UNIVERSITY OF PUNE
M.A./ M.Sc. Syllabus in Geography (from June, 2009)

SEMESTER I :	
Gg-101	Principles of Geomorphology
Gg-102	Principles of Climatology
Gg-103	Principles of Economic Geography
Gg-104	Principles of Population and Settlement Geography
Gg-105	Praticals in Physical Geography a. Geomorphology b. Climatology c. Field visit up to seven days

SEMESTER II :	
Gg-201	Quantitative Techniques in Geography
	One of the following according to specialization
Gg-210	Tropical Geomorphology
Gg-211	Synoptic Climatology
Gg-212	Agricultural Geography
Gg-213	Population Geography
Gg-214	Geoinformatics – Paper I
	One of the following according to Specialization
Gg-220	Fluvial Geomorphology
Gg-221	Monsoon Climatology
Gg-222	Industrial Geography
Gg-223	Geography of Rural Settlements
Gg-224	Geoinformatics – Paper II
Gg-202	Practical in Human Geography a. Economic Geography b. Population and Settlement Geography c. Computer Application
Gg-203	Practicals in Surveying and Map Projections.

SEMESTER III :	
Gg-301	Theoretical and Applied Geography
	One of the following according to Specialization
Gg-310	Coastal Geomorphology
Gg-311	Applied Climatology
Gg-312	Trade and Transport Geography
Gg-313	Urban Geography
Gg-314	Geoinformatics – III
	One of the following
Gg-320	Multivariate Statistics
Gg-321	Political Geography

Gg-322	Soil Geography
Practical 1 –	One of the following according to Specialization
Gg-330	Practicals in Geomorphology
Gg-331	Practicals in Climatology
Gg-332	Practicals in Economic Geography
Gg-333	Practicals in Population and Settlement Geography
Gg-334	Practicals in Geoinformatics
	(Note : Fieldwork / Field visit for a duration of not more than 7 days should be undertaken)
Practical	
Gg-302	Interpretation of Topographical Maps and Village Survey / Project Work

SEMESTER IV :	
Gg-401	Resource Management
	One of the following
Gg-420	Regional Planning and Development
Gg-421	Geography of Water Resources
Gg-422	Biogeography
Gg-423	Geography and Ecosystem
	One of the following
Gg-424	Research Methodology
Gg-430	Social and Cultural Geography
Gg-431	Computer Geography
Gg-432	Oceanography
Gg-433	Natural and Man-made Hazards
	One of the following
Gg-440	Dissertation
Gg-441	Regional Geography of Europe
Gg-442	Regional Geography of South East Asia
Gg-443	Regional Geography of North America
Gg-444	Geography of Japan
Gg-445	Geography of India
Gg-402	Practicals in Remote Sensing and GIS
Gg-403	Advanced Practical Course in Quantitative Techniques in Geography
	(Note : Only those students who have opted for the specialization in Geoinformatics (Gg 214, 224, 314, 334), will be allowed to offer above practical course Gg 403).

Teaching Programme and Conditions:

1. The total number of courses to be offered by a student will be 20, spread over four semesters. Theory and practical ratio will be as 14:6. All the 20 courses will be University Courses.
2. Each theory course will be covered in at least 40 lectures. There shall be four periods each of 55 minutes per week, per theory course.
3. There will be a continuous assessment of the student through class tests and / or seminars and home assignments.
4. There shall be a minimum 5 students for each optional course. There shall be a batch of 10 students for each Practical Course. There shall be two Practicals each of them of (3) hours duration, per week, per practical course.
5. The students will have to declare the option for Dissertation at the beginning of the 3rd semester. No student who carries any backlog of courses up to 2nd semester will be allowed to offer Gg 440 : Dissertation.
6. The students will maintain a journal for all the practical courses and it will be certified by Head of the Department and will be reassessed at viva-voce. In the semester-end examination, the viva-voce and journal will carry 10 marks.

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M.A., M.Sc. – Semester III

Gg 301 : THEORETICAL AND APPLIED GEOGRAPHY

From June 2009

Sr. No.	Topics	Subtopics	Learning points	Periods
1.	Historical Development of Geographical Thought	1. Ancient period	1. A brief account of Greek, Roman, and Indian Schools of thought 2. Contributions of Herodotus, Eratosthenes, Strabo, Ptolemy.	10
		2. Medieval period	1. First Half – Dark age and brief account of Arab School. 2. Second Half – Age of Discovery, Contributions of Marco Polo, Columbus, Vasco-Da-Gama and Captain Cook.	
		3. Modern period	1. A brief account of different schools of thought – German, French, British and American. 2. Contributions of Kant, Humboldt, Ritter, W. M. Davis.	
2.	Dualism in Geography	Dualism and Dichotomies in Geography	1. Determinism and Possibilism 2. Systematic versus Regional Geography 3. Physical versus Human Geography	4
3.	Paradigms, System approaches and Models in Geography	1. Paradigms	1. Hypothesis, Theories and Laws. 2. Paradigms in Geography	10
		2. Systems	1. Structure, elements and relationship. 2. System approaches in Geography.	
		3. Models	1. Definitions and Significance. 2. Types of Models used in Geographical Studies	
4.	Recent Trends in Geography	1. Scientific methods 2. Quantitative revolution 3. Computer application	1. Field survey process studies and experimental studies. 2. Quantification and application of statistical techniques in Geography. 3. Computer based Cartography, Remote Sensing, GIS and Geo-informatics.	6
5.	Applied Geography	1. Definition 2. Application of Geographical concepts and techniques	1. Definition, Need and Significance 2. Application in land-use planning, regional planning and urban planning, resource management, environmental management, natural hazards, scenic evaluation.	10

