.4 Global Political Conflicts and Resources: Politics of Oceanic resources, Energy and Territory; Global climatic

3.3 World Wars and strategic relations: Geo political context of Cold War; North-South Divide; Emergence of Superpowers

Unit-IV: Issues in Political Geography and the Indian Polity

4.1 Border issues and enclaves: emerging problems and consequences

4.2 Electoral Geography: Overview of models; Political ecology: Tragedy of commons

4.3 India: Federalism, SAARC, BRICS, BIMSTEC

4.4 Water dispute issues in India: interstate and international

GEO/CC/TH/302

REGIONAL PLANNING & DEVELOPMENT

[Theoretical: Written Exam: 40 marks + Internal Assessment: 10 marks]

Unit-I: Regional Planning - Concepts

1.1 Concept of region: Formal, functional and planning; classification and delineation; Regionalization

1.2 Concept of multilevel planning: Local, regional and national level planning

1.3 Basic principles of regional planning

1.4 Metropolitan concept: Metropolis, metropolitan area, metropolitan region and megacity

Unit-II: Regional Planning and Development

2.1 Models of regional development: Perroux and Mishra, D. North, Myrdal, Hirschman, Friedmann

2.2 Indicators of regional development: economic, social, technological and infrastructural

2.3 Integrated regional development: Balanced vs. unbalanced development; Rural-urban linkages

2.4 Polarization and the Development of Underdevelopment: World Capitalist System by Frank; Colonialism and Spatial Structure of underdevelopment by Slater; Shared Space by Santos

Unit-III: Strategies of Regional Development and Zonal Planning

3.1 Regional disparity; Convergence and divergence

3.2 Regional imbalances: Identification of backward areas and policy issues

3.3 Special Economic Zones - special reference to West Bengal

3.4 Regional planning in India: DVC, National Capital Region, Kolkata and Tribal Area Development

Unit-IV: Regional Planning in India

4.1 Regional Policies: Five Year Plans; NITI Ayog

4.2 Role of Institutions in Regional Development

4.3 Micro-regional planning; Aspirational districts

4.4 Pandemics and City planning

GEO/CC/PR/303

STATISTICAL TECHNIQUES [PRACTICAL]

[Practical: Written Exam: 40 marks + Viva-voce & Laboratory Notebook: 10 marks]

Unit-I: Probability, Sampling and Test of Confidence

1.1 Probability theory and Normal distribution

1.2 Sampling theory and Sampling Error

1.3 Scaling Techniques: Rank Score, Weighted Score, Likert's Opinionnaire

1.4 Social Affinity Index (SAI), t-test, Type I and Type II errors, One-tailed and two-tailed tests

Unit-II: Correlations and Statistical inferences

2.1 Partial and Multiple correlations

2.2 Factor Analysis (Centroid Method)

2.3 Analysis of Variance (ANOVA)

2.4 Non-parametric tests: Chi-Square Test, Mann-Whitney U Test

Unit-III: Computer Application in Data Processing and Representation

3.1 Data mining from internet sources: Preparation of an inventory

3.2 Tabulation of data and its graphical representation: Population, Land use, Weather

3.2 Use of statistical formula: Central tendency, Dispersion, Co-efficient of Variation

3.3 Fitting of trend lines: Bi-variate, Time series

Laboratory Note Book and Viva Voce

GEO/CC/PR/304

QUANTITATIVE TECHNIQUES & FIELD REPORT [PRACTICAL]

(Quantitative techniques-25 & Field report-25)

QUANTITATIVE TECHNIQUES (Written-20)

Unit-I: Quantitative analysis and diagrams

1.1 Lorenz curve and Gini-coefficient

1.2 Nearest Neighbour Analysis and Occupational Ternary diagram.

1.3 Exponential growth curve and population projection

1.4 Index number and Cumulative Index Curve

Unit-II: Quantitative Mapping and interpretation

2.1 Mean centre of population and its shift; Concentration of population about mean centre

2.2 Location quotient; Z-score

2.3 Residual mapping; Crop combination analysis

2.4 Population potential (Gravity Model) ; Accessibility Map (Distance/Centrality Matrix/ MAT)

Laboratory note book and viva-voce: 5 marks

FIELD REPORT (Report-15 & Viva-voice-10)

3.1 Collection of secondary data from various offices and online sources; uses of Topographical map, Cadastral map, satellite image and Google earth image

3.2 Application of field instruments: Abney Level, Clinometer, sound meter, Distometer, GPS

3.3 Landform and landuse survey

3.4 Socio-economic survey

[Field survey and participation in the field work is mandatory for 3rd Semester PG Geography Students. Students will prepare a field report on a specified topic. Total length of the field report will not be more than 120 pages (A4, font: 12, spacing: 1.5) including figures, tables, photographs, references, appendences and all. One soft copy and triplicates of final hard copy of field report has to be submitted to the Department. Both hard and soft copy of the report will duly be certified by the field instructor/s and the Head of the Department. Marks will be allotted based on their field performances, review of literature, methods of analysis, inferences and referencing which are to be evaluated by examiners.]

OPEN ELECTIVE-CBCS PAPER (FOR OTHER DISCIPLINE)

GEO/OE/TH/305

ENVIRONMENTAL SCIENCE

[Theory: 40 marks and Internal Assessment: 10 marks]

Unit-1: Basic Concepts of Environmental Science

1.1: Scope and content of Environmental science

1.2 Environmental education, ethics and awareness

1.3 Approaches to Environmental science

1.4 Environmental Issues in India

Unit-II: Ecology and Ecosystem

1.1 Ecosystem dynamics-Tropic structure, energy flow, food-web complexity, law of thermodynamics, structure of forest ecosystem.

1.2 Population ecology-population growth model, factors effecting population size and age structure.

1.3 Population adaptation; concept of carrying capacity.

1.4 Landscape ecology-landscape element, and landscape sustainability

Unit-III: Environmental Geosciences

1.1 Geological time scale

1.2 Weathering of rocks and mass wasting, fluvial processes and landforms

1.3 Continental drift and sea floor spreading

1.4 Plate tectonics and mountain building processes.

Unit-IV: Environmental Hazards, Disasters and Risk

1.1 Perception of degradation, pollution, hazards and disasters

1.2 Classification of hazards and disasters; vulnerability and risk

1.3 Hydrometeorological, Biological and man-made disasters

1.4 Community adaptability and social response to hazards and disasters

OPEN ELECTIVE-CBCS PAPER (FOR OTHER DISCIPLINE)

GEO/OE/TH/306

RESOURCE MANAGEMENT

[Theory: 40 marks and Internal Assessment: 10 marks]

Unit-I: Basic Concept of Resources

1.1 Resource: concept and classification

1.2 Resource creating factors: nature, man and culture; Resource adequacy and concept of scarcity

1.3 World resources: distribution and pattern

1.4 Resource regionalisation: Concept of developed and developing nations

Unit-II: Aspects of Natural Resource

2.1 Land and Forest Resources

2.2 Water and Marine Resources

2.3 Mineral and power resources; World energy crisis; Non-conventional sources of energy

2.4 Contemporary Issues: Energy Security, Energy Efficiency, Energy Auditing, Geo-Politics of Energy

Unit-III: Population Resource Dynamics

3.1 Population as resource; Population and development: A Debate

3.2 Limits to Growth; Ackerman's scheme

3.3 Nature of population growth and dynamics; Demographic transition; Migration

3.4 Population and Vulnerability: Diaspora and Identity Crisis; Enclaves and their problems

Unit-IV: Managerial Aspects of Resource

4.1 Resource Crisis and Scarcity

4.2 Resource Conservation: Resource database preparation; Sustainable development

4.3 Resource Appraisal- Application of ICT

4.4 Role of Geoinformatics: Remote sensing in resource mapping and environmental monitoring

SEMESTER-IV

GEO/CC/TH/401

ENVIRONMENT AND REGIONAL GEOGRAPHY

[Theoretical: Written Exam: 40 marks + Internal Assessment: 10 marks]

Unit-I: Concepts and Environmental Issues

1.1 Geographers' approach to environmental studies; Significance of environmental perception;
1.2 Concept of Holistic Environment and emergence of Environmentalism
1.3 Global resource crisis and population equilibrium
1.4 Big dams and their viable alternatives; Conservation of wetland and wasteland management

Unit-II: Environmental Hazards, Pollution and Technology

2.1 Concept of Degradation, Pollution, Hazards and Disaster
2.2 Natural hazards: classification, Vulnerability and risk; Management
2.3 Social hazards: factors, impact and redressal
2.4 Pollution of air, water and soil: Sources, health impact and management

Unit-III: India-Selected Regional Problems

3.1 Problems of water resource management and its impact on food security
3.2 The problem of regionalism: Ethno–political identities
3.3 MGNREGA and Rural development; PM Gram Sadak Yojana
3.4 JNNURM and urban mobility

Unit-IV: Ganga Delta

4.1 Tectonic and stratigraphic evolution of the Bengal basin.
4.2 Ganga delta: Quaternary evolution and geomorphic classification.
4.3 Drainage system of the Indian Ganga delta: characteristics and changes in the last 250 years.
4.4 Indian Sundarbans: hydrodynamics and impacts of landuse change.

SPECIAL PAPER-FLUVIAL GEOMORPHOLGY (OPTIONAL)

GEO/DCE/TH/402A

FLUVIAL GEOMORPHOLOGY–I

[Theoretical: Written Exam: 40 marks + Internal Assessment: 10 marks]

Unit-I: Concept and approaches

1.1 Fluvial Geomorphology: Quantitative and Modern approaches, chronology of development

1.2 Fluvial System Components and Variables, scale in fluvial geomorphology, threshold, feedbacks, equilibrium

1.3 Drainage Basin: Hydrological components, form and processes and factors affecting hydrological response of a basin

1.4 Channel Equilibrium, channel adjustment and channel restoration

Unit-II: River Hydrology

2.1 Channel flow: Energy and velocity principle in flow, flow resistance, flow behavior, forces driving and resisting the flow

2.2 Flow generation, stream flow velocity and fluid shear stress, upstream and downstream variation of discharge

2.3 Fluvial process: stream power, erosion process, sediment entrainment process and transport, bed load transport

2.4 Sediment transfer-control on sediment yield, discharge and sediment transfer, sediment budgets

Unit-II: Channel morphology

3.1 Channel Geometry: channel geomorphic units, morphological and hydrological factors

3.2 Alluvial channel form: morphology and behavior of straight, meander and braided channel

3.3 Channel Change: spatio-temporal changes of channel configuration and channel bed forms

3.4 Channel engineering: implication to flow regime and morphology

Unit-III: Drainage Basin quantification

4.1 Models of channel initiation and channel evolution

4.2 Empirical and genetic models of drainage pattern

4.3 Quantitative analysis of drainage basin and its applicability

4.4 Application of Remote sensing and GIS in Drainage Basin Analysis

GEO/DCE/TH/403A
FLUVIAL GEOMORPHOLOGY-II

[Theoretical: Written Exam: 40 marks + Internal Assessment: 10 marks]

Unit-I: Fluvial landforms

1.1 Alluvial Terrace: Evolution and Characteristics with special reference to Tista River Basin

1.2 Alluvial Fan: Evolution and Characteristics with special reference to Kosi River Basin

1.3 Flood Plain: Evolution and Characteristics with special reference to Lower Ganga Baisn

1.4 Delta Plain: Evolution and Characteristics with special reference to Subarnarekha delta

Unit-II: Fluvial hazards

2.1 River Floods: Causes, Consequences, Viability of Management Strategies with special reference Southern West Bengal.

2.2 River Bank Erosion: Causes, Consequences, Viability of Management Strategies with special reference to River Ganga

2.3 River Shifting: Causes, Consequences, Viability of Management Strategies with special reference to Himalayan Foothills River Torsa

2.4 River Pollution: Causes, Consequences, Viability of Management Strategies with special reference to Bhagirati-Hugli River

Unit-III: Anthropogenic impacts on River health

3.1 Effect of Dams, Reservoirs and Bridges on morphological and hydrological character of river basin

3.2 Effects of Irrigation and Navigation canals on morphological and hydrological character of river basin

3.3 Effect of Urbanization and Industrialization on morphological and hydrological character of river basin

3.4 Drainage basin response to climate change

Unit-IV: River basin Management

4.1 Watershed Management: Approaches and Principles with reference to India

4.2 Flood Plain Management: Approaches, Evaluation of existing strategies of Eastern India

4.3 Interlinking of Rivers: Issues, Evaluation, Consequences with reference to India

4.4 River Water Sharing: Interstate and International Issues with case studies

GEO/DCE/PR/404A
FLUVIAL GEOMORPHOLOGY-III

[Practical: Written Exam: 40 marks + Viva-voce & Laboratory Notebook: 5+5 marks]

