

University of Kalyani



Department of Geography

REVISED SYLLABUS

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

2 Year PG Course (Semester System with Credit and Course)

(With Effect From: 2017-2018)

Department of Geography

University of Kalyani

Kalyani, Nadia-741235, West Bengal

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

SEMESTER I

Paper	Group	Course Title	Contact hours per week			Credit	Internal Assessment/ Evaluation	Examination/ Report/ Viva-Voice	Total Marks	Total Credit
			L	T	P					
I	A	Geotectonics	2	1	0	4	5	25	100	4
	B	Geomorphology	2	1	0		5	30		
	C	Hydrology	2	1	0		10	25		
II	A	Climatology	2	1	0	4	10	30	100	4
	B	Soil Geography	2	1	0		5	25		
	C	Biogeography	2	1	0		5	25		
III	A	Social Geography	2	1	0	4	5	25	100	4
	B	Cultural Geography	2	1	0		5	25		
	C	Political and Historical Geography	2	1	0		10	30		
IV (Prac)	A	Toposheet Interpretation and Fluvial Morphometry	0	2	6	2	10	30+10	100	4
	B	Survey with Instruments	0	2	6	2	10	30+10		
Total							400			

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

SEMESTER II

Paper	Group	Course Title	Contact hours per week			Credit	Internal Assessment/ Evaluation	Examination/ Report/ Viva- Voice	Total Marks	Total Credit
			L	T	P					
V [Open Course]	A	Earth and Society	3	1	0	4	10	40	100	4
	B	Geography of Resources and Hazards	3	1	0		10	40		
VI	A	Population Geography	3	1	0	4	10	40	100	4
	B	Settlement Geography	3	1	0		10	40		
VII	A	Environmental Issues in Geography	3	1	0	4	10	40	100	4
	B	Geography of Hazards and Disasters	3	1	0		10	40		
VIII (Prac)	A	Quantitative Techniques in Geography	0	2	6	2	10	30+10	100	4
	B	Field Report	0	2	6	2	10	30+10		
Total							400			16

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

SEMESTER III

Paper	Group	Course Title	Contact hours per week			Credit	Internal Assessment/ Evaluation	Examination/ Report/ Viva-Voice	Total Marks	Total Credit
			L	T	P					
IX	A	Geographical Thought	3	1	0	4	10	40	100	4
	B	Economic Geography, Transport Geography and Geography of Trade	3	1	0		10	40		
X	A	Advanced Cartography and Geoinformatics	3	1	0	4	10	40	100	4
	B	Research Methodology	3	1	0		10	40		
XI	A	Special Paper Theory	3	1	0	2	10	40	100	4
	B	Special Paper Theory	3	1	0	2	10	40		
XII (Prac)	A	Remote Sensing and GIS - I	0	2	6	2	10	30+10	100	4
	B	Remote Sensing and GIS - II	0	2	6	2	10	30+10		
Total							400			16

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

SEMESTER IV

Paper	Group	Course Title	Contact hours per week			Credit	Internal Assessment/ Evaluation	Examination/ Report/ Viva-Voice	Total Marks	Total Credit
			L	T	P					
XIII	A	Regional Planning and Developmental Issues in India	3	1	0	4	10	40	100	4
	B	Regional Geography of West Bengal	3	1	0		10	40		
XIV	A	Special Paper Theory	3	1	0	2	10	40	100	4
	B	Special Paper Theory	3	1	0	2	10	40		
XV (Prac)	A	Special Paper Practical	0	2	6	2	10	30+10	100	4
	B	Special Paper Practical	0	2	6	2	10	30+10		
XVI (Prac)	A	Seminar Presentation on Research Proposal of Field Based Project	0	0	8	2	10	30+10	100	4
	B	Special Paper Field based Project Report	0	8	0	2	10	30+10		
Total							400			16

SEMESTER-I

Paper – I: (Total Credit - 4, Total Marks – 100)

Group – A: Geotectonics

(Marks - 30: Internal Evaluation – 5, Semester-end Examination - 25)

Internal structure of the earth; Palaeomagnetism and Sea floor spreading; Theories of mountain building; Geosynclines; Earthquake and Vulcanicity: mechanism and distribution

Group – B: Geomorphology

(Marks - 35: Internal Evaluation – 5, Semester-end Examination - 30)

Fundamental concepts in Geomorphology; Evolution of topography in fluvial, coastal, arid and karst landscapes – Cyclic and Non-cyclic concepts; Elements of slope and different approaches of slope development; Concept of Fluvial morphometry – linear, areal and relief aspects; Periglacial processes and landforms

Group – C: Hydrology

(Marks - 35: Internal Evaluation – 10, Semester-end Examination - 25)

Significance of Global Hydrological Cycle; Aquifers: types and issues related to over utilization; Importance of Piezometric level; Basin hydrology; Run off cycle; Unit hydrograph and its application; Fresh water crisis: issues and management; Rain water harvesting; Significance of water-shed management

Mode of Internal Evaluation:

For Group A & B – Class test

For Group C – Individual term paper on any aspect of basin hydrology

SEMESTER-I

Paper – II: (Total Credit - 4, Total Marks – 100)

Group – A: Climatology

(Marks - 40: Internal Evaluation – 10, Semester-end Examination - 30)

Nature and scope of Climatology; Airmasses and atmospheric stability and instability; Adiabatic processes; Tri-cellular model; Monsoon: Recent theories of its origin; El Nino, Southern Oscillation and La Nina; Weather forecasting: short, medium and long range; Global warming and climate change

Group – B: Soil Geography

(Marks - 30: Internal Evaluation – 5, Semester-end Examination - 25)

Soil taxonomy and world pattern of soils; Soil nutrients and soil organisms; Micro-organisms and their relation with soil fertility; Soil pollution and soil degradation; Concept of integrated management of soil