Reference Books :

1. Hertshone, R. (1959) : Perspectives of Nature of Geography, Rand MacNally and Co.
2. Frazire, J. W. (1982) : Applied Geography, Prentice Hall, Englewood Cliffs.
3. Hussain, M. (1995) : Evolution of Geographical Thought, Rawat Pub., Jaipur
4. Coffey, W. J. (1981) : Geography : Towards a general spatial systems approach, Mathuen, London
5. Cooke, R. U. and Doornkamp, J. C. (1974) : Geomorphology in Environmental Management, Clarendon Press, Oxford.
6. Singh I. (2006) : Diverse aspect of Geographical Thought, ALFA Publications, New Delhi.
7. Dikshit, R. D. (1997) : Geographical Thought : A Contextual History of Ideas, Pub. By A. K. Ghosh, Prentice – Hall of India Pvt. M 97, New Delhi.

UNIVERSITY OF PUNE

M.A., M.Sc. – Semester IV

Gg. 302: Interpretation of Topographical Maps and Village Survey / Project Report

From June 2009

Sr. No.	Topics	Sub-topics	Learning Points	Practicals (3 hrs)	No: of sheets (minimum)
a. Interpretation of Topographical Maps (for 50 marks)					
1	Study of S.O.I and O.S Topographical Maps (1: 50,000 Series)	1.Indexing and conventional signs and symbols (OS)	1. 15'× 15' 2. 7.1/2'× 7.1/2' 3. 5'× 7.1/2'	4	2 (One each for S.O.I and O.S. sheets)
		2. Grid references.	1. 4-figure grid 2. 6-figure grid 3. International grid reference		
		3. Locational and Relief aspects of the area	1. Latitudinal & Longitudinal extension 2. Contour interval 3. Maximum and Minimum heights		
2	Interpretation of S.O.I and O.S. toposheets.	1. Patterns of Relief	1. Distribution of Spot heights, bench marks, Trigonometrical Points etc. 2. Types of Slopes (convex, concave, uniform etc.) 3. Major landforms from contour patterns	10	SOI –3 sheets OS – 3 sheets
		2. Patterns of Drainage network	1. Types-trellis, dendritic, radial, etc. 2. Streams with water, without water. 3. Influence of relief on drainage		
		3. Patterns of Vegetation.	1. Types of vegetation 2. Association of relief and drainage 3. Reserved Forest and Protected Forest		
		4. Patterns of Settlements.	1. Types, amenities, facilities and communication, etc 2. Distribution, relative size, relative distance (dispersed, nucleated etc)		
		5. Patterns in Land Use.	1. Agriculture, mining etc, areal distribution, impact of physical landscape.		
b. Village Survey (for 30 marks)					

3	Physical Survey	Location	1. Location on toposheet (lat. & long), extension, grid reference if available, height above mean sea level, area, site and situation) 2. Map showing physical features surrounding the village. 3. Position of the village on the cross-section line. 4. Location of the village shown in the map of catchment area.	6	15 page report
		Geology and climate	Information regarding geology, climate, soils and vegetation of the village		
4	Socio-Economic Survey	Population characteristics	1. Population, population structure, facilities available 2. Information regarding households-based on 10% sample survey.		
		Village morphology	1. Plan prepared by pace survey 2. Description of the plan.		

Note:

1. The selection of the village must be based on the availability of S.O.I. toposheet and/or Cadastral Map.
2. As far as possible the village should be selected from the nearby area, so that the students can undertake at least two field visits.
3. Collection of data / information should be undertaken by the student by visiting the various Government Offices
4. The Village Survey Report should include the following:
   1-Locational aspects of the village
   2-Physical Landscape
   3-Cultural Landscape
   4-Socio-economic Landscape
   5-Observations.
5. Appropriate maps, diagrams, graphs, sketches etc should be included.
6. The Report should not preferably exceed 15 pages.
7. Village survey is equivalent to 6 Practicals.