Unit-I: Drainage basin analysis

1.1 Morphometry: Stream Ordering, Bifurcation Ratio, Law of Stream Frequency, Infiltration Number, Basin Shape Analysis, hypsometry and Sub-basin priority

1.2 Computation of long and cross profiles of drainage basin; Rating Curve, Discharge Plotting, Isovel, Calculation of Stream Energy,

1.3 Analysis of Precipitation Data; Preparation of Water Budget Graph (Recharge, discharge, surplus and deficit)

1.4 Surface Runoff Estimation: Empirical Methods, SCS Curve Number Method

Unit-II: Channel morphology analysis

2.1 Measurement of Channel Stability: Entrenchment Ratio and W/D Ratio, Stability Rating, Sinuosity Index and Braiding Index, radii of curvature, arc angle, near bank stress

2.2 Channel cross profile, width-depth ratio, channel thalweg, hydraulic radius, maximum depth and velocity; depth-velocity profile, flow properties

2.3 Analysis of bank sediments by sieving, sediment rating curve, and channel bed forms

2.2 Measurement of river bank Hazards using BEHI parameters after Rosgen

Unit-III: Fluvial Hazard analysis

3.1 Computation and preparation of Annual hydrograph, Techniques of Base Flow Separation

3.2 Preparation of river flood hazard zonation map and Flood probability analysis: Weibull and Gumbel's Method

3.3 Preparation of River bank erosion map and vulnerable zone with the aid of topo-sheets, GPS, satellite images & GIS techniques

3.4 Estimation of river pollution-measurement of BoD, CoD, p^H, dissolved solids (TDS), dissolved oxygen, Nitrate etc.

SPECIAL PAPER-GENDER GEOGRAPHY

GEO/DCE/TH/402B

GENDER GEOGRAPHY-I

[Theoretical: Written Exam: 40 marks + Internal Assessment: 10 marks]

Unit-I: Introduction to Gender Geography

1.1 Sex and Gender: Types of Gender, Gender Stereotyping and Gender Discrimination

1.2 Understanding of Masculinity: Politics of Masculinity and Power; Emergence of Feminism

1.3 Historical Overview of Feminist Movements: Waves of Feminism

1.4 Women's Studies to Gender Studies: A Paradigm Shift; changing view on sexuality

Unit-II: Gender and Society

2.1 Gender and Family: Gender division of labour; Gendered socialization

2.2 Gender Roles: Biological vs cultural determinants; Caste, Class and Gender, politics of reproduction and motherhood

2.3 Patriarchy and Gender-power: Male Gaze and Objectivity; Capitalism and Gender; Media and Feminine Identities

2.4 Gender Disparity in Education: Equal access to education; Gender bias in school curriculum knowledge; Education goals from gender perspective

Unit-III: Gender and Economy

3.1 Labour market scenario: Segmented labour market and labour force participation; Occupational segregation and wage discrimination; Invisibility of women's work

3.2 Gendered Jobs: Sex Segregation and wage discrimination; Gender stereotyping in work place

3.3 Gender and Poverty: Feminisation of poverty; Status of female headed households limited voice in community decision making

3.4 Gender Discrimination: Marginalization and Glass Ceiling; Globalization and its impact on gender.

Unit-IV: Gender, Environment and Livelihood

4.1 Gender and Natural Resources: Gender Roles in Rural and Tribal Societies; Women's Access to Land and Natural Resources

4.2 Farming System: Differential roles Rural Women Livelihood in Subsistence Economy; Changing Scenario of Rural Economy and Livelihoods of Women

4.3 Coping with Environmental Degradation: Gender specific consequences of environmental degradation; Role of SHGs

4.4 Eco-feminism: Women in Natural Resources Management and sustainable development; Role of women in environmental movements

GEO/DCE/TH/403B
GENDER GEOGRAPHY-II
[Theoretical: Written Exam: 40 marks + Internal Assessment: 10 marks]

Unit-I: Gender and Health

1.1 Gender Roles and Health: Socio-Economic Inequality and Women's Health; Biological and Psychological Determinants of Women's Health

1.2 Issues affecting Young Adult Girls: Menstruation health; unwanted adolescent pregnancy

1.3 Impact of Patriarchy: Oppression and Mental Health; Sexually Transmitted Infections; Health issues relating to violence

1.4 Access to Health Care Services: Gender Sensitive Health Care Services; Improving Access and Breaking Barriers

Unit-II: Gender Empowerment

2.1 Women and Movements: International Women's Movement; Women's Movement with special reference to India

2.2 Gender Mainstreaming; Approaches to Gender Development-Gender Development Index; Gender Empowerment Measure

2.3 Gender Dimensions in Electoral Politics: Empowerment of Women at Various Levels-Grassroot to Parliament

2.4 Programmes for Women's Empowerment: Towards Equality Report; Beijing Platform; CEDAW; National Policy for Empowerment of Women, 2001; Gender Responsive Planning and Gender Budgets

Unit-III: Gender and Violence

3.1 Understanding Violence: Historical Perspective; Classification of gender-based violence-Private and public; Physical, structural and cultural; Family and community

3.2 Structural Inequalities and Violence: Racism, Classicism, Hetero-sexism, Sexism

3.3 Sexual violence causing Trauma: Childhood sexual abuse, Domestic violence, Sexual harassment at work place, Eve Teasing, Rape

3.4 Cultural practices violating women's rights: Forced polyandry; Devadasi system; Honour killing; Witch hunting

Unit-IV: Gender and Law

4.1 Creation of Colonial law: Penal Code and Personal Laws; Women's Human Rights and Law Reform

4.2 Women & Family Laws: Marriage, Child Marriage, Widow Remarriage, Divorce, Maintenance and Dowry Prohibition act.

4.3 Laws related to gender-based violence; Gender sensitive laws for working people

4.4 Role of law enforcing agencies: National Human Rights Commission; National Commission for Women; Legal Aid Cells, Helplines and NGOs

GEO/DCE/PR/404B

GENDER GEOGRAPHY-III

[Written Exam-40 & Note book & viva-10]

Unit- I: Generation and Analysis of Gender Data

1.1 Hypothesis- Meaning and construction; Sampling-design and types

1.2 Formulation of Research Design: Exploratory, Descriptive, Diagnostic, Explanatory and Experimental

1.3 Techniques of data collection: Interview; Structured and unstructured Questionnaire; Schedule; Observation (longitudinal and cross sectional)-participant and non-participant; Gender related data handling from Census; NSSO (National Sample Survey Organization) and NFHS (National Family health Survey)

1.4 Calculation of: Male –Female growth differentials; Temporal changes in sex ratio; Gender Development index; Correlation-Regression

Unit-II: Preparation of maps related to Gender

2.1 Work participation and Wage differentials gender wise in Primary, Secondary and Tertiary sectors

2.2 Gender disparity in education: Primary, secondary and tertiary

2.3 Locational Quotient, Lorenz Curve and Gini's coefficient

2.4 Z-Score; Residual mapping

Unit-III: Qualitative Techniques and Gender Analysis Framework

3.1 Ethnographic study; Grounded Theory; content analysis

3.2 Focus Group Discussion; Oral Narratives; Triangulation and action research

3.3 Harvard Analytical Framework/Gender Roles Framework

3.4 Gender Planning Framework-Caroline Moser; Gender Analysis Matrix-Rani Parker

Laboratory note book and viva-voce

SPECIAL PAPER: URBAN AND RURAL PLANNING AND DEVELOPMENT

GEO/DCE/TH/402C

URBAN AND RURAL PLANNING AND DEVELOPMENT-I

[Theoretical Written Exam: 40 marks + Internal Assessment: 10 marks]

Unit-1: Urban Geography: Concept and approaches

1.1 Changing perception of Urban space and Spatiality

1.2 Approaches to Urban Geography: Traditional, Quantitative and Critical

1.3 Urbanism and its Facets

1.4 Social Area Analysis; Neighbourhood; Community

Unit-2: Aspects of Urban geography

2.1 Urbanisation in Developed and Developing Countries

2.2 Economic: Land Rent, Market

2.3 Environmental: Land, Water, Waste, Ecological Footprint

2.4 Contemporary: Housing, Health, Education, Crime, Gentrification

Unit-3: Urban Governance, Policy and Management

3.1 Globalisation and Urban governance

3.2 Impact of CAA on urban local governance

3.3 Urban Development Policies in India; Metropolitan Planning

3.4 Urban Management and Sustainability

Unit-4: Trends of Urbanisation in India

4.1 Metropolitan growth and urban sprawl

4.2 New towns and smart cities development in India

4.3 Medium and small towns: problems and prospects

4.4 Heritage conservation: Glimpses of old towns

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GEO/DCE/TH/403C
URBAN AND RURAL PLANNING AND DEVELOPMENT-II

[Theoretical Written Exam: 40 marks + Internal Assessment: 10 marks]

Unit-I: Approaches to Rural Development and planning

1.1 Basic Concepts of Rural Development; Scope of rural development and planning

1.2 Theories of Rural Development: Dependency Theory of Marxist School and Gandhian Model

1.3 Modernisation theory of Capitalist Schools

1.4 Approaches to planning: Multi-level planning in India

Unit-II: Components and Actors of Rural Development

2.1 Components of rural development: Natural, Human, Capital, Technology

2.2 Urbanization Policies for Rural Development by Rondinelli and Ruddle

2.3 Infrastructure & Services for Rural Development: Rural connectivity, Rural Electrification, Drinking Water.

2.4 Institutions for Rural Development: Role of Panchayati Raj Institutions; District, Block, Gram Panchayat & Village level Planning; Role of Non-Government Actors

Unit-III: Sectoral Linkages and Initiatives for Rural Development

3.1 Agriculture and Rural Development: Role of Agriculture & Allied activities in Rural Development with special reference to Dairying and Fishery

3.2 Rural Industrialisation: Policies, problems and prospects; Agro-based, village and Cottage industries

3.3 Flagship Programmes for Rural Development: MGNREGA, NRHM and NRLM

3.4 Problems of Rural development: Weaknesses and Hurdles in Rural Development policies and Initiatives.

Unit-IV: Emerging Issues in Rural Planning and Development

4.1 Land reforms and land acquisition in rural areas

4.2 Women Empowerment through rural planning

4.3 Role of ICT in rural planning and development; Smart villages

4.4 Rural planning in the context of Pandemics and environmental crisis

GEO/DCE/PR/404C

URBAN AND RURAL PLANNING AND DEVELOPMENT-III

[Written-40 & Viva & note book-10]

Unit-I: Quantitative Techniques in Urban Planning

1.1 Urban growth differentials: Absolute growth, Decadal growth rate, Index of growth

1.2 Correlation of associated variables (Pearson and Spearman methods); Residual mapping

1.3 Mapping Inequalities: Lorenz Curve, Gini's Co-efficient

1.4 Population Potential by Gravity Model and Delineation of Sphere of Influence

Unit-II: Quantitative and Qualitative Techniques in Rural Planning

2.1 Agricultural Regionalization: Weaver's and Jasbir Singh's methods

2.2 Measures of Connectivity and accessibility

2.3 Qualitative Methods of Data Collection: Focussed Group Discussion, Rapid Rural Appraisal; Participatory Rural Appraisal

2.4 Technique of Questionnaire preparation for Qualitative data

Unit-III: Application of RS & GIS

3.1 Land use-Land cover mapping of rural areas; detection of change

3.2 Land use-Land cover mapping of urban areas; detection of change and urban expansion

3.3 Preparation of Thematic Maps at Village Level; Village Information Map Using GPS and Open Street mapping (OSM)

3.4 Preparation of Thematic Maps at Ward Level; Ward Information Map Using GPS and OSM

Laboratory note book and viva.

