

**Department of Geography
University of Pune**

**Syllabus for M.A./M.Sc. Geography
Semester I**

**Department of Geography
University of Pune**

**Syllabus for M.A./M.Sc. Geography
Semester I**

Code No: Gg:1011

Title: Principles of Geomorphology

No. of Credits: 3

No. of Periods: 45

Sr. No.	Topics	Lectures
1	Introduction to Geomorphology as a science and its brief history; Fundamental concepts in geomorphology, main branches of Geomorphology	4
2	Interior of the Earth, evidence from temperature, pressure density and earthquake waves	3
3	Holmes Convection Current Theory; Isostasy; Wegener's Continental Drift Theory	3
4	Distribution of oceans and continents – Palaeomagnetism, Seafloor Spreading, Plate tectonics	7
5	Diastrophism, Folds and Faults and their types	3
6	Geomorphic processes - weathering, mass movement, erosion and transportation	5
7	Slope morphology - models of slope development	3
8	Fluvial processes and landforms	4
9	Coastal processes and landforms	3
10	Aeolian processes and landforms	3
11	Glacial processes and landforms. Ice Ages	4
12	Karst processes and landforms	3

Books:

1. Thornbury, W. D. (1960): Principles of Geomorphology, John Wiley and Sons, New York
2. Chorley, R. J., Schumm, S. A. and Sugden, D. E. (1984): Geomorphology, Methuen, London.
3. Ollier, C (1981): Tectonics and Landforms, Longman Group Ltd.
4. Sparks, B.W (1972): Geomorphology, Longman Group Ltd.
5. Strahler, A.H and Strahler A.N (1992): Modern Physical Geography, John Wiley and Sons (Asia) Pvt. Ltd.
6. Steers, J.A (1937): The Unstable Earth, Methuen and Co. Ltd. London
7. Kale, V. S. and Gupta, A. (2001): Introduction to Geomorphology, Orient Longman, Calcutta.
8. Savindra Singh (2002): Geomorphology, Prayag Pustak Bhawan, Allahabad
9. Bloom, A. L. (2002). Geomorphology: A systematic analysis of late Cenozoic landforms. Prentice-Hall of India, New Delhi
10. Goudie, A. S. (2004) (Eds.). Encyclopedia of Geomorphology. Routledge, London.

Code No: Gg: 1021

Title: Principles of Climatology

No. of Credits: 3

No. of Periods: 45

Sr. No.	Topics	Lectures
1.	Nature and Scope of Climatology, Development of modern Climatology and tropical Climatology	2
2	Earths Atmosphere: Evolution, structure and chemical composition of atmosphere	4
3	Solar radiation and Terrestrial radiation Electromagnetic spectrum Latitudinal and Seasonal variation, effect of atmosphere, green house effect and heat budget.	5
4	Temperature measurements and controls, lapse rate and inversion	4
5	Tropical and extra-tropical cyclones, Fronts,	
6	Atmospheric pressure and winds: Pressure measurement and distribution; Wind observation, measurement, factors affecting wind; geostrophic wind and gradient wind, local winds, models of general circulation of the atmosphere, Jet Stream	8
7	Atmospheric moisture: Forms of condensation; Precipitation, Hydrological cycle	8
8	Stable and unstable atmosphere: Environmental lapse rate, dry and wet adiabatic lapse rate and atmospheric stability	2
9	Air masses and Fronts: Classification and modifications of air masses. Characteristics and types of fronts	6
10	Classification of climates: Empirical and generic	6

Books:

1. Lutgens, Frederic K. & Tarbuck, Edward J. (1995): 'The Atmosphere: An Introduction to Meteorology', Prentice Hall, New Jersey
2. Lal, D. S.(1998): 'Climatology', Chaitanya Publishing House, Allahabad
3. Savindra Singh (2005): Climatology , Prayag Pustak Bhawan, Allahabad

Code No: Gg:1031 Title: Principles of Economic Geography

No. of Credits: 3

No. of Periods: 45

Sr. No.	Topics	Lectures
1.	Nature of economic geography;	2
	Approaches to the study of economic geography	2
	Economic concepts and principles	2
	Hypotheses in economic geography	2
	Economic landscape	3
	Evolution of world economy	4
2	Factors of production	5
	Rostow's model of economic development	5
	Economic growth and development	5
3	Modes of transport; cost of transport	4
	Characteristics of international trade	3
	Comparative cost trade theory	4
	Globalization	4

Books:

1. Hartshorne, T. A. and Alexander, J. W. (1988): Economic Geography, Prentice Hall
2. Lloyd, P. and B. Dicken (1972): Location in space - A theoretical approach to economic geography. Harper and Row, New York.
3. Siddhartha, K. (2000): Economic Geography - Theories, process and patterns, K-isalaya Publications Pvt. Ltd., New Delhi

Code No: Gg:1041 Title: Principles of Population and Settlement Geography

No. of Credits: 3

No. of Periods: 45

Sr. No.	Topics	Lectures
1.	Introduction to basic concepts in human geography	5
2	Approaches, scope and nature of the study of human geography	5
3	Introduction to concepts and issues in population geography	5
4	Introduction to concepts and issues in settlement geography	5
5	Evolution and development of the sub-discipline of population geography	5
6	The place of settlement geography; the development of the two sub-fields.	5
7	Urban settlements and rural settlements Terminology, concepts, urban-rural dichotomy; Scope and approaches	5
8	Origin of rural settlement, Domestication Culture hearths;	5
9	Origin of urban settlements and urbanization	5

Books:

1. Knowled, R. and Wareing, J. (1998): 'Economic and Social Geography', Rupa and Co., N. Delhi
2. John R. Weeks (1999): 'Population - An Introduction to Concepts and Issues', Wadsworth Pub. Co. Ca USA
3. Population Reference Bureau: 'World Population data Sheet, 2000', Washington DC
4. Hudson, R. S. (1970): 'A Geography of Settlements', McDonald and Sons, London
5. Chisholm, M. (1962): 'Rural Settlements and Landuse', London
6. Short, John R. (1984): 'An Introduction to Urban Geography', Routledge and Regan Paul, London

Code No: Gg: 1010

Title: Practical in Physical Geography

No. of Credits: 2

No. of Practicals: 10

Sr. No.	Topics	Practicals
(Geomorphology)		
1	Hypsometric curve and integral	1
2	Slope and aspect maps	1
3	Profiles	1
4	Block Diagrams	2
(Climatology)		
1	Scientific Notation Conversion in Different Units	1
3	Preparation of Climatic Maps and Diagrams circular graph, climograph, water budget diagram, wind roses	2
4	Koppen's classification	2

Note: Students will have to maintain a journal. Out of the total internal marks 5 marks or 10% marks, whichever is higher, will be allotted to the journal.

Books:

1. King, C. A.M (1966): Techniques in Geomorphology, Edward Arnold, London
2. Monkhouse, F. J. and Wilkuison, H. R., (1976). Maps and Diagrams, Methuen & Co.
3. Savindra Singh (2002): Geomorphology, Prayag Pustak Bhawan, Allahabad
4. Miller, Austin (1953): The skin of the Earth, Methuen & Co. Ltd. London

Code No: Gg:1020

Title: Practicals in Human Geography

No. of Credits: 2

No. of Practicals: 10

Sr. No.	Topics	Practicals
1.	Methods of representing and mapping population data	3
2	Methods of field study - Preparation of questionnaire schedules	3
3	Field work	1
4	Calculation of locational rent	1
5	Spatial interaction	1
6	Measures of transport network	1

Note: Students will have to maintain a journal. Out of the total internal marks 5 marks or 10% marks, whichever is higher, will be allotted to the journal.

Books:

1. Liendsor, J. M. (1997): Techniques in Human Geography, Routledge.
2. Lloyd, P. and B. Dicken (1972): Location in Space - A theoretical approach to economic geography. Harper and Row, New York

Code No: Gg: 1030

Title: Practicals in Cartographic Techniques

No. of Credits: 02
10

No. of Practicals:

Sr. No.	Topics	Practicals
1	Map Scales: Conversion types - Vertical exaggeration, enlargement, reduction	1
2	Maps: Choropleth, Isopleth, Dot	2
3	Two and Three dimensional diagrams	1
4	Plots: Semi-log and Log on X, Y axis, X, Y, Z with Whisker and Box method, Scatter plot	3
5	Map Projections: Construction of Cylindrical, Conical, Zenithal and Modified	3

Note: Students will have to maintain a journal. Out of the total internal marks 5 marks or 10% marks, whichever is higher, will be allotted to the journal.

Books:

1. Mailing, D. H., (1973): Co-ordinate systems and map projections, George Philip and Sons Ltd., London
2. Keates, J. S., (1973): Cartographic design and production, Longman, London
3. Goodchild, Michael (1973): Environmental Studies and GIS, Oxford Uni. Press, New York.
4. Croxton, F. E., Cowden, D. J. and Klein, S. (1975): Applied General Statistics, Prentice-Hall of India.
5. Frank, H. and Althoen, S. C., (1994): Statistics: Concepts and Applications, Cambridge University Press.
6. Yeates, M. (1974): An introduction to Quantitative Analysis in Human Geography, McGraw-Hill
7. Robinson A.H. and others (1995): Elements of Cartography, John Willy and Sons Singapore

Code No: Gg: 1040

Title: Statistical Methods

No. of Credits: 3

No. of Practicals: 15

Sr. No.	Topics	Practicals
1.	Geographical data: Discrete and continuous series, scales of measurements, frequency distribution, construction of ogive curves	2
2	Central tendency – concept; arithmetic mean, mode, median for ungrouped and grouped data	3
3	Measures of dispersion: absolute and relative measures; range, standard deviation (grouped and ungrouped data), variance, quartile deviation, coefficient of variability	3
4	Skewness, Kurtosis	2
4	Geometric mean, harmonic mean, quadratic mean	1
5	Probability - normal, poisson and binomial	3
6	Time series analysis - moving averages (3 and 5 unit cycles)	1

Note: Students will have to maintain a journal. Out of the total internal marks 5 marks or 10% marks, whichever is higher, will be allotted to the journal.

Books:

1. Hammond, R. and McCullagh, P. (1991): Quantitative Techniques in Geography, Clarendon Press, Oxford
2. Ebdon, D. (1977): Statistics in Geography, Basil Blackwell.
3. Gregory, S. (1978): Statistical Methods for Geographers, Longman
4. Frank, H. and Althoen, S. C., (1994): Statistics: Concepts and Applications, Cambridge University Press.

Code No: Gg: 1050 Title: Practicals in Interpretation of Topographical Maps

No. of Credits: 3

No. of Practicals: 15

Sr. No.	Topics	Practicals
1.	Introduction to SOI topographical maps - numbering, scales, grid reference, signs and symbols, colour system, etc.	2
2	Study and interpretation of SOI maps	5
3	OS and USGS maps	7
4	Preparation of sets of thematic maps - relief, drainage, land use, railroad, and settlement maps from toposheets	1

Note: Students will have to maintain a journal. Out of the total internal marks 5 marks or 10% marks, whichever is higher, will be allotted to the journal.

Books:

1. Ramamurthy, K. (19 82): Map Interpretation, Rex Printer, Madras
2. Vaidyanadhan, R. (1968): Index to a set of sixty topographic maps illustrating specified physiographic feature.
3. Gupta, K. K. and Tyagi, V. C. (1992): Working with maps. Survey of India Publication.
4. Tamaskar, B. G. and Deshnnikh, V. M. (1974): Geographical Interpretation of Indian Topographical maps. Orient Longman.