Reference Books :

1. Tamaskar B.G. and Deshmukh V.M. (1974), Geographical Interpretation of Indian Topographical Maps. Orient Longman Limited Bombay
2. Ramamurthy, K. (1982): Map interpretation, Madras
3. Petrie N. (1992), Analysis and Interpretation of Topographical Maps. Orient Longman Limited Calcutta.
4. Dury G.H. (1960), Map Interpretation. Sir Isaac Pitman and Sons Limited, Pitman House, Bath.
5. Meux A. H. (1960), Reading Topographical Maps. University of London Press Limited
6. Jones P. A. (1968), Field work in Geography. Longmans, Green and Company Limited
7. Archer J. E and Dalton T. H. (1968), Field work in Geography B.T. Batsford Limited London
8. Wheeler K.S. Ed (1970), Geography in the field. Blond Educational, London.
9. Gupta, K. K. and Tyagi, V. C. (1992): Working with maps, Survey of India Publication, Dehradun
10. Vaidyanadhan. R. (1968). Index to a set of 60 topographical maps, CSIR, New Delhi

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M.A., M.Sc. – Semester III

Gg-310: COASTAL GEOMORPHOLOGY

From June 2009

Sr. No.	Topic	Subtopics	Learning points	Periods
1.	Introduction	Coastal systems	1. Components of coastal systems processes, sediment transport Morphology,Stratigraphy 2. Spatial and temporal scales in coastal Geomorphology 3. Coastal classification – Genetic and Morphological	3
2.	Coastal Processes	Waves	Definition, wave length, wave height, amplitude, depth, period , fetch, frequency Types of waves, sea waves, swell waves , capillary waves, gravity waves, long period tidal waves, storm waves, Standing waves, Process of shoaling, wave breakers – spilling, plunging and surging, reflection , diffraction and refraction of waves	6
		Currents	Currents – Wave induced shore normal and long shore currents, rip currents , beach drift , wind induced , river induced and tide induced current, flood and ebb currents	
		Tides	Equilibrium Theory of tides, semidiurnal, diurnal, spring , and neap tides. Amphidromic point, co – tidal lines, coastal tides, tides in bays and estuaries Tides and coastal landforms	
3.	Sea level	Mechanism of sea level changes	1.Transgression , Regression, Relative and eustatic sea level change 2.Causes and consequences sea level change Pleistocene sea levels, glacial eustasy, Staircase theory 3. Holocene transgression 4. Future sea levels 5. Indicators of former sea levels: Fossil beach ridges, beach rocks, abandoned cliffs, Caves , raised features , shore platforms	5
4.	Coastal sediments	Properties, types and Movement	1.Clastic and biogenic sediments 2. Grain size characteristics 3. Sources sediments: Coastline erosion and sea floo 4. Pathways of sediments transport : Factors affecti Transport , sediments traps and sinks	4
5.	Coastal environments	Fluvial-dominated	Coastal deltas: Classification , formation, morphology delta plain, delta front and pro delta Fan delta, Braid delta. Morphodynamics of deltas	5
		Wave-dominated	1.Introduction: Process of deposition 2.Beaches and spits: Profiles, types and sediments 3. Barrier islands 4. Coastal sand dunes, dune systems 5. Sea cliffs and caves- Formation and morphology 6. Shore platforms – Formation types and Morphology 7. Sea arches, stacks , stumps, geos and blow holes	4

		Tide-dominated	1.Introduction 2.Estuaries and mud flats: morphology and Hydrodynamics	5
		Biotic environments	1.Mangroove swamps and salt marshes 2.Corals and coral reefs	4
6.	Applied coastal Geomorphology	Current coastal issues	1. Sea level rise 2. Storm hazard management 3. Coastal erosion 4. Wetlands, Kharlands, Estuarine reclamation 5. Salt intrusion and subsidence of coastal aquifers	4

Reference Books:

1. Davis J L (1980): Geographical variation in coastal development, Longman, New York
2. Embelton and Thornes (1979): Process in geomorphology, Arnold, London
3. Hails J and Carr A (1975): Nearshore sediment dynamics and sedimentation, Wiley, London
4. Karlekar Shrikant (1993): Coastal geomorphology of Konkan, Aparna Publication, Pune
5. Masselink G, Hughes M G (2003): Introduction to coastal processes and geomorphology, Arnold, London
6. Pethick John (1984): An Introduction to coastal geomorphology, Arnold Heinemann, London
7. Tooley M M and Shennan I (1987): Sea level changes, Basil Blackwell, Oxford, U K
8. Bird, E. (2000): Coastal Geomorphology. An Introduction, John Wiley and Sons, Chichester.
9. Kale, V.S. and Gupta, A. (2001): Introduction to Geomorphology, Orient Longman, Calcutta.