SPECIAL PAPER: ADVANCED GEOMORPHOLOGY (OPTIONAL)

GEO/DCE/TH/402D

ADVANCED GEOMORPHOLOGY-I

[Theoretical: Written Exam: 40 marks + Internal Assessment: 10 marks]

Unit-I: Approaches to Geomorphology

1.1 Quantitative and modern approaches to geomorphology

1.2 Geomorphic system, thresholds, equilibrium and evolution, scale in geomorphology

1.3 Geomorphology and allied disciplines: geophysics, geochemistry, sedimentology, hydrology, climatology, pedology and engineering

1.4 Quaternary Environmental Change and Landform Development with special reference to glaciations and sea level change.

Unit-II: Fluvial Processes and Landform development

2.1 Drainage basin hydrology: spatial and temporal variation of discharge; run-off generation and channel development

2.2 Fluvial processes and slope evolution: hill slope drainage, fluvial erosion, sediment transport & deposition

2.3 Flow character and flow regime of alluvial channel through time: channel discharge, channel planform and channel hydraulic geometry

2.4 Fluvial process and its response to channel adjustment and forms

Unit-III: Coastal processes and landscape changes

3.1 Coastal processes, classification and relevance of coastal study

3.2 Wave and tides: estuarine morphology and hydrodynamics

3.2 Coastal landforms: shoreline platforms, beaches, tidal flats, deltas, dunes and coral reefs

3.3 Anthropogenic interventions and coastal landscape changes; coastal ecosystem and vulnerability with special reference to West Bengal

Unit-IV: Climate change and process geomorphology

4.1 River response to climate change: catchment linkage and connectivity

4.2 Climate change and magnitude-frequency distribution of floods and avulsions

4.3 Climate change: complex interaction between fluvial and coastal processes; coastal morphodynamics

4.4 Climate change, sea level rise and landscape development

GEO/DCE/TH/403D
ADVANCED GEOMORPHOLOGY-II

[Theoretical: Written Exam: 40 marks + Internal Assessment: 10 marks]

Unit-1: Applied Geomorphology

1.1 Geomorphology in Environmental Impact Assessment and military intelligence

1.2 Geomorphology in search for resources

1.3 Methods and uses of rainwater harvesting and check dams

1.4 Principles of Integrated Drainage Basin Management and Integrated Coast Zone Management

Unit-2: Case Studies of Landforms and Landuse

2.1 Badlands on laterite duricrusts: Garhbeta and Santiniketan, West Bengal

2.2 Tors and inselberges: Chhotanagpur plateau, Jharkhand

2.3 Alluvial fans: Sub-Himalayan West Bengal

2.4 Deltas and estuaries: Lower Ganga delta, West Bengal

Unit-3: Management of Geomorphic Problems

3.1 Management of mining subsidence with special reference to Raniganj coalbelt and Darjiling hills.

3.2 Management of river discharge with special reference to Damodar Valley Corporation and Farakka Barrage Project

3.3 Management of urban water supply and disposal with special reference to Kolkata

3.4 Management of reclaimed coastal areas with special reference to Indian Sundarbans

Unit-4: Management of Geomorphic Hazards

4.1 Management of landslides with special reference to northern West Bengal

4.2 Management of floods with special reference to northern alluvial fans and Padma-Bhagirathi interfluve of West Bengal

4.3 Management of riverbank erosion with special reference to Ganga and Bhagirathi in West Bengal

4.4 Management of coastal erosion with special reference to West Bengal coast

GEO/DCE/PR/404D

ADVANCED GEOMORPHOLOGY-III

[Written-40; Viva & note book-10]

Unit I: Geomorphic techniques and Drainage basin analysis

1.1 Delineation of watershed, computation of long profiles and cross profiles, estimation of areal and shape parameters

1.2 Estimation of surface run-off using SCS-CN method, flood probability analysis after Weibull and Gumbel

1.3 Estimation of flow velocities and discharge; stream power, stream hydraulic parameters-critical flow, Raynolds and Froude numbers

1.4 Preparation of DEM and geomorphological mapping using total station and DGPS

Unit II: Analysis of channel planforms and channel geometry

2.1 Channel cross profile, width-depth ratio, channel thalweg, maximum depth and velocity, depth-velocity profile, rating curve

2.2 Estimation of channel morphology-braiding index, sinuosity, radii of curvature, arc angle, meander wavelength; channel bed forms

2.3 Analysis of coastal and fluvial sediments using ϕ grade sieve and electronic balance; sediment transport and sediment discharge estimate; bed load and suspended load

2.4 Estimation of BEHI parameters- and identification of bank erosion vulnerable zones

Unit-III: RS & GIS in Geomorphic hazard zonation mapping

3.1 Extraction of geomorphic features using RS, GIS and web platforms.

3.2 Flood and coastal erosion hazard and risk zonation mapping

3.3 Landslide hazard zonation mapping using weighted overlay and AHP model

3.4 Riverbank erosion map and vulnerable zone using geospatial tools

Laboratory note book and viva-voce

SPECIAL PAPER: SOIL GEOGRAPHY AND LAND USE

GEO/DCE/TH/402E

SOIL GEOGRAPHY & LANDUSE–I

[Theoretical: Written Exam: 40 marks + Internal Assessment: 10 marks]

Unit–I: Soil genesis: factors, processes & profile development

1.1 Importance of the study of soils, Processes of Weathering, Formation of Regoliths.

1.2 Soil formers and factors of Soil formation

1.3 Soil forming processes

1.4 Soil Profile development under different Climatic conditions

Unit–II: Physical and chemical properties of soils

1.1 Physical Properties: Texture, Structures, Colour, Pore spaces & Temperature.

2.2 Chemical Properties of Soils: Soil Reaction: Acidity and Alkalinity, Nutritional significance of Soil pH.

2.3 Soil Organic Matter: Humus – Genesis and Nature; Factors affecting Soil Organic Matter; Carbon Cycle

2.4 Soil Colloids: Nature and Practical Significance

Unit–III: Techniques of soil survey and soil classifications

3.1 Procedures of Soil Survey

3.2 Some Classical Genetic Soil Classifications: Dakucheav, Marbut

3.3 Evolution of Indian Soil Classification Systems

3.4 Comprehensive Soil Classification Systems: Soil Taxonomy

Unit–IV: Soil fertility

4.1 Nitrogen (N)

4.2 Phosphorous (P)

4.3 Potassium (K)

4.4 Micronutrients

GEO/DCE/TH/403E
SOIL GEOGRAPHY & LANDUSE–II
[Theoretical: Written Exam: 40 marks + Internal Assessment: 10 marks]

Unit–I: Concept of land and land use

1.1 Factors governing land utilisation; Importance of soil as determinant of land use

1.2 Objectives and Principles of land use planning

1.3 Methods of Land Use Survey

1.4 Land use Planning Techniques and Methods

Unit–I: Principles and techniques of land classifications

2.1 Land Capability classification of USDA, UK methods

2.2 Land Capability Classification of UK methods

2.3 FAO Methods of Land Suitability Classification

2.4 Land Capability Classifications in India

Unit–I: Soil pollution

3.1 Reactions of Pesticides in Soils

3.2 Soils as Organic Waste Disposal Sites

3.3 Acid Rain

3.4 Fertilizer Contamination of Water

Unit–I: Methodology for assessing land & soil degradation

4.1 Methods for assessing land degradation

4.2 Methods for assessing soil degradation

4.3 Desertification and degradation

4.4 Salinization &Alkalinization of Soils

GEO/DCE/PR/404E
SOIL GEOGRAPHY & LANDUSE–III

[Practical: Written Exam: 40 marks + Viva-voce & Laboratory Notebook: 5+5 marks]

Unit–I: Physical soil properties: Laboratory analysis

1.1 Soil samples: Techniques of collection, preparation and preservation

1.1 Measurement of Hygroscopic moisture

1.2 Munsell's Soil Colour Analysis

1.3 Mechanical Analysis (Robinson's International Method).

Unit–II: Keen Raczkowski measurements

2.1 Soil density & Soil specific gravity

2.2 Soil porosity

2.3 Volume expansion

2.4 Water holding capacity

Unit–IV: Chemical soil properties: Laboratory analysis

4.1 Kit Box analysis (N.P.K., Organic Matter, and pH)

4.2 Determination of Organic Matter (Walkley& Black's Rapid Titration method)

4.3 Determination of Organic Carbon

4.3 Soil pH (Kuhn's Colourimetric method).

Laboratory note book and viva-voce.

SPECIAL PAPER-COASTAL GEOMORPHOLOGY

GEO/DCE/TH/402F

COASTAL GEOMORPHOLOGY–I

[Theoretical: Written Exam: 40 marks + Internal Assessment: 10 marks]

Unit–I: Coastal processes and forms

1.1 Coastal Morphodynamics: factors, characteristics and relativedominanceofwave,tidal and fluvial processes. Morphodynamic indices and their controls

1.2 Processes and effects of bio-tidal accretion, coral formation and storm urge/tsunami in coasts.

1.3 Formation, system of change and classification of coastal landforms with special reference to rhythmic beach topography, coastal dunes and deltas.

1.4 Coastal classification schemes of Hayes (1979), Orton and Reading (1991 and 1993) and Darlymple, Zaitlin and Boyd (1992).

Unit–II: Coastal ecology

2.1 Coastal ecosystems: Diversity and uniqueness

2.2 Coastal vegetation of humid tropics: Classification and significance

2.3 Coastal animals of humid tropics: Classification and significance

2.4 Coastal ecosystems of West Bengal: threats and management

Unit–III: Anthropogenic impacts on coasts

3.1 Origin, typology and classification of impacts: Direct, indirect, cumulative, ecosystem, socio-economic and natural.

3.2 Coastal reclamation: types, techniques and effects

3.3 Coastal pollution: sources and management

.4 Principles of Environmental Impact Assessment and Environmental Management Planning

Unit–IV: Coastal hazards - Factors, risks, vulnerability and management

4.1 Tropical storm

4.2 Tsunami

4.3 Saltwater incursion

4.4 Dune encroachment

GEO/DCE/TH/403F
COASTAL GEOMORPHOLOGY–II

[Theoretical: Written Exam: 40 marks + Internal Assessment: 10 marks]

Unit–I: Coastal Engineering

1.1 Modelling in coastal engineering

1.1 Erosion prevention structures: classification and evaluation

1.3 Beach nourishment and augmentation

1.4 Dredging: types and utility

Unit–II: Socio-economic aspects in coastal management

2.2 Coastal communities: Types, opportunity and vulnerability

2.2 Coastal development: stakeholders, issues and management

2.3 Environmental impacts of coastal communities

2.4 Socio-economic responses to climate and sea level change in coasts Unit–

III: Integrated Coast Zone Management

3.1 Coast zone components: identification and establishment of relationships

3.2 Environmental assessment and auditing; problem analysis and conflict resolution

3.3 Coastal management and planning techniques: Administrative, social and technical

3.4 Integrated coastal management plan: Types, implementation, monitoring and evaluation.

Unit–IV: Case studies on coastal issues and management

4.1 Coastal erosion in Medinipur and Sundarban coasts

4.2 Reclamation of Sundarban

4.3 Sedimentation of the Hugli estuary

4.4 Coastal tourism at Digha, Bakkhali and Mandarmani

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COASTAL GEOMORPHOLOGY–III (PRACTICAL)

[Practical: Written Exam: 40 marks + Laboratory notebook and Viva-voce: 10 marks]

Unit–I: Quantification of coastal processes

2.1 Preparation of wave refraction diagram.

2.2 Determination of breaker types by empirical equations.

2.3 Determination of discharge of tidal streams by using field equipment (total station / dumpy level, echosounder and current meter)

2.4 Longshore drift estimation using tracers.

Unit–II: Quantification of coastal landforms and environment

2.1 Coastal mapping and profiling using survey equipment (total station / theodolite)

2.2 Floral species survey using grid method.

2.3 Sample designing for conducting perception survey of coastal issues.

2.4 Questionnaire preparation for primary survey.

Unit–III: Sediment analysis and image interpretation

3.1 Measurement of suspended sediment concentration.

3.2 Analyses of pebbles and sediments: shape indices, textural analysis by sieving.

3.3 Extraction of geomorphic and cultural features from Satellite images.

3.4 Coastal erosion and inundation: rate estimation and risk zoning from maps and images. Unit–

Laboratory Notebook and Viva Voce

GEO/DCE/DP/405
DISSERTATION PROJECT

A Dissertation project Report is to be made in connection to the special papers opted by the students and it has to be submitted to the Office of HoD for its evaluation. All the students will present their dissertation projects before the board of examinations.

