1. Program Specific outcome (PSO)

PSO of MA in Geography
PSO01: Geographical Thought
PSO02: Environment and Ecology
PSO03: Fundamentals of Remote Sensing and GIS
PSO04: Statistical Techniques in Spatial Analysis
PSO05: Advanced Physical Geography
PSO06: Contemporary Human Geography
PSO07: Computer Aided Mapping and Thematic Atlas
PSO08: Spatial Economic System
PSO09: Advanced Remote Sensing and GIS
PSO10: Natural Resource Management
PSO11: Principles of Political Geography
PSO12: Systematic Agricultural Geography
PSO13: Social Geography of India
PSO14: Urban Settlement System
PSO15:Regional Development
PSO16: Cultural Geography
PSO17: Geomorphic Analysis
PSO18: Rural Development Planning and Policy
PSO19: Project Report
PSO20: Regional Development in India
PSO21: Hydrology and Water Resource Management
PSO22: Geography of Energy
PSO23: Environmental Impact Assessment
PSO24: Natural Hazards and Disaster Management
PSO25: Urban Impacts on Natural Resources and Environment
PSO26: Historical Geography
PSO27: Geography of Landscape
PSO28: Demography and Population Policy
PSO29: Health Environment and Society
PSO30: Geography of Social Well-being
PSO31: Gender and Space with Special Reference to India
PSO32: Techniques and Methods of Regional Analysis
PSO33: Transport Network and Flows
PSO34: Urban Development Management and Policy

PSO35: Social Impact Assessment

PSO36: Analytical Physical Geography
PSO37: Biogeography
PSO38: Geography of Himalayas
PSO39: Terrain Modeling and Evaluation
PSO40: Political Geography of India
PSO41: Geography of Federalism
PSO42: Electoral Geography
PSO43: Political Geography of Central Asia
PSO44: Political Geography of Middle East
PSO45: Agricultural Development and Environmental Degradation
PSO46: Land use Planning
PSO47: Dryland Farming
PSO48: Food Security System
PSO49: Geography in India

PSO of MPhil/PhD in Geography
PSO01: Research Methodology
PSO02: Advanced Spatial Analysis
PSO03: Specialization

2) Course Outcomes (CO)

MA in Geography

Course 101: Geographical Thought
CO 1. Evolution of Geographic Thought: Changing paradigms – Environmentalism, Possibilism, areal differentiation, spatial organisation
CO2. Theory in Geography: structure, nature, type and applications in geography; human-environment interactions and social theory.
CO 3. Philosophical debates in Contemporary Geography: Critical understanding of positivism, behaviouralism, realism, Marxism, Structuralism, post-structuralism and postmodernism.
CO 4. Methods in Geographical Analysis: Epistemology of geography, critical

assessment and debates on quantitative, qualitative, field and cartographic methods in geography
CO 5. Future of Geography: changing nature, concepts, approaches and methodologies of geography in a Globalising World
CO 6. Progress and Contributions in Indian Geography

Course 102: Environment and Ecology
CO 1. Geography, Environment and Ecosystem: Population, Resources, Environment and Development; Concepts and Approaches; Sustainability and sustainable development; Global Environmental Problems.
CO 2. Urban Ecosystem: Environmental Problems and their Management-Air, Water, Noise and Solid Waste.
CO 3. Forest Ecosystem: Processes and Patterns; Problems and Management; Biodiversity.
CO 4. Desert Ecosystem: Desertification - Process and Patterns; Management Strategies.
CO 5. Mountain Ecosystem: Theory of Mountain Environment Degradation; Highland-Lowland Interactive Systems; Sustainable Mountain Development.
CO 6. Coastal Ecosystem: Issues and Problems- Mangroves, Coastal pollution, Cyclone, Tsunami.
CO 7. National Environmental Policies and Programmes.

Course 103: Fundamentals of Remote Sensing and GIS
CO 1. Remote Sensing: Historical development; components, types and various platforms; Global Positioning System.
CO 2. Aerial Photography: Stereoscopy, Principles of Photo Interpretation.
CO 3. Principles of Remote Sensing; Electromagnetic Energy; Interaction mechanism with atmosphere and earth surfaces; Photography vs. Image; Concept of resolution; Satellite and Sensors. Spectral responses of earth surface features, Visual interpretation of satellite images.
CO 4. Applications of remote sensing for landuse/landcover mapping and change detection, Environmental Studies, Urban, Hazard and Disaster, Water Resources, Agriculture etc.

CO 3. The Climate System and Climate Change: Paleoclimate; Climate variability; EL Nino Southern Oscillation; Climate change and its impact on environment.
CO 4. The Ocean System: Ocean topography; The Global Carbon Cycle; Sea surface temperature and sea-level fluctuation; Land – ocean interactions in the coastal zone.
CO 5. Soils: Nature, colour, texture; parent material and composition, soil moisture, pH factor, soil structure and mineral content
CO 6. Soil Development: Soil Horizon, soil profile, soil forming processes, temperature, soil classification and major soil types; the global scope of soils-soil order, desert and Tundra soil.
CO 7. The Hydrological System: Components of hydrological system-ecohydrology, mountain hydrology, arid hydrology, urban hydrology and ground water system; Biospheric aspects of the Hydrological cycle.