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M.A., M.Sc. – Semester III

Gg 311 : APPLIED CLIMATOLOGY

From June 2009

Sr. No.	Topics	Subunits	Learning points	Periods
1	Introduction	1. Nature and scope	1 Development of applied climatology 2 Atmospheric concern and awareness 3 Climate impact assessment	2
2	Basic climatic elements	1. Radiation 2. Temperature 3 Moisture 4. Evaporation and evapo-transpiration 5. Wind	Radiation -Basic relations, Radiation laws, distribution, instruments to measure radiation Temperature - Basic relations, distribution, soil temperature, instruments to measure temperature Moisture - Basic relations, humidity, clouds, precipitation, rain, snow, sleet, hail, rime, dew, distribution and instruments to measure precipitation Evaporation and evapo-transpiration - Basic relations, soil plant relationship, empirical methods to estimate evapo-transpiration, distribution and instruments Wind - Basic relations, turbulence, gustiness, instruments	12
3	Agro-climatology	1. Agricultural relationship of climate	1. Climate and soil 2. Climate and soil management 3. Climate pests and diseases 4. Micro-meteorological changes and behaviour of pests and diseases 5. Climate and livestock 6. Climate and crops 7. Artificial control of plant environment	5
4	Climate and Human behaviour	Climate and health	1. Human bio-meteorology 2. Climate, clothing and human control 3. Climate and health	2
5	Urban Climate	Urban climate and global environmental change (GEC)	1. Nature of global environmental change 2. Nature of urban climates 3. Impact of urban climate on GEC 4. Urban heat Island 5. Urban air Pollution problems	5
6	Climate industry, commerce and engineering	Climate and Industry	1. Significant climate variables 2. Industrial and commercial activities 3. Construction operations	3
7	Engineering applications	Climate and engineering	1. Heating degree-days. cooling towers 2. Traction ability	2
8	Climate and Transportation	Land transport, Air transport, Water transport	1. Effect of climate on land transport 2. Effect of climate on water transport 3. Effect of climate on air transport – clear air turbulence	3
9	Remote sensing in agriculture	Remote sensing and agriculture	1. Indian remote sensing 2. Satellite programming for crop condition. 3. Meteorological study monitoring 4. Detection of plant stress 5. Canopy transpiration and crop stress	3

10	Climates, past, present and future	1. Mechanisms of climatic change 2. Reconstruction of past climate 3. Theories of climatic change	1. External causes of climatic change 2. Internal causes of climatic change 3. Techniques 4. Ocean floor sediments 1. Plate tectonics 2. Volcanic activity 3. Astronomical 4 Solar variabilities	3

Reference Books :

1. Mather, J.R.(1974) : Climatology : Fundamentals and Applications, McGraw Hill, New York.
2. Hobbs, John E. (1980) : Applied Climatology, Dawson West View Press.
3. Oliver, John E. (1973) : Climate and Man's Environment, John Wiley and Sons, New York.
4. Geiger, Rudolf (1966): The Climate near the Ground, Hardward University Press.
5. Lal, M. (ed.) (1993) : Global Warming, Tata McGraw Hill, New York.
6. Oliver, John E. (1981) : Climatology, Selected Applications, V.H. Winston and Sons, London.

UNIVERSITY OF PUNE

M.A., M.Sc. – Semester III

Gg. 312 : TRADE AND TRANSPORT GEOGRAPHY

From June 2009

Sr. No.	Topics	Subunits	Learning points	Periods
1	Introduction	1. History of Development 2. Approaches	1. Contribution of different scholars 1. Functional Approach 2. Significance of transportation in world and regional economies	4
2	Modes of transportation	1. Development and distribution of different modes 2. Characteristics and significance	1. Landways: Roadways, railways and Pipeline 2. Waterways: Ocean and inland 3. Airways Factors associated with their growth Characteristics and relative significance of different modes of transport	5
3	Location of seaports and airports	Factors associated with their growth	1. Physical factors 2. Economic factors 3. Political factors	4
4	Transport network	1. Network structure 2. Measurement of accessibility	1. Nodes and routes 1. Hierarchies 2. Hinterlands 3. Models of network changes 4. Graph theoretic measures 5. Traffic flow 6.Gravity models 7. Transport network and economic development	7
5	Urban transport	Growth and problems	1. Growth of urban transportation in developing countries 2. Transport and environmental degradation 3. Vehicular pollution and congestion 4. Alternative transport system in mega cities of India 5. National highway development and planning in India	5
6	Trade	Concept, Development and Significance of trade	1. Concept of trade, Types of trade, Concept of Balance of trade 2. Role of trade in the world and regions 3. Significance of Trade	4
7	Trade Theories	Types of theories	1. Theory of comparative advantage 2. Neo-classical theory 3. Modern theory	4
8	International trade	Trade	1. Trade areas and economic blocks 2. Various treaties of trade at international level 3. History and development of International trade 4.Geographical factors influencing international trade 5. Problems and prospects of international trade in globalisation	7

Reference Books:

1. Chorely R. J. and Haggett P. (1968): Network Analysis Edward Arnold, London
2. Taffe, E. J. and Gauthier H. L. (1973): Geography of Transportation, Prentice-Hall
3. Thoman and Conkling: Geography of International Trade
4. O'Dell and Richards (1968): Railways and Geography
5. Sealy (1968): Geography of Air Transportation. Hutchinson University
6. Morgan: Ports and Harbours
7. Singh K N (1990): Transport network in Rural Development, Institute of Rural Economic Development, Varanasi.
8. Thoman, Gonkling, Vegles (1974): Geography of Economic Acivity
9. Tolley R. S. and Turton B. J. 91989): Transport system, Policy and Planning Longman Group, Singapore
10. White H.P. and Senior M.L. 91989): Transport Geography, Longman Group, Hongking
11. Bhandari S (1992): Transport and Regional Development, Concept Publication, New Delhi
12. Pande (1991): Transport Geography, Concept Publication, New Delhi
13. Vaidya B C (eds)(1998): Reading in Transport Geography: A Regional Perspective, Devika Publications, New Delhi
14. Saxena, H.M. : Transport Geography.