**Department of Geography
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**Syllabus for M.A./M.Sc. Geography
Semester II**

Semester II

Code No: Gg: 2111

Title: Coastal Geomorphology

No. of Credits: 3

No. of Periods: 45

Sr. No.	Topics	Lectures
1.	Coastline, shoreline, hinterland	1
2	Shore-zone processes – tides, waves and currents, swells, breakers and surf, storm surges and tsunamis	9
3	Control of structure, climate, tectonics and time on coasts	3
4	Processes of weathering, erosion and transportation in coastal areas	3
5	Coastal sediment: production and transport – clastic and biogenic	2
6	Rocky and sandy/muddy coasts	2
7	Erosional shore-zone features	6
8	Depositional shore-zone features	6
9	Constructional shore-zone features – Coral reefs	3
10	Shoreline changes: Quaternary eustatic changes – evidence, causes and effects	5
11	Classification of coasts	2
12	Coastal zones – hazards and management	3

Books:

1. Bird, E. C. (1984): Coasts - An Introduction to Coastal Geomorphology, Basil-Blackwell, Oxford
2. Kale, V. S. and Gupta, A. (2001): Introduction to Geomorphology, Orient Longman, Calcutta
3. King, C. A. M (1972): Beaches & Coasts, Edward Arnold, London
4. Bloom, A. L. (2002). Geomorphology, Third Edition, Prentice-Hall of India, New Delhi
5. Bird, E. C. (2000): Coastal Geomorphology. An Introduction. John Wiley and Sons, Chichester
6. Bloom, A. L. (2002). Geomorphology: A systematic analysis of late Cenozoic landforms. Prentice-Hall of India, New Delhi
7. Goudie, A. S. (2004) (Eds.). Encyclopedia of Geomorphology. Routledge, London

Code No. Gg: 2121

Title: Synoptic Climatology

No. of Credits: 3

No. of Periods: 45

Sr. No.	Topics	Lectures
1	Introduction and scope of synoptic climatology, weather Observations and analysis	4
2	Synoptic scale motion: laws of motion	3
3	Synoptic charts and maps, atmospheric stability: dry adiabatic lapse rate and saturated adiabatic lapse rate, changes in stability	7
4	Air masses: air mass characteristics, air mass identification, air mass modification.	5
5	Fronts: frontogenesis and frontolysis and frontal types frontal weather	4
6	Cyclones and anticyclones: wave cyclone, tropical cyclone rossby waves and western disturbances, anticyclones : cold and warm core systems, anticyclonic weather.	7
7	Weather patterns: precipitation processes. heat and cold waves, thunderstorms	6
8	Synoptic scale forecasting: types and methods	4
9	Application of synoptic climatology in pollution studies and aviation and navigation	5

Books:

1. Barry and Perry (1973): 'Synoptic Climatology', Methuen & Co. Ltd., London
2. A. A. Rama Sastry: 'Weather and Weather forecast', IMD
3. Petterson, Sverre (1969): 'Introduction to Meteorology', McGraw Hill, New York

Code No. Gg: 2131

Title: Agricultural Geography

No. of Credits: 3

No. of Periods: 45

Sr. No.	Topics	Lectures
1	Nature, scope and significance of agricultural geography	3
2	Various approaches to the study of agricultural geography	3
3	Place of agriculture in the world and regional economies	3
4	Origin and dispersal of agriculture	4
5	Factors influencing agriculture: Physical, Economic, Technological	10
6	Agricultural types: Shifting cultivation. Intensive subsistence agriculture. Mixed farming, Commercial grain farming. Plantation agriculture	8
7	Agricultural regionalization	4
8	Measures of agricultural productivity	5
9	Land use: Surveys and Land classification	5

Books:

1. Grigg David (1995): An introduction to agricultural geography (second edition), Routledge, London and New York
2. Sing Jasbir and Dhillon, S. S. (1994): Agricultural Geography, Tata McGraw Hill Publishing Co. Ltd., New Delhi
3. Symons, Leslie (1970): Agricultural Geography, G. Bell and Sons Ltd.. London

Code No. Gg: 2141

Title: Population Geography

No. of Credits: 3

No. of Periods: 45

Sr. No.	Topics	Lectures
1	Theories of population growth and Regulation. Concepts of stepped, exponential growth, Homeostatic regime, Population equilibrium	8
2	Limits to growth. Concept of over, under and optimum population. Applicability of Demographic Transition Model to less developed World	7
3	Theories of Mortality, Fertility and migration	8
4	Concept of morbidity and nuptality	7
5	Population policies: A historical perspective, population policies in China, India and Sweden	8
6	Future Trends, Problems and Issues of population in Developed and Developing countries	7

Books:

1. Peters and Larkin (1997): Population Geography: Problems, Concepts and Prospects Kendall / Hunt, Iowa.
2. Weeks, John (1999): Population: An Introduction to Concepts and Issues, Wadsworth and Co. Ca, USA

Code No: Gg: 2110

Title: Practicals in Coastal Geomorphology

No. of Credits: 2

No. of Practicals: 10

Sr. No.	Topics	Practicals
1	Geomorphic mapping of coastal features – field / toposheets / images Planimetric and cross profile studies	2
2	Methods of measurement of waves in surf zone, monitoring of tides, analysis of wave/tide records	3
3	Study/measurement of beach/cliff/shore platform morphology in the field	2
4	Coastal sediment textural analysis – beaches/dunes/marshes	3

Note: Students will have to maintain a journal. Out of the total internal marks 5 marks or 10% marks, whichever is higher, will be allotted to the journal.

Books:

1. Goudie, A. (1990): Geomorphological Techniques. Unwin Hyman, London.
2. Dackombe, R. V. and Gardiner, V. (1983): Geomorphological Field Manual. George Allen and Unwin, London.

Code No. Gg: 2120 Title: Practicals in Synoptic Climatology

No. of Credits: 2

No. of Practicals: 10

Sr. No.	Topics	Practicals
1.	Instrumentation and measurement techniques of weather elements and processing of weather data	5
2	Station Model: Coding, decoding and plotting of synoptic data	2
3	Climatic map Analysis: Daily weather reports	3

Note: Students will have to maintain a journal. Out of the total internal marks 5 marks or 10% marks, whichever is higher, will be allotted to the journal.

Books:

1. WMO No. 8 (1983): Guide to Meteorological Instruments and Methods of Observation

Code No. Gg 2130 Title: Practicals in Agricultural Geography

No. of Credits: 2

No. of Practicals: 10

Sr. No.	Topics	Practicals
1.	Crop concentration and diversification	3
2	Crop combination technique	4
3	Measurement of agricultural efficiency	3

Note: Students will have to maintain a journal. Out of the total internal marks 5 marks or 10% marks, whichever is higher, will be allotted to the journal.

Books:

1. Singh Jasbir and Dhillon S. S. (1994): Agricultural geography, (second edition), Tata McGraw Hill Publication, New Delhi
2. Yeats, M. H. (1978): An introduction to quantitative analysis in human geography

Code No. Gg 2140 Title: Practicals in Population Geography

No. of Credits: 2

No. of Practicals: 10

Sr. No.	Topics	Practicals
1	Thematic Mapping of population data from census and other sources. Methods (Statistical) of analyzing population data	5
2	Field trip to IIPS and TISS Collection of primary data and analysis using suitable cartographic techniques	5

Note: Students will have to maintain a journal. Out of the total internal marks 5 marks or 10% marks, whichever is higher, will be allotted to the journal.

Books:

1. Keates, J. S. (1973): Cartographic Design and Production, Longman, London
2. Monkhouse, F. J. (1967): Maps and Diagrams, Methuen & Co., London
3. Jones, P. A. (1968): Field work in Geography, Longman, London
4. Archer, J.E and Dalton, T. H. (1968): Field Work in Geography, E. T. Bastsford Ltd., London
5. Hinde, A. (1998): Demographic Methods

Code No: Gg: 2211

Title: Fluvial Geomorphology

No. of Credits: 3

No. of Periods: 45

Sr. No.	Topics	Lectures
1.	Drainage basin and network: Laws of drainage composition	3
2	Mechanics of fluvial erosion - overland, through and groundwater flow. Hydrographs.	5
3	Open channel hydraulics-Type of flows, regimes, stream energy	5
4	Hydraulic geometry - at-a-station, downstream	3
5	Sediment transport - suspended and bedload	3
6	River channel morphology – bedrock and alluvial Channel cross section, patterns, gradient	8
7	Concept of grade - graded profile, dynamic equilibrium	3
8	Landforms of fluvial erosion - erosional processes	5
9	Landforms of fluvial deposition - depositional processes, flood plains,	5
10	River terraces - alluvial and bedrock	3
11	River metamorphosis and Quaternary fluvial systems	2

Books:

1. Leopold, L. B., Wolman, M. G. and Miller, J. P. (1964): Fluvial Processes in Geomorphology, W.H. Freeman, San Francisco.
2. Schumm, S. A. (1977). Fluvial Systems, Wiley, New York.
3. Richards, K. (1982): Rivers: Form and processes in alluvial channels, Methuen, London.
4. Kale, V. S. and Gupta, A. (2001): Introduction to Geomorphology, Orient Longman, Calcutta.

Code No: Gg: 2221

Title: Applied Climatology

No. of Credits: 3

No. of Periods: 45

Sr. No.	Topics	Lectures
1	Nature and scope of applied Climatology the development of applied Climatology, atmospheric concern and awareness. Climate impact assessment.	4
2.	Climate and the physical environment: Climate, Hydrology and Water Resources, Snow Hydrology, climate and soils	6
3	Climate and biological environment Climate and Flora, Climate and Fauna	5
4	Climate, industrial and commercial activities, Location of industries, Industry operation, Construction operations	4
5	Climate and transport services, Air transport, Rail transport, Road transport, Water transport	4
6	Urban climate and global environment change The nature of the global environmental change, the nature of the urban climates, UHI, Impact of the urban climate on GEC, Urban air pollution problems	8
7	Climate and human comfort: Comfort, clothing and health the human energy balance, Thermal stress estimation, thermal comfort. Acclimatization atmospheric impacts on performance and behaviour, atmospheric, impacts on morbidity and mortality Town planning.	8
8	Climate Change: Data sources, Methods and Theories	6

Books:

1. Thompson, R. D. and Allen, P. (1997): Applied Climatology: Principles and Practice, Routledge, London and New York.
2. Oliver, John E. (1973): Climate and Man's Environment: An Introduction to Applied Climatology, John Wiley & Sons, New York, London.
3. Mather, J. R. (1974): Climatology: Fundamentals and Applications, Mc Graw Hill, New York.

Code No. Gg: 2231

Title: Industrial Geography

No. of Credits: 3

No. of Periods: 45

Sr. No.	Topics	Lectures
1	Nature and Scope, Effect of industrial revolution,	3
	different commodities of manufacturing,	5
	significance of manufacturing in the world economy	5
	Basis of industrialization.	4
2	Location of manufacturing	3
	models of industrial location	
	Weber	3
	Losch, Greenhut	3
	Isard's models.	3
3	Industrial Regions	4
	Distribution, locational factors and problems and prospects of	
	Anglo-America,	3
	Russia,	2
	Western Europe,	2
	Japan,	2
	India	3

Books:

1. Smith, David M. (1971): Industrial Location: An Economic Geographical Analysis John Wiley and sons. New York.
2. Watts, H. D. (1989): Industrial Geography, Longman group (FE) Ltd., Hong Kong

Code No. Gg: 2241

Title: Urban Geography

No. of Credits: 3

No. of Periods: 45

Sr. No.	Topics	Lectures
1	Distribution and evolution of cities through historical times	3
	Ancient	2
	Medieval and	2
	Modern	2
	The urban landscape	3
	Development cycles	3
2	Land-use in cities: Models of city structure,	5
	Factorial Ecology and Social area analysis,	5
	The Western and non-western city concepts	5
3	Urban Revolution, Urban involution, down-town, metropolitan revolution, megalopolis, slums, suburbs and beyond the suburbia	8
4	Suburbanization, Zoning and growth controls and planning in Western and Indian cities	7

Books:

1. Roberts, Brian K. (1996): Landscapes of Settlement: Prehistory to the Present, Routledge, London
2. Gates, Richard and Stout, Fredric (2000): The city Reader, Routledge (London and New York)
3. O'sullivan, A. (2000): Urban Economics, 4th Edition, Me Graw Hill, Boston
4. Knox, Paul and Pinch Steven (1996): Urban Social Geography: An Introduction

Code No: Gg: 2210 Title: Practicals in Fluvial Geomorphology

No. of Credits: 2

No. of Practicals: 10

Sr. No.	Topics	Practicals
1.	Drainage basin and network morphometry Longitudinal profiles of rivers and Hack's stream gradient index	3
2	Calculation of velocity and discharge using Manning equation Calculation of hydraulic geometry equations Calculation of sediment load and sediment yield	2
3	Measurement of channel cross-sections in the field, Geomorphic map of channel bed Study of erosional and depositional features in the field	5

Note: Students will have to maintain a journal. Out of the total internal marks 5 marks or 10% marks, whichever is higher, will be allotted to the journal.