Course 202: Contemporary Human Geography
CO 1. Human Geography: changing nature or perspectives, issues and debates.
CO 2. Human Geography and Social Sciences: Critical understanding of social theory and human Geography
CO 3. Conceptualizing space and place: Structure and dynamics of space; relational framework of space and place; social construction of space and time; ethics of space and place
CO 4. Geography of difference and exclusion: Geographies of identity and difference related to class, religion, caste, gender and location; social justice and political geography of difference.
CO 5. Geographical organisation of power: Spatial meaning and definitions of power; dynamics of spatio-social interactions and power; geopolitics of power-territoriality and globalization.
CO 6. Geography of development: meaning, definitions and approaches; construction of development indicators; linking globalisation and new forms of development; local initiatives towards development.
CO 7. Geography of social action and movements: reasons and approaches to social movements; aspects of social security; social-environmental movements in

India.

Course: 203 Computer Aided Mapping and Thematic Atlas

CO 1. Each candidate shall be required to prepare a Thematic Atlas using suitable cartographic techniques of designing and mapping. Thematic Atlas focusing on any specific theme of interest will cover any region or area for purpose of mapping. All plates of the Atlas will be prepared with computers. The Thematic Atlas (Project Report) complete in all respects and duly signed by the teacher-in-charge, as having been prepared by the candidate-himself/herself, shall be submitted in duplicate on or before a date to be fixed by the department each year.

Course 204 : Spatial Economic Systems

CO 1.Economic geographic space: Economic grouping and typology of countries, stages of development of productive forces, the post colonial states, international détente.

CO 2. Socio-economic spatial relations: Territorial division of labour, location of productive forces, socio-economic complementarities, economico-geographic links, economic gravitations.

CO 3. Geospatial paradigms: Historical materialism, dialectics of nature, instruments of productions, relations of productions, types of economic systems.

CO 4. Geography of the world economy: World capitalist and socialist economy, scientific and technological revolution and the world economy.

CO 5. Spatial Economic Structures: United States of America, People's Republic of China and the Republic of India.

CO 6. Development through cooperation: Europian Union, Central American Common Market, South Asian Association of Regional Cooperation.

CO 7. System Growth and Spatial Dynamics: Types of growth and change, patterns of growth, development of spatial organizations, limits to growth.

Course 301: Advanced Remote Sensing and Geographical Information System

CO 1. Digital Image Processing: Digital image, storage and supply of digital data, radiometric and geometric correction, image registration, enhancement, filtering,

transformation, color enhancement, image fusion, perspective visualization
CO 2. Digital Image Classification: Image segmentation, Supervised and unsupervised classification; advanced classification methods, accuracy assessment; Digital change detection
CO 3. Principles of Thermal, Hyperspectral and Microwave remote sensing
CO 4. Terrain Modeling: Spatial interpolation techniques - types, uses and problems. Digital elevation / terrain model; Triangulated Irregular Networks (TIN); Watershed analysis.
CO 5. Attribute Data Management : DBMS – Hierarchical, Network and Relational
CO 6. Network Analysis; Analytical Modeling in GIS: Binary, Index, Regression and Process Based Modeling; Web-GIS; Errors in GIS
CO 7. Integration of Remote Sensing and GIS : applications to geosciences

Course : 302 Natural Resource Management
CO 1. Concept, models and approaches to natural resource management.
CO 2. Utilisation, Conservation and Management of Resources
CO 3. Problems of Resource Utilization
CO 4. Resource Appraisal: Ground, remote sensing and G.I.S.
CO 5. Sustainable Resource Development: Concept, method and dimensions, creating sustainable systems.
CO 6. Integrated Resource Development: Ecological, economic and social aspects; problems of river basin development.
CO 7. Institutions and Policy Making : Institutional arrangements; policy models; policy making and resource management.
CO 8. Utilization, management problems and policies of natural resources in India.

Course 303: Principles of Political Geography
CO 1. Ideas in Political Geography, Geography and its relationship with political economy and political sociology.
CO 2. Theoretical contributions to political geography: Ratzel, Hartshorne, Taylor and Harvey.

CO 3. Political Geography of Ocean: Maritime Boundaries, delimitations: principles and problems, international law of the sea.
CO 4. Electoral Geography: electoral systems, methods of studying electoral geography, geographical influence in voting.
CO 5. Geo-strategic views: Mahan, Mackinder, Spikeman, conflict between states and conflict resolutions, supra-national organisations and their geographical significance.
CO 6. Political Geography of the world order: Theories of international systems, evolution of contemporary world order, alternate models of development for the future.
CO 7. Administrative organisation of space: Methods of administrative organisation, territory, public administrations and landscape formation, polity as an agent of landscape change.

Course 304: Systematic Agricultural Geography
CO 1. Agricultural Geography: Origin and dispersal of agriculture - major theories of origin of agriculture; genecentres of agriculture - New World and Old World.
CO 2. Agricultural Regionalisation: Concept and criteria, Whittlesey's agricultural regions; agricultural typology-concept and criteria, hierarchy of world type of agriculture; agricultural regions of India.
CO 3. Models in Agricultural Geography : Bases of classification; normative models - locational model, diffusion model, and decision making models; combinational models.
CO 4. Agricultural Productivity: Concept, determinants and methods of its measurement; regional imbalances in agricultural productivity in India.
CO 5. Agricultural problems and strategies for agricultural developments; agricultural planning regions.
CO 6. New Perspectives in Agriculture: Urban agriculture; agri-business; food security, Sustainable Agricultural Development.