UNIVERSITY OF PUNE

M. A. M. Sc.

Gg 313 : URBAN GEOGRAPHY

Effective June 2009

Sr. No.	Topic	Sub-Topic	Learning Points	Periods
1.	Introduction	Nature, Scope and significance of Urban Geography	1. Nature and scope 2. Significance 3. Relation to other disciplines	4
2.	Urbanization	Concept and Process	1. Meaning of Urban settlement and urbanization. 2. Criteria used to distinguish urban settlements 3. Behavioral, structural and demographic concept of urbanization. 4. Brief review of spatial- temporal variations in urbanization in the world 5. Urbanization curve 6. Contemporary factors of urbanization	4
3.	Urban Morphology	Models of urban structure	1. Park and Burgess Model 2. Homer Hoyet Model. 3. Harris and Ullman Model 4. Characteristics and demarcation of CBD	4
4.	Urban Classification	Approaches to Classification Functional Classification	1. Various approaches to classification 2. Urban function 3. Functional classification of towns and cities by C.D. Harris and H. J. Nelson	4
5.	Urban Demography	Characteristics of urban populations	1. Growth of urban population 2. Urban explosion in developing countries. 3. Density of population in cities. 4. Age, sex and occupational structure.	4
6.	Rural-Urban fringe	Characteristics and methods of demarcation	1. Meaning of rural-urban fringe. characteristics of rural-urban fringe 2. Suburbanization 3. Concepts of conurbation, megalopolis, satellite towns.	4
7.	City and its Region	Concept, characteristics and demarcation	1. Concepts of city region and various synonymous terms used. 2. Criteria used to demarcate the city region 3. Nature of urban influence	4
8.	Central place concepts	Central place theory and urban Hierarchy	1. Christaller's Central Place Theory. 2. Rank-size relationship and rank-size rule 3. Hierarchy of urban settlements	4
9.	Contemporary Urban issues	Nature of issues	1. Price of land and vertical and horizontal growth of cities 2. Urban sprawl 3. Scarcity of housing and growth of slums 4. Problems of civic amenities 5. Urban transport problem 6. Environmental pollution	4
10.	Urban policy and planning	Development policies and	1. Policies of Urban development. 2. Need of city planning	4

		planning	3. Elements of city plan 4. Master plan of towns 5. New towns 6. Urban development and urban policy in India	

Reference Books :

1. Carter (1972) : The Study of Urban Geography, Edward Arnold,.London.
2. Hall P. (1992) Urban and Regional Planning, Routledge, London
3. Kundu, A. (1992) : Urban Development and Urban Research in India, Khanna Publication.
4. Singh. K. and Steinberg. F.(eds) (1998) : Urban India in Crisis. New Age Interns,
5. Brian.R.K. (1996) : Landscape of Settlement Prehistory to the present, Routledge, London
6. Northam : Urban Geography
7. Urban Geography : Tim Hall
8. Johnson : Urban Geography
9. K. Siddharth and S. Mukherji : Cities,. Urbanizations and Urban Systems.
10. Mayer and Kohn : Readings in Urban Geography
11. Roy Turner: Indian's Urban Future.
12. Shah Manzooor Alam : Urbanization in Developing Countries
13. Verma : Urban Geography, Rawat, Jaipur
14. Bhattacharya: Urban development in India, Shree publication.
15. Raj Bala : Urbanization in India.