Books:

1. Leopold, L. B., Wolman, M. G. and Miller, J. P. (1964): Fluvial Processes in Geomorphology, W.H. Freeman, San Francisco.
2. Schumm, S. A. (1977): Fluvial Systems, Wiley, New York.
3. Richards, K. (1982): Rivers: Form and processes in alluvial channels, Methuen, London.
4. Savindra Singh (2002): Geomorphology, Prayag Pustak Bhawan, Allahabad.

Code No. Gg: 2220 Title: Practicals in Applied Climatology

No. of Credits: 2

No. of Practicals: 10

Sr. No.	Topics	Practicals
1.	Climatic Classification: Thornthwaite	2
2	Climate and architectural analysis, Comfort indices, identification of heat and cold waves	3
3	Climatological Statistics; Frequency distribution - Normal and incomplete gamma distribution	5

Note: Students will have to maintain a journal. Out of the total internal marks 5 marks or 10% marks, whichever is higher, will be allotted to the journal.

Books:

1. Oliver, John E. (1981): Climatology, Selected Applications, V. H. Winston and Sons, London.
2. WMO, Technical Note No. 79 (1966): 'Climatic Change'.
3. WMO, Technical Note No. 81 (1966): 'Some Methods of Climatological Analysis'.

Code No. Gg: 2230 Title: Practical in Industrial Geography

No. of Credits: 2

No. of Practicals: 10

Sr. No.	Topics	Practicals
1	Location Quotient, Lorenz Curve, Gird's coefficient. Trade area delimitation	5
2	Field Work / Project work (Any one)	5

Note: Students will have to maintain a journal. Out of the total internal marks 5 marks or 10% marks, whichever is higher, will be allotted to the journal.

Books:

1. Yeats, M. H. (1968): 'An Introduction to Quantitative Analysis in Economic Geography'.
2. Monkhouse, F. J. and Wilkinson, H. R., (1976). Maps and Diagrams, Methuen & Co.

Code No. Gg: 2240 Title: Practicals in Urban Geography

No. of Credits: 2

No. of Practicals: 10

Sr. No.	Topics	Practicals
1	Representation of urban data, techniques of analysis. Mapping land-use data, deriving social and functional area	3
2	Use of urban data from municipal and other bodies	2
3	Field based assignments on local urban landscape	2
4	Field Trip to local urban areas to study urban morphology and urban landscapes	3

Note: Students will have to maintain a journal. Out of the total internal marks 5 marks or 10% marks, whichever is higher, will be allotted to the journal.

Books:

1. Doing Field work. The Geographical Review, Vol 91, No 1 & 2 (Jan - April 2001), A publication of Geographical Society of India.
2. Archer, J. E. and Dalton, T. H. (1968), Field Work in Geography, E. T. Bastsford Ltd., London.

Code No. Gg: 2311

Title: Fundamentals of Remote Sensing

No. of Credits: 2

No. of Periods: 30

No.	Topics	Lectures
1	Basics of remote sensing: Concept, History and Development Fundamentals of aerial photography	4
2	Basic geometric characteristics of aerial photographs. Projection, Tilt, Swing, Scale, Resolution	4
3	Image Displacement, Parallax and Stereoscopy; Measurement of height on aerial photograph	4
4	Basics of satellite remote sensing: Definition, Principle, Stages, Types of remote sensing: Optical, Thermal, Microwave	4
5	Characteristics of electromagnetic radiation (EMR): EMR spectrum, concept of black body. Radiation laws	4
6	Interaction of EMR with the earth's surface and atmosphere: Reflection, Absorption, Transmission, Scattering, Refraction, Atmospheric Windows	5
7	Orbits, Platforms, Sensors and Scanning Systems (Pushbroom and Whiskbroom)	5

Books:

1. Lillisand, T. M. and Keifer, R. W. (1990): Remote Sensing and Image interpretation, John Willey and Sons, New York
2. Agarwal, C. S. and Garg, P. K. (2000): Remote Sensing, A. H. Wheeler and Co. Ltd., New Delhi
3. Joseph G. (2003): Fundamentals of Remote Sensing, Universities Press, Hyderabad.

Code No. Gg: 2310

Title: Practicals in Remote Sensing

No. of Credits: 3

No. of Practicals: 15

Sr. No.	Topics	Practicals
1.	Determination of scale and height on aerial photograph	2
2	Interpretation of single vertical aerial photograph	1
3	Interpretation of stereopair of aerial photograph	4
4	Reference system of IRS Satellites, Data Products, Data format	2
5	Interpretation of MS S images	6

Note: Students will have to maintain a journal. Out of the total internal marks 5 marks or 10% marks, whichever is higher, will be allotted to the journal.

Books:

1. Lillisand, T. M. and Keifer, R. W. (1990): 'Remote Sensing and Image interpretation', John Willey and Sons, New York.
2. Agarwal, C. S. and Garg, P. K. (2000): 'Remote Sensing', A. H. Wheeler and Co. Ltd., New Delhi.
3. Joseph G. (2003): Fundamentals of Remote Sensing, Universities Press, Hyderabad.

Code No: Gg: 2320

Title: Surveying - Practicals

No. of Credits: 3

No. of Practicals: 15

Sr. No.	Topics	Practicals
1	Levelling – Terms used in leveling, Instruments used for levelling The Dumpy Level – parts of dumpy level, common terms used in dumpy level survey, adjustments in dumpy level. Levelling staff – types of levelling staves. Methods used to compute reduced levels in dumpy level survey – collimation method and rise and fall method	2
2	Dumpy level - profile drawing	3
	block contouring	2
3	Theodolite – types of theodolite, parts of theodolite, common terms used in theodolite survey, adjustments in theodolite	2
4	Theodolite - intersection method	3
	tacheometric method	3

Note: Students will have to maintain a journal. Out of the total internal marks 5 marks or 10% marks, whichever is higher, will be allotted to the journal.

Books:

1. Kulkarni and Kanitkar (1960): Surveying and leveling. Part I & II, A. V. Ghriha Prakashan, Pune.
2. Pugh, J. C. (1975): Surveying for Field Scientists, Methuen & Co. Ltd., London.

Code No: Gg: 2330 Title: Statistical Methods in Geography

No. of Credits: 3

No. of Periods: 45

Sr. No.	Topics	Lectures
1	Concept of covariance, correlation and regression — bivariate Bivariate analysis - linear, exponential, power; explained variance, partial correlation, residuals - mapping of residuals.	15
2	Inferential statistics - samples and population, sampling distribution, standard error of mean and best estimates of standard deviation, concept of random numbers. Hypothesis testing. Formulation, Rejection rule, one and two tailed tests, significance level, degrees of freedom type I and type II errors Large samples and small sample	15
3	Student's t test ANOVA - One way, two way (single entry and multiple entry) Chi-square test - One way and two way	15

Note: Students will have to maintain a journal. Out of the total internal marks 5 marks or 10% marks, whichever is higher, will be allotted to the journal.

Books:

1. Hammond, R. and McCullagh, P. (1991): Quantitative Techniques in Geography, Clarendon Press, Oxford
2. Gregory, S. (1978): Statistical Methods for Geographers, Longman
3. Frank, H. and Althoen, S. C., (1994): Statistics: Concepts and Applications, Cambridge University Press.
4. Yeates, M. (1974): An introduction to Quantitative Analysis in Human Geography, McGraw-Hill

Code No. Gg: 2341 Title: Geography of Environment

No. of Credits: 3

No. of Periods: 45

Sr. No.	Topics	Lectures
1.	Environmental Science: Introduction, Scope, approaches to study of environment	5
2	Ecology and Ecosystem: Ecological hierarchy, structure and developmental, Energy and nutritional flux, Food Chain and Food Web, biogeochemical cycles – nitrogen, carbon-dioxide, oxygen, phosphorus.	10
3	Resources and resource management; soil, water, air; Depletable and Renewable resources; Energy resources: Oil, Natural gas, Coal	6
4	Environmental quality: Air, Water, Soil; Major pollutants: types, sources and effects	9
5	Extreme Events, Hazards and Disasters; Natural Hazards and man induced hazards; Disaster Reduction and management	6
6	Environmental degradation and pollution in India; Population growth, deforestation, urbanization; global issues	9

Books:

1. Savindra Singh, (2000): Environmental Geography, Prayag Pustak Bhavan, Allahabad
2. Wright, R. T. and Nebel, B. J. (2004): Environmental Science: Toward a Sustainable Future, Prentice-Hall of India, New Delhi
3. Turk, Jonathan (1985): Introduction to Environmental Studies, Sounders College Publishing, Tokyo.

Code No: Gg: 2340 Title: Practicals in Geography of Environment

No. of Credits: 2

No. of Practicals: 10

Sr. No.	Topics	Practicals
1.	Determination of molecular weight, valency, Equivalent weight, gram equivalent, normality and molarity	2
2	Preparation of normal solution	1
3	Collection and Analysis of water sample: Determination of acid and bases in water sample, quantitative tests of sulphates, ammonia, chlorides, nitrates in the given water sample	2
4	Use of dB meter	1
5	Collection and Analysis of air samples: SPM & PM ₁₀	2
6	Estimation of chloride, hardness, TDS	2

Note: Students will have to maintain a journal. Out of the total internal marks 5 marks or 10% marks, whichever is higher, will be allotted to the journal.