Course 305: Social Geography of India
CO 1. Social Geography of India: Nature and Scope, Indian society - a study in

unity and diversity: Centripetal and centrifugal forces, regional identities, modernization and role of media and new communication technology in shaping identities.
CO 2. Historical Bases of Socio cultural regionalization of India: Elements in the development of socio cultural regions; continuity and change in the historically evolved regional structure; implications of emerging regional structure since independence.
CO 3. Religion and Region in India: Religion and regional culture; Religious diversity and regional identity, Geographical factors explaining the distribution of the tribal religions, Hindus, Muslims, Christian, Buddhist, Jain and Sikh communities.
CO 4. Geographic analysis of Caste and Tribe: varna and jati-pan Indian structure and regional specificity, Caste Regions, caste and settlement morphology, distribution of SC population, Tribes in India, dominance and dispersion of Tribal population, penetration of tribal regions.
CO 5. Spatial Patterning of Language in India: linguistic diversity , Geographic patterning of languages, stability and fluidity of language returns; language loss, language retention and language shift.

Course 306: Urban Settlement Systems
CO 1. Growth of Towns and Cities – First Urban Revolution: Earliest Towns, Greek and Roman Towns, Urbanism during Dark Ages, Medieval Period and Renaissance; Second Urban Revolution: Industrial and Modern Towns; Urbanization
CO 2. The process and the patterns of the urbanisation in the developed and the developing countries; the process in India: colonial legacy, the post-independence characteristics.
CO 3. Influence of Sites and Functions; Distribution and Spacing of Towns, Actual vs. Optimum Size, and Concept of Hierarchy, The concept of urban primacy and over urbanization, rank-size rule, urban-rural continuum.
CO 4. The analysis of urban systems: structuralist perspectives, the systems approach
CO 5. Classification of Towns – Criteria, Age and Function; Political and

Regional Capitals; Inland Trading Centers; Ports; Mining and Industrial Towns; Towns with Miscellaneous Functions; Million Cities, Conurbations and Megalopolises.
CO 6. Urban Systems and the Regional Economy: Illustrations from India

Course : 307 Regional Development
CO 1. Regional Imbalance as a Policy Problem – General Spatial Equilibrium by Ohlin and Losch; Cumulative Causation by Myrdal; Spatial Equilibrium and Spatial Integration by Friedmann (1966)
CO 2. Growth, Income Distribution and Spatial Inequality – Aggregate Efficiency vs. Interregional Equity; Large City Problem and Urban Bias; Spatial Reorganization
CO 3. Urban-Industrial Growth Pole Strategies and the Diffusion of Modernization - Original Growth Pole Concept by Perroux; Transformation into Regional Theory; Two False Starts by Boudeville and Hirschman; USA as an Ideal Case Type: Williamson, North, Perloff, Schultz, Friedmann, and Berry; Dualistic Perspective and Geography of Modernization
CO 4. Polarization and the Development of Underdevelopment: An Anti-Thesis – Failure of Growth Pole Strategies; Polarized Development by Friedmann (1973), World Capitalist System by Frank, Colonialism and Spatial Structure of underdevelopment by Slater; Shared Space by Santos
CO 5. Neo-Populist Regional Development Strategies – National Development Strategy; Urbanization Policies for Rural Development by Johnson, and Rondinelli & Ruddle; Selective Spatial Closure by Stohr & Todtling; Territorial Regional Planning and Development from Below by Friedmann (1979); Agropolitan Development by Friedmann (1978)
CO 6. Space and Explanation in Regional Development Theory – Conceptions of Space by Perroux, and Friedmann & Alonso (1964); Spatial Analysis of Polarized Development: Spatial Centre-Periphery Model, Spatial Diffusion Analysis, Spatial Dependency Analysis; Functional Analysis by Hempel; Analysis of Locational Behaviour by Massey
CO 7. Limits of Spatial Policy & Territorial Regional Planning and State, Development and Regional Planning Practice – Territorial Regional Planning as

an Alternative; Territorial Interests; Organic Conception of Region; Development and Regional Planning; Policy Formation & Objectives and Planning Strategies & Practices in Developmentalist States

308: Cultural Geography

CO 1. Nature of Cultural Geography: Environmental Determinism; Carl Sauer and the Cultural Theory; the Morphology of Landscape; Superorganicism, its critique and the birth of New Cultural Geography; Post Modernism and the Cultural Turn.

CO 2. Reading Culture: Meaning, Sign, Reading, Textuality, Aesthetics, Ideology and Representation and the Production of Cultural Spaces.

CO 3. Cultural Politics of Spatial Dominence: Creating Hegemonic Cultures and Stereotypes- Mediums, Tactics and Strategies.

CO 4. Cultural Politics of Spatial Resistance: Reassertion of Marginal Groups in everyday life Worlds, the emergence of Alternative and Resistant Cultures.

CO 5. Globalisation of Cultures: Deterritorialisation of Spaces and Cultures, Role of Global Capital and Media in Hybridization of the World.

Course 309: Geomorphologic Analysis

CO 1. Approaches in Analysis of Geomorphological Forms and Processes : A state of art.

CO 2. Major Erosion Surfaces : Peneplains, pediplains, periglacial and exhumed surfaces; their identities, forms and models of evolutions.

CO 3. Mega-geomorphology: Plate tectonics and sea-floor spreading, modes of landform development and morpho-genetic regions.

CO 4. Analysis of Tectonic, Structural Landforms: Vertical movements and horizontal displacements rates of geomorphological subsidence, glacial eustasy and deltaic loading.

CO 5. Depositional Landforms and their Processes : Alluvial channel - its hydraulic geometry; forms of drainage patterns and systems; typology of river deposition.

CO 6. Microforms and Processes : Analysis of slopes, their classification and slope mapping; analysis of sediments in geomorphology, particle size

classification; their distribution and analysis.

Course 310: Rural Development – Planning and Policy

CO 1. Concept of Rural Development: Development theories and rural development in underdeveloped countries; Macro processes and micro-level development issues.