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M.A., M.Sc. – Semester III

Gg 314 : GEO-INFORMATICS

From June 2009

Sr. No.	Topic	Sub-topic	Learning Points	Periods
1	Data Analysis	Spatial	Simple to complex, Grid Operations: Zonal and Global	2
2	Spatial Interpolation	Surfaces	Visualization of continuous surfaces, Digital Elevation Model, Digital Terrain Model, Interpolation techniques: Global and local methods of interpolation, Applications	4
3	Spatial Analysis	Analytical tasks	Single – Layer Operations, Multiple – Layer Operations, Spatial Modelling, Topological Overlays, Point Pattern Analysis, Network Analysis, Surface Analysis, Grid Analysis	6
4	Digital Image Processing (I)	Image Rectification Georeferencing	Types of errors: Systematic & Non-systematic Sources of distortions: Atmospheric, Radiometric, Geometric and noise GCP Tools, Mapping Function, Resampling	7
5	Digital Image Processing (II)	Image Enhancement	Density Slicing, Contrast Stretching, Spatial Filtering, Edge Enhancement, Multi image manipulation: Spectral Ratioing, PCA and Végétation component – TVI, GNDVI & NDVI	6
6	Digital Image Processing (III)	Classification	Unsupervised: ISODATA approach Supervised: Training Stage, Classification Stage (Minimum Distance to Means, Parallel-piped & MXL Classifiers), Output Stage	6
7	Digital Image Processing (IV)	Classification Accuracy	Confusion Matrix, Producer`s Accuracy, User`s Accuracy, Mapping Accuracy	2
8	Microwave, and Thermal Applications	Microwave RS Thermal RS	Basic concepts of Radar, SLR, SAR, LIDAR, SRTM and Hyper spectral RS Concept of Thermal Remote sensing Applications of microwave and thermal RS	3
9	Post Classification Analysis			2
10	Resolutions		Spatial, Spectral, Radiometric and Temporal.	2

Reference Books :

1. P. A. Burrough and R. A. McDonnell (2000) : Principles of Geographical Information System, Oxford University Press.
2. Lo, C. P. and Albert K. W. Yeung (2002) : Concepts and Techniques of Geographic Information System, Prentice –Hall, India.
3. Paul A. Lonfley, Michel F. Goodchild, D J. Maguire and D.W. Rhind (2002) : Introduction to Geographic Information Systems and Science, John Wiley and Sons Ltd.
4. Kang – tsung – Chang, (2002) : Introduction to Geographical Information System, McGraw Hill.
5. George Joseph, Fundamentals of Remote Sensing, 2004, Universities Press Pvt. Ltd., Hyderabad.
6. J.R. Jensen, (2003) : Remote Sensing of Environment, An Earth Resource Perspective, Pearson Education Pvt. Ltd., New Delhi.
7. Lillesand T.M. and Kiefer R.W., 2002, Remote Sensing and Image Interpretation, John Wiley and Sons, New Delhi.

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M.A., M.Sc. – Semester III

Gg 320 : MULTIVARIATE STATISTICS

From June 2009

Sr. No.	Topics	Subtopics	Learning points	Periods
1.	Introduction	Nature and Objectives	1. Bivariate & Maultivariate Analysis 2. Objectives of Multivariate Analysis a) Data reduction or simplification b) Sorting and Grouping c) Prediction d) Hypothesis Testing	4
2.	Matrix and Vector Elementry Ideas	Vectors : Rows and Columns Algebra	1. Matrix : a) Definition, Elements, Order and Types b) Determinant of a matrix c) Addition, substraction and multiplication of matrices d) Transpose, adjoint and inverse of matrix e) Determination of unknowns in a simultaneous equation by matrix solution using (a) – Crammer's rule and (b) Inverse method	5
3.	Curvilinear bi-variate relationships	Nature and Types Regression Equations	Nature of non linear bi-variate functions Bi-variate relationships y=x^2, y=x^3, y=x^4, etc. Examples of non linear bi-variate functions in Geography Computation, plotting and interpretation of 1. Second Degree (Quadratic) equation, Y=a+bx+cx^2 2. Third Degree (Cubic) equation y=a+bx+cx^2+dx^3	7
4.	Multivariate Analysis	1. Multiple correlation, and regression 2. Regression equations	Meaning of multiple regression and multi-co linearity stepwise regression Computation of multiple regression equations involving two and three independent variables (by solving simultaneous equations or by using variance – covariance matrix) 1. Second order multiple regression equation, $y=a+b_1x_1 + b_2x_2$ 2. Third order multiple regression equation, $y=a+b_1x_1 + b_2x_2 + b_3x_3$ 2. Calculation of Co-efficient of multiple determination (R^2) Co-efficient of multiple Co-relation (R) and Explained Variance (EV)	7
5.	Trend Surface Analysis	Principle and Computation	1. importance of Trend surface analysis in the study of spatially distributed data. Examples. 2. Computation, application and plotting of linear trend surface, Interpolation of trends. Ideas of quadratic and cubic trend surfaces.	4
6.	Principal component Analysis	Principle and Computation	Extraction of first two principal components, Eigen vector, explained variance, component scores communalities, Plotting of two components in two dimensional space. Mapping of scores. Interpretation and regionalization.	4

7.	Factor Analysis	Principle and Computation	Extraction of first two factors, Eigen value, Explained variance, Factor Scores, Mapping of factors and regionalization, varimax rotation.	4
8.	Application	Application in various branches of geography	Use of bi-variate and trend surface analysis in climatology and geomorphology, PCA in remote sensing, FA in human geography etc.	2
9.	Exercises in Excel / SPSS	Use of MS-Excel or SPSS	Basic introduction to computer applications of multivariate analysis.	3

Reference Books :

8. Shaw g and Wheller D. (1985) : Statistical techniques in geographical analysis. John Wiley and Sons, New York.
9. Sumner G. J. (1978) : Mathematics of Physical Geographers, Edward Arnold.
10. Dr. S. N. Kelkar and Dr. kale mohan (2005) : Statistical Analysis of Geographical Data, Diamond Publication, Pune
11. Clark W. A. V. and Hosking P. L. (1986) : Statistical methods of geographers
12. Collins (1984) : Introduction to multivariate analysis, Edward Arnold
13. Jonston, R. J. (1979) : Multivariate statistics in Geography, Longman, London
14. Fortheringham, A.S., Brunsdon, G., Charlton, M. (2000) : Quantitative Geography, Perspectives on Spatial Data Analysis, SAGE.