Books:

1. Goel, P. K. and Trivedy, R. K. (1986): Chemical and Biological Methods for Water Pollution Studies, Environmental Pub., Karad

Code No. Gg: 2351

Title: Social Geography

No. of Credits: 3

No. of Periods: 45

No.	Topics	Lectures
1	Social Geography: Nature, scope and development. Relationship with social sciences. Nature and problem of data	10
2	Geographic basis of social region formation with reference to India - The role of caste, ethnicity, religion and language in the evolution of social regions. Unity amidst diversity in India. Social transformation, Sanskritization, Role of rural - urban interaction	15
3	Space and society, contribution of social geography to social theory, power relations and space	10
4	Social well-being - Concept of social well-being, quality of life, Measurement of human development with reference to social and economic indicators	10

Books:

1. Jones Emrys and Eyles John (1977): An introduction to social geography, Oxford University Press
2. Aijazuddin Ahmed (1999): Social Geography, Rawat Publications, New Delhi
3. Knowles R, Wareing J (1998): Economic and Social Geography
4. Smith David (1977): Geography - A Welfare Approach, Edward Arnold
5. Knox P. L (1975): Social Well-being: A Spatial Perspective, Oxford University Press, London

Code No. Gg: 2352

Title: Cultural Geography

No. of Credits: 2

No. of Periods: 30

No.	Topics	Lectures
1	Cultural Geography: Definition, nature, scope Elements and components. Convergence and divergence processes, cultural perception, behaviouralism and cultural relativism	10
2	Bases of cultural diversity - race, religion and language. Culture hearts, realms and cultural regions of the world. Cultural diversity and regionalism in India	10
3	Domestication of plants and animals and diffusion of culture traits in the world and in India. Cultural landscape and cultural ecology in folk geography	10

Books:

1. Crong Mike (1998): Cultural geography Routledge publications, London
2. Readings in Cultural Geography: Wagner and Mikesell
3. Jordan and Lester, G. (1979): The Human Mosaic Harper Row, New York
4. Massey et al (ed) (1999): Human Geography today, Polity Press, Cambridge, 1999
5. Mukerjee, A. B., Aijaxuddin Ahmed (1985): India Culture Society's Economy, Inter India Publications, New Delhi

**Department of Geography
University of Pune**

**Syllabus for M.A./M.Sc. Geography
Semester III**

Semester III

Code No: Gg: 3111

Title: Tropical Geomorphology

No. of Credits: 3

No. of Periods: 45

Sr. No.	Topics	Lectures
1.	Definition of Tropics: Peculiar features of tropical climate; intensity and erosivity of rainfall, role of vegetation, Morphogenetic classification	5
2	Tropical weathering: processes and products. Weathering profiles, tropical soils and clay minerals	5
3	Duricrusts: Definition and types - laterite and laterite profiles	5
4	Denudation - mass movement, chemical and mechanical denudation, Fluvial processes in tropics Surface processes- pipe flows, gully erosion, fluvial erosion	5
5	Tropical landscapes - humid, subhumid, semi-arid, arid and karst	6
6	Hillslopes and pediments	4
7	Landform evolution in Tropics: Role of tectonics, climate and structure in tropics	3
8	Tropical planation - Etchplains, Peneplains and Pediplains, occurrence, distribution, morphology and origin	7
9	Environmental change in tropics	3
10	Quaternary geomorphology of tropics	2

Books:

1. Faniran, A. and Jeje, L. K. (1983): Humid Tropical Geomorphology, Longman, London.
2. Thomas, M. F. (1994): Geomorphology in the Tropics: A study of weathering and denudation in low latitudes. John Wiley and Sons, Chichester.
3. Kale, V. S. and Gupta, A. (2001): Introduction to Geomorphology, Orient Longman, Calcutta.
4. Goudie, A. (1985): Duricrusts in tropical and sub-tropical landscapes. Alien Unwin
5. Savindra Singh (2002): Geomorphology, Prayag Pustak Bhawan, Allahabad
6. Bloom, A. L. (2002). Geomorphology: A systematic analysis of late Cenozoic landforms. Prentice-Hall of India, New Delhi

Code No. Gg: 3121

Title: Monsoon Climatology

No. of Credits: 3

No. of Periods: 45

No.	Topics	Lectures
1	Introduction and Scope of Monsoon Climatology. Historical background and economic importance	3
2	Different concepts regarding origin of Monsoon. The Asian Monsoon: East and South Asian Monsoon. Classical Theory of Indian Monsoons	6
3	Monsoon Model: Driving mechanism, realistic monsoon model	5
4	Monsoon Climatology: Normal temperature, wind and pressure, dates of onset & withdrawal, monsoon rainfall	5
5	Regional aspects of Indian monsoon: Semi- permanent system – Heat low, Monsoon trough, Easterly jet, Tibetan high	6
6	Interseasonal Variation: Active and break period, depressions, Trough of low pressure, Mid-tropospheric disturbances, offshore and onset vortices, effect of orography	6
7	Interannual variation: Variability of summer monsoon rainfall, snow cover, meteorological teleconnections. Walker circulation, The role of ocean and upper atmosphere.	8
8	Monsoon forecast: Different time scales, factors for forecasting, power regression and parametric model, MONEX and IIOE.	6

Books:

1. Y. P. Rao (1976): Meteorological Monograph Synoptic Meteorology No. 1. Southwest Monsoon
2. P. K. Das (1991): The Monsoons, National Book Trust, New Delhi
3. Keshavamurty, K. N. (1992): The Physics of Monsoon, Allied publishers Limited, New Delhi, Mumbai, Kolkata.
4. Fein J. S. and Stephens P. L. (1987): Monsoons, John Wiley and Sons, New York
5. Pant and Rupkumar - Climate of South Asia.

Code No. Gg 3131 Title: Geography of Trade and Transport

No. of Credits: 3

No. of Periods: 45

No.	Topics	Lectures
1	International trade	5
2	Trade theories	5
3	Meaning and scope of Trade and Transport Geography	5
4	Modes of transportation	5
5	Factors associated with seaport and airport	5
6	Modes of transportation in India	8
7	Transport network and patterns of movement: Models of transport development	10
8	Transport policy and planning - Urban Transport	2

Books:

1. Thoman and Conkling (1971): Geography of International Trade
2. Taffee and Gawtheir (1973): Geography of Transportation, Prentice Hall
3. White H. P. and Senior M. L. (1984): Transport Geography

Code No. Gg 3141

Title: Geography of Rural Settlements

No. of Credits: 3

No. of Periods: 45

No.	Topics	Lectures
1	Nature, scope, significance and development of settlement geography. Approaches to rural settlement geography	5
2	Origin of rural settlements: spatio-temporal dimensions and process of settling, Changing morphology of rural settlement.	10
3	Factors affecting site, situation and location of rural settlements. Distribution of rural settlements: size and spacing of rural settlements. Types, forms and patterns of rural settlements	10
4	Growth of rural settlements: factors operating in the development of rural settlements - system of land holding, agricultural systems and land tenure system.	10
5	Classification of rural settlements, central places and rural source areas, their nature, hierarchy and functions, rural-urban divide - its structure characteristics and functions, use of remote sensing in rural settlement.	10

Books:

1. Hudson F. S. (1976): A Geography of Rural Settlements, Mac Donald and Evans, New York.
2. Chisholm, M. (1967): Rural Settlements and Land use, John Wiley, New York
3. Clout, H. D. Rural Geography
4. Mandal R.B. (2001): Introduction to Rural Settlement,
5. Singh R. L. Rural Settlements in Monsoon Asia, Varanasi, Banaras Hindu University, 1972
6. Sing W. L. and Singh, K.N. (ed) (1975): Readings in Rural Settlement Geography, NGS, Varanasi.
7. Singh R. Y.- Geography of Settlement. Rawat Publisher.

Code No: Gg: 3110

Title: Practicals in Tropical Geomorphology

No. of Credits: 2

No. of Practicals: 45

Sr. No.	Topics	Practicals
1.	Simple listing of Bowen's Reaction Series and Goldfinch's Weathering, Series, Listing of important clay minerals and their properties	1
2	Calculation and interpretation of silica-sesquioxide ratio and Chemical Weathering Index for given data	2
3	Hydrographs of tropical rivers	2
4	Mapping and identification of tropical landforms on maps/photos/images and/or in the field	2
5	Study of weathering and/or laterite profiles in the field	3

Note: Students will have to maintain a journal. Out of the total internal marks 5 marks or 10% marks, whichever is higher, will be allotted to the journal.

Books:

1. Thomas, M. F. (1994): Geomorphology in the Tropics: a study of weathering and denudation in low latitudes. John Wiley and Sons, Chichester.
2. Kale, V. S. and Gupta, A. (2001): Introduction to Geomorphology, Orient Longman, Calcutta.

Code No. 3120

Title: Practicals in Monsoon Climatology

No. of Credits: 2

No. of Practicals: 10

No.	Topics	Practicals
1	Study of Indian Daily Weather Report (IDWR) Preparation of Report about the monsoon activity during a particular week with respect to temperature, rainfall, semi-permanent system and their outlook Note: Based on map discussion	3
2	Analysis of temperature, pressure, etc. for various stations using IDWR. Charting of system using IDWR.	2
3	Representation of weather elements using IDWR.	2
4.	T-Phigram	3

Note: Students will have to maintain a journal. Out of the total internal marks 5 marks or 10% marks, whichever is higher, will be allotted to the journal.

Books:

1. Daily and weekly weather reports of IMD.

Code No: Gg 3130 Title: Practicals in Geography of Trade and Transport

No. of Credits: 2

No. of Practicals: 10

No.	Topics	Practicals
1	Graph theoretical measures of transport network	3
2	Models of spatial interaction - Gravity, potential population surface, Breaking point theory - Trade area delimitation, Law of retail trade gravitation	3
3	Case study of traffic flow of any two areas	4

Note: Students will have to maintain a journal. Out of the total internal marks 5 marks or 10% marks, whichever is higher, will be allotted to the journal.

Books:

1. Kansky N. T. (1965): Structure of Transport Network
2. Yeats M. H. (1978): An Introduction to Quantitative Analysis in Human Geography

Code No. Gg:3140 Title: Practicals in Geography of Rural Settlements

No. of Credits: 2

No. of Practicals: 10

No.	Topics	Practicals
1	Computation and application of statistical methods in rural settlement.	3
2	Collection demographic, social and economic data of the village from census and / or with the help of structured questionnaire at the household level and supplement information by personal observations.	4
3	Preparation of an analytical survey report based on the land use and socio-economic data from primary / secondary sources.	3

Note: Students will have to maintain a journal. Out of the total internal marks 5 marks or 10% marks, whichever is higher, will be allotted to the journal.

Code No: Gg: 3211 Title: Geomorphology - Theoretical and Applied

No. of Credits: 3

No. of Periods:45

Sr. No.	Topics	Lectures
1	Historical and process Geomorphology – Hutton to Horton; Horton to Strahler-Hack; The paradigm change.	3
2	Theories, techniques and fieldwork (including field experiments) in geomorphology	3
3	The geomorphic system: - morphologic and cascading system. General System Theory	5
4	Concepts: - Uniformitarianism and Neocatastrophism. Open system. Ergodic principle. Equilibrium – types of equilibria. Complex response and geomorphic thresholds	4
5	Space and time in Geomorphology. Time – cyclic, graded, steady. Magnitude and frequency. Spatial scales – micro, meso and macro	4
6	Climatic Geomorphology and Tectonic Geomorphology	4
7	Quantitative morphology – Geomorphological mapping and geomorphometry. DEM and digital geomorphometry. Fractals in Geomorphology. Remote Sensing and GIS	8
8	Applied Geomorphology – Nature and objectives	1
9	Geomorphic hazards – fluvial, coastal and slope.	4
10	Terrain classification – Principles, methods and applications	4
11	Applied fluvial geomorphology	3
12	Applied geomorphology in coastal-zone management	2

Books

1. Hart, M. G. (1986): Geomorphology, Pure and Applied. George Allen and Unwin, London.
2. Chorley, R. J., Schumm, S. A., Sugden, D. E. (1984): Geomorphology, Methuen, London.
3. Hails, J. R. (1977): Applied Geomorphology. Elsevier, Amsterdam.
4. Schumm, S.A. and R.W. Lichty. (1965): Time, space and causality in geomorphology. American Journal of Science, 263: 110-119.
5. Wolman, M.G. & W.P Miller. (1960): Magnitude and frequency of forces in geomorphic processes. Journal of Geology, 68: 54-74.
6. Brunnsden, D. and Thornes, J.B. (1979): Landscape sensitivity and change. Transactions, Institute of British Geographers, 4: 463-484.
7. Chorley, R. J. (1962): Geomorphology and General System Theory U. S. Professional Paper 500-B.
8. Goudie, A. S. (2004) (Eds.). Encyclopedia of Geomorphology. Routledge, London

Code No. Gg:: 3221

Title: Agro-Meteorology

No. of Credits: 3

No. of Periods: 45

No.	Topics	Lectures
1	Nature and scope of agrometeorology, Concept of growth and development of plants, factors affecting growth	4
2	Plants and energy related agrometeorological elements Radiation – solar energy utilization by crops, radiation distribution in crop canopy, Temperature – Cardinal temperature, air temperature, sensible heat flux, photoperiodism, Growing Degree Days (GDD) Soil temperature – Factors affecting soil temperature, cardinal soil temperature.	8
3	Plants and moisture related agrometeorological elements Moisture – soil moisture, water flow in plants, water stress, Field Capacity, Permanent Wilting Point, Available moisture content, Management Allowed Deficit (MAD) Rainfall – Effective Rainfall (ER), dry and wet spells	7
4	Droughts: Types of droughts, Drought Index. Practices to control agricultural drought	4
5	Water loss and its measurement: evaporation, transpiration, Estimation of PET, methods for computing PET Water balance methods:	10
6	Agroclimatic classifications: Agroclimatic Indices, Agroclimatic Regions of India.	8
7	Climate and biological hazards: Pests and diseases, extreme weather hazards.	4

Books:

1. Doorenbos, J. and W. O. Pruitt: (1977): Guidelines for Predicting Crop Water Requirements, FAO (United Nations)
2. WAMI (1988), Crop Water Requirements
3. Thornthwaite, C. W. and J. R. Mather (1957): Instructions and Tables for Computing Potential Evapotranspiration and Water Balance, Drexel Institute of Technology, Laboratory of Climatology.
4. Mavi, H. S. (1996): Introduction to Agrometeorology, (second edition), Oxford and IBH publishing co. pvt. ltd., New Delhi
5. Kakade J. R.: Agricultural Climatology, Metropolitan Book Co.