CO 2. Rural Development Processes in India: Major features of pre-colonial, colonial, and post-independence periods.

CO 3. Rural-Urban Relations: Rural Urban disparities, regional dimensions of migration, occupational patterns, levels of living and poverty.

CO 4. Area Approach to Rural Development: Services provision, settlement systems, growth centre approach, issues of spatial equity and efficiency in the provision of rural services.

CO 5. Target-group Approach to Rural Development: Review of development programmes for rural development.

CO 6. Technology and Rural Development: Economic and ecological impact of green revolution, technology of dry land farming, rural industrialisation, rural energy, technology and resource recycling.

CO 7. Institutional Aspects of Rural Development: Review of role of Decentralization, District Planning and Panchayats, Co-operatives, Land Reforms, Non-governmental Organizations in Rural Development.

Course 401 : Project Report

CO 1. Project report on a theme related to area of specialization.

Course 402 : Regional Development in India

CO 1. Changing Paradigms of Development – Economic , social , political , ecological regional policy and regional development plans , need for sustainable regional development.

CO 2. Models and Approaches to Development : Ideological approaches – capatilistic, socialistic and Gandhian; spatial and non- – spatial models , sustainable development approaches .

CO 3. Measuring Sustainability in a Region :Problems of measurement – indicators , scale, data availability, composite sustainability index, Human Development Index , Index of Governance.
CO 4. Identification of Regional Disparities – Spatial patterns and temporal trends at macro , meso and micro scales .
CO 5. Regionalisation for Sustainable Development : Agro climatic regions, metropolitian regions , ecological regions .
CO 6. Sustainability of selected regions – Industrially backward area , flood prone area, drought prone area , tribal area, hill area , desert area and border areas.
CO 7. Sustainable development strategies: Centre-state relations, administrative restructuring, watershed approach, urban management, microlevel planning.

Course 411: Hydrology and Water Resource Management
CO 1. Hydrological Cycle: Systems approach in hydrology, human impact on the hydrological cycle; Precipitation, interception, evaporation, evapo-transpiration, infiltration, ground-water, run off and over land flow; Hydrological input and output.
CO 2. River Basin and Problems of Regional Hydrology: Characteristics of river basins, basin surface run-off, measurement of river discharge; floods and droughts.
CO 3. Water Balance Pattern: Measurement of water balance; time-space characteristics of water balance, assessment of water requirement.
CO 4. Groundwater: Assessment and development, depletion and water quality parameters.
CO 5. Water Resource Problems: water demand and supply, water quality, interstate water dispute, water Rights, institutional and financial constraints, ecohydrological consequences of environmental degradation.
CO 6. Water Management: Water Management in disaster areas, water quality management and Pollution control, water management in urban areas, watershed management, integrated use of surface and ground water, Water Policy.

Course 412 : Geography of Energy

CO 1. Importance of Energy: Energy and Economic Development; Energy and Environment; Historical Development of Energy: the Global pattern.
CO 2. Energy resources of the World: Conventional and Non Conventional Sources, New Discoveries and Inventions; Production and Consumption, the World Patterns; Oil Prices and the International Economy, the Nuclear Debate.
CO 3. Energy in Developing and Developed Countries: Characteristics and Consumption Patterns.
CO 4. Energy Resources Of India: Conventional and Non Conventional Sources: Potential, Production and Consumption: Sectoral and Regional patterns of Energy Use, New alternatives and Inventions, Rural Energy in India, Energy policies.
CO 5. Contemporary Issues: Energy Security, Energy Efficiency, Energy Auditing, Conservation of Energy and Sustainable Development, the Geo-Politics of Energy; Emerging Issues in Energy sector.

Course 413 : Environmental Impact Assessment
CO 1. Environmental Impact Assessment: Principles of EIA, Concepts and approaches, historical development of impact assessment process, methods and procedure and currents issues in EIA.
CO 2. Environmental Impact Assessment: Stages, Screening and scoping, baseline data, Impact identification, Impact prediction, evaluation and mitigation, criteria and standards for assessing significant impact, cost-benefit analysis and valuation of environmental impacts, public participation, presentation and review and preparation of environmental Impact action plan.
CO 3. Selected National Procedures of EIA: The USA model of EIA; EIA in Canada and other countries model.
CO 4. Case Studies of Environmental Impact Assessment: Water Impact Assessment; Hydro-electric power Impact Assessment; Ecological Impact Assessment; Social Impact Assessment; Mining Impact Assessment; Cumulative effects Assessments.
CO 5. Environmental Impact Assessment regulations and policies in India.

Course 414: Natural Hazards and Disaster Management
CO 1. Concept of Hazards, Risk, Vulnerability and Disaster.

CO 2. Types of Hazards: Natural, man-made.
CO 3. Regional Dimension of hazard: Occurrence and trends, methods of identifying hazard prone regions.
CO 4. Disaster Losses and Impact – Displacements, livelihood, economy and infrastructure, health.
CO 5. Response to Disasters: International, national, government, non government, community and individual, media and education.
CO 6. Mitigation and Management: Plans and policies; engineering, economic, social, political and policy initiatives.

Course 415: Urban Impacts on Natural Resources and Environment
CO 1. Urban Dynamic and resource use: driving forces of urban growth and changing resource use.
CO 2. Consumption of natural resources in city systems: water, energy, land, soil, biofuels, vegetation and other minerals.
CO 3. Ecological foot prints of mega cities in resource – source regions.
CO 4. Production of resource – waste in urban areas: Production system and generation of wastes, levels and trends in air pollution, water pollution, degeneration of land and soils and solid waste.
CO 5. Issues related to disposal of wastes within peri–urban settings: Impact of air, water and solid waste disposal beyond city boundaries.
CO 6. Hazards and disasters in the cities: Issues of impacts, vulnerability, risks, exposure and mitigation.
CO 7. Climate change and impact on water resources in the cities.