Special papers and course code of the project:

i. **Fluvial Geomorphology:** **Course Code- GEO/DCE/DP/405A**
ii. **Gender Geography:** **Course Code- GEO/DCE/DP/405B**
iii. **Urban and Rural planning and Development:** **Course Code- GEO/DCE/DP/405C**
iv. **Advanced Geomorphology** **Course Code- GEO/DCE/DP/405D**
v. **Soil Geography and Land Use:** **Course Code- GEO/DCE/DP/405E**
vi. **Coastal Geomorphology:** **Course Code- GEO/DCE/DP/405F**

Instructions for preparing Dissertation project:

Total Marks: 50 (Dissertation preparation and submission: 20; Viva-voce: 20 and Internal Assessment: 10)

Exam. Duration: 4 Hours

Instruction hours: 5 × 15 = 75 credit hours per semester

General Guide Lines:

1) The topic of the dissertation will be distributed among the students based on the consensus of faculty members concerned and to be supervised by the concerned teachers.

2) The final report covers:

a. Introduction to the problem. b. Aims and objectives of the study. c. Methodology d. Results and Discussion, e. Conclusions f. References (standard referencing system).

3) Every table, figure, photograph should have a caption.

4) The list of references should be given at the end of the report

5) Maximum page limit should not exceed 130pages. Font of the text will be 12, spacing 1.5 with Times New Romans Format.

Suggested readings

Philosophy of Geography

[1] Adams, P., Steven, H. and Karel, T. (eds.) (2001): Texture of Place. Exploring Humanistic Geographies. University of Minnesota Press, Minneapolis.
[2] Anderson, K., Domosh, M., Pile, S. and Thrift, N. (eds.) (2003): Handbook of Cultural Geography. Sage Publications, London.
[3] Adhikari, S. (Reprint 2016): Fundamentals of Geographical Thought, Orient Blackswan Pvt. Ltd.
[4] Barnes, T. and Gregory, D. (eds.) (1997): Readings in Human Geography: The Poetics and Politics of Inquiry. Arnold, London.
[5] Blis, H. J. (1971). Geography Regions and Concepts. New York: John Wiley of Sons INC.
[6] Board, C., Chorley, R., & Stoddart, D. (1974). Progress in Geography. International Reviews of Current Research Vol - 6.
[7] Bunge, W. (1962). Theoretical Geography. London: Glenerp.
[8] Buttimer, A. (1971): Society and Milieu in the French Geographic Tradition. Rand McNally, Chicago.
[9] Chorley, R., & Haggett, P. (1965). Frontiers in Geographical Teaching. Oxford: OUP.
[10]Coffey, W. (1981). Geography - Towards a General Spatial System Approach. USA: British Library Cataloguing in Pub. Data.
[11] Daniels, P., Bradshaw, M., Shaw, D. and Sidaway, J. (2000): An Introduction to Human Geography. Issues for the 21st Century. Prentice Hall, London.
[12] Dear, M. J. and Flusty, S. (2002): The Spaces of Postmodernity: Readings in Human Geography. Blackwell Publishers, Oxford.
[13] Dickinson, R. (1969). Makers of Modern Geography. Ludhiana: Lyall Book Depot.
[14] Dikshit, R. (2006). Geographical Thought - A Contextual History of Ideas. New Delhi: Prentice Hall of India Private Limited.
[15] Dikshit, R. (1994). The Art and Science of Geography: Selected Reading. New Delhi: Prentice Hall India Ltd.
[16] Doel, M. (1999): Poststructuralist Geographies. The Diabolical Art of Spatial Science. Edinburgh University Press, Edinburgh.
[17] Dunbar, G. (1991). Modern Geography: An Encyclopaedic Survey. Chicago: St. James Press.
[18] Freeman, T. (1971). A Hundred Years of Geography. London: Gerald Duckworth & Co. Ltd.
[19] Gregory, D., & Walford, R. (1988). Horizons in Human Geography. London: Macmillan.
[20] Hartshorne, R. (1968). Perspectives on the Nature of Geography. John Murray, London: Association of American Geographers, Great Britain.
[21] Hartshorne, R. (2002). The Nature of Geography. New Delhi: Rawat Pub. Co.
[22] Harvey, D. (2003). Explanation in Geography. New Delhi: Rawat Pub. Co.
[23] Harvey, D. (1979). Social Justice and the City. Great Britain: The Pitman Press, Bath.
[24] Harvey, E., & Holly, B. P. (2002). Themes in Geographical Thought. New Delhi: Rawat Pub. Co.
[25] Hubbard, P., Kitchin, R., Bartley, B. and Fuller, D. (2002): Thinking Geographically: Space, Theory and Contemporary Human Geography. Continuum, London.
[26] Husain, M. (2007). Models in Geography. New Delhi: Rawat Pub. Co.
[27] Hussain, M. (Reprint 2017): Evolution of Geographical Thought, Rawat Pub. Co.

[28] Johnston R and Sidaway, J. (2013 Edition): Geography and Geographers, Routledge.
[29] Johnston, R., & Hemer, J. (1990). Regional Geography: Current Developments and Future Prospects. London & New York: Routledge Publishers.
[30] J o h n s t o n, R . , G r e g o r , D . , P r a t t , G , Watts, M. and Whatmore, S . (2003): The Dictionary of Human Geography. Blackwell Publishers, Oxford. 5th edition.
[31] Kapur, A. (ed.) (2001): Indian Geography – Voice of Concern. Concept Publishing. Company, New Delhi.
[32] Legg, S. (2007). Spaces of Colonialism. UK: Blackwell Publishing.
[33] Massey, D. (1994). Space, Pace and Gender. Minnesota: University of Minnesota Press.
[34] Moss, P. (2002). Feminist Geography in Practice Research and Methods. UK: Blackwell Pub. Co.
[35] Murdoch, J. (2006). Post-Structuralist Geography. New Delhi: Sage Publications Limited.
[36] Peet, R. (2003). Radical Geography. New Delhi: Rawat Pub. Co.
[37] Peet, R. (1998): Modern Geographical Thought. Blackwell Publishers Inc, Massachusetts.
[38] Peet, R., & Thrift, N. (1989). New Models in Geography. Boston, Sydney, Wellington: Unwin Hyman.
[39] Raju, S., & Lahiri-Dutt, K. (2011). Doing Gender Doing Geography Emerging Research in India. UK: Routledge.
[40] Rana, L. (2008). Geographical Thought - A Systematic Record of Evolution. New Delhi: Concept Publishing Company.
[41] Sauer, C. O. (1963): Land and Life. University of California Press, Berkeley.
[42] Smith, D. (1994). Geography and Social Justice. Oxford, UK & Cambridge, USA: Blackwell.
[43] Soja, E. (2003). Postmodern Geographies. UK: British Library Cataloguing in Publication Data.
[44] Stoddart, D. (1986). On Geography and Its History. Oxford: Basil Blackwell.
[45] Taylor, G. (ed.) (1953): Geography in the Twentieth Century. Methuen and Company Ltd. and Company, London.
[46] Tuan, Y.-F. (1990). Topophillia: A Study of Environmental Perception, Attitudes and Values, New York: Columbia University Press.
[47] Whatmore, S. (2002): Hydrid Geographies – Natures, Cultures, Spaces, Sage.

Geomorphology

[1] Aleshire, A. (2007): *The Extreme Earth: Ocean Ridges and Trenches*, Infobase Publishing, New York
[2] Anderson, R.S. and Anderson, S.P. (2010): *Geomorphology: The Mechanics and Chemistry of Landscapes*, Cambridge University Press, Cambridge
[3] Bloom A.L. (2002): *Geomorphology: A Systematic Analysis of Late Cenozoic Landforms*, Prentice Hall, Upper Saddle River, New Jersey
[4] Chorley, R.J. and Kennedy, B.A. (1971): *Physical Geography: A Systems Approach*, Prentice Hall, Upper Saddle River, New Jersey
[5] Condie, K.C. (2003): *Plate Tectonics and Crustal Evolution*, Butterworth-Heinemann, Oxford, Burlington ,
[6] Cooke, R.U. and Doornkamp, J.C. (1974): *Geomorphology in Environment Management*, Clarendon Press, London
[7] Faniran, A. and Jeje, L.K. (1983): *Humid Tropical Geomorphology*, Longman, London
[8] Firsch, W., Meschede, M. and Blakey, R. (2011): *Plate Tectonics, Continental Drift and Mountain Building*, Springer-Verlag, Berlin
[9] Goudie, A.S. (1990): *Geomorphological Techniques*, Unwin Hyman, London

[10] Goudie, A.S. (ed.) (2004): *Encyclopaedia of Geomorphology*, Routledge, London

[11] Goudie, A.S. and Viles, H. (2010): *Landscapes and Geomorphology: A Very Short Introduction*, Oxford University Press, Oxford

[12] Gutierrez, M. (2013): *Geomorphology*, CRC Press, Boca Ranton, Florida

[13] Hamblin, W.K. and Christiansen, E. (2003): *Earth's Dynamic Systems*, Prentice Hall, Upper Saddle River, New Jersey

[14] Hart, M.G. (1986): *Geomorphology: Pure and Applied*, George Allen and Unwin, London

[15] Huggett, R.J. (2011): *Fundamentals of Geomorphology*, Routledge, New York

[16] Kale, V.S. and Gupta, A. (2001): *Introduction to Geomorphology*, Orient Longman, Kolkata

[17] Keary, P. and Vine, M. (1997): *Global Tectonics*, Blackwell Scientific Publications, Oxford

[18] Leopold, L. B., Wolman, M. G. and Miller, J. P. (1964): *Fluvial Processes in Geomorphology*, W.H. Freman, San Franscisco

[19] Ollier, C.D. (1981): *Tectonics and Landforms*, Longman Group Ltd., London

[20] Richards, K. (1982): *Rivers: Form and processes in alluvial channels*, Methuen, London

[21] Schumm, S.A. (1977): *Fluvial Systems*, Wiley, New York

[22] Selby, M.J. (1985): *Earth's Changing Surface: An Introduction to Geomorphology*, Clarendon Press, Oxford

Climatology

[1] Ackerman, S.A. and Knox, J.A. (2012): *Meteorology: Understanding the Atmosphere*, Jones & Bartlett Learning, London

[2] Atkinson, B. W. (Ed.) (1981): *Dynamical Meteorology: An Introductory Selection*, Methuen, London

[3] Barry, R.G. and Chorley, R.J. (2003): *Atmosphere, Weather and Climate*, Routledge, London

[4] Byers, H. R. (1974): *General Meteorology*, McGraw-Hill Book Company, New York

[5] Chandrasekar, A. (2010): *Basics of Atmospheric Science*, PHI Learning Pvt. Ltd., New Delhi

[6] Houghton, J. (2002): *Physics of Atmosphere*, Cambridge University Press, Cambridge

[7] Mcllveen, R. (2010): *Fundamentals of Weather and Climate*, Oxford University Press, Oxford

[8] Rayner, J.N. (2001): *Dynamic Climatology - Basis in Mathematics and Physics*, Blackwell Publishers Ltd., Oxford

[9] Rohli, R.V. and Vega, A. J. (2012): *Climatology*, Jones & Bartlett Learning, London

[10] Thompson, R. D. (1998): *Atmospheric Pressures and Systems*, Routledge, London

[11] Uman, M. A. (1984): *Lightning*, Dover-Publications, New York

[12] Wallace, J.M. and Hobbs, P.V. (1977): *Atmospheric Science-An Introductory Survey*, Academic Press, New York

Population Geography

[1] Chandana, R. C. (2000): *Regional Planning - A Comprehensive Text*, Kalyani Publishers, Ludhiana
[2] Friedmann, J Alanso W (1967): *Regional Development and planning - A Reader*, MIT Press Mass
[3] Mishra R. P (Ed.) (1992): *Regional Planning, Concepts, Techniques, Policies and Case Studies*, Concept Pub. New Delhi.
[4] Dube K. N. (ed) (1990): *Planning and Development in India,* Asia Publishing House, New Delhi
[5] Govt. of India (1986), *Regional Plan 2001 - National Capital Region*, NCRPB, Ministry of Urban Development, New Delhi
[6] Bhat, L. S. (1973): *Regional Planning in India*, Statistical Publishing Society, Kolkata
[7] Raychaudhuri, J. (2001): *An Introduction to Development and Regional Planning*: With Special Reference to India, Orient Blakswan, New Delhi
[8] Burton & Kates: *Regional Planning in India*.
[9] Sdasyuk. Galina and Dengupta, P.: Economic *Regionalization of India problems and Approches*
[10] Friedmann J. & Alonsow: *Regional Development and Planning*, M.I.T. Press.