Group – C: Biogeography

(Marks - 30: Internal Evaluation – 5, Semester-end Examination - 25)

Nature, scope and significance of Biogeography; Plant ecology: Concept of Adaptation, Succession and Climax; Impact of climate and soil on distribution of plants; Means and barriers of dispersal and migration of animals; Biodiversity and related issues; International Biological Programme; Man and Biosphere Programme

Mode of Internal Evaluation:

For Group A – Individual term paper on any of the global warming and climate change related issues

For Group B & C – Class test

SEMESTER-I

Paper – III: (Total Credit - 4, Total Marks – 100)

Group – A: Social Geography

(Marks - 30: Internal Evaluation – 5, Semester-end Examination -25)

Concept of space: geographical, material and social; Geography and social life; Social structure and Social processes; Social class and caste; Social distance; Geography of inequality: race, ethnicity and gender; Health and social well-being; Human ecology of disease and emergence of Medical Geography; Social Geography and Millennium Development Goals; Human Development Index and Gender Empowerment Measures; Subaltern studies in Geography

Group – B: Cultural Geography

(Marks - 30: Internal Evaluation – 5, Semester-end Examination - 25)

Culture as a geographical process; Mosaic of culture, language, religion and customs; Emergence of ethnic geography: ethnic neighbourhood and ghetto; Ethno-ecology of PTGs in India; Partition of Indian and Diaspora; Globalization, Cultural ecology and folk geography: study on folk architecture, folk music and dance, folk fairs and festivals; Emergence of Tourism Geography from Cultural Geography

Group – C: Political and Historical Geography

(Marks - 40: Internal Evaluation – 10, Semester-end Examination - 30)

Geographical perspectives on formation of State; Concept of State after Ratzel and Marx; Colonialism, Imperialism and Federalism for understanding core-periphery relationship; Concept of Geopolitics; Geopolitical significance of international water disputes with India and its neighbouring countries; Concept of Electoral Geography; Approaches to the study of geography of elections: Areal and Spatial Behavioural approaches; Spatial organization of electoral areas and the geography of representation

Scope and content of Historical Geography; Ancient period: Territorial organization of *JANAPADAS* in India; Agriculture, industry, trade and urbanization under the Mughal Empire; Plantation farming and textile industry during Colonial India

Mode of Internal Evaluation:

For Group A & C – Class test

For Group B – Seminar presentation on any aspect of folk geography in West Bengal

SEMESTER-I

Paper – IV: [Practical] (Total Credit - 4, Total Marks – 100)

Group – A: Toposheet Interpretation and Fluvial Morphometry [Credit: 2]

(Marks - 50: Internal Evaluation – 10, Semester-end Examination – 30+10)

Interpretation on structure, relief, vegetation and settlement pattern from topographical maps (Plateau and Plain); Nearest Neighbour Analysis of settlement distribution; Application of fluvial morphometric techniques on drainage basins demarcated on the topographical map;

Laboratory Note Book and Viva voce.

Group – B: Survey with Instruments [Credit: 2]

(Marks - 50: Internal Evaluation – 10, Semester-end Examination – 30+10)

Contouring by Prismatic Compass and Dumpy Level; Determination of Height by Theodolite (Base accessible and inaccessible case); Application of GPS in terrain evaluation; DGPS and Total Station;

Laboratory Note Book and Viva voce.

Mode of Internal Evaluation:

For Group A – Continuous assessment on map laboratory performances

For Group B – Performance during field survey

SEMESTER-II

Paper – V: [OPEN COURSE] (Total Credit - 4, Total Marks – 100)

Group – A: Earth and Society

(Marks - 50: Internal Evaluation – 10, Semester-end Examination - 40)

Ecological system of the earth- atmosphere, lithosphere, hydrosphere and biosphere; endogenetic forces- interior of the earth and surface configuration; exogenetic forces and resultant landforms- fluvial and arid landforms; concept of land and land use; land capability classification, carrying capacity of land; measuring land surface-concept of scale and map, procedures of land survey and map making using tape and theodolite;

Concept of society and space, material and social space, social structure and social processes, cultural realms, cultural diffusion; rural and urban settlements and its classification; Human Development Index; sustainable development

Group – B: Geography of Resources and Hazards

(Marks - 50: Internal Evaluation – 10, Semester-end Examination - 40)

Concept and classification of resources, conventional and non-conventional resources, distribution of energy resources (coal and mineral oil), crisis, conservation and management of resource; major economic activities- primary, secondary and tertiary activities;

Concept of hazards and disasters; physical hazards: tropical cyclone, flood, land slide with reference to West Bengal; social hazards: poverty and crime; management of hazards and disasters

Mode of Internal Evaluation:

For Group A – Class test

For Group B – Individual term paper on any hazard in West Bengal

SEMESTER-II

Paper – VI: (Total Credit - 4, Total Marks – 100)

Group – A: Population Geography

(Marks - 50: Internal Evaluation – 10, Semester-end Examination - 40)

Scope and content of Population Geography; Sources of population data; Population Geography as distinct from demography; Theories of population growth; Factors controlling fertility, mortality and migration; Demographic Transition Model; Limits to growth; Population policies – Pro and Anti Natal; Comparative study of population policies between India and China

Group – B: Settlement Geography

(Marks - 50: Internal Evaluation – 10, Semester-end Examination - 40)

Concept of Ekistics; Study on settlement hierarchies; Theories and models of settlement study: Central Place, Rank-size Rule and concept of Primacy; Types, pattern and segregation of rural settlements in India; Urban definition: World and India; Urbanization in India as multi-dimensional process; Concept of Million cities, Mega cities, Megalopolis and Ecumenopolis, Urban Sprawl, Urban Renewal and Rural-urban Continuum in Indian context

Mode of Internal Evaluation:

For Group A – Class test

For Group B – Individual term paper on application of any of the concept of settlement studies in Indian context

SEMESTER-II

Paper – VII: (Total Credit - 4, Total Marks – 100)

Group – A: Environmental Issues in Geography

(Marks - 50: Internal Evaluation – 10, Semester-end Examination - 40)

Concept of resource-population relationship; Types and significance of worldwide contemporary major environmental issues; Concept of ecological foot print; Sustainable development; Role of IUCN, UNDP, UNEP, IPCC and UNFCCC; Concept of participatory management of forest: Agro forestry, Social forestry and JFM; Wildlife conservation and management: Sanctuaries, National Parks and Biosphere Reserves w.r.t. India; Dams and development – displacement and rehabilitation issues; Environmental implications of River Linking Project; Dimensions of environmental movements in India

Group – B: Geography of Hazards and Disasters

(Marks - 50: Internal Evaluation – 10, Semester-end Examination - 40)

Concept and types of hazards and disasters; Assessment of risk and vulnerability; Concepts of hazard and disaster management; Climatic hazards: Tropical cyclones (prediction, precaution and mitigation), Marine/Tectonic hazard: Tsunami (prediction, precaution and mitigation), Hydrological hazards: Flash floods in Himalayan Region and floods in southern part of West Bengal, Sources, impacts and mitigation measures of Nuclear hazard and Radio-active contamination; CFC and Plastic hazard; Lead, Arsenic and Fluoride contaminations

Mode of Internal Evaluation:

For Group A – Class test

For Group B – Individual term paper on any particular hazard / disaster taken place recently

SEMESTER-II

Paper – VIII: [Practical] (Total Credit - 4, Total Marks – 100)

Group – A: Quantitative Techniques in Geography [Credit: 2]

(Marks - 50: Internal Evaluation – 10, Semester-end Examination - 30+10)

Location of Mean Centre of population and shift over time; Scatter diagram; Pearson's Product-Moment Correlation; Spearman's Rank Correlation; Regression: Least Squares Method; Concept of Probability and Normal Distribution; Skewness and Kurtosis; Hypothesis Testing: t-test, z-test and Chi-square test; Matrix Algebra; Shortest Path Analysis by Shimbil Index; Location Quotient and Lorentz Curve;

Laboratory Note Book and Viva voce.

Group – B: Field Report [Credit: 2]

(Marks - 50: Internal Evaluation – 10, Semester-end Examination – 30+10)

Field Report and Viva voce.

Mode of Internal Evaluation:

For Group A – Class test

For Group B – Continuous assessment during field survey

SEMESTER-III

Paper –IX: (Total Credit - 4, Total Marks – 100)

Group – A: Geographical Thought

(Marks - 50: Internal Evaluation – 10, Semester-end Examination - 40)

General character and development of Geographic knowledge: Contributions of Greek, Roman and Indian scholars during the ancient period and Arab scholars during the medieval period; Different schools of Modern Geography; Concept of paradigm shifts in Geography;

Dualism and dichotomies in Geography: Physical Geography and Human Geography, Regional Geography and Systematic Geography, Ideographic approach and Nomothetic approach; Positivism and Quantitative revolution in Geography; Hartshorne-Schaefer debate, System approach in Geography; Critical revolution in Geography; Humanistic Geography; Radical Geography; Behavioural perspectives in Geography; Welfare Geography; Feminism and Feminist Geography; Postmodernism and Postmodern Geography

Group – B: Economic Geography, Transport Geography and Geography of Trade

(Marks - 50: Internal Evaluation – 10, Semester-end Examination - 40)

Scope and advancement of Economic Geography; Concept and classification of resources; Concept of agricultural region; Concept and measurement of agricultural productivity and efficiency; Green revolution and White revolution in India; Concept of industrial region and industrial complex; Special Economic Zone; Growth of IT industry in India; Industrial policy of India: Role of Liberalization; Privatization and Globalization; Concept of Digital Divide

Concepts and measures of distance, accessibility and connectivity; Transport cost: factors and comparative cost advantages; Freight corridor; Concept of Ring road, By-pass, Golden Quadrilateral, North-South and East-West Corridor; Significance of trade in regional and national economy; Concept of Export Processing Zones, Exclusive Economic Zones, Forward trading and E-commerce; Freight equalization Policy on Indian trade; Role of GATT and WTO in international trade; Issues related to FDI in India's retail sector and cashless economy

Mode of Internal Evaluation:

For Group A – Class test

For Group B – Individual term paper on any emerging issue in economic geography

SEMESTER-III

Paper –X: (Total Credit - 4, Total Marks – 100)

Group – A: Advanced Cartography and Geoinformatics

(Marks - 50: Internal Evaluation – 10, Semester-end Examination - 40)

Cartography – nature, scope and development; Principles of Spherical Trigonometry; Basic Principles of Cartography; Nature and types of Geoid; Concept of Datum with special reference to NAD, Everest and WGS-84; Principles and properties of UTM Projections

Concept of Geoinformatics; Remote Sensing Platforms and Sensors; Nature of EMR, EMS, and interaction with atmosphere and surface materials; Different sensors and resolutions; Digital Image Processing – principles and approaches; Analytical Modelling in GIS, GPS-GIS integration

Group – B: Research Methodology

(Marks - 50: Internal Evaluation – 10, Semester-end Examination - 40)

Spectrum of Geographical Research and its approaches: Inductive and Deductive, Objective and Subjective; Critical issues in major areas of geographical research; Identification of Research Problem and Hypothesis Building; Methods of Sampling and sample design; Methodological orientation: Quantitative and Qualitative; Abstract and summery and synopsis: their differences; Referencing style and preparation of Bibliography

Mode of Internal Evaluation:

For Group A – Individual term paper on application of digital cartography / geo-informatics in management of any natural resource