Course 421: Historical Geography
CO 1. Approaches and contribution to the study of historical geography: over view of European and American contributions to historical geography.
CO 2. The study of historical geography in India – critical evaluation of methodologies and approaches.
CO 3. Evolution of the cultural landscape of India from pre- historic times to the present
CO 4. Resources, environment, settlements, territorial organization, economy and

trade routes in early historic India.
CO 5. Centres of pilgrimage and geography of sacred places
CO 6. Economic activities, settlement patterns, forest and trade routes, territorial political divisions in the medieval period.
CO 7. Role of coastal and interior centres, developments in resource use, settlements, and transportation and their effects in the colonial period.
CO 8. Urbanisation, migrations, famines, diffusion of land grant settlements, deforestation in the post colonial India.

Course 422: Geography of Landscapes
CO 1. Landscapes in Geography and beyond: Defining space and place, theoretical approaches in understanding landscapes.
CO 2. Spatial thinking and spatial behaviour in Landscapes: Spatial boundaries and socio-spatial construction of landscapes, mental maps and landscape imagery, psycho-social geographies.
CO 3. Politics of Landscapes: Insider and outsider view of landscapes – colonial, indigenous landscapes, contested landscapes, landscapes and memory.
CO 4. Representation of landscapes: Articulation and re-articulation of landscapes in literature, films, art, music and popular media with particular reference to India.
CO 5. Built environment and landscapes: Cityscapes and houses, street scenes, multiplexes and malls.

COURSE 423: Demography and Population Policy
CO 1. Population Geography: Nature, Scope, Development, Sources of Population Data (Census, Registration Systems, Population tables).
CO 2. Theories of Population: Malthus and his Critique; the Demographic Transition Theory.
CO 3. Population Composition: Age, Sex, Literacy, Rural- Urban.
CO 4. Fertility and Mortality: Measurements, Theories, Regional Patterns.
CO 5. Migration: Theories, Typologies, Patterns and Flows; Causes and Consequences
CO 6. Human Development: Concept, Construction of HDI, Regional patterns.

CO 7. Political Economy of Population and the Politics of Population Control.

COURSE 424: Health, Environment and Society

CO 1. Perspectives on Health: Definitions; linking environment, development and health; driving forces in health and environmental trends- population dynamics, urbanization, poverty and inequality, science and technology and life styles.

CO 2. Pressure on Environmental Quality and Health : Human activities and environmental pressure- landuse and agricultural development; industralisation; transport and energy.

CO 3. Exposure and Health Risks: Air pollution; household wastes; water; housing; workplace; global environment change; multiple challenges for health protection.

CO 4. Health and Disease in Environmental Context with special reference to India: Estimating the burden of disease-acute respiratory infections, diarrhoeal diseases , tropical vector-born and newly emerging diseases, injuries and poisoning; mental health conditions, cardiovascular diseases and cancer.

CO 5. Climate Change and Human Health: Changes in climate system - heat, cold and air pollution; extreme weather events; sea level fluctuation; ozone depletion; effects on biological disease agents; food production and nutrition.

CO 6. Linkage Methods for Environment, Development and Health Analysis: Approaches to linkage analysis; health and environmental analysis for decision making; development of environmental health indicators; assessment of health effects.

CO 7. Promotion of environmentally sound healthy settings in India - Districts; cities, neighbourhoods, institutions, markets.

COURSE 425: GEOGRAPHY OF SOCIAL WELL BEING

CO 1. Welfare Geography and Social Well Being: Theoretical approaches and Development; Human needs and wants; State of Well being and Level of Living, Welfare as the focal theme in human geography.

CO 2. Discrimination, Deprivation and Poverty: Concept of absolute and relative deprivation; Discrimination and Deprivation, place and people’s poverty,

geographic patterns of rural and urban poverty.
CO 3. Regional Inequalities in Social Well Being: Key indicators of well being, Assessing social well being- choice of indicators , Inter regional differences in levels of social well being; implications for human resource development.
CO 4. Access, Empowerment and Political Participation: Common property resources and access, participation of marginalized groups in decision making, 73 and 74 amendments to constitution, caste succession and rise of regional aspirations.
CO 5. Well Being in a globalizing world: India shining and India invisible, Privatization of welfare sectors, conspicuous consumerism and relative deprivation

COURSE 426 : GENDER AND SPACE WITH SPECIAL REFERENCE TO INDIA
CO 1. Conceptualising Gender within Geography: Social construction of the feminine and masculine, Development of and theoretical approaches to the study of Gender in geography; Analysing gender and space in India.
CO 2. Examining Gender in relation to space: Division of space in to private and public spaces, Gendered environments, gendered access to and experience of space; Spatial variations in the construction of gender.
CO 3. Spatial Patterns and Bases of Gender inequalities: Patriarchy, son preference, social value; new reproductive technology, skewed sex ratios, gender disparities in social wellbeing, gendered patterns of crime and violence.
CO 4. Gender and “other spaces”: Representations of gender in media space, the commodification of feminine and masculine- reassertion of indigenous gender identities.
CO 5. Gender, Power and Policy: Concept of gender relations, strategic and practical needs; Gender and Development-issues and concerns, Policy analysis from a gendered perspective.