Code No. Gg: 3231

Title: Geography of Development

No. of Credits: 3

No. of Periods: 45

No	Topics	Lectures
1	Geography and development	4
	Growth and development	3
2	Economic systems	4
3	Developed and developing economies	5
4	Resources and development	8
5	Culture and development	3
	Rural agricultural development	2
	Urban industrial development	2
6	Globalization and development	3
7	Poverty	3
8	Theories, strategies of development	8

Books:

1. Dutta R. and Sundaram K. P. M. (2002): Indian Economy
2. Hodder, R. (2000): Development Geography, Routledge: Contemporary human Geography series, London
3. Potter, R. B. Binns Tonny, Elliot J. A. and Smith Davis (1999): Geographies of development, Longman, England
4. UNDP (2002): Human Development Report, Oxford University Press, Oxford
5. Fryer D. W: World Economic Development, Mc Graw Bark Hill

Code No. Gg: 3241 Title: Geography of Population Resources

No. of Credits: 3

No. of Periods: 45

No.	Topics	Lectures
1.	Concept of population development.	3
2.	Population and environment.	5
3.	Quality of human resources.	3
4.	Sustainable development of population resources.	3
5.	Population and women development	5
6..	Geographical impact on spatial variation in population resources in India	5
7.	Demand and supply of labour in different activities Labour scarcity and unemployment and dichotomy.	5
8.	Population and development planning: Inter relationship.	6
9.	Management of labour force to achieve optimum utilization of Population resource	4
10.	Demographic considerations in sector wise planning	6

Books:

1. United Nations Organization (1973): Determinants and consequences of population trends
2. Alexander and Hartshorne : Economic Geography
3. Government of India: India Year Books
4. Sawant, S. B.: Population Geography
5. Todaro, M. P. (1985): Economic Development in third worlds Third Edition
6. David, Y. (1985): Demography - The study of Human population, New York, St. Martin's Press, Inc.
7. National Family Health Survey. IIPS, Mumbai.

Code No: Gg: 3210 Title: Practicals in Geomorphology: Theoretical and Applied

No. of Credits: 2

No. of Practicals: 10

Sr. No.	Topics	Practicals
1	Geomorphological Mapping - symbols	2
2	Mapping landscape materials – Texture, shape, colour Use of Munsell colour chart Introduction to use of Sedigraph in textural analysis	2
3	Study of sedimentary sequences in the field Study of facies and major sedimentary structures Mialls' facies notations/lithocodes	1
4	Estimation of fractal dimension of a line	1
5	Exercises in terrain classification – Composite score method, Crofts (1973) Critical slope for specified activates	4

Note: Students will have to maintain a journal. Out of the total internal marks 5 marks or 10% marks, whichever is higher, will be allotted to the journal.

Books:

1. Hart, M. G. (1986): Geomorphology, Pure and Applied. George Allen and Unwin, London.
2. Goudie, A. (1990): Geomorphological Techniques. Unwin Hyman, London.
3. Dackombe, R. V. and Gardiner, V. (1983): Geomorphological Field Manual. George Allen and Unwin, London.
4. Cooke, R. U. and Doornkamp, J. C. (1974). Geomorphology in Environment Management. Clarendon Press, London.
5. Goudie, A. S. (2004) (Eds.). Encyclopedia of Geomorphology. Routledge, London

Code No: Gg: 3220 Title: Practicals in Agro-Meteorology

No. of Credits: 2

No. of Practicals: 10

Sr. No.	Topics	Lectures
1.	Estimation of PE	1
2	Determination of growing season	1
3	Construction of crop coefficient curve	1
4	Estimation of crop evapotranspiration	1
5	Computation of Water balance	3
6	Computation of irrigation scheduling	3

Note: Students will have to maintain a journal. Out of the total internal marks 5 marks or 10% marks, whichever is higher, will be allotted to the journal.

Books

1. J. Doorenbos and W. O. Pruitt: (1977): Guidelines for Predicting Crop Water Requirements, FAO (United Nations)
2. WAMI (1988): Crop Water Requirements
3. Thornthwaite, C. W. and J. R. Mather (1957): Instructions and Tables for Computing Potential Evapotranspiration And Water Balance, Drexel Institute of Technology, Laboratory of Climatology.

Code No. Gg: 3230 Title: Practicals in Geography of Development

No. of Credits: 2

No. of Practicals: 10

No.	Topics	Practicals
1	Collection of demographic and socio-economic data at household level from primary and / or secondary sources and preparation of an analytical survey report to assess the development of an area	10

Note: Students will have to maintain a journal. Out of the total internal marks 5 marks or 10% marks, whichever is higher, will be allotted to the journal.

Code No. Gg 3240 Title: Practicals in Geography of Population Resources

No. of Credits: 2

No. of Practicals: 10

No.	Topics	Practicals
1	Measures of economic activity	1
2	Calculation of Human Development Index (HDI)	1
3	Physical Quality of Life Index and Gender related development Indices	2
4	Lewis Growth Model and Big Push Approach and Leibensteins's critical minimum thesis	2
5	Collection of labour force data at household level from primary and / or secondary sources and preparation of an analytical survey report to assess the population development of an area	4

Note: Students will have to maintain a journal. Out of the total internal marks 5 marks or 10% marks, whichever is higher, will be allotted to the journal.

Books:

1. Michael P. Todaro, (1985): Economic Development in third worlds Third Edition
2. Yaukey, David (1985): Demography - The study of Human population, New York, St. Martin's Press, Inc.

Code No: Gg: 3311 Title: Introduction to Computer Programming: Theory

No. of Credits: 2

No. of Periods: 30

Sr. No.	Topics	Lectures
1	Introduction to computers, input-output devices. Operating systems.	3
2	Constants, variables and arithmetic expressions.	2
3	Introduction to Qbasic – Menus, commands, dialog boxes	5
4	Keywords – Control program flow, declare constants and variable, mathematical calculations, file input/output	15
5	Creating BASIC program – syntax, debugging	2
6	Qbasic Environment limitations	1
7	Graphics - Introduction	2

Books:

1. Qbasic Manual and help file.

Code No: Gg: 3310 Title: Introduction to Computer Programming: Practicals

No. of Credits: 3

No. of Practicals:15

Sr. No.	Topics	Practicals
1	Creating Programs in BASIC for analysis of univariate alphanumeric data – use of keywords	3
2	Creating Programs in BASIC for analysis of bivariate alphanumeric data – use of keywords	4
3	Creating Programs in BASIC for analysis of multivariate alphanumeric data – use of keywords	4
4	Creating and reading files	4

Note: Students will have to maintain a journal. Out of the total internal marks 5 marks or 10% marks, whichever is higher, will be allotted to the journal.

Book:

1. Qbasic Manual and help files.

Code No: Gg: 3321

Title: Physical Geography of Japan

No. of Credits: 2

No. of Periods: 30

Sr. No.	Topics	Lectures
1	Introduction: Geographical Location, Tectonic History, Geological Setting	5
2	Relief and Drainage: Characteristics of Relief and distribution of Plain and mountain, Characteristics of Rivers	5
3	Climate: Climatic characteristics, Seasons, Climatic Regions	4
4	Soil: Characteristics and types of soil, Distribution of soil	3
5	Vegetation: Types of Natural Vegetation, Distribution	3
6	Natural Hazards: Volcanoes, Earthquakes, Tsunami, Typhoons, Floods	5
7	Natural Resources: Mineral Resources; Major types of minerals and their distribution, Energy Resources; (.Coal, Petroleum and Hydel Power Resources)	5

Books:

1. Ackroyd J.I (1972): Japan Today, Muthuen Co., London
2. Association of Japanese Geographers (Ed) (1980): Geography of Japan. Teikoku Shoin
3. Dempster Prue (1967): Japan Advances, A Geographical Studies. Mathuen and Co. Ltd.
4. Woronoff (1993): Japanese Management Mystique, Reality behind the Myth. Neo Pub. Press, new Delhi
5. Kunio Yoshihara (1972): Japanese Economic Development : A Short Introduction, Methuen Co., London
6. Reischauer E.D (1946): Japan Past and Present. Alfred A Knoph, New York
7. Trewartha Glenn T. (1965): Japan – A physical Cultural and Regional Geography. Muthuen Co., London
8. Hall R.B (1970): Japan, Industrial Power of Asia, Pall Mall Press, London

Code No: Gg: 3322

Title: Human Geography of Japan

No. of Credits: 3

No. of Periods: 45

Sr. No.	Topics	Lectures
1	Agriculture - Problems and Prospects, Salient features of Agriculture and changing scenario, Agricultural Regions, Major Crops, Irrigation: Types of Irrigation and Distribution	6
2	Industries - Problems and Prospects, History of the evolution of Industries, Industrial regions, Major industries, Changing scenario after II World War	8
3	Transportation: Development of Transportation Network, Roadways, Railways, Airways, Major ports and Seaways	5
4	International Trade: Definition, types, Balance of Trade, Factors affecting international trade in Japan, Trade Treaties in Japan, Major Imports, Major Exports	6
5	Population, Structure and Composition: Growth and distribution of population, Migration, Population composition – age, sex, education, occupation, Population Resource	6
6	Settlement: Growth and distribution of Settlement, Urbanization and development of Megalopolis, associated problems	5
7	Tourism: Factors Affecting Tourism in Japan, Development of Tourism, Major centers	3
8	Rise of Japan after II World War Devastation: National economic policies, International policies, Innovative steps in various sectors – i.e. Agriculture, Industries, International Trade Policies, Education	6

Books:

1. Ackroyd J.I (1972): Japan Today, Muthuen Co., London
2. Association of Japanese Geographers (Ed) (1980): Geography of Japan. Teikoku Shoin
3. Dempster Prue (1967): Japan Advances, A Geographical Studies. Mathuen and Co. Ltd.
4. Woronoff (1993): Japanese Management Mystique, Reality behind the Myth. Neo Pub. Press, new Delhi
5. Kunio Yoshihara (1972): Japanese Economic Development : A Short Introduction, Methuen Co., London
6. Reischauer E.D (1946): Japan Past and Present. Alfred A Knoph, New York
7. Trewartha Glenn T. (1965): Japan – A physical Cultural and Regional Geography. Muthuen Co., London
8. Hall R.B (1970): Japan, Industrial Power of Asia, Pall Mall Press, London

Code No. Gg: 3331

Title: Physical Geography of China

No. of Credits: 2

No. of Periods: 30

No.	Topics	Lectures
1	Introduction – Location and geostrategic Importance	2
2	Geology, Physiography, Major Physiographic Regions and their Characteristics , Drainage	9
3	Climate – Distribution of rainfall and temperature, climatic classification, Typhoons,	5
4	Soils and natural vegetation	4
5	Resources from natural environment – Resource Appraisal, Water and Land resources	5
6	Mineral and Power resources	5

Books:

1. Spencer Joseph E. (1995): Oriental Asia, Prentice Hall
2. Ginsburg Norton (1995): The Patterns of Asia, Prentice Hall
3. Lee Chung: Geography of China
4. Leeming, Frank: (1993): Changing Geography of China, Blackwell

Code No: Gg: 3332

Title: Human Geography of China

No. of Credits:3

No. of Periods: 45

No.	Topics	Lectures
1	Agriculture – Agricultural activities, pattern, region, problems and prospects	9
2	Industries – Development, evolution, distribution, problems and prospects, industrial regions	6
3	Trade and Transportation – International Trade, Development of Transportation	5
4	Population – Growth, characteristics and distribution,	6
5	Settlement – Growth, characteristics and distribution	5
6	Tourism – Development of tourism industry, Places of tourist interest	4
7	Special Issues – Development in post-resolution period, Problem of annexation of Tibet, Sino-Indian boundary dispute, Problem of relationship of Republic of China and Nationalist (either nationalist or nationalism), International policy, Taiwan dispute, Status of Hong Kong	10

Books:

1. Spencer Joseph E. (1995): Oriental Asia, Prentice Hall
2. Ginsburg Norton (1995): The Patterns of Asia, Prentice Hall
3. Lee Chung: Geography of China

Code No: Gg: 3411 Title: Multivariate Statistics in Geography: Theory

No. of Credits: 2

No. of Periods: 30

Sr. No.	Topics	Lectures
1	Geographical data and multivariate analysis	1
2	Elementary ideas of matrix algebra	3
3	Non-linear bivariate relationships	4
4	Multivariate analysis – multiple regression and correlation	3
5	Trend Surface Analysis (TSA) – computation of linear trend and ideas of quadratic and cubic surfaces	3
6	Principal Component Analysis (PCA)	4
7	Factor Analysis (FA)	3
8	Logistic Model	2
9	Canonical correlation analysis	3
10	Discriminant Analysis – 2 variables	2
11	Harmonic Analysis – Fourier Series – basic idea. Computation of first approximation to harmonic series	2

Books:

1. Johnston, R. J. (1978). Multivariate Statistics in Geography. Longman, London
2. Yeats, M. H. (1974): An Introduction to Quantitative Analysis in Human Geography,
3. Summer, G. (1978): Mathematics for Physical Geographers.

Code No: Gg: 3410 Title: Multivariate Statistics in Geography: Practicals

No. of Credits: 3

No. of Practicals: 15

Sr. No.	Topics	Practicals:
1	Exercises in matrix algebra	1
2	Exercises in - non-linear bivariate relationships	1
3	Exercises in - multivariate analysis – multiple regression and correlation	2
4	Exercises in - Trend Surface Analysis - Linear trend	2
5	Exercises in - Principal Component Analysis	2
6	Exercises in - Factor Analysis	2
7	Exercises in - Logistic model	1
8	Exercises in - Canonical correlation analysis	2
9	Exercises in - Discriminant analysis – 2 variables	1
10	Exercises in - Harmonic analysis – computation of first approximation to harmonic series	1

Note: Exercises on calculators and / or Excel.

Students will have to maintain a journal. Out of the total internal marks 5 marks or 10% marks, whichever is higher, will be allotted to the journal.

Books:

1. Johnston, R. J. (1978). Multivariate Statistics in Geography. Longman, London
2. Yeats, M. H. (1974): An Introduction to Quantitative Analysis in Human Geography,
3. Summer, G. (1978): Mathematics for Physical Geographers.

Code No. Gg: 3421

Title: Physical Geography of USA

No. of Credits: 2

No. of Periods: 30

No.	Topics	Lectures
1	Introduction - Location, geostrategic importance, characteristics of size	2
2	Geology, physiography, major physiographic regions and their characteristics, drainage	11
3	Climate – distribution of rainfall and temperature, climatic classification, thunderstorms, tornadoes, hurricanes	7
4	Soils and vegetation	5
5	Natural resources - Resource appraisal, water and land resources	5

Books

1. Charles B. Hunt(1967): Physiography of the United States
2. George T. Miller and Parkins B. Hudgis, Geography of North America
3. John Fraser Hart (1972): Regions of the United States
4. G. H. Dary and Mathiescu (1970): United States and Canada
5. E. S. Shaw and Farland J. M (1959) : Anglo America - A Regional Geography
6. Longdom, C. Foscue, J. (1954) : Regional Geography of Anglo – America
7. J. W. Watson(1982): The United States

Code No. Gg: 3422

Title: Human Geography of USA

No. of Credits: 3

No. of Periods: 45

No.	Topics	Lectures
1	Energy and mineral Resources	6
2	Agriculture – Agricultural activities, agricultural patterns, regions, problems and prospects	7
3	Industries – Development, evolution, distribution, Problems and prospects, Industrial Regions.	7
4	Trade and Transport – International Trade and development of transportation	5
5	Population – Growth, characteristics and distribution.	6
6	Settlement – Growth characteristics and distribution of settlement. Development of Megalopolis	5
7	Tourism – Development of tourism, important National Parks	4
8	Geopolitics and International Relations –USA in cold war and post-cold war period	5

Books:

1. George T. Miller and Parkins B. Hudgis, Geography of North America
2. John Fraser Hart (1972): Regions of the United States
3. G. H. Dary and Mathiescu (1970) : United States and Canada
4. E. S. Shaw and Farland J. M (1959) : Anglo America - A Regional Geography
5. Longdom, C. Foscue, J. (1954) : Regional Geography of Anglo – America
6. J. W. Watson (1982): The United States

Code No. Gg: 3431 Title: Physical Geography of Europe

No. of Credits: 2

No. of Periods: 30

No.	Topics	Lectures
1	Europe as a continent	5
2	Geological structure	5
3	Relief and drainage	5
4	Climate - climatic types and characteristics	5
5	Soils - types and distribution	5
6	Vegetation - types and distribution	5

Books:

1. Ian Gottman (1989): A Geography of Europe, 4th edition, Holt, Reinhart and Winston, New York
2. Hoffman, G. W. (Ed) (1983): A Geography of Europe, John Wiley and sons

Code No. Gg: 3432

Title: Human Geography of Europe

No. of Credits: 3

No. of Periods: 45

No.	Topics	Lectures
1	Historical geography of Europe	5
2	Land and power - The geopolitical aspects	3
3	European Economy Agriculture Industries Trade and transport	10
4	Europe - A culture Physical traits; Languages, Religions Urban and rural settlements	10
5	Regional development policies	5
6	The regions of Europe	10
7	Europe in 21 st century	2

Books:

1. Ian Gottman (1989): A Geography of Europe, 4th edition, Holt, Reinhart and Winston, New York
2. Hoffman, G. W. (Ed) (1983): A Geography of Europe, John Wiley and sons
3. Hefferman Michael (1998): Europe - Geography and Geopolitics, Arnold, London
4. Jordan Terry G. (1973): The European Cultural area - A systematic geography, Harper international Ed, Harper and Row Publishers, New York

Code No. Gg: 3511 Title: Fundamentals of GIS: Theory

No. of Credits:2

No. of Periods: 30

No.	Topics	Lectures
1	Definition of GIS - Concept of space and time Spatial Information Theory History of GIS, Objectives of GIS Elements of GIS, Tasks of GIS, Functional and Logical relationships among geographic features and their attributes, Types of attributes	6
2	Hardware and Software requirements of GIS	4
3	Map Projection, Spherical coordinate system, Datum Plane	4
4	Conceptual models of Spatial Information - Raster data model, Vector data model, comparative overview	4
4	Conceptual Models of non-spatial Information - Hierarchical data base structure, network structure, relational model	6
5	Structuring of spatial data - scanning, digitizing, error detection and correction, topology	6

Books:

1. Burroughs, P. A (1986): Principles of Geographical Information Systems for land Resources Assessment, Oxford University Press
2. Environmental Systems Research Institute (1993): Understanding GIS: The Arc Info method
3. Training Course for GIS for resource management and development planning: Lecture notes, V1: GIS Fundamentals and Techniques, Government of India
4. Bernhardsen, Tor (1999): Geographic Information Systems: An Introduction, John Wiley and Sons
5. Clarke, Keith C. (1999): Getting Started with Geographic Information Systems, Prentice Hall
6. Demers, Michael N. (2000): Fundamentals of Geographic Information Systems, John Wiley
7. Haywood, Ian (2000): Geographical Information Systems, Longman
8. Chang, Kang-taung (2002): Introduction to Geographic Information Systems, Tata McGraw-Hill

Code No. Gg: 3510 Title: Fundamentals of GIS: Practicals

No. of Credits: 3

No. of Practicals: 15

No.	Topics	Practicals
1	Data quality and sources of errors i) Nature of sources of geographical data ii) Sources of errors in GIS database iii) Data quality parameters	3
2	Map scale and projections i) Information on various scales ii) Need of projection iii) Spherical co-ordinate system iv) Properties of map projections	2
3	Preparation of vector database and maps: manual method for point line and area entities. Topology building for connectivity, containment and contiguity	5
4	Preparation of a raster database and map: manual method for point line and area entities	2
5	Encoding raster data: Full Grid, Chain Code, Run Length, Block Code	3

Note: Students will have to maintain a journal. Out of the total internal marks 5 marks or 10% marks, whichever is higher, will be allotted to the journal.

Books:

1. Burroughs, P. A (1986): Principles of Geographical Information Systems for land Resources Assessment, Oxford University Press
2. Environmental Systems Research Institute (1993): Understanding GIS: The Arc Info method
3. Training Course for GIS for resource management and development planning: Lecture notes, V1: GIS Fundamentals and Techniques, Government of India
4. Bernhardsen, Tor (1999): Geographic Information Systems: An Introduction, John Wiley and Sons
5. Clarke, Keith C. (1999): Getting Started with Geographic Information Systems, Prentice Hall
6. Demers, Michael N. (2000): Fundamentals of Geographic Information Systems, John Wiley
7. Haywood, Ian (2000): Geographical Information Systems, Longman
8. Chang, Kang-taung (2002): Introduction to Geographic Information Systems, Tata McGraw-Hill

Code No. Gg: 3521 Title: Geography of Tourism: Part I

No. of Credits: 2

No. of Periods: 30

No.	Topics	Lectures
1	Nature and scope of tourism	3
2	History of tourism	2
3	Factors affecting tourism	6
4	Types of tourism	8
5	Evaluation of tourism potential	6
6	Environmental laws and tourism	3
7	Globalization and tourism	2

Books:

1. Robinson H. (1996): A Geography of Tourism, Macdonald and Evans, London
2. Bhatia A. K (1996): Tourism Development: Principles and Practices, Sterling Publisher Ltd., New Delhi
3. Bhatia, A. K. (1991): International Tourism - Fundamentals and Practices, Sterling, New Delhi.
4. Manoj Das (1999): India: A Tourist Paradise
5. Pearce D. G. (1987): Tourism To-day: A Geographical Analysis, Harlow, Longman

Code No. Gg: 3522

Title: Geography of Tourism: Part II

No. of Credits: 3

No. of Periods: 45

No.	Topics	Lectures
1	Infrastructure and support system for tourism	10
2	Development and planning for tourism	10
3	Economic, social, physical and cultural impact of tourism	10
4	Case Studies of tourist centres	15
	1) Religious Centres	
	2) Historical Centres	
	3) Resort	
	4) Dams	
	5) Sanctuaries and National Parks	

Books:

1. Mathieson A and Wall: Tourism: Economic, Physical and Social Impact
2. Manert Kumar: Tourism Today: An Indian Perspective
3. Inskeep E (1991): Tourism Planning: An Integrated and Sustainable Development Approach, Van Nostrand and Reinhold, New York
4. Sharma J. K. (Ed.) (2000): Tourism Planning and Development - A new perspective, Kanishka Publishers, New Delhi.