UNIVERSITY OF PUNE

Gg-321: POLITICAL GEOGRAPHY

M.A., M.Sc. – Semester III

From June 2009

Sr. No	Topic	**Sub- Topic**	**Learning Points**	Periods
1	Introduction to political Geography	Nature, Scope, Development	1) Definition 2) Geography & politics 3) History & development of political Geography	4
2	Approaches to the Study of Political Geography	Types of Approaches	1) Whittlesey's landscape approach 2) Functional approach 3) Centrifugal & centripetal forces, analysis of external functions, 4) Unified Field Theory	5
3	Concept of Nation & State	Geographical Perspective	1) Territoriality 2) State & Nation 3) State formation. 4) Nation building / Nationalism	4
4	Frontiers & Boundaries	1. Definition. 2. Classification	1) Definition of frontiers & boundaries 2) Distinction between frontiers & boundaries 3) Genetic, functional & morphological classification of boundaries	7
5	Global Geo-Strategic View	Land, Sea, & Air Power	Views of Mahan, Mackinder, Spyk man & Cohen	5
6	Resource Development & Power	Resources & National Strategy	1) Classification of resources 2) Resources & National strategy 3) Resource management & power of Nation	3
7	Geopolitical Significance of Indian Ocean	Geopolitics Indian Ocean Border States and England	Political Geography of SAARC region.	5
8	Political Geography of India	Contemporary Issues	1) Changing political map of India. 2) Unity in diversity. 3) Stability & instability in state politics 4) Interstate water & language Disputes. 5) Problems of border states of India 6) Emergence of new states.	7

- **Reference Books :**

1. Alexander L.M (1963): World Political Patterns, Ram McNally, Chicago.
2. Political Geography By Sudeepta Adhikari, Rawat Publication.
3. Dikshit R.D (1996): Political Geography: A Contemporary Perspective, Tata McGraw Hill, New Delhi.
4. Dikshit R.D (1999): Political Geography: A Century of Progress, Sage, New Delhi.
5. De Blij. H. J And Glassner, M. (1968) Systematic political Geography, John Wiley, New York.
6. Pounds N.J.G (1972): Political Geography, McGraw, New York.
7. Taylor, R.J.(1989) Political Geography, Longman UK.

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M.A., M.Sc. – Semester III

Gg-322 : SOIL GEOGRAPHY

From June 2009

Sr. No	Topics	Sub-topics	Learning Points	Periods
1	Introduction	Geography and soils	1 Importance of the study of soils 2 Physical Geography and soils, Hydrology and soils, buried soils, Paleosoils 3 Human Geography and Soils Soils and Agriculture Soils and Forestry 4 Productivity of soil	4
2	Soil formation	Factors of soil formation.	1 Factors of soil formation including climate, biotic, topography, parent material and time 2 Parent material and soil 3 Topography and soil 4 Vegetation and soil 5 Climate and soil	6
3	Properties of Soils	1. Physical	1 Soil Texture 2 Soil Structure 3 Soil Colour 4 Bulk Density, Porosity , Pore Space 5 Soil Temperature 6 Permeability 7 Soil Water 8 Soil Moisture	12
		2. Chemical	1 Acidity and Alkalinity 2 Soil pH 3 Soil Colloids 4 Redox Potential 5 Cation, Anion exchange	
		3. Biochemical	1 Organic matter-floral and faunal 2 Humus content (process of humus formation) 3 Soil biomass	
4	Soil Profile	1. Development of soil **Profile.**	1 Soil Horizons Nomenclature 2 Development of soil profile with reference to deposition of iron, aluminum, calcium-carbonate, clays	6
		2. Genetic structure of Soils.	1 Primary minerals 2 Texture 3 Organic matter	
		3. Morphological features of soil horizons.	1 Soil Colour 2 Soil Structure	

5	Weathering and Soils	**1. Weathering Processes**	1 Physical Weathering 2 Chemical Weathering, Ion exchange 3 Secondary Clay minerals and their distribution in the profile	6
6	Soil Classification, land capability and suitability classification	1. Soils Classification Systems 2. Land capability classification and Land suitability classification	1 United states soil classification 1. Land capability classification 2. Land suitability classification	3
7	Problems related to Soil Degradation and Conservation	**1. Problems related to soil degradation.** **2. Problems related to soil conservation**	1 Salinization 2 Acidification 3 Soil fertility decline 4 Soil contamination 1 Deforestation 2 Overgrazing 3 Incorrect methods of farming	3