Course 431: Techniques and Methods of Regional Analysis
CO 1. Population Projection and Migration Estimation – Comparative Forecasting, Extrapolation, Ratio & Correlation Methods, and Growth

Composition Analysis; Past Interregional, Rural-Urban and Future Migrations
CO 2. Regional Income Estimation and Social Accounting – National Income Accounts, Regional Income Measurements, and Regional Social Accounting
CO 3. Interregional Flow Analysis and Balance of Payment Statements – Location Quotient, Commodity Flow Analysis, Money Flow, and Balance of Payment Statements
CO 4. Regional Cycle and Multiplier Analysis – Industrial Composition & Regional Cycles, Regional Multipliers, Interregional Trade Multiplier, Regional & National Cycles
CO 5. Regional Industrial Location and Composition Analysis – Comparative Cost Approach, Labor Coefficients, Coefficient of Localization and Localization Curves & Ratios, and Coefficient of Specialization & Diversification Index; Modern Weberian Framework, Location Quotient and Shift-Share Analysis
CO 6. Interregional and Regional Input-Output Techniques – Statistical Framework, Basic Problems, Projection, Final Demand Sectors, and Constant Coefficients; Interregional Linear Programming
CO 7. Decision Analysis – Optimization Techniques, Value Tradeoffs and Risk Aversion; Project Evaluation – Aggregative (Benefit-Cost) & Disaggregate Approaches; Welfare and Inequality Analysis

Course 432: Transport Network and Flows
CO 1. Transport for spatial interaction: Spatial interaction and time-space convergence, enlarging the catmint area of markets, dynamic relationship between transport and spatial readjustment---Role of transport as a lead sector.
CO 2. Problem of accessibility: The transport network; Network shape and location; Regional variations in its density; Methods of measurement, transport and spatial processes; Traffic flow and regional interaction.
CO 3. Graph theory and Network Geometry; Concept of topology, topological measurement of network efficiency
CO 4. Urban Transport: Profile of urban transport facilities; Traffic in towns; Transport services and urban land use pattern, role of intermediary transport modes; modal split.
CO 5. Regional Transport Planning: The framework of regional transport

Planning traffic generation; methods of forecasting;zonal interchange of traffic; mode and route assignment methods.
CO 6. Indian Transport: Transport development during colonial and plan periods; transport and regional structure of Indian Economy.

Course 433: Urban Development – Management and Policy
CO 1. Urban Issues: Problems and challenges of urbanization; urbanization trends, patterns and impacts; urban economy; urban poverty; social &physical infrastructer; urban enviorment
CO 2. Components of Urban Management: Scope for urban management decentralization and local autonomy; intersectoral linkages; public-private partnership; capacity building - resource mobilization and institutional strengthening; civic engagement; information base and governance.
CO 3. Environmental Planning and Management: Environmental indicators and mapping; wastewater management; solid waste management; control of air pollution; planning for disaster mitigation.
CO 4. Land Management : Importance of land in urban development; landuse and planning ; land regulation and policies; land values and prices ; land market assessment; land development strategies.
CO 5. Slum Improvement and Upgradation: Evaluation of slum improvement programmes and schemes; resettlement and rehabilitation actions; slum development through participation of slum dwellers; security of land tenure; infrastructure development in slums.
CO 6. Infrastructure Management: Traffic and transport management; healthcare services; water resources and supply management; power supply, financing urban services; integrated infrastructure development planning.
CO 7. Urban Poverty Alleviation: City as an economic space; urban basic services for the poor; participation of poor in governance of poverty; access to urban land; expanded employment opportunities; environmentally sound shelter ; supportive government policies.
CO 8. Management Towards Sustainable and Safer Cities

Course 434: Social Impact Assessment

CO 1. Fundamentals of Social Impact Assessment : Concept; scope and need: goals, evolution; typology.

CO 2. Development, process and Social Impacts: Process of socio-economic development; major development types, transport and communication, river valley projects; irrigation projects; industrial development, urban development; social risks in development projects.

CO 3. Displacement and Resettlement Planning : Relocation, resettlement and involuntary migration; resettlement area development planning; project management; resettlement monitoring and evaluation; development of Management Information System (MIS) for resettlement.

CO 4. Techniques and Methods of SIA : Delphi technique, Cost-benefit analysis, Checklist methods, matrix method, linear graphs and network analysis, GIS, Expert system.

CO 5. Social Impact Assessment (SIA) : SIA process-screening, scoping, base-line and census surveys; identification and measurement of impacts; public consultation process; mitigation and avoidance of impacts; preparation of resettlement action plan.

CO 6. Case Studies on SIA : Road construction, dams, irrigation projects, new town development; industrial relocation; urban development projects; hazards and disasters.

CO 7. Social Impact Assessment and related policies and legislation in India

Course 441: Analytical Physical Geography

CO 1. Humidity and Aridity Indices: Koeppen, Bailey and Thornthwaite classification; soil-water balance determining climatic comfortability.

CO 2. Extreme value distribution for river discharges leading to flooding; Waybill's plotting position, Gumbel and Log Pearson Type III distributions.

CO 3. Surface Soil Loss Equations of Watersheds.

CO 4. Aerial Platforms and aerial photography, photoscales and stereoscopy; Aerial photo interpretation keys; identifying salient structures and landforms for given stereo-pair.

CO 5. Rock and mineral identification.
CO 6. Topographic Map Reading and Landform Mapping.
CO 7. Interpretation of Geological Maps.
CO 8. Quantitative Analysis of Morphometric data.