For Group B – Preparation of bibliography on any field of geographical research

SEMESTER-III

Paper –XI: (Total Credit - 4, Total Marks – 100)

Group – A: Special Paper Theory (Agricultural Geography / Environmental Geography / Tourism Geography/ Urban Geography/ Fluvial Geomorphology) [Credit: 2]

Group – B: Special Paper Theory (Agricultural Geography / Environmental Geography / Tourism Geography/ Urban Geography/ Fluvial Geomorphology) [Credit: 2]

Paper –XI: Special Paper Theory (Agricultural Geography)

Group – A: Basic Concepts in Agricultural Geography [Credit: 2]

(Marks - 50: Internal Evaluation – 10, Semester-end Examination - 40)

Nature, scope and significance of Agricultural Geography; Approaches to the study of Agricultural Geography: regional, systematic, system analysis, behavioural and inter-disciplinary; Determinants of agricultural patterns: physical and non-physical determinants; Concept of sustainable agriculture and integrated farming systems; Agricultural region: concept and evolution; Techniques and methods of agricultural regionalization; Agricultural systems of the world after Whittlesey: shifting cultivation, intensive subsistence tillage, Mediterranean agriculture, commercial grain farming and commercial plantation; Significance of mixed farming; Models in agriculture: von Thunen's Model and Diffusion Model

Group – B: Emerging Issues in Agriculture [Credit: 2]

(Marks - 50: Internal Evaluation – 10, Semester-end Examination - 40)

Acquisition of arable land with reference to India: issues and options; Possible impact of climate change on agriculture; Crop calendar in question; Agricultural Carbon Credits; Application of biotechnology in agriculture – GM crops: issues and implications; Seasonality of crop diseases and pest attack; Role of agro-chemicals, bio-fertilizers and bio-pesticides; Impact of agriculture on environment; Issues in agriculture and nanotechnology options; Gender issues in agriculture; Child labour in agriculture; World patterns of hunger

Mode of Internal Evaluation

Group A: Class Test

Group B: Term paper based on emerging issue(s) in agriculture.

Paper –XI: Special Paper Theory (Environmental Geography)

Group – A: Concept [Credit: 2]

(Marks - 50: Internal Evaluation – 10, Semester-end Examination - 40)

Definition of relevant terms; Nature, scope and content of Environmental studies in Geography; Ecosystem; Ecology; Land-man ratio; Optimum population; Concept of population equilibrium, Gaia-hypothesis; Deep ecology; Organismic and holistic explanations; Environmentalism in geography; Spaceship earth; Stationary state economy; Concept of environmental system, environmental balance and environmental degradation

Group – B: Environment and Development [Credit: 2]

(Marks - 50: Internal Evaluation – 10, Semester-end Examination - 40)

Man and Environment: Case studies from river valley projects – Silent Valley and Narmada dispute with special reference to environmental movement; Earth summits: 1972, 1992, and 2012; Protocols: Montreal and Kyoto; Anthropogenic impact on environment: population, resource, development and environment; Environmental Impact Assessment; Environmental audit and Environmental Management Planning; Concept and methods of alternative agriculture; Use and misuse of forest resources and forest conservation; Tourism industry and environment: issues and challenges

Mode of Internal Evaluation:

For Group A – Class test

For Group B – Term paper on any specific environmental problem generating due to anthropogenic activities on environment, preferably from the student's own district

Paper –XI: Special Paper Theory (Tourism Geography)

Group – A: Tourism Basics [Credit: 2]

(Marks - 50: Internal Evaluation – 10, Semester-end Examination - 40)

Basic definition and concept of tourism; Tourism as a subject of multidisciplinary research; Nature, scope and development of Geography of Tourism; Tourism Geography as distinct from Tourism Management; Models on Tourist Motivation and Tourist Behaviour; Evolution of Tourism Typologies; Tourism as an industry; Hotel Industry and Tourism; Tourism and Transport: Road, Rail, Air and Water Transport Development for Tourism; Role of Tour Operators and Travel Agents; Concept of Destination Planning and Techniques of Visitor Management; Tourism Marketing with special reference to “Incredible India” concept

Group – B: Tourism and Sustainability [Credit: 2]

(Marks - 50: Internal Evaluation – 10, Semester-end Examination - 40)

Tourism as a System; Models in Tourism Studies – Irradex and Life cycle model; Impact of tourism on habitat, economy and society; Tourism carrying capacity and Environmental Impact Assessment (EIA); Concept of Sustainable Tourism; Agenda 21 and Tourism Industry; Mass tourism vs Ecotourism; Ecotourism activities and impacts; World consciousness on Sustainable Tourism: Declaration of Manila, Cape Town, Berlin, Bali and Kerala; Indicators of Sustainable Tourism; Protected Area management through Ecotourism; Emerging and future challenges for tourism in National Parks: Case studies from India; Problems of tourism in the Himalayas; Environmental code and conducts of Tourism; Coastal Tourism and CRZ Act; Tourism, Climate Change and Biodiversity Loss; Tourism and Resource Management; Conceptualization of nature and scope of Green Tourism

Mode of Internal Evaluation

Group A: Class test

Group B: Term paper on impact of tourism on habitat, economy and society in any Indian tourist destination (based on literature survey and E – searching)

Paper –XI: Special Paper Theory (Urban Geography)

Group – A: Background and Basic Concepts of Urban Geography [Credit: 2]

(Marks - 50: Internal Evaluation – 10, Semester-end Examination - 40)

Concept of urban, urbanism and urbanization; Attributes of urban places; Approaches to the Study of urban geography: traditional, modern and post-modern; Histogenesis of Urbanization with special reference to India – Ancient, Medieval, Colonial and Post-colonial Phases; Classification of Urban Settlements: J.M. Houston, G. Tralor , Mumford, C.D.Haris and Nelson; Metropolitan Concept, Concepts of Megacity, Megalopolis, Ecumenopolis, Conurbation, Counter-urbanization, Planned Towns, New Towns, Satellite Towns, Green/ Garden cities, Sister Towns, Urban Corridor, Rural-urban Fringe, Urban Sprawl, Urban Umland and Urban Primacy; Concept of City Region after Dickinson; Rank-size Distribution of Towns after Zipf and B.J.L. Berry; Perception of Urban-rural Continuum after Bailey.