Environmental Issues in population Geography

[1]Agarwala S. N. (1972). *India's Population Problem*. Tata McGraw Hill Publishing Co. Ltd., Bombay
[2]Basu, Alaka M., (1992): *Culture, The Status of Women and Demographic Behaviour,* Oxford University, New York.
[3] Chaudhuri, S. and Chouhan, P.(2013). Gender Roles and Caste Effects in Indian Social Setup. Book Bazar, Kolkata.
[4]David G. Mandelbaum, (1974), *Human Fertility in India: Social Components and Policy Perspectives,* University of California Press, Berkeley. .
[5]Gray, R et al (eds.), (1993), *Biomedical and demographic determinants of reproduction,* Oxford University Press, Oxford.
[6]Haq, Mahbubul (1996): *Reflections on Human Development*,Oxford University Press, Delhi.
[7]Hess, B.B. and M.M. Ferree. (1987). *Analyzing Gender: A Handbook of Social Science Research*. Sage Publication, London.
[8]Johnston, R.J., Gregory, Pratt and Watts.(2005). The Dictionary of Human Geography, Blackwell Publishing, India
[9]Miller, Barbara, D.(ed) (1993) *Sex and Gender Hierarchies*, Cambridge University Press, New York.
[10]Mishra, B.D.(1981) *An Introduction to the Study of Population*, South Asian Publishers, Pvt. Ltd., New Delhi.
[11]Pollard, A.H., Yusuf, Farhat, and Pollard, G.N. (1990). *Demographic Techniques* (third edition). Pergamon Press, Sydney.
[12]Rowland, Donald,T. (2006) *Demographic methods and concepts*. Oxford University Press, New York.

[13]Ray, Debraj(1998): *Development Economics.* Oxford University Press, New Delhi.

[14]Srinivasan K. (1998) *Basic Demographic Techniques and Applications*. Sage Publications, New Delhi.

[15]Tripathi, R.K.(2000) . Population Geography. Commonwealth Publications: New Delhi. [16]United Nations Development Programme (2006): *Human Development Report 2006*

SOIL AND BIO-GEOGRAPHY

[1] Pitty A.F. (1978): *Geography And Soil Properties*, Methuen and Company Ltd., London

[2] White R.E. (1987): *Introduction to The Principles And Practice of Soil Science*, Blackwell Scientific Publications, London

[3] Fenwick I. M. and Knapp B.J. (1982): *Soils - Process and Response*, Unwin Brothers Ltd., The Greshman Press, Surrey

[4] Birkeland P.W. (1999): Soil *And Geomorphology*, Oxford University Press Inc., New York

[5] Brady N.C. (1984): *The Nature And Properties of Soils*. Macmillan Publishing Company, New York and Collier Macmillan Publishers, London

[6] Thomas J.B. and Brunsden D (1977): *Geomorphology And Time*, Methuen and Company Ltd

[7] Bunting B.T. (1969): *Geography of Soil*, Hutchinson University Library, London

[8] Cruickshank J.G (1972): *Soil Geography*, David and Charles (publishers) Limited, Newton Abbot

[9] Foth H.D and Turk L.M (1973): *Fundamentals of Soil Science*, Wiley Eastern Private Limited, New Delhi

[10] Charman P.E.V and Murphy B.W. (2000): *Soils: Their Properties and Management*, Oxford University Press, Melbourne, Australia

[11] Cox. C.D. and Moore P.D. (1993): *Biogeography: An Ecological and Evolutionary Approach*, 5th edn. Blackwell

[12] Huggett R.J. (2004): *Fundamentals of Biogeography*, Routledge

[13] Llies J. (1974): *Introduction to Zoogeography*, McMillan, London

[14] Khoshoo, T.N. and Sharma M. (edn. (1991): *Indian Geosphere-Biosphere*, Har-Anand Publication, Delhi

[15] Lapedes D.N. (ed) (1974): *Encyclopedia of Environmental Science*, McGraw Hill

[16] Mathur H.S. (1998): *Essentials of Biogeography*, Anuj Printers, Jaipur

[17] Pears, N. (1985): *Basic Biogeography 2nd edn*. Longman, London

[18] Simmon I.G. (1974): *Biogeography, Natural and Cultural*, Longman, London

[19] Tivy, J (1992): *Biogeography: A study of Plants in Ecosphere*, Oliver an Boyd

[20] Ian N Healey, C Barry Cox, Peter D Moore (1972): *Biogeography an ecological and evolutionary approach*, Blackwell, Oxford

[21] Pielou E.C. (1973): *Biogeography*, John Wiley. New York

[22] Husain M. (1994): *Biogeography*, Anmol Publication, New Delhi

Social and Cultural Geography

[1] Ahmad, A. (1999): *Social Geography, Rawat Publications*, Jaipur and New Delhi

[2] Anderson, K. (2006): *Race and Crises of Human Development*, Routledge, London and New Delhi

[3] Beteille, A. (1983): Equality and Inequality, Oxford University Press, New Delhi

[4] Brewer, J.D. (2000): *Ethnography*, Open University Press, Buckingham, Philadelphia

[5] Casino, V.J.D., Jr., (2009): *Social Geography: A Critical Introduction*, Wiley-Blackwell, Chichester

[6] Jones, E. (ed.) (1975): *Readings in Social Geography*, Oxford University Press, London

[7] Norton, W. (2006): *Cultural Geography: Environments, Landscapes, Identities, Inequalities*, Oxford University Press, Toronto

[8] Sopher, D. (1980): *An Exploration of India: Geographical Perspectives on Society and Culture*, Cornell University Press, Ithaca, New York

[9] Sharma, K.L. (1980): *Essays on Social Stratification*, Rawat Publications, Jaipur and New Delhi

[10] Coates, B. E. et. al. (1977): *Geography and Inequality*, Oxford University Press, London

[11] Jordon and Lester, G. (1995): *The Human Mosaic*, Harper and Row, New York

[12] Knoy, P. L. (1988) : *Social Well-being – A Spatial Perspective*, Oxford University Press, London

[13] Massey, D. et. al. (Eds) (1999): *Human Geography Today*, Policy Press, Cambridge

[14] Harmondorf (1989): *Tribes of India : The Struggle for Survival*, Oxford University Press, Delhi

[15] Thapar, R (1977): *Tribe, Caste and Religion in India*, The Macmillan Company of Indian Limited, Meerut.

[16] Bowen, M. (1981): *Empiricism and Geographical Thought*, Cambridge University Press, Cambridge

[17] Dickinson, R.E. (1969): *Makers of Modern Geography*, Routledge, London

[18] Dikshit, R.D. (2004): *Geographical Thought: A Critical History of Ideas*, Prentice Hall of India, New Delhi

[19] Freeman, T.W. (1961): *A Hundred Years of Geography*, Gerald Duckworth, London

[20] Gregory, D. (1978): *Ideology, Science and Human*, Geography, Hutchinson, London

[20] Hartshone, R. (1959): *Perspectives on the Nature of Geography*, Rand MacNally and Co., Chicago

[21] Hartshorne, R. (1939): *The Nature of Geography*, Association of American Geographers, Lancaster

[22] Harvey, D. (1969): *Explanation in Geography*, Arnold, London

[23] Harvey, D. (1973): *Social Justice and the City*, Arnold, London

[24] James, P.E. (1972): *All Possible Worlds: A History of Geographical Ideas*, The Odyssey Press , Indianapolis

Settlement Geography

[1] Bowen, M. (1981): *Empiricism and Geographical Thought*, Cambridge University Press, Cambridge

[2] Dickinson, R.E. (1969): *Makers of Modern Geography*, Routledge, London

[3] Dikshit, R.D. (2004): *Geographical Thought: A Critical History of Ideas*, Prentice Hall of India, New Delhi

[4] Freeman, T.W. (1961): *A Hundred Years of Geography*, Gerald Duckworth, London

[5] Gregory, D. (1978): *Ideology, Science and Human*, Geography, Hutchinson, London

[6] Hartshone, R. (1959): *Perspectives on the Nature of Geography*, Rand MacNally and Co., Chicago

[7] Hartshorne, R. (1939): *The Nature of Geography*, Association of American Geographers, Lancaster

[8] Harvey, D. (1969): *Explanation in Geography*, Arnold, London

[9] Harvey, D. (1973): *Social Justice and the City*, Arnold, London

[10] James, P.E. (1972): *All Possible Worlds: A History of Geographical Ideas*, The Odyssey Press , Indianapolis

[11] Johnston, R., Gregory D., Pratt G., Watts M. and Whatmore, S. (2003): *The Dictionary of Human Geography*, Blackwell Publishers, Oxford

[12] Johnston, R.J. (1983): *Geography and Geographers*, Edward Arnold, London

[13] Johnston, R.J. (1985): *The Future of Geography*, Methuen and Company Ltd., New York

[14] Johnston, R.J. and Sidaway, J.D. (2004): *Geography and Geographers*, Edward Arnold, London

[15] Martin, G. (2005): *All Possible Worlds: A History of Geographical Ideas*, Oxford University Press, New York

[16] Peet, R. (1998): *Modern Geographical Thought*, Blackwell Publishers Inc., Massachusetts

[17] Soja, E. (1989): *Post-modern Geographies*, Verso Press, London

[18] Tuan, Y. (1977): *Space and Place: The Perspective of Experience*, Edward Arnold, London

[19] Agnew, J., (2002): *Making Political Geography*, Arnold, London

[20] Agnew, J., Mitchell, K. and Toal, G. (eds.) (2003): *A Companion to Political Geography*, Blackwell, Oxford

[21] Cohen, S. (1964): *Geography and Politics in a World Divided*, Random House, New York

[22] Cox, K.R., Low, M. and Robinson, J. (2008): *The SAGE Handbook of Political Geography*, SAGE Publications Ltd., London

[23] Cox, K.R., (2002): *Political Geography: Territory, State and Society*, Wiley-Blackwell, Chichester

[24] de Blij, H.J. and Glassner, M. (1968): *Systematic Political Geography*, John Wiley & Sons, New York

[25] Dikshit, R.D. (1987): *Political Geography and Geopolitics*, Tata McGraw Hill, New Delhi

[26] Dikshit, R.D. (2000): *Political Geography: A Contemporary Perspective*, Prentice-Hall, New Delhi

[27] Gallaher, C., Dahlman, C.T., Gilmartin, M., Mountz, A. and Shirlow, P. (2009): *Key Concepts in Human Geography: Key Concepts in Political Geography*, SAGE Publications Ltd., London

[28] Glassner, M., (1993): *Political Geography*, John Wiley & Sons, New York

[29] Jones, M., (2004): *An Introduction to Political Geography: Space, Place and Politics*, Routledge, London

[30] Mathur, H.M. and Cernea, M.M. (eds.) (1995): *Development, Displacement and Resettlement - Focus on Asian Experience*, Vikas Publishing House Ltd., New Delhi

[31] Painter, J. and Jeffrey, A. (2009): *Political Geography*, SAGE Publications Ltd., London

[32] Prescott, J.R.V. (1972): *The Political Geography*, Methuen, London

[33] Taylor, P. and Flint, C. (2000): *Political Geography*, Pearson Education, Harlow, Essex

Hydrology and Oceanography

[1] John, J. A. (1997) : *Global Hydrology : Processes, Resources and Environment Management*, Longman Publishers
[2] Law, B. C. (Ed. 1968) : *Mountains and Rivers of India, IGU National Committee for Geography*, Calcutta.
[3] H.M.,Raghunath (1985): *Hydrology, Principles, Analysis, Design*, New Age International Publishers
[4] Davis, R.J.A. (1986): *Oceanography - An Introduction of the Marine Environment*, Win C. Brown, Iowa
[5] Day, T. (2006): *Oceans*, Chelsea House, New York
[6] Erickson, J. 2003): *Marine Geology: Exploring the New Frontiers of the Ocean*, Facts on File, Inc., New York
[7] Garrison, T. (2009): *Essentials of Oceanography*, Brooks/Cole, Belmont, California
[8] Ilyin, A.V. (2003): *Evolution of the Ocean Floof Morphostructure - Actualistic Model*, in Evans, I.S., Dikau, R. Tokunaga, E., Ohmori, H. and Hirano, M. (eds.) *Concepts and Modelling in Geomorphology: International Perspectives*, Terrapub, Tokyo, pp. 43-59
[9] King, C.A. (1962): *Oceanography for Geographers*, Edward Arnold, New York
[10] Pinet, P.R. (2009): *Invitation to Oceanography*, Jones and Bartlett Publishers, Sudbury, Massachusetts
[11] Robert, C.M. (2009): *Global Sedimentology of the Ocean: An Interplay between Geodynamics and the Palaeoenvironment*, Elsevier, Amsterdam
[12] Stahler, A.N. and Stahler A.N. (1997): *Geography and Man's Environment*, John Wiley and Sons, New York
[13] Thorpe, S.A., Steele, J.H., Turekian, K.K. (eds.) (2009): *Elements of Physical Oceanography*, Academic Press, London
[14] Thurnman, H.V. (1978): *Introduction to Oceanography*, Charles E. Merrill Pub. Co., London
[15] Weyl, P.K. (1970): *Oceanography: An Introduction of the Marine Environment*, John Wiley and Sons Ltd., London .
[16] Black, P.E. (1991): *Watershed Hydrology*, Prentice Hall, London
[17] Michael, A.M. (1992): *Irrigation Engineering*, Vikas Publishing House
[18] Murty, J.V.S. (1998): *Watershed Management*, New Age International, New Delhi
[19] Murthy, J.V.S. (1994): *Watershed Management In India*, Wiley Eastern, New Delhi
[20] A textbook of Hydrology, Prof. P Jayaramireddy

[21] R.K.Linsley, Applied Hydrology M.A.KohIer & Paulhus

Historical and Political Geography

[1] Adhikari, Sudeepta (2002): Political Geography, Rawat Publications, New Delhi.