**Department of Geography
University of Pune**

**Syllabus for M.A./M.Sc. Geography
Semester IV**

Semester IV

Code No. Gg: 4111

Title: Geography of Resources: Part I

No. of Credits: 2

No. of Periods: 30

No.	Topics	Lectures
1	Resources: concept, functional operational theory, process, need for study, principals of resource adequacy and resource scarcity	7
2	Classification of resources, resource appraisal	6
3	World distribution of resources	17
	Water	
	Soil	
	Forest	
	Mineral	
	Energy	

Books:

1. Encyclopedia Britanica (1985), WI - 16
2. Mitchell B. (1989): Geography and resource analysis (2nd Edition), Longman Scientific and Technical, U.K
3. Negi, B. S. (1997): Geography of resources
4. Ramesh, A (Ed) (1984): Contribution to Indian Geography Resource Geography, Heritage Publishing, New Delhi.
5. Roy, P. (2000): Resource Studies, Central Educational Enterprises, Kolkata

Code No. Gg: 4112 Title: Geography of Resources: Part II

No. of Credits: 3

No. of Periods: 45

No.	Topics	Lectures
1	Distribution of Resources in India Water Soil Forest Mineral Energy	20
2	Degradation of resources – air, water, land, causes and consequences	6
3	Human resources - quantitative and qualitative assessment and development.	6
4	Conservation of natural resources	6
5	Resource development and management	7

Books:

1. Encyclopedia Britannica (1985), WI - 16
2. Mitchell B. (1989): Geography and resource analysis (2nd Edition), Longman Scientific and Technical, U.K
3. Negi, B. S. (1997): Geography of resources
4. Ramesh, A (Ed) (1984): Contribution to Indian Geography Resource Geography, Heritage Publishing, New Delhi.
5. Roy, P. (2000): Resource Studies, Central Educational Enterprises, Kolkata

Code No. Gg: 4121 Title: Bio-geography: Plant Geography

No. of Credits: 3

No. of Periods: 45

No.	Topics	Lectures
1	Bio-geography: Scope, development. Biosphere, Phytogeography, interdisciplinary subfields	2
2	Ecosystem: structure - biotic and abiotic, Functioning and development of ecosystem - Energy transfer, energy loss, food chain, food web	7
3	Geography of plant communities Evolution of plants, classification - taxonomic, ecological, climatic, Raunkiaer's, Grime's	8
4	Floristic Survey - Qualitative and Quantitative measures	4
5	Plant and their environment - physiographic, climatic, edaphic, anthropogenic Plant communities, formation and association,	6
6	Atmospheric factors affecting plant - Solar radiation, light, temperature, precipitation, evapotranspiration	4
7	Plant and edaphic factors: Soil formation, structure of texture, nutrient cycles, soil types - zonal, azonal, intrazonal	4
8	Major biomes of the world forest - tropical and temperate, Grassland - tropical and temperate, Deserts - hot and cold	5
9	Anthropogenic effects on plants - Impact of pre-agricultural man, Impact of domestication, impact of industrialization and urbanization	5

Books:

1. Mathur, H. S.: Essentials of Biogeography, Pointer Publishers, Jaipur
2. Robinson H.: Biogeography, Mac Donald and Evans, London
3. Pears Nigel (1993): Basic Biogeography, Longman, London, New York
4. Sedden Brian: Introduction to Biogeography, Duckworth, London
5. Tivy Joy (1996): Biogeography, A study of plants in the ecosphere, Addison Wesley Longman
6. Simmons T. G.: Biogeography: Natural and cultural, Arnold Heinemann, London
7. Mather, Alexander S. (1992): Global Forest Resources, Pinter
8. Schmitt, Russell J. (1996): Detecting Ecological Impacts: Concepts and Applications in Coastal Habitat, Academic Press
9. Shiva, Vandana (1991): Biodiversity: Social & Ecological Perspectives, World Rainforest Movement

Code No. Gg: 4122

Title: Bio-geography: Zoogeography

No. of Credits: 2

No. of Periods: 30

No.	Topics	Lectures
1	Zoogeography: Scope and development	2
2	Geography of animal communities Evolution - evolution of animals, animal characteristics, environmental adaptations; camouflaging and luminescence	8
3	Classification - Taxonomic Zoo-geographical regions of the world	8
4	Animal dispersal and migrations Dispersal of mammals: Climatic and terrain barriers Dispersal of birds: terrain barriers Dispersal of reptiles: terrain barriers Dispersal of fishes: terrain barriers	8
5	Anthropogenic effects on animals - Impact of pre-agricultural man, impact of domestication, Impact of industrialization and urbanization	4

Books:

1. Mathur, H. S.: Essentials of Biogeography, Pointer Publishers, Jaipur
2. Robinson H.: Biogeography, Mac Donald and Evans, London
3. Pears Nigel: Basic Biogeography, Longman, London, New York
4. Sedden Brian: Introduction to Biogeography, Duckworth, London
5. Tivy Joy: Biogeography, A study of plants in the ecosphere, Oliver and Boyd, Edinburgh
6. Simmons T. G.: Biogeography: Natural and cultural, Arnold Heinemann, London
7. Darlington P. J.: Zoogeography. The geographic distribution of animals, Wiley and Sons, New York

Code No. Gg: 4211

Title: Advance course in Remote Sensing

No. of Credits: 3

No. of Periods: 45

No.	Topics	Lectures
1	Digital Image Processing (DIP): i) Image rectification, ii) geometric correction iii) Radiometric correction iv) Atmospheric correction	15
2	Image enhancement: i) Contrast stretch, ii) Filtering- Low Frequency, High frequency iii) Linear edge enhancement iv) Band ratioing	15
3	Image classification: i) Supervised, ii) Unsupervised, iii) Accuracy assessment iv) Ground truth data collection	15

Books:

1. Lillesand, Thomas M. & Kiefer Ralph (2000): Remote Sensing and Image Interpretation, John Wiley
2. Agarwal C. S. and Garg, P. K. (2002): Text Book on Remote Sensing, Wheeler Publishing, New Delhi
3. Prithvish Nag and M. Kudrat (1998): Digital Remote Sensing, Concept Publishing Company, New Delhi

Code No. Gg: 4212

Title: Advance course in GIS

No. of Credits: 2

No. of periods: 30

No.	Topics	Lectures
1	Data Base Management System: Concept, advantages and disadvantages, RDBMS: Definition, Terms, Components SQL: Operations from algebraic theory and set theory	10
2	Spatial data analysis (Vector based): i) Single and multi layer operations, ii) topological overlays, iii) logical operators	10
3	Spatial data analysis (Raster based): i) Local functions, ii) Focal functions, iii) Zonal functions iv) Global functions	10

Books:

1. Williams, Jonathan (1995): Geographic Information from Space: Processing and Applications of Geocoded Satellite Images, John Wiley and Sons
2. Taylor and Francis (1996) Spatial Analytical on GIS
3. DeBarry, Paul A. (1999): GIS Modules and Distributed Models of the Watershed: A Report from ASCE Task Committee on GIS Modules and Distribution, ASCE

Code No. Gg: 4221

Title: Hazard Management: Natural

No. of Credits: 2

No. of Periods: 30

No.	Topics	Lectures
1	Natural hazards and disasters - definition and areas	2
2	Natural hazards - Meteorological - cyclones, typhoons, hurricanes and droughts, forest fires. Causes, assessment, effects and control measures	6
3	Natural hazards - Geological – earthquakes. Causes, effects and control measures	3
4	Natural hazards - hydrological - Floods (river and seawater); failure of natural and man-made dams. Causes, assessment, effects and control measures	8
5	Natural hazards - Geomorphic - landslides, soil erosion and gullying, coastal erosion. Causes, assessment, effects and control measures	5
6	Concept of vulnerability, mitigation, prevention, preparedness, response and recovery. Risk and vulnerability assessment Hazard zonation. Use of remote sensing and GIS in hazard studies	6

Books:

1. Morisawa, M. (Ed.)(1994). *Geomorphology and Natural Hazards*, Elsevier, Amsterdam
2. Hart, M. G. (1986). *Geomorphology, Pune and Applied*. George Allen and Unwin, London
3. Goudie, A. (1990). *Geomorphological Techniques*. Unwin Hyman, London
4. Valdiya, K. S. (1987). *Environmental Geology*, Tata McGraw Hill, New Delhi

Code No. Gg: 4222 Title: Hazard Management - Manmade

No. of Credits: 3

No. of Periods: 45

No.	Topics	Lectures
1	Man induced physical hazards - land slides, soil erosion, earthquakes, forest fires, desertification, etc.	8
2	Chemical and nuclear hazards, release of toxic elements in air through human activity nuclear explosion, leakage of crude oil from tankers into oceanic waters	8
3	Biological hazards induced by man: population explosion, eutrophication, adverse impact on biodiversity	5
4	Pollution	
	Air pollution: sources and types of air pollutants, effects on weather and climate, effects on living organisms control of air pollution	8
	Water pollution: sources and types, surface water pollution, lake and water pollution, ground water and sea water pollution, pollution effects and control of water pollution	7
	Solid waste pollution: types and management of solid waste	6
	Soil pollution – causes and measures	
	Noise pollution – causes and measures	
5	Global issues – Global warming, ozone depletion, acid rain	3

Books:

1. Turk J. (1985): Introduction to Environmental studies, Saunders college Publ. Japan.
2. Singh Savindra (2000): Environmental Geography, Prayag Pustak Bhavan, Allahabad.
3. Morisawa, M. (Ed.)(1994): Geomorphology and Natural Hazards, Elsevier, Amsterdam

Code No: Gg: 4311 Title: Watershed Management: Concepts and Issues

No. of Credits: 3

No. of Periods: 45

Sr. No.	Topics	Lectures
1	Concept of Watershed. Significance of watershed based development	2
2	Watershed characteristics – geomorphology and hydrology. Drainage basin, network and channel morphology.	7
3	Watershed Hydrology - Hydrologic cycle, water balance, climate and precipitation, soils and infiltration, interception and evapotranspiration, groundwater, streamflow and runoff, water quality, aquatic ecosystems (eutrophication, habitat disturbance, etc.)	16
4	Watershed resource appraisal – Physical, hydrological, land use/cover. Land Capability Classification.	5
5	Watershed Management and Planning – objectives	2
6	Issues in water resources - Point source pollution, agricultural and urban non-point source pollution, erosion, water scarcity, flooding, drinking water protection, wastewater treatment and septic systems	6
7	Soil and water conservation measures	5
8	Watershed Program – Benefit-Cost Analysis	2

Books:

1. Murthy, J. V. S. (1994). Watershed Management in India. Wiley Eastern Ltd., New Delhi.
2. Pranjape, S. and Others. (1998). Watershed-based Development, Bharat Gyan Vigyan Samithi, New Delhi.
3. Mutreja, K. N. (1990). Applied Hydrology, Tata McGraw-Hill Pub. Co. Ltd. New Delhi.
4. Singh, R. J. (2000): Watershed Planning and Management, Yash Publishing House, Bikaner
5. All India seminar on modern techniques of rain-water harvesting, water conservation and artificial recharge for drinking water: Ground Water Surveys and Development

Code No: Gg: 4310

Title: Watershed Management: Practical

No. of Credits: 2

No. of Practicals: 10

Sr. No.	Topics	Practicals
1	Mapping and demarcation of watershed	1
2	Morphometric analysis of watershed	1
3	Areal Precipitation – Thiessen Polygon, Isohyetal methods. Analysis and interpretation of rainfall data. Water balance estimation	3
4	Estimation of Runoff and streamflow. Flow duration curve, return period. Analysis and interpretation of streamflow data	2
5	Groundwater contouring and interpretation regarding movement and flow direction	1
6	Land capability classification	1
7	Soil loss estimation	1

Note: The students may visit a watershed

Students will have to maintain a journal. Out of the total internal marks 5 marks or 10% marks, whichever is higher, will be allotted to the journal.