Group – B: Urban Morphology [Credit: 2]

(Marks - 50: Internal Evaluation – 10, Semester-end Examination - 40)

Delineation of Functional and Planning Regions in Urban Arena –their typologies and significances; Theories of urban hierarchy and spacing of urban settlements after Christaller, Smailes and Philbrick, Role of Urban Hierarchy in Regional Planning, Significance of Urban Hierarchy in India; The theories and Model of Urban Morphology after Burgess, Homer Hoyt, Harris and Ullman, Mann, Sinclair with merits and demerits; Social area analysis after Shevky and Bell- Residential Segregation and Factorial Ecology.

Mode of Internal Evaluation

Group A: Class Test

Group B: Term paper on any specific urban issue

Paper –XI: Special Paper Theory (Fluvial Geomorphology)

Group–A: Basics of Fluvial Geomorphology [Credit: 2]

(Marks - 50: Internal Evaluation – 10, Semester-end Examination - 40)

Scope and significance of fluvial geomorphology; Fluvial system: concepts, components, input output with stores of material and energy; Variables of fluvial system: internal and external, adjustable and controlling; Scales in fluvial geomorphology: times and space scales; Channel initiation: theory of overland flow, theory of sub-surface flow; Drainage network: composition, laws of stream number and stream length, number of Topologically Distinct Channel Networks, classification of link types; Drainage evolution: parallel development and coalescence, headward extension and branching, lateral expansion; Analysis of drainage basin: Basin shape, form factor (Horton, 1932), ellipticity index (Stoddart, 1965), circularity index (Miller, 1953), influence of basin shape on hydrological regime; Basin size: area ratio and law of basin area, law of allometric growth and basin area; Relation of basin area with stream number and length; Flow regime: hydrological pathways, measurement of stream flow and annual flow regimes; Classification of natural streams by D.L. Rosgen.

Group – B: Mechanism of Fluvial Processes [Credit: 2]

(Marks - 50: Internal Evaluation – 10, Semester-end Examination - 40)

Stream power and energy; Mechanics of flow: uniform and non-uniform, steady and unsteady, laminar and turbulent, tranquil and rapid; Velocity and resistance: factors affecting velocity, flow resistance and viscosity; Mechanics of fluvial erosion: threshold of erosion, entrainment and bed erosion, headward erosion and channel lengthening, bank erosion by fluvial processes; Sediment load: nature and types of sediment load, sources of sediment load; River transportation: process of particle entrainment, initiation of sediment transport, selective theories of sediment transport, theories of equal mobility transport, transport of bed load and suspended load; Mechanics of sediment deposit: Channel competence, capacity and efficiency; Sediment deposition - processes, nature and characteristics of fluvial deposits; Flood plain and deltaic plain deposits.

Mode of Internal Evaluation

Group A: Class Test

Group B: Term Paper on any one Topic

SEMESTER-III

Paper –XII: [Practical] (Total Credit - 4, Total Marks – 100)

Group – A: Remote Sensing and GIS - I [Credit: 2]

(Marks - 50: Internal Evaluation – 10, Semester-end Examination – 30+10)

Principles of Aerial Photography; Stereovision and Photogrammetry; Delineation of overlapping area and effective area; Preparation of landuse map from Aerial photograph; Visual image interpretation: identification and delineation of various landforms, landuse and landcover from satellite images;

Laboratory Note Book and Viva voce.

Group – B: Remote Sensing and GIS - II [Credit: 2]

(Marks - 50: Internal Evaluation – 10, Semester-end Examination – 30+10)

Preparation of FCC and image classification (un-supervised and supervised) using software; GIS Data Processing – Raster based and Vector based principles, Integration of spatial and non-spatial data and preparation of Thematic maps using software;

Laboratory Note Book and Viva voce.

Mode of Internal Evaluation:

For Group A – Continuous assessment in RS laboratory

For Group B – Continuous assessment in GIS laboratory

SEMESTER-IV

Paper –XIII: (Total Credit - 4, Total Marks – 100)

Group – A: Regional Planning and Developmental Issues in India

(Marks - 50: Internal Evaluation – 10, Semester-end Examination - 40)

Concept of region; Regional typology: formal, functional and planning regions; Regional hierarchy; Region as a social unit; Concept of city region; Basic principles of regional planning; Techniques of regionalization, Stage model, Polarisation and Trickle-down theory, Model of cumulative causation, Core-Periphery theory, Growth pole theory

Concept of balanced and imbalanced development; Agro-politan approach in development; Regional disparity and diversity in India; Role of SGSY and MGNREGA in rural development in India; Concept of multilevel planning in India: Local, Regional and National Level planning; Regional planning and developmental issues in North-East India; Damodar valley region and Sunderban delta

Group – B: Regional Geography of West Bengal

(Marks - 50: Internal Evaluation – 10, Semester-end Examination - 40)

Delineation of Geographical regions in West Bengal; Identification of developmental bottle necks of the regions; Role of industry and transport in regional development; Study on the available natural resources and access to them; Regional status of human development and their constraints; Socio-economic developmental potentialities with special emphasis on the districts of Nadia and Murshidabad

Mode of Internal Evaluation:

For Group A – Class test

For Group B – Seminar presentation on any Block/ Municipal issue on developmental aspects (preferably from area of origin of individual students)

SEMESTER-IV

Paper –XIV: (Total Credit - 4, Total Marks – 100)