[2] Agnew, J. (ed.) (1997): Political Geography: A Reader, Arnold, London.

[3] Ali, S.M. (1966): The Geography of the Puranas, People's Publishing House, Delhi.

[4] Baker, A.R.H (ed.) (1972): Progress in Historical Geography. David and Charles.

[5] Baker, A.R.H., Hamshere, J.D., Langton, J. (1972) : Geographical Interpretation of historical Sources, David and Charles.

[6] Bhardwaj, S.M., (1973): Hindu Places of Pilgrimage in India: A Study in Cultural Geography, University of California Press, Berkley.

[7] Bharadwaj, O.P. (1986): Studies in the Historical Geography of Ancient India, Sundeep Prakashan, Delhi.

[8] Blake, G. (ed.), 1987: Maritime Boundaries and Ocean Resources, Croom Helm, London.

[9] Brereton, E. (1992): Resource Use and Management, Cambridge University Press, Cambridge

[10] Bryant, R. L. and Bailey, S. (1997): Third World Political Ecology, Routledge, London.

[11] Butin, R.A. (1993): Historical Geography: Through the Gates of Space and Time, Edward Arnold, London.

[12] Cox, Kevin R. (2002): Political Geography: Territory, State, and Society, Blackwell Publishers, Oxford.

[13] Dey, N.L., (1971): The Geographical Dictionary of Ancient and Medieval India, New Delhi.

[14] Dikshit, R. D. (1997): Developments in Political Geography: A Century of Progress, Sage Publications, New Delhi.

[15] Dodds, K., (2000): Geopolitics in a Changing World, Prentice Hall, Essex.

[16] Elliott, L. (1998): Global Politics of the Environment, Macmillan Press Ltd., London.

[17] Elliotte, J. A. (1994): An Introduction to Sustainable Development: The Developing World, Routledge, London

[18] Gottman, J. (ed.), (1980): Centre and Periphery: Spatial Variations in Politics, Sage, London.

[19] Guelke, L. (1982): Historical Understanding in Geography: An idealist approach, Cambridge University Press, Cambridge.

[20] Habib, I. (1986): An Atlas of Mughal Empire, Oxford University Press, Delhi.

[21] Husain Majid (1994): Political Geography, Anmol Publications Pvt. Ltd.

[22] Johnston, R.J., Taylor, P.J. and Watts, M.J. (ed.), (1995): Geographies of Global Change: Remapping the World in the Late Twentieth Century, Blackwell, Oxford.

[23] Law, B. (1968): Historical Geography of Ancient India, Societe Asiatique deiParis, Paris.

[24] Mitchell, B. (1997): Resources and Environment Management, Addison Wesley Lon~an Ltd., Harlow.

[25] O'Tuathail, G. and Simon, D. (1998): Rethinking Geopolitics, Routledge, London.

[26] Pacione, M. (1987): Historical Geography: Progress and Prospect, Croom Helm, London.

[27] Parker, G. (1998): Geopolitics: Past Present and Future, Printer, London.

[28] Pickering, K. and Owen, L.A. (1997): A n Introduction to Global Environmental Issues, 2nd edition, Routledge, London.

[29] Pounds, Norman J.G. (1963): Political Geography, Mc Graw Hill Book Company

[30] Roberts, P.E., (1995): Historical Geography of India, Vol. I & II, Printwell, Jaipur.

[31] Roy, S & Mukhopadhyay, M. (2013): Geography behind myth, acb publisher, Kolkata

[32] Schwartzberg, J.E. (1978): A Historical Atlas of South Asia, University of Chicago Press, Chicago.

[33] Sircar, D.C. (1971): Studies in the Geography of Ancient and Medieval India, Motilal Banarasi Dass, India.

[34] Taylor, P.J. (2000): Political Geography: World Economy, Nation-State and Locality, Longman, London.

[35] Taylor, P.J. and Johnston, R.J. (1979): Geography of Elections, Croom Helm, London.

[36] Tamaskar, B.G. (1985): Contributions to Historical Geography of India, Inter-India Publications, New Delhi.

[37] United Nations Populations Fund (1997): India Towards Population and Development Goals, Oxford University Press, New Delhi.

[38] Unwin, T. (ed.), (1994): Atlas of World Development, John Wiley and Sons Ltd., Chichester.

[39] World Bank (1996): From Plan to Market: World Development Report 1996, Oxford University Press, Oxford.

[40] World Resources Institute (1998): World Resources 1998-99: A Guide to the Global Environment, Oxford University Press, Oxford.

Techniques in Physical Geography

[1] King, C. A.M (1966): Techniques in Geomorphology, Edward Arnold, London

[2] Monkhouse, F. J. and Wilkinson H. R., (1976): Maps and Diagrams, Methuen & Co

[3] Rowell, D.L. (1995): *Soil Science- Methods and Applications*; Longman Scientific & Technical, UK

[4]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

[5] McKenzie, N.J., Grundy, M.J., Webster, R. and Ringrose-Voase, A.J. (2008): *Guidelines for Surveying Soil and Land Resources*; CSIRO Publishing, Melbourne

[6] Burt, R. (ed.) (2004): *Soil Survey Laboratory Methods Manual: Soil Survey Investigations Report No. 42 Version 4.0*, USDA, USA

[7] WMO No. 8 (1983): Guide to meteorological instruments and methods of observations

[8] Thornthwaite, C. W. and Mather, J. R. (1957): Instructions and Tables for computing potential evapo-transpiration and water balance, Drexel Institute of Technology, Laboratory of Climatology.

[9] Indian Daily Weather Report, IMD, Pune.

[10] Oliver, John E. (1973): Climate and Man's Environment, John Wiley and Sons, New York.

Statistical Techniques

[1] Mahmood, A (1993): Statistical Methods in Geographical Studies, Rajesh Publications, New Delhi
[2] Paul, S. K (1998): Statistics for Geoscientists : Techniques and Applications, Concept Publishing Company, New Delhi
[3] Gupta, C. B (1974): An Introduction to Statistical Methods, Vikas Publishing House, Delhi
[4] Gregory, S (1964): Statistical Methods and the Geographers, Longman, London
[5] Hoshmand A. R (2nd edt) (1998): Statistical Methods for Environmental and Agricultural Sciences, CRC Press, New York
[6] Johnston R. J (4th edt) (1989): Multivariate Statistical Analysis in Geography, Longman Scientific and Technical, John Wiley & Sons.
[7] Rogerson. P.A. (2010): Statistical Methods for Geography, (A Student's Guide), 3rd Edition, Sage Publication, New Delhi
[8] Jack Levin and J.A. Fox (10th edt) (2006): Elementary Statistics in Social Research, Peason Education, New Delhi

[9] Doumpos, M. and Zopounidis, C. (2004): *Multicriteria Decision Aid Classification Methods,* Kluwer Academic Publishers, New York

[10] Fotheringham, A.S., Brunsdon, C. and Charlton, M. (2007): *Quantitative Geography: Perspectives on Spatial Data Analysis*, SAGE Publications India Pvt. Ltd., New Delhi

[11] Garson, G.D. (1998): *Neural Networks: An Introductory Guide for Social Scientists,* SAGE Publications, London.

[12] Griffith, D.A. and Amrhein, C.G. (1997): *Multivariate Statistical Analysis for Geographers*, Prentice Hall, Upper Saddle River, New Jersey

[13] John, B.G.and Pau, J. (2010): *Research Methods in Geography: A Critical Introduction*, John Wiley & Sons, UK

[14] Johnston, R.J. (1978): *Multivariate Statistical Analysis in Geography: A Primer on the General Linear Model*, Longman, Harlow

[15] 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

[16] Khan, N. (1998): *Quantitative Methods in Geographical Research,* Concept Publishing Company, New Delhi

[17] Ripley, B.D. (2004): *Spatial Statistics*, John Wiley & Sons, N.J

[18] Swan, A.R.H., Sandilands, M. and McCabe, P. (1995*): Introduction to Geological Data Analysis*, Blackwell Science Ltd., Oxford
[19] Waller, L. A. and Gotway, C.A. (2004): *Applied Spatial Statistics for Public Health Data*, John Wiley & Sons, New Jersey

Spatial Data analysis

[1] P. A. Burrough and R. A. McDonnell, (2000): *Principles of Geographical Information System*, Oxford University Press.
[2] C. P. Lo and Albert, K. W. Yeung (2002): *Concepts and Techniques of Geographic Information System*, 2002 Prentice –Hall, India.
[3] Paul A. Lonfley, Michel F. Goodchild, D J. Maguire and D.W. Rhind (2002): *Introduction to Geographic Information Systems and Science*, John Wiley and Sons Ltd.
[4] Kang – Tsung – Chang, (2002): *Introduction to Geographical Information System*, McGraw Hill.
[5] George J. (2004): *Fundamentals of Remote Sensing*, Universities Press Pvt. Ltd., Hyderabad.
[6] J. R. Jensen, (2003): *Remote Sensing of Environment, An Earth Resource Perspective*, Pearson Education Pvt. Ltd., New Delhi.
[10] George Joseph (2003): *Fundamentals of Remote Sensing*, Universities Press, Hyderabad
[11] Chang Kang-tsung. (2002): *Introduction to GIS*, Tata McGraw Hill, New Delhi.
[12] Burrough, P.A. and R.A. McDonnell (2000): *Principles of Geographical Information System*, Oxford University Press.
[13] Vaidyanadhan, R.(1973): *Index to a set of 70 aerial stereopairs*, UGC, New Delhi.

[14] P.A. Burrough and R. A. (2000): McDonnell, *Principles of Geographical Information System*, Oxford University Press.
[17] Kang – tsung- Chang (2002): *Introduction to Geographical Information System*, McGraw Hill.
[18] George J. (2004): *Fundamentals of Remote Sensing*, 2004, University Press Pvt. Ltd. Hyderabad.
[19] Jensen, J.R. (2003) *Remote Sensing of Environment, An Earth Resource Perspective*,2003, Pearson Education Pvt. Ltd. . New Delhi.

Remote Sensing and GIS

[1] P. A. Burrough and R. A. McDonnell, (2000): *Principles of Geographical Information System*, Oxford University Press.
[2] C. P. Lo and Albert, K. W. Yeung (2002): *Concepts and Techniques of Geographic Information System*, 2002 Prentice –Hall, India.
[3] Paul A. Lonfley, Michel F. Goodchild, D J. Maguire and D.W. Rhind (2002): *Introduction to Geographic Information Systems and Science*, John Wiley and Sons Ltd.
[4] Kang – Tsung – Chang, (2002): *Introduction to Geographical Information System*, McGraw Hill.
[5] George J. (2004): *Fundamentals of Remote Sensing*, Universities Press Pvt. Ltd., Hyderabad.