Course 442: Biogeography
CO 1. Biogeography: Concept, approaches and relevance.
CO 2. Evolution of Plants and Animals: Theories, classification and characteristics.
CO 3. Community Dynamics and Energy Flow: Food webs, biogeochemical pathways, ecological succession, climax concept, and ecosystem balance.
CO 4. Factors Influencing the Community: Physical , biological and human.
CO 5. Floristic and Zoogeographic Division with special reference to India: Migration and dispersal, barriers and disjunctions; latitudinal and altitudinal distribution, realms, regions and provinces.
CO 6. Major Ecological Communities: Composition and Structure - forest, grassland, desert, island, mountain and aquatic.
CO 7. Adaptations of Plants and Animals to the Environment : Classification and characteristics.
CO 8. Biodiversity in India: Concept, distribution, legislation, conservation and institutions.

Course 443: Geography of Himalayas
CO 1. Origin of Himalayas: Himalayas as a regional entity – physical, historical, social -cultural, ecological, sustainable regional development.
CO 2. Development Process – Pre-colonial, colonial, independence and post war period and present trends
CO 3. Sectoral Development – agriculture, horticulture, forestry, animal husbandry, mining, tourism.
CO 4. Resilience and vulnerability - environmental and political.
CO 5. Approaches to Development - hill area region development, highland – lowland development, watershed approach, integrated resource management.
CO 6. Spatial Characteristics of Development – indicators of development,

regional disparities, regions at risk.
CO 7. Search for a Sustainable Himalayas – movements and identity, non – government organizations, decentralization and panchayati raj institution and laws.

Course 444: Terrain Modelling and Evaluation
CO 1. Principles of Photogrammetry: Stereoscope Parallax and height determination; Orthorectification; Global Positioning System based altitude determination; contouring.
CO 2. Digital Terrain Model: Contour/point interpolation – IDW, Spline, Krigging etc.; SAR Ineterferometry; Laser Scanning; Quality assessment of DTM.
CO 3. Terrain Analysis on grided DEM: slope, aspect, curvature, flow direction, watershed delineation etc.; Terrain classification; Secondary topography attributes-wetness indices, stream-power indices, radiation indices, temperature indices etc.
CO 4. Geomorphological, Hydrological and Biological applications of Digital Terrain Model.
CO 5. 3-D visualization of the terrain and identification of landform and land cover features.

Course: 451 POLITCAL GEOGRAPHY OF INDIA
CO 1. Geographical Bases of the Indian State: Territoriality, Location and size; Population: Distribution, ethnic and religious composition, quality; Implications in the current geopolitical context.
CO 2. Geographical Factors in India's Political History: Centripetal and centrifugal forces; Role of terrain, Rivers and sea coasts in shaping political history;
CO 3. Geography of internal conflicts and problems of Nation Building: Religious conflicts: Linguistic conflicts, separatist movements, terrorism; environmental movements, river water disputes.
CO 4. Geography of Electoral support and Representation: Constituencies and their evolution, Redstricting: Issues and concerns; Patterns of electoral support

and representation; politico electoral regions of India
CO 5. Geography of International Relations: India's bilateral relations with SAARC nations; India's position in the Indian ocean region; Between two worlds India.'s position in world politics.

Course 452: Geography of Federalism
CO 1. The State: Concept and evolution; Nation, and the nation-states, types of states, shape and location of state.
CO 2. Definition of Federalism: Concept, approaches and types, geography and federalism.
CO 3. A Spatio-temporal analysis of the classical federation of Switzerland.
CO 4. Evolution of Indian Federation: Pre-colonial period, colonial period, post-colonial period and state reorganisation.
CO 5. Centre-State Relations: Spatial nature of administrative, judiciary and financial relations.
CO 6. Government's Policies: Development planning, agricultural policies, industrial policies, land reforms and Panchayati Raj.
CO 7. Regionalism and its Manifestations: Types of movements, Inter-State river water disputes, Inter-State boundary disputes.

Course 453: Electoral Geography
CO 1. Scope and Contents of Electoral Geography: Evolution of electoral geography in different phases: Review and understanding of work done in electoral geography with special reference to India: Scope of Electoral Geography.
CO 2. Types of Electoral Systems
CO 3. Source Material, techniques and approaches in electoral geography.
CO 4. The Geography of Power through Elections.
CO 5. Case Studies of Indian Elections.

Course 454: Political Geography of Central Asia
CO 1. Central Asia in Global Perspectives: Central Asia and the world, external

links, political alignment and geopolitics.
CO 2. Physical Environment: Relief, landscape, temperature, pressures and winds directions, water balance and environmental hazards.
CO 3. Economic Structure: Natural resources , livestock , crops, agricultural regions and evolution of economic regions.
CO 4 Cultural Landscape: Ethno- linguistic region, human development, rise of great powers, region in the period of Bolshevik revolution.
CO 5 Political Systems: Political parties, extremist politics, radical movements and foreign policy.
CO 6 Transport and Communication: Railways, roads, airways and international tourism.
CO 7 Perspective and Linkages of the Region with Russia and its Southern Neighbours.

Course 455: POLITICAL GEOGRAPHY OF MIDDLE EAST
CO 1. Middle East as a region: Territorial Evolution, space relationship and interdependencies.
CO 2. Political history and administrative structure: Evolution of national boundaries and administrative structures.
CO 3. Geographical bases of geo-ethnic regions: Relief, climate, language, migration, types of geo-ethnic regions.
CO 4. Economic structure: Agriculture, mineral oil, industry, role of petroleum in regional economies.
CO 5. Conflict resolution: Economic, social, political, centripetal and centrifugal forces.
CO 6. Foreign Policy: Spatial Problems, linkages with developing and developed countries.
CO 7. Middle East and the global economy.