Books:

1. Murthy, J. V. S. (1994). Watershed Management in India. Wiley Eastern Ltd., New Delhi.
2. Pranjape, S. and Others. (1998). Watershed-based Development, Bharat Gyan Vigyan Samithi, New Delhi.
3. Mutreja, K. N. (1990). Applied Hydrology, Tata McGraw-Hill Pub. Co. Ltd. New Delhi.
4. Singh R. J. (2000): Watershed Planning and Management, Yash Publishing House, Bikaner.

Code No. Gg: 4321

Title: Regional Planning: Part I

No. of Credits: 3

No. of Periods: 45

No.	Topics	Lectures
1	Regional planning: Role of Geography. Concept, scope, and levels	10
2	Region: Definition and types	10
3	Surveys for Regional Planning - Regional, techno-economic and diagnostic surveys	5
4	Methodology and Techniques of Regional planning	10
5	Regional Development and Planning Strategies - Concentration versus dispersal - Case studies from developed and developing countries	10

Books:

1. Chandana, R. C. (2000): Regional Planning - A Comprehensive Text, Kalyani Publishers, Ludhiana
2. Friedmann, J Alanso W (1967): Regional Development and planning - A Reader, MIT Press Mass
3. Mishra R. P (Ed.) (1992): Regional Planning, Concepts, Techniques, Policies and Case Studies, Concept Pub. New Delhi.

Code No. Gg: 4322

Title: Regional Planning: Part II

No. of Credits: 2

No. of Periods: 30

No.	Topics	Lectures
1	Regional Policies in the Indian Five Year Plans, experience of Regional Planning in India - multi level planning (State, District and Block level Planning)	10
2	Regionalization for planning of metropolitan regions, tribal and hill areas, command areas, river basins, National Capital Region	10
3	Regional Planning and regional disparities in India	10

Books:

1. Dube K. N. (ed) (1990): Planning and Development in India, Asia Publishing House, New Delhi
2. Govt. of India (1986), Regional Plan 2001 - National Capital Region, NCRPB, Ministry of Urban Development, New Delhi
3. Bhat, L. S. (1973): Regional Planning in India, Statistical Publishing Society, Kolkata

Code No: Gg: 4411

Title: Geography of India

No. of Credits: 3

No. of Periods: 45

Sr. No.	Topics	Lectures
1	Introduction: Geostrategic location, Historical and political background, Geological Setting	3
2	Physiography: Physiographical divisions of India, Mountain, plains and plateaus, Rivers	4
3	Climate and Soil: Climatic Characteristics, Seasons and Climatic Regions, Types and distribution of soil	4
4	Vegetation: Types of Natural Vegetation, Distribution of vegetation	2
5	Agriculture, Problems and Prospects: Salient features of Agriculture, Agricultural Regions, Major Crops, Irrigation: Types of Irrigation and distribution	5
6	Natural Resources: Mineral Resources; (Distribution of major types of minerals), Energy Resources; (Distribution of coal, petroleum and hydel power)	3
7	Industries Problems and Prospects. Salient features of Industry in the State, Industrial regions, Major industries, Industrial policies, multinationals, liberalization, privatization and global trends	5
8	Transportation: Development of Transportation Network, Roadways, Railways, Airways	3
9	International Trade: Definition, types, Balance of Trade, Trade Policies, WTO, globalization and Free market economy, Major Imports and exports	4
10	Population, Structure and Composition: Growth and distribution of population, Migration, Population composition – age, sex, education, occupation	4
11	Settlement: Growth and distribution of Settlement, Urbanization and development of Megalopolis and associated problems	4
12	Tourism: Factors Affecting Tourism in India, Development of tourism and major tourist, centers in India	2
13	Special Issue: International Relationships of India with other nations	2

Books:

1. Ahir R (2005): Geography. Spectrum Books Pvt. Ltd, Janakpuri, New Delhi
2. Khullar D.R (2005): India, A Comprehensive geography. Kalyani Publishers, Ludhiana
3. Gautam A (2006): Advance Geography of India. Sharda Pustak Bhawan, Allahabad

Code No: Gg: 4412

Title: Geography of Maharashtra

No. of Credits: 2

No. of Periods: 30

Sr. No.	Topics	Lectures
1	Introduction: Location and a brief background of the State	2
2	Geology Relief and Drainage: Geology, Characteristics of Relief and distribution of Plain, Plateaus and mountain, Characteristics of Rivers	6
3	Climate and Soil: Climatic Characteristics and Climatic Regions, Characteristics and types of soil, Distribution of soil	4
4	Agriculture, Problems and Prospects: Salient features of Agriculture, Agricultural Regions, Major Crops, Irrigation: Types of Irrigation and distribution	4
5	Natural Resources: 1.Mineral Resources; (Distribution of major types of minerals), Energy Resources; (Distribution of coal, petroleum and hydel power)	3
6	Industries Problems and Prospects: Salient features of Industry in the State, Industrial regions, Major industries	4
7	Transportation: Transportation network in the state	2
8	Population, Structure and Composition: Growth and distribution of population, Population composition – age, sex, education, occupation, Migration	3
9	Urbanization: Development of Megalopolis and associated problems	2

Books:

1. Arunachalam B. (1967) Maharashtra: A study in Physical, Regional setting and Resource Development.
2. Deshpande C.D (1971) Geography of Maharashtra.
3. Dikshit K.R (1986) Maharashtra in Maps. Maharashtra State Board for literature and culture, Bombay
4. Diddee J, Jog S.R, Kale V.S and Datye V.S (2000) Geography of Maharashtra. Rawat Publication, New Delhi

Code No: Gg: 4511

Title: Oceanography

No. of Credits: 3

No. of Periods: 45

Sr. No.	Topics	Lectures
1.	Nature and scope of oceanography	2
2	The morphology of ocean bottom : Continental shelf, continental slope , Theories of the origin of submarine canyons, Tsunami waves, The deep sea fans and the continental rise, the deep sea plains, The oceanic deeps	5
3	Bottom Relief of Indian, Atlantic and Pacific Oceans.	4
4	Temperature distribution on the oceans, sources of heat, factors affecting horizontal distribution of surface temperature, range of temperature, vertical distribution of temperature, frontogenesis.	4
5	Salinity of ocean water: various sources of oceanic salts, factors causing, and variations in salinity. Annual variation in surface salinity Distribution of salinity. Horizontal and vertical regional distribution of salinity.	8
6	Density of ocean water: Thermohaline convection, factors controlling the density of ocean waters. The horizontal and vertical distribution of density	4
7	The Marine deposits: Classification of marine sediments coral reef, types of coral reefs. Theories of the origin of coral reefs.	4
8	Oceanic waves : Waves characteristics deep water waves shallow waves transitional waves, transitional waves, destructive waves,	4
9	Tides : Types of tides. Theory of ocean tides tidal current tidal bore storm surge	4
10	Ocean currents: Characteristics and origin of ocean current Theories of ocean current factors influencing generation and modification of ocean current, currents of Pacific, Atlantic and Indian ocean.	6

Books:

1. Lal, D. S. (2003): Oceanography, Sharda Pustak Bhawan, Allahabad.
2. Sharma, R. C. and Vatal, M. (1986): Oceanography for Geographers, Chaitanya Publishing House, Allahabad

Code No: Gg: 4512

Title: Geography of Soils

No. of Credits: 2

No. of Periods: 30

Sr. No.	Topics	Lectures
1.	Soils: Definition, origin. Pedology, distinction between soil and sediment	2
2	Weathering and soils: soil formation: soil forming factors, soil profile. Soil taxonomy	7
3	Physical properties of soils - texture, structure, colour, porosity and permeability	7
4	Chemical properties of soils - soil clays. Cation exchange, Humus, organic matter, pH, Soil biochemistry	7
5	Classification of tropical soils. Major soils in India – Black soils and red soils – their characteristics and distribution	4
6	Soils and environmental problems — soil erosion, salinization, pollution	3

Books:

1. Miller, R. W. and Donahue, R. L. (1990): Soils, Prentice-Hall of India
2. Pitty, A. F. (1978): Geography and soil properties. University Press.
3. Bridges, E. M. (1986): Principles and Applications of Soil Geography, Halsted Press.
4. Daji, J. A. (1970): A textbook of soil science, Asia Pub. House
5. Bunting, B. T. (1976). The Geography of soils, Hutchinson, London
6. Brikeland, P. W. (1984). Soils and geomorphology, Oxford University Press

Code No: Gg: 4521

Title: Political Geography

No. of Credits: 3

No. of Periods: 45

Sr. No.	Topics	Lectures
1.	History and Development - Definitions, Pre-modern phase (before 1890), modern phase (1890 - 1933), nature and scope of political geography - The types of approaches State and nation - the idea of the state, special factors of the state (Location, size and shape), concept of nation, elements and characteristics of nation, nationalism	15
2	Frontiers and boundaries - Definitions, Classifications of boundaries, boundaries as economic barriers, India's borders and associated problems Global strategic views - views of Mahan, Mackinder, Spykman and Cohen. Role of sea and ocean influencing the national characteristics, the concept and measurement of the territorial sea	15
3	Electoral studies in political geography – Trend in electoral geography, Geography of voter's participation, regional stability urban-rural conflict, revised model of electoral geography	15

Books:

1. Adhikari, Sudepta (1997): 'Political Geography', Rawat Publications, Jaipur
2. Dikshit, R. D. (1994): 'Political Geography', Tata MacGraw Hill Publication, New Delhi

Code No. Gg: 4522

Title: Geography of Health

No. of Credits: 2

No. of Periods: 30

No.	Topics	Lectures
1	Geography of health: Definition, development, achievements and challenges, approaches to geography of health care	5
2	Geographical factors affecting human health and diseases arising from them	8
3	Classification of diseases – genetic, communicable, non – communicable, occupational, deficiency diseases, WHO classification of diseases	6
4	Ecology, etiology, transmission of major diseases. Diffusion of diseases and causes of the same. Deficiency disorders and problems of malnutrition	5
5	Health care systems in India	3
8	Health care policies and rehabilitation programs	3

Books:

1. Hazra J. (Ed.)(1997): Health care planning in developing countries, University of Calcutta, Calcutta.
2. May J.M (1959): Ecology of Human diseases, M.D. Publications, New York.
3. Philips D.R (1990): Health and health care in Third world, Longman, London
4. Rais A. and Learmonth A.T.A.: Geographical aspects of health and diseases in India
5. Stamp L.D (1964): Geography of life and death, Cornell University, Ithaca

Code No: Gg: 4523

Title: Development of Geographical Thought

No. of Credits: 2

No. of Periods: 30

Sr. No.	Topics	Lectures
1.	Geographical knowledge of the ancient world: Greek-Roman Period	4
2	Geography of medieval period: contributions by Arab geographers	2
3	Period of explorations: Discoveries and spread of European trade	2
4	Development of scientific geography, Varenus and Emmanuel Kant	1
5	Geography in the nineteenth century, contributions by Humboldt and Ritter, Impact of Darwin	5
6	Dualism in Geography: Human and Physical, Regional and Systematic	4
7	Conceptual Development: Environmental determinism, possibilism, areal differentiation, classification and regionalization	4
8	Developments of models in geography Approaches in Geography: behavioural, humanistic and rational	4
9	Exploration in Geography – temporal exploration, Ideology, Marxist geography, radical geography	4

Books:

1. Arild Holt-Jensen (1999): Geography: History and Concepts, Sage Publ. London.
2. Hussain Majid (1984): Evolution of Geographical Thought, Rawat Publications, Jaipur
3. Tozer, H. P. (1951): History of Ancient Geography, Cambridge
4. Dikshit, R. D. (1997): Geographical Thought: Contextual History of Ideas, Prentice Halls, New Delhi
5. Taylor G. (1951): Geography in the 20th century, Matheun & Co. London
6. Chorley, R. J. (Ed) : Directions in Geography, Matheun & Co. London
7. Richard, P. (1998): Modern Geographical Thought, Blackwell