[6] J. R. Jensen, (2003): *Remote Sensing of Environment, An Earth Resource Perspective*, Pearson Education Pvt. Ltd., New Delhi.
[10] George Joseph (2003): *Fundamentals of Remote Sensing*, Universities Press, Hyderabad
[11] Chang Kang-tsung. (2002): *Introduction to GIS*, Tata McGraw Hill, New Delhi.
[12] Burrough, P.A. and R.A. McDonnell (2000): *Principles of Geographical Information System*, Oxford University Press.
[13] Vaidyanadhan, R.(1973): *Index to a set of 70 aerial stereopairs*, UGC, New Delhi.

[14] P.A. Burrough and R. A. (2000): McDonnell, *Principles of Geographical Information System*, Oxford University Press.
[17] Kang – tsung- Chang (2002): *Introduction to Geographical Information System*, McGraw Hill.
[18] George J. (2004): *Fundamentals of Remote Sensing*, 2004, University Press Pvt. Ltd. Hyderabad.
[19] Jensen, J.R. (2003) *Remote Sensing of Environment, An Earth Resource Perspective*,2003, Pearson Education Pvt. Ltd. . New Delhi.

Field Techniques

[1] Har Prasad (1992): *Research Methods and Techniques in Geography*, Rawat Publishers, Jaipur
[2] Mishra, H.N. and Singh V.P. (ed.) (1998): *Research Methodology*: Social, Spatial and Policy Dimensions, Rawat Publishers, Jaipur
[3]. Goode and Hat (): *Research Methodology in Social Sciences*, Oxford University Press, New Delhi
[4] Black, J.A. and Champion, D. J. (1976): *Methods and Issues in social Research*, New York, Jolm Wiley and Sons, Inc.
[5] Young, P.V. (): *An introduction to research methodology*
[6] Jones P. A. (1968): *Field work in Geography*. Longmans, Green and Company Limited
[7] Archer J. E and Dalton T. H. (1968): *Field work in Geography*, B.T. Batsford Limited London
[8] Wheeler K.S. Ed (1970): *Geography in the field*. Blond Educational, London
[9] Gupta, K. K. and Tyagi, V. C. (1992): *Working with maps*, Survey of India Publication, Dehradun
[10] Vaidyanadhan. R. (1968); *Index to a set of 60 topographical maps*, CSIR, New Delhi
[11] Maslov A. V.Gordeev A. V. Batrakov Yu. G. (1984): *Geodetic surveying*, Mir Publishers, Moscow
[12] Kanetkar T. P. & Kulkarni S.V. (1986): *Surveying & leveling*, Pune Vidyarthi Griha Prakshan, Pune

Resource Management

[1] Elliotte, J. A (1994): *An Introduction to Sustainable Development: The Developing World*, Routledge, London
[2] Mitchell, B (1997) : *Resources and Environment Management*, Addison Wesley Longman Ltd., Harlow
[3] Brereton, E (1992): *Resource Use and Management*, Cambridge University Press, Cambridge
[4] Klee, G.A. (1991): *Conservation of Natural Resources*, Prentice Hall, Englewood Cliffs, New Jersey
[5] Bolen, E. and G. R William (5th Edt) (2002): *Wildlife Ecology and Management*., Prentice Hall
[6] Mitra, A (2000): *Resource Studies*, Sreedhar Publishers, Kolkata

[7] Hartshorne, T.A. and J.W. Alexander (1988): *Economic Geography*, Prentice Hall
[8] Janaki. V.A. (1985): *Economic Geography*, Concept Publishing Co
[9] Lloyd, P.and P. Dicken (1972): *Location in space: A theoretical approach to Economic Geography*, Harper and Row, New York
[10] McCarty, H.H. and J.B. Lindberg (1966): *A Preface to Economic Geography*, Englewood Cliffs, N.J.Prentice
[11] Thomas, Conkling and Yeates (1974): *Geography of Economic Activity*, Mc Graw Hill, New York
[12] Knox, P. and J. Agnew (1998): *The Geography of the World Economy*, Arnold, London

Environment

[1] Chapman J.L. and Reiss, M.J (1993): Ecology: Principles and Applications, Cambridge University Press, Cambridge
[2] Myers, A.A. and Giller, P.S. (editors) (1988): *Analytical Biogeography: An Integrated Approach to the Study of Animal and Plant Distributions*
[3] Chapman and Hall. Ricklets, R.E (1993): *The Economy of Nature: A Textbook in Basic Ecology*, 3rd edition, W.H. Freeman and Co. New York
[4] Sharma. P.D (1996): *Ecology and Environment*, Rastogi Publications, Mirat
[5] Bhattacharra, R.N. (2007): *Environmental Economics-An Indian Perspective*, Oxford University Press, New Delhi
[6] Blaikie, P., Cannon, To Davis, I. and Wisener (1994): *At Risk: Natural Hazards, People's Vulnerability and Disasters*, Routledge, London
[7] Brown, J.H. & Lomolino, M.V (1998): *Biogeography*, Sinauer Associates, USA
[8] Bryant, E.A (1991): *Natural Hazards*, Cambridge University Press, Cambridge
[9] Buchholz, R.A (1993): *Principles of Environmental Management, the Greening of Biosphere*, Prentice Hall Inc., New Jersey
[10] Canter, L. W (1996): *Environmental Impact Assessment*, McGraw Hill, New York

Advanced Geomorphology

[1] Aleshire, A. (2007): *The Extreme Earth: Ocean Ridges and Trenches*, Infobase Publishing, New York
[2] Anderson, R.S. and Anderson, S.P. (2010): Geomorphology*: The Mechanics and Chemistry of Landscapes*, Cambridge University Press, Cambridge
[3] Bloom, A.L. (2002): Geomorphology: *A Systematic Analysis of Late Cenozoic Landforms*, Prentice Hall, Upper Saddle River, New Jersey
[4] Chorley, R.J. and Kennedy, B.A. (1971): *Physical Geography: A Systems Approach*, Prentice Hall, Upper Saddle River, New Jersey
[5] Condie, K.C. (2003): *Plate Tectonics and Crustal Evolution*, Butterworth-Heinemann, Oxford, Burlington
[6] Cooke, R.U. and Doornkamp, J.C. (1974): *Geomorphology in Environment Management*, Clarendon Press, London

[7] Faniran, A. and Jeje, L.K. (1983): *Humid Tropical Geomorphology*, Longman, London
[8] Firsch, W., Meschede, M. and Blakey, R. (2011): *Plate Tectonics, Continental Drift and Mountain Building*, Springer-Verlag, Berlin
[9] Goudie, A.S. (1990): *Geomorphological Techniques*, Unwin Hyman, London
[10] Goudie, A.S. (ed.) (2004): *Encyclopaedia of Geomorphology*, Routledge, London
[11] Goudie, A.S. and Viles, H. (2010): *Landscapes and Geomorphology*: A Very Short Introduction, Oxford University Press, Oxford
[12] Gutierrez, M. (2013): *Geomorphology*, CRC Press, Boca Ranton, Florida
[13] Hamblin, W.K. and Christiansen, E. (2003): *Earth's Dynamic Systems*, Prentice Hall, Upper Saddle River, New Jersey
[14] Hart, M.G. (1986): *Geomorphology: Pure and Applied*, George Allen and Unwin, London
[15] Huggett, R.J. (2011): *Fundamentals of Geomorphology*, Routledge, New York
[16] Kale, V.S. and Gupta, A. (2001): *Introduction to Geomorphology*, Orient Longman, Kolkata
[17] Keary, P. and Vine, M. (1997): *Global Tectonics, Blackwell Scientific Publications*, Oxford
[18] Leopold, L. B., Wolman, M. G. and Miller, J. P. (1964): *Fluvial Processes in Geomorphology*, W.H. Freman, San Franscisco
[19] Ollier, C.D. (1981): *Tectonics and Landforms*, Longman Group Ltd., London
[20] Richards, K. (1982): *Rivers: Form and processes in alluvial channels*, Methuen, London
[21] Schumm, S.A. (1977): *Fluvial Systems*, Wiley, New York
[22] Selby, M.J. (1985): *Earth's Changing Surface: An Introduction to Geomorphology, Clarendon Press*, Oxford
[23] Small, R.J. (1978): *The Study of Landforms: A Textbook of Geomorphology*, Cambridge University Press, Cambridge 2
[24] Sparks, B.W. (1972): *Geomorphology*, Longman, London
[25] Summerfield, M.A. (1991): *Global Geomorphology: An Introduction to the Study of Landforms*, Longman, London
[26] Summerfield, M.A. (ed.) (2000): *Geomorphology and Global Tectonics*, Wiley, Chichester
[27] Thomas, M.F. (1994): *Geomorphology in the Tropics: A study of weathering and denudation in low latitudes*, John Wiley & Sons, Chichester
[28] Thorn, C. (1988): *Introduction to Theoretical Geomorphology*, Unwin Hyman, Boston
[29] Thornbury, W. D. (I960): *Principles of Geomorphology*, John Wiley & Sons, New York
[30] Young, A. (1972): *Slopes*, Oliver and Boyd, Edinburgh.

Environmental Hazards

[1] Alexander, D. (1993): Natural Disasters, Research Press, New Delhi: 619p. Baarrsches,
[2] W.H. (1996): Eco-facts and Eco-fiction: Understanding the Environmental Debate, Routledge, London.
[3] Chapman, D. (1994): Natural Hazards, Oxford University Press, Melbourne: 174p.

[4] Dasgupta, P. and Mller, K.G. (1997): The Environment and Emerging Development Issues, Volumes I and 2,
[5] Clarendon Elsom, D.M. (1992): Atmospheric Pollution: A Global Problem, 2nd edition, Blackwell Pub. Co., London: 422p.
[6] Farmer, A. (1997): Managing Environmental Pollution, Routledge, London: 246p.
[7] Hyndman, Donald and Hyndman, David. (2008): Natural Hazards and Disasters; Cengage Learning. Keller,
[8] Edward A. and Blodgett,Robert H. (2007): Natural Hazards: Earth's Processes As Hazards, Disasters and Catastrophes; Pearson Prentice Hall.
[9] Middleton N. (1995): The Global Casino: An .Introduction to Environmental Issues, John Wiley and Sons.
[10] New Park, C. 1998: The Environment: Principles and Applications, Routledge, London:York: 332p.
[11] Pickering, K. and Owen, L.A. (1997): An Introduction to Global Environmental Issues, 2nd edition, Routledge, London:
[12] Roberts, N. (editor) (1994): The Changing Global Environment, 3rd edition, Blackwell Pub. Co., London: 531 p.
[13] Smith, Keith and Petley, David N. (2009): Environmental Hazards: Assessing Risk And Reducing Disaster; Taylor & Francis.
[14] Valancy, F. and Bronstein, D.A. (1995): Environmental and Social .Impact Assessment, John Wiley and Sons inc., New York: 325p.
[15] Vogler, J. (1995): The Global Commons: A Regime Analysis, John Wiley and Sons Ltd., Chichester: 233p.