Course 461: Agricultural Development and Land Degradation
CO 1. Agricultural Development: Concept, criteria and historical perspective of agricultural development

CO 2. Determinants of agricultural development: Physical; techno-economic; cultural and socio-institutional
CO 3. Agricultural Development in India: Pre-Independence period; Post-independence period; dynamics of agricultural land use; agricultural productivity; socio-economic and ecological consequences of agricultural development.
CO 4. Land Degradation: Concept, process and approaches, Regional pattern and consequences of: ground water depletion and contamination; salinity and alkalinity ; deteriorating soil fertility and soil erosion.
CO 5. Land Degradation in India: Identification and delimitation based on NWDB; classification and their spatial distribution; regeneration of degraded land and its sustainability; Case Studies
CO 6. Sustainable Agricultural Development: Concept and methods; issues and strategies of sustainable agricultural development.

Course 462: Landuse Planning
CO 1. Approaches to Landuse Surveys: Census approach, Unit area approach; sampling approach; Remote sensing approach; review of landuse surveys in India.
CO 2. Determinants of Landuse: Physical, techno-economic, institutional, and socio-cultural.
CO 3. Models and Theories of Landuse: General landuse model, Diagrammatic model, Category model of NRSA, Physical Optima, Economic Optima, Model of Landuse Competition Locational model.
CO 4. Dynamics of Landuse and Land Cover: Past trends and emerging patterns; analysis of landuse change; monitoring rural landuse change.
CO 5. Land Capability Classification: Concept and criteria; land capability classification in U.S.A.,China, U.K. and India; land capability and landuse planning in India.
CO 6. Land use Planning: Agro-climatic region, agricultural planning region, landuse policy and planning.

Course 463: Dryland Farming
CO 1. Dryland farming: Concept, nature and scope; methods of identification and

delimitation
CO 2. Dryland characteristics and degradation process: Physical, biological, social and institutional
CO 3. Models of Dryland Development and management: Risk and uncertainty model
CO 4. land Capability Classification in Dryland: Concept, criteria and capability classes, patterns of general landuse
CO 5. Dryland Farming Technology and Cultivation Practices: Absorption of rainwater in the soil, soil moisture conservation, and erosion control; availability and potential of irrigation; patterns of crop landuse and crop combination; agricultural productivity.
CO 6. Problems and Prospects of Dryland Agriculture: Alternate mode of landuse opportunities: Animal Husbandry, forestry, horticulture and pisiculture.

Course 464: Food Security System
CO 1. Food Security : Concept, approaches, indicators and methods of measurement..
CO 2. Distributional Patterns of Food Resources: Agriculture, animal husbandry, inland fisheries, forest, horticulture and marine.
CO 3. Factors and Patterns of Food Resources Consumers : Population, density and distribution, age, sex and occupation.
CO 4. Food Resources and Human Consumer Interface: Demand and availability of food resources in calorific and monetary value, poverty, hunger and vulnerability.
CO 5. Regional Pattern of Food Security : Bases of measurements, comparison of relations with developed countries and developing countries on selected parameters of food security.
CO 6. Regional Dimensions of Food Security in India: Distributional pattern of consumers - total population and agricultural population; food availability - calorific and monetary value, food security and insecurity regions, food consumption and nutritional status, problem of malnutrition.
CO 7. Public Distribution System and Food Security: Structure and Policy of P.D.S; Regional Variation, Transport Network and P.D.S, Impact of P.D.S. on

food security with special reference to non-food crop regions of India.
CO 8. Food Security through Sustainable Agriculture.Global environmental change and food security and other mitigation strategies.

MPhil/PhD in Geography

Course 1: Research Methodology
CO 1: Data Collection, Analysis and Thesis Writing

Course 2: Advanced Spatial Analysis
CO 1: Techniques of Qualitative and Quantitative Research (GIS and Spatial Statistics)

Course 3: Specialization
CO1: Specialized paper in any one area of Geography

3) Student-Computer Ratio: 15:1

CO 5. GIS: Definition and Applications; Components and Elements of GIS; Development of GIS technology; Geographic objects: point, line and area; analog and digital maps; theoretical models and framework for GIS, representation of geographic data-base; coordinate systems and map projections.
CO 6. Data Input, Storage and Editing: Nature of geographic
CO 7. data: Spatial and Attribute Data, Concept of vector and raster based models; data input devices: Digitization; external data bases; storage and manipulation of GIS data bases;
CO 8. GIS and Spatial Analysis: Neighbourhood analysis; Proximity analysis and buffers; Overlays Analysis – raster and vector based overlay and their applications; Presentation of GIS output.

Course: 104 Statistical Techniques in Spatial Analysis
CO 1. Statistics and Statistical Data: Spatial and non-spatial; centrographic measures in geography.
CO 2. Probability theory, probability density functions with respect to Normal, Binomial and Poisson distributions and their geographical applications.
CO 3. Sampling: Sampling plans for spatial and non-spatial data, sampling distributions; sampling estimates for large and small samples tests involving means and proportions.
CO 4. “F” Distribution and Analysis of Variance –“one-way” and “two-way” analysis.
CO 5. Non-parametric Tests: Chi-Square, Kolmogorov-Smirnov, Mann-Whitney and Kruskal-Wallis.
CO 6. Correlation and Regression Analysis: Rank order correlation and product moment correlation; linear regression, residuals from regression, and simple curvilinear regression; Introduction to multi-variate analysis.
CO 7. Time Series Analysis: Time Series processes; Smoothing time series; Time series components.

Course 201: Advanced Physical Geography
CO 1. Earth System: Physical processes, the interaction and linkages.
CO 2. Landscape ecology: mountains, deserts, and coastals.