Group – A: Special Paper Theory (Agricultural Geography / Environmental Geography / Tourism Geography/ Urban Geography/ Fluvial Geomorphology) [Credit: 2]

Group – B: Special Paper Theory (Agricultural Geography / Environmental Geography / Tourism Geography/ Urban Geography/ Fluvial Geomorphology) [Credit: 2]

Paper –XIV: Special Paper Theory (Agricultural Geography)

Group – A: Agriculture in India [Credit: 2]

(Marks - 50: Internal Evaluation – 10, Semester-end Examination - 40)

Agricultural regions of India: types and salient features; Agricultural revolution in India - Green, White and Yellow: concept and implications; Impact of new economic policy and information technology on Indian agriculture; Contract farming and forward trading; Agricultural policies of India since independence; Food security, nutritional security and future strategy with reference to storage and Public Distribution System (PDS); Impact of MGNREGA on Indian agriculture; Farmers indebtedness and its fall out in India

Group – B: Agriculture in West Bengal [Credit: 2]

(Marks - 50: Internal Evaluation – 10, Semester-end Examination - 40)

Agro-climatic regions of West Bengal: types and characteristics; Land reform and role of Panchayat for agricultural development in West Bengal; Importance of farm size; Changing agricultural profile of West Bengal: cropping incidence, cropping intensity, cropping pattern, crop combination, crop diversification, crop specialization, crop productivity and yield; Agrarian crisis in West Bengal: nature and possible solutions; Ground water irrigation: issues and management; Organic farming and dry farming; Linkage between agriculture and industry; Scope of food processing industry; Problem of surplus management and storage; Significance of Mckinsey report

Mode of Internal Evaluation

Group A: Seminar presentation on any aspect of agricultural profile in any region in India.

Group B: Term paper based on specific issue(s) related to agriculture of any district in West Bengal using RS and/or GIS techniques.

Paper –XIV: Special Paper Theory (Environmental Geography)

Group – A: Environmental Issues [Credit: 2]

(Marks - 50: Internal Evaluation – 10, Semester-end Examination - 40)

Concept of the scale of environmental issues; Contemporary global issues in environment: Deforestation, Biodiversity loss, Global warming, Sea-level change, Wetland and wasteland; Social pathology - Crime and disease; Global resource scarcity with special reference to food and fresh water; Environmental pollution with reference to E-waste and other non-degradable waste products; Ground water contamination and noise pollution

Group – B: Environmental Management [Credit: 2]

(Marks - 50: Internal Evaluation – 10, Semester-end Examination - 40)

Challenges of natural and quasi-natural hazards and methods of adaptation and mitigation: Case studies from littoral tract of West Bengal; Salient features of India's urban environment and sustainable transportation; Concept of sustainable development; Eco-tourism: Case studies from the Himalayas and the coastal belt of India; Green technology and green economy; Renewable energy and recycle; Environmental ethics, policies and laws in India

Mode of Internal Evaluation:

For Group A – Seminar presentation on impact of any environmental pollution on habitat, economy and society in any place of India (based on literature survey and E – searching)

For Group B – Term paper on any environmental issue with its management plan using RS and GIS techniques

Paper –XIV: Special Paper Theory (Tourism Geography)

Group – A: Regional Dimensions of Tourism [Credit: 2]

(Marks - 50: Internal Evaluation – 10, Semester-end Examination - 40)

International tourism in the context of Globalization; China as growth engine for Asian Tourism; South East Asia as a Tourism region: Status of tourism in Singapore, Thailand, Malaysia, Indonesia, Vietnam, Cambodia, Laos and Myanmar; History and Development of Tourism in India; Tourism Circuits in India in the context of third world; Tourism in other SAARC nations: Case studies from Bangladesh, Sri Lanka, Nepal, Bhutan and Maldives; Major hindrances in International Tourist Flow (security, quality of food, shelter, water quality and sanitation, health issues, political instability and reservation fiasco)

Group – B: Tourism and Development [Credit: 2]

(Marks - 50: Internal Evaluation – 10, Semester-end Examination - 40)

Themes and subject matter of Geotourism; Tourism as an instrument for backward area development; Tourism and poverty alleviation: concept of pro-poor tourism; Ethnicity, culture and tourism; Tourism ethics and indigenous cultures; Levels of tourism planning – National, Regional and Local; Community involvement in tourism planning; Tourism and rural development; Urban tourism and its different dimensions; Issues and future prospects: Nature tourism, Adventure tourism, Ethno tourism, Wildlife tourism, Tea tourism, Heritage tourism and Medical tourism in West Bengal.

Mode of Internal Evaluation

Group A: Term paper on status of any international heritage tourism destination in any neighboring SAARC nations

Group B: Seminar presentation on problems and future prospects of any potential tourism destination of West Bengal

Paper –XIV: Special Paper Theory (Urban Geography)

**Group – A: Urban Processes, Social Analysis, Urban Spacing and Linkages [Credit: 2]
(Marks - 50: Internal Evaluation – 10, Semester-end Examination - 40)**

Processes of Urbanisation; Concept of urban space; Impact of Rural to Urban, Urban to Rural and Urban to Urban migration on the socio-economic structure of a specific urban area; Gentrification-Concept and its effects, Typologies, Theories and Impact analysis; Concept of Economic Marginalization and reasons behind the proliferation of Slums and Shanty Towns in Urban India; Economic Base Theory, Formal and Informal Economy; Types of Urban Linkages and its significance in the theory of Cumulative Causation after Gunnar Myrdal; Examples of Linkage-development in manifold sectors of India, Development of Migration-linkages in India during post-independence phase.