Urban Geography

[1] Bala, Raj (1986): *Urbanisation in India*, Rawat Publishers, Jaipur

[2] Bansal, S.C. (2010): *Urban Geography*, Meenakshi Prakashan, Meerut

[3] Cadwallader, Martin (1986): *Urban Geography*, Prentic Hall, New Jersey

[4] Carter, Harold (1995): *The Study of Urban Geography* (4th Edition), Arnold, London

[5] Dickinson, R.E. (1964): *City and Region*, Routledge, London

[6] Kundu, A (1992): *Urban Development and Urban Research in India*, Khanna Publication, New Delhi

[7] Mayer H.M. and Kohn, C.F. (eds.) (1958): *Readings in Urban Geography*, University of Chicago Press, Chicago

[8] Pacione, Michael (2001): *Urban Geography-A Global Perspective*, Routedge, London

[9] Ramachandran, R. (1989), *Urbanisation and Urban Systems in India*, Oxford, New Delhi

[10] Rao, B.P. and Sharma, N. (2000-01), *Urban Geography* (Hindi Edition), Vasundhra Prakashan, Gorkhpur

[11] Singh, K. and Steinberg, F. (eds.) (1987), *Urban India in Crisis*, New Age International, New Delhi

[12] Smailes, A.E. (1953), *The Geography of Towns*. Hutchinson, London

Urban and Regional Planning

[1] Robert Potter, et.al. *Geographies of Development.* 2nd revised edition, Pearson, 2003
[2] Hall P. (1992) Urban and Regional Planning, Routledge, London
[3] Kundu, A. (1992) : Urban Development and Urban Research in India, Khanna Publication.
[4] Singh. K. and Steinberg. F.(eds) (1998) : Urban India in Crisis. New Age Interns,
[5] K. Siddharth and S. Mukherji: Cities,. Urbanizations and Urban Systems.
[6] Chandana, R. C. (2000): Regional Planning - A Comprehensive Text, Kalyani Publishers, Ludhiana
[7] Friedmann, J Alanso W (1967): Regional Development and planning - A Reader, MIT Press Mass
[8] Mishra R. P (Ed.) (1992): Regional Planning, Concepts, Techniques, Policies and Case Studies, Concept Pub. New Delhi.
[9] Dube K. N. (ed) (1990): Planning and Development in India, Asia Publishing House, New Delhi
[10] Govt. of India (1986): Regional Plan 2001 - National Capital Region, NCRPB, Ministry of Urban Development, New Delhi

Rural Planning and Development

[1] Chand, M. and Puri, V.K. (1988): Regional Planning in India, Vikas, New Delhi
[2] Singh, Katar (1986). Rural development : principles, policies and management, Sage Publications India New Delhi.
[3] Vijay, Chand Mal (1989). Rural development administration in India, Akashdeep Publishing House, New Delhi.
[4] Upadhyay, H.C (1991). Modernization and rural development, Anmol Publications, New Delhi.
[5] Riley, John M (2002). Stakeholders in rural development : critical collaboration in state-NGO partnerships, Sage Publications India, New Delhi
[6] Ray, C.N (1994). Politics of rural development : The case of anti-Poverty programme in West Bengal and Gujarat, Rawat Publications, Jaipur.
[7] Mahajan, V.S(1996). Agriculture,rural development and panchayati raj, Deep and Deep Publications, New Delhi.
[8] Kar, Samit (1991). Rural development in West Bengal : a quest, Sarat Book House, Kolkata.
[9] Yugandhar, B.N., Mukherjee, Neela (1991). Studies in village India : Issues in rural development, Concept Publishing, New Delhi.

[10] Subramanian, S (1988). Rural development : an inside Look at Problems and prospects, Yatan Publications, New Delhi.
[11] Kumar, Sunil (1990). Regional rural banks and rural development, Deep and Deep Publications, New Delhi Saudhu, Baldere S (1996). Banking and rural development, Deep and Deep Publications, New Delhi.
[12] Reddy, K. Venkata(1988). Rural development in India, Himalaya Publishing House, Bombay.
[13] Lakshman, T.K.., Narayan, B.K.. (1984). Rural development in India: a multi-demensional analysis, Himalaya Publishing House, Bombay
[14] Yadav, Subah Singh., Gurjar, Ram Kumar (1997). Rural development and poverty alleviation, Pointer Publishers, Jaipur.
[15] Dutta, Siba kanta (1986). Co-operative societies & rural development, Mittal Publications, New Delhi.
[16] Desai, Vasant (1991). Fundamentals of rural development: a system approach, Himalaya Publishing House, Bombay.
[17] Ahmed, Rais (1996). Comparatives and integrated rural development programme, Mittal Publications, New Delhi. Ministry of rural development, Government of India, web add: http://rural.nic.in/

Gender Geography

[1] Agarwal, B. (2008): Rural Women in Indian Economy. ABD Publishers, Jaipur.

[2] Anker, Richard (1998): Gender and Jobs: Sex Segregation of Occupation in the World. ILO, Geneva.

[3] Arora, P (2011): Gender and Power. Pacific Publication, Delhi.

[4] Bansal, D. K. (2006): Gender Violence. Mahaveer and Sons, New Delhi.

[5] Baumgartner R. & Hogger R. (eds). (2004): In Search of Sustainable Livelihood System, Managing Resources and Changes. Sage Publications, New Delhi.

[6] Bell, Hooks (2000): Feminist Theory: From Margin to Center. London: Pluto Press.

[7] Burra N, Ranadive J & Murthy R (eds) (2005): MicroCredit, Poverty and Empowerment, Linking the Triad. Sage Publications, New Delhi.

[8] Caroline, S. (2002): Gender Development and Poverty. Oxfam, New York.

[9] Chanrda, Pradan K (2008): Rural Women, Issues and Options. Sonali publictions, New Delhi.

[10] Chant, S. (2007): Gender Generation and Poverty Explaining the Feminization of Poverty in Africa, Asia and Central America. Edward Elgar Publishing Limited, London.

[11] Christine L., Williams, S. A. (Ed.) (2002): Sexuality and Gender. Blakwell, Massachusetts.

[12] Chloe E. Bird, Patricia Perri Rieker (2008:) Gender and Health: The Effects of Constrained Choices and Social Policies. Cambridge University Press, Cambridge.

[13] Chowdary, P. (ed) (2009): Gender Discrimination in Land Ownership. Sage Publications, New Delhi.

[14] Cornell, R W (1995): Gender. Polity Press, Cambridge

[15] De Beauvoir, S. (1988/1949): The Second Sex. Pan, London.

[16] Fausto-Sterling, A. (2000): Sexing The Body: Gender Politics and the Construction of Sexuality. Basic Books, New York.

[17] Fergusons, C. (ed) (2010): Violent Crime, clinical and implications. Sage publication, California.

[18] Gatens, M (1991): A Critique of the Sex/Gender Distinction in S. Gunew (ed.) A Reader in Feminist Knowledge. Routledge, London.

[19] Glover D., Kaplan C (2007): Genders. Routledge, Oxon Holmes M (2007): What is Gender. Sage Publications, New Delhi.

[20] Goldman, B. and Hatch C. M. (eds.) (2000): Women and Health. Academic Press, California.

[21] Harcourt, W. (ed) (1994): Feminist perspective on sustainable development Zed books, London.

[22] Heywood, L. L. (2007): The women's movement today, An encyclopaedia of third wave feminism. Volume 2. Jaipur: R awat Publication

[23] Holmes, M (2007): What is Gender. Sage Publications, New Delhi.

[24] Jackson, S and Scott, S (2002): Gender: A Sociological Reader. Routledge, New York.

[25] Kabeer, N. (2005): Gender Mainstreaming in Poverty Eradication and the Millennium Development Goals. International Development Research Center, Canada.

[26] Kaur S (2008): Women and Poverty. Book Enclave Limited, Jaipur.

[27] Kesseler S J and Mckenna W (1978): Gender: An Ethnomethodological Approach. University of Chicago Press, Chicago.

[28] Kimmel, S Michael (2004): The Gendered Society; Reader. Oxford: Oxford University Press.

[29] Khanna, S. (2009): Violence against Women and Human Rights. Swastik Publishers and Distributers, Delhi

[30] Krishna, S. (ed) (2004): Livelihoood and gender, Equity in community resource management. Sage Publications, New Delhi.

[31] Krishna, S. (ed) (2007): Women's Livelihood Rights, recasting citizenship for development. Sage Publications, New Delhi.

[32] Lewis, L. (ed.) (2010) New Dimensions in Women's Health. Jones Barrett Publishers, Ontario.

[33] Linda Lewis Alexander, Judith Larosa and William James Alexander (ed.) (2009) New Dimensions in Women's Health. Jones and Barrett Publishers, Massachusetts.

[34] Lipman-Blumen, J (1984): Gender Roles and Power. Prentice Hall, New Jersey.

[35] Malik B.B (2009): Poverty in India; Fundamental Issues. Mittal Publications, New Delhi.

[36] Millett, K. (1970): Sexual Politics. Doubleday, New York.

[37] Netten, S.N. (2007): Gender Development: Dimensions and Policies. Serial Publications, New Delhi.

[38] Oakley, A (1985): Sex, Gender and Society. Temple Smith, London.

[39] Sharma, U. (2006): Female Labour in India. Mittal Publications, New Delhi.

[40] Sontheimer, S. (ed) (1991): Women and the Environment: A reader, Crisis and Development in the Third World. Earthscan publications, London.

[41] Wal, S. and Bhanerji, S. (2007): Women and Globalization. Sarup and Sons, New Delhi.

[42] Walby, S. (1986): Patriarchy at Work. Polity Press, Cambridge.

[43] Wang, Auang-zhen. (2010) Women's Reproductive Health and Gender Evaluation: Methods, Measurements and Implications. Ashgate Publishing Limited, London.

Process Geomorphology

[1] Anderson Robert S. and Anderson Suzanne P., 2010 Geomorphology (1st Edition, Kindle Edition) by , Cambridge University Press.
[2] Anderson, M.G. (1988) Modelling Geomorphological Systems, John Wiley & Sons, New York
[3] Chorley R.J. (Ed.) (1972) Spatial Analysis in Geomorphology., Methuen & Co., London.
[4] Chorley, R.J. Schumm,S.A. & Sugden, D.E. (1985): Geomorphology, Methuen & Co. Ltd., London, New York.
[5] Christopherson, R.W. (1995): Elemental Geosystems: A Foundation in, Prentice Physical Geography Hall Englewood Cliffs, New Jersey.
[6] Coates, D.R. and Vitek, J.D. (1980) (eds), Thresholds in Geomorphology, George Allen & Unwin, London.
[7] Crozier, M. J. (1986), Landslides: Causes, Consequences and Environment, Croom Helm, London.
[8] Greeley, Ronald (2013) Introduction to Planetary Geomorphology, Cambridge University Press
[9] Gupta, A. (2011) Tropical Geomorphology, Cambridge University Press
[10] Knighton, D. (1990) Fluvial Forms and Processes, Hodder Education, UK. Leopold, L.B. Wolman, M.G. &
[11] Miller, J.P. (1964): Fluvial Processes in Geomorphology, W.H.Freeman
[12] Maiti, R.K. (2016) Modern Approaches to Fluvial Geomorphology, Primus Books.
[13] Mondal S. and Maiti, R.K. (2015) Semi-quantitative Approaches in Landslide Assessment and Prdiction, Springer.
[14] Morisawa, M. (1985) Rivers, Longman, London.
[15] Ollier, C. D. (1969) Weathering. Elsevier, New York.
[16] Pity A.F., 1971, Introduction to Geomorphology, Methuen, London.
[17] Ritter, D.F. (1986) Process Geomorphology, Wm. C. Brown Publisher, Dubuque, Iowa. Ritter, Kochel and
[18] Miller Process Geomorphology, 4th edition, Waveland Press 2006 (ISBN 13: 978-157766-461-1).
[19] Robinson, Harry (1969): Morphology and Landscape, University Tutorial Press Ltd. London.
[20] Selby, M.J. (2005) Hill slope materials and processes, Oxford University Press, Oxford.
[21] Selby, R.C. (1976), An Introduction to Sedimentology, Academic Press, London.
[22] Sparks, B.W (1972) Geomorphology, Longman, London.
[23] Thomas Michael F. 2014 Geomorphology in the Tropics, , Wiley.

[24] Worcester, P. G. (1948): Textbook of Geomorphology, Princeton,
[25] D.Van, Nortrand. Zaruba, Q. et al (1969) Landslides and their control. Elsevier, Amsterdam.

Coastal Geomorphology

[1] Carter, R.W.G (1988): Coastal Environments: An Introduction to the Physical, Ecological and Cultural Systems of Coastlines, Academic Press, London
[2] Dayer K.R. (1979): Estuary Hydrography, and Sedimentation, Cambridge Univ. Press, Cambridge.
[3] Devis R.A. (ed) (1978): Coastal Sedimentary Environmental; Springer-Verlag, New York.
[4] Harikawa , K. (1978): Coastal Engineering, Univ Of Tokyo Press, Tokyo.
[5] Inman, D.L. (1960): Shore Processes, Encyclopedia of Science & Technology, Mc Graw Hill, New York.
[6] Knight, B. and Philip, A. (1979): Estuarine and coastal Land reclamation and water storage, Saxon House.
[7] Laussn, E and Lato, I.(ed): Chemistry and Biochemistry of estuaries, Wiley, New York.
[8] Pethick, J. (2000): An Introduction to coastal Geomorphology, Arnold, London.
[9] Stanley, D.J. and Suist D.J.P.(ed)(1976): Marine Sediment Transport and environmental management;Wiley, NewYork.
[10] Wagret,P. (1968): Polderlands, Methuen, London.