**Group – B: Emerging Urban Issues in India [Credit: 2]
(Marks - 50: Internal Evaluation – 10, Semester-end Examination - 40)**

Sanitation and Sewerage related problems in Indian cities- Recent Initiatives of Development and Case Study on KMC; Urban-social problems with special reference to Poverty, Crime and Juvenile Delinquency in Indian Metropolis; Urban transport system and its associated problems with special reference to mass transit and para-transit in Indian Megacities - Solution-strategies; Analysis on Urban Housing Policies in India-its Problems and Prospects; Urban Renewal and Urban Redevelopment in India - Role of JNNURM; Smart cities and AMRUT.

Mode of Internal Evaluation

Group A: Seminar presentation.

Group B: Term paper on any emerging urban problem in Indian towns / cities.

Paper –XIV: Special Paper Theory (Fluvial Geomorphology)

Group – A: Channel Morphology [Credit: 2]

(Marks - 50: Internal Evaluation – 10, Semester-end Examination - 40)

Channel forms and processes; Hydrological properties of channels: regime, velocity, discharge and energy; Channel geometry, bed configuration, bed forms and bed asymmetry; Longitudinal profile of river channel; Concept of most efficient channel: width, mean depth, maximum depth, channel form index; Channel pattern:controlling factors, types of pattern and their comparison; Meanders – morphological characteristics, geometry and flow; Concept of unit channel bar location and computation; Alluvial fans, deltas and estuaries of West Bengal, floods and flood plain formation; Changes of river channel through time: causes and evidences of channel shifting; Decay of river channels: causes and consequences; Concept of stream corridor and its management; Construction of dams and reservoirs and their impacts on fluvial system.

Group – B: Fluvial hazards and its Management [Credit: 2]

(Marks - 50: Internal Evaluation – 10, Semester-end Examination - 40)

Fluvial hazards: nature and types; Effects of Flood - River bank erosion, Channel modification and characterization;Flash flood – causes, spatial nature, behaviour, effects; Geo-environmental effects, control and management of fluvial hazards; Flood Hazards in India; Flood risk Management; Management of river discharge at Farakka Barrage, Management of riverbank erosion and floods with reference to West Bengal; River water as a resource and its sustainable management; River linking and its probable impact; Strategies and principles of watershed and floodplain management; Principles of Integrated River Basin Management approach; Regional Fluvial Geomorphology: forms, processes and geomorphic hazards of any two regions: a) Darjeeling Himalaya b) Terai and Dooars c) Rarh Bengal d) Ganga delta of West Bengal.

Mode of Internal Evaluation:

Group A–Seminar presentation

Group B- Term paper on any specific fluvial hazard of West Bengal

SEMESTER-IV

Paper –XV: [Practical] (Total Credit - 4, Total Marks – 100)

Group – A: Special Paper Practical (Agricultural Geography / Environmental Geography / Tourism Geography/ Urban Geography/ Fluvial Geomorphology) [Credit: 2]

Group – B: Special Paper Practical (Agricultural Geography / Environmental Geography / Tourism Geography/ Urban Geography/ Fluvial Geomorphology) [Credit: 2]

Paper –XV: Special Paper Practical (Agricultural Geography)

Group – A: Agricultural Data Collection, Analysis and Mapping [Credit: 2]

(Marks - 50: Internal Evaluation – 10, Semester-end Examination –30+10)

Data collection techniques in Agricultural Geography: primary and secondary; Agricultural Census; Crop Calendar and Ergograph; Crop diversification index after Gibbs-Martin; Crop productivity index after Enyedi and Shafi; Crop concentration index after Bhatia; Crop combination analysis after Weaver; Application of Statistical Software in agricultural research;

Laboratory Note Book and Viva voce.

Group – B: Soil Testing and application of RS and GIS [Credit: 2]

(Marks - 50: Internal Evaluation – 10, Semester-end Examination – 30+10)

Determination of moisture holding capacity, available N, P, K, pH, and organic carbon from soil samples, analysis and preparation of maps; Measurement of land capability; Preparation of Landuse maps and Thematic maps based on agricultural data using RS and GIS techniques; Spatial modeling in agriculture using RS and GIS technique;

Laboratory Note Book and Viva voce.

Mode of Internal Evaluation

Group A: Continuous assessment on performance in the application of statistical software for data analysis

Group B: Continuous assessment on performance in Agricultural Laboratory.

Paper –XV: Special Paper Practical (Environmental Geography)

Group – A: Environmental Survey and Mapping [Credit: 2]

(Marks - 50: Internal Evaluation – 10, Semester-end Examination – 30+10)

Preparation of Survey Schedule and Questionnaires for Perception Survey of Natural and Social Environmental Studies; Preparation of the Environmental Management Plan in any hazard prone area; Preparation and interpretation of Environmental Maps using RS and GIS techniques; Mapping of spatio-temporal variations of environmental parameters applying geoinformatics;

Laboratory Note Book and Viva voce.

Group – B: Detection of Environmental Pollution and Analysis through Laboratory Techniques [Credit: 2]

(Marks - 50: Internal Evaluation – 10, Semester-end Examination – 30+10)

Air: Measurement of Air Pollutants and Noise pollution; Soil: Acidity, Salinity and Alkalinity of Soil; Organic matter content in soil; Water: Acidity and Alkalinity of water; TSS and TDS in water; BOD and Total Hardness; Application of statistical software in Environmental data analysis;

Laboratory Note Book and Viva voce.

Mode of Internal Evaluation:

For Group A – Continuous assessment on performance in GIS Laboratory

For Group B – Continuous assessment on performance in Environmental Laboratory

Paper –XV: Special Paper Practical (Tourism Geography)

Group – A: Data Collection and Analysis [Credit: 2]

(Marks - 50: Internal Evaluation – 10, Semester-end Examination – 30+10)

Data collection techniques in Tourism Geography: primary and secondary; Query Building and E – searching; Ethnographic survey methods; Designing Questionnaires and application of Likert's Scale; Application of Delphi Techniques in Tourism Research; Accessibility and Connectivity Analysis of Tourism Hubs; Implication of TALC model in destination analysis; Tourism Forecasting: Qualitative and Quantitative methods; Application of SPSS in tourism research; SWOT analysis on tourism destination; Laboratory Note Book and Viva voce.

Group – B: Application of GIS [Credit: 2]

(Marks - 50: Internal Evaluation – 10, Semester-end Examination – 30+10)

Preparation of Tourism Land use map with application of geo – informatics; GPS survey and its application in tourism geographical research; GIS based thematic mapping of tourism infrastructure and superstructure; Vulnerability mapping of mountain and coastal destinations; Preparation of tourist literature applying techniques of digital cartography; Laboratory Note Book and Viva voce.

Mode of Internal Evaluation

Group A: Continuous assessment on performance in the application of statistical software for data analysis

Group B: Continuous assessment on performance in GIS Laboratory.

Paper –XV: Special Paper Practical (Urban Geography)

Group – A: Urban Concentration and Transport Network Analysis [Credit: 2]

(Marks - 50: Internal Evaluation – 10, Semester-end Examination – 30 +10)

Concentration of Urban Population by Location Quotient, Measurement of Inequality by Lorenz Curve, Sphere of Influence by Gravity Model, Break-point analysis, Analysis of Regional Disparity after Sopher's Index, Urban Growth Index and Decadal Growth Rate, Rank-size Distribution of Towns after Zipf and Pareto (Normal and Log/log), Nearest Neighbour Analysis, Weighted Score and Combination Analysis, Bivariate Regression and Spatial Correspondence, Urban Growth by Time Series analysis in Least Square and Moving Mean Method, Connectivity Mapping by Alpha, Beta and Gamma Index, Network Analysis by König /Associated Number and Cyclomatic Number, Accessibility Development by Detour Index, Measurement of Transport Accessibility by Shortest Path Matrix after Shimbel and Distance Flow Matrix;

Laboratory Note Book and Viva voce.

Group – B: Perception Studies on Urban Environs [Credit: 2]

(Marks - 50: Internal Evaluation – 10, Semester-end Examination – 30+10)

Index of Urbanization, Urban Intensity Index and Urban Ratio, Urban Density Distribution by Standard Deviation and Quartile Deviation Method, Urban Occupational Diversities and Specialization (After Nelson and C.D. Harris), Urban Flow Analysis-Dependant and Independent Flow, Urban Land use Mapping through Satellite Imageries- Supervised and Unsupervised Classification, Perception Survey on Burning Urban-Environmental Issues through Structured Questionnaire, Perception study of the City through neighborhood and intimacy mapping-evaluation of urban ecological arena with special reference to Urban Greens and Urban Blues, Quality of Life Index for Urban Residential Areas;

Laboratory Note Book and Viva voce.

Mode of Internal Evaluation

Group A: Continuous assessment on class performance

Group B: Continuous assessment on performance in the Laboratory of Urban Geography

Paper –XV: Special Paper Practical (Fluvial Geomorphology)

Group – A: Analysis of Drainage Basin [Credit: 2]

(Marks - 50: Internal Evaluation – 10, Semester-end Examination –30+10)

Drainage basin identification and delineation from topographical maps and images; Terrain Analysis of river basin; Drainage network analysis, classification of channel links, identification of Topologically Distinct Channel Network and Topologically Integrated Channel Network; Quantitative analysis of Channel Plan forms (Braiding, meandering, etc.) and indices; (Sinuosity index after Brice 1964, Schumm 1963), meander shape index; Morphometric analysis of drainage basin; Measurement of shape, size and area in different fluvial environment; Identification, analysis and interpretation from field observation and measurement applying GIS-RS technique; Channel bed topography: identification, measurement and analysis of in-channel geomorphic units; Sediment analysis of river basin deposits.

Laboratory Note Book and Viva voce.

Group – B: Hydro Geomorphology of River Basin [Credit: 2]

(Marks - 50: Internal Evaluation – 10, Semester-end Examination –30+10)

Construction and interpretation of Hydrographs: Monthly and Annual; Unit Hydrographs- Pnet method; Rating curves; Computation and interpretation of channel parameters –width (w), depth (d), wetted perimeter (p), cross-sectional area (A), flow parameters- Hydraulic radius, Velocity and Discharge; Calculation of efficiency of channel cross-section; Analysis of Hydro-system Approach of drainage basin; Mapping of flood inundation and risk zones, Vulnerability analysis of floods and riverbank erosion, Preparation of overlays of fluvial features and their analysis, Preparation of geomorphic map of a river basin; Interpretation of morphometric and morphologic changes from topographical maps and images.

Laboratory Note Book and Viva voce.

Mode of Internal Evaluation

Group A - Continuous assessment on class performance

Group B - Continuous assessment in Laboratory

SEMESTER-IV

Paper –XVI: [Practical] (Total Credit - 4, Total Marks – 100)

Group – A: Seminar Presentation on Research Proposal of Field Based Project [Individually] (Agricultural Geography / Environmental Geography / Tourism Geography/ Urban Geography/ Fluvial Geomorphology) [Credit: 2]

(Marks - 50: Internal Evaluation – 10, Semester-end Examination – 30+10)

Seminar Presentation and Viva voce.

Group – B: Special Paper Field based Project Report [Individually] (Agricultural Geography / Environmental Geography / Tourism Geography/ Urban Geography/ Fluvial Geomorphology) [Credit: 2]

(Marks - 50: Internal Evaluation – 10, Semester-end Examination – 30+10)

Project Report and Viva voce.

N.B.: Research proposal writing and field based project report may be the same topic

Mode of Internal Evaluation:

For Group A – Evaluation on write-up of the Research proposal

For Group B – Field performance