Reference Books :

1. Pitty A.F. (1978): Geography And Soil Properties, Methuen and Company Ltd., London.
2. White R.E. (1987): Introduction to The Principles And Practice of Soil Science, Blackwell Scientific Publications, London.
3. Fenwick I. M. and Knapp B.J. (1982): Soils - Process and Response, Unwin Brothers Ltd., The Greshman Press, Surrey.
4. Birkeland P.W. (1999): Soil And Geomorphology, Oxford University Press Inc., New York.
5. Brady N.C. (1984): The Nature And Properties of Soils. Macmillan Publishing Company, New York and Collier Macmillan Publishers, London.
6. Thomas J.B. and Brunsden D (1977): Geomorphology And Time, Methuen and Company Ltd.
7. Bunting B.T. (1969): Geography of Soil, Hutchinson University Library, London.
8. Cruickshank J.G (1972): Soil Geography, David and Charles (publishers) Limited, Newton Abbot.
9. Foth H.D and Turk L.M (1973): Fundamentals of Soil Science, Wiley Eastern Private Limited, New Delhi.

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

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M.A., M.Sc. – Semester III

Gg 330 : PRACTICALS IN GEOMORPHOLOGY

From June 2009

Sr. No.	Topics	Subtopics	Learning points	Practicals (3 hrs)	No. of Sheets (Minium)
1.	Sediment Analysis	Sieving and pipette method	Analysis of 1 sandy and 1 Clayey sample Plotting of data on probability graph paper and estimation of grain size parameters. Interpretation of processes.	4	2
2.	Hillslope Analysis	Direct and indirect measurements	1. Using clinometers / profiles from toposheet, 2. Identification of segments 3. Dalrymple et al's nine-unit landsurface model Understanding nature of processes	4	2
3.	Geomorpholo-gical mapping	Use of symbols (Hert, 1986)	1. Chart showing symbols 2. Preparing a geographic map of a small area / basin – toposheet / field 3. Interpretation of the map in terms of forms and processes.	3	2
4.	Study of Sedimentary sequences and weathering profile	Sedimentary structures and weathering zones	Study of 1 sedimentary sequence of river or costal sediments and 1 weathering profiles. Interpretation in terms of past and present processes	4	2
5.	Field Survey	Profile Survey and Measurement of Coarse sediments	1. Surveying and plotting of stream or gully channel cross – section or beach profile or slope profile. 2. Quadrate or Traverse survey of sediment size on riverbed or beach. 3. Analysis of shape and size of coarse sediment (Zingg's classification)	4	3
		GPS based survey	Preparation of beach, river channel maps etc. using GPS	1	1

(Note : Fieldwork / Field Visit for a duration of not more than 5 days should be undertaken for the course selected)

Reference Books :

1. Hart, M. G. (1986) : Geomorphology, Pune and Applied George Allen and Unwin
2. Goudie, A. (1990) : Geomorphological Techniques, Unwin Hyman, London
3. King, C.A.M. (1966) : Techniques in Geomorphology, Edward Arnold, London
4. Aackombe, R. V. and Gardiner, V. (1983) : Geomorphological Field Manual. George Allen and Unwin, London
5. Chorley, R. J., Schumm, S. A. and Sugden, D.E. (1984) : Geomorphology, Methuen, London
6. Kale, V. S. and Gupta, A. (2001) : Introduction to Geomorphology, Orient Longman, Culcutta

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M.A., M.Sc. – Semester III

Gg 331 : PRACTICALS IN CLIMATOLOGY

From June 2009

Sr. No.	Topic	Subtopic	Learning Points	Practical (3 hrs)	No. of Sheets (Minimum)
1	Weather elements	Processing of weather data	Instrumentation and measurement techniques of weather elements and processing of weather data (5-10 years data)	5	3
2	Station Model	Synoptic data	Coding, decoding and plotting of synoptic data	2	3
3	Indian Daily Weather Report (IDWR)	Study and Analysis of IDWR	Study of IDWR and analysis of Temperature, Air Pressure, etc. for various stations. Charting of Systems (4 years)	5	4
4	Water balance	Principle and computation	Computation of water balance for 4 stations in different rainfall zones and irrigation scheduling	7	4
5	Climate-architecture analysis	Sketch design recommendations	The Mahoney tables: Air temperature, humidity, Rain and Wind, Diagnosis of climatic stress	1	3

Reference Books:

1. WMO No. 8 (1983): Guide to meteorological instruments and methods of observations
2. Thornthwaite, C. W. and Mather, J. R. (1957) : Instructions and Tables for computing potential evapo-transpiration and water balance, Drexel Institute of Technology, Laboratory of Climatology.
3. Indian Daily Weather Report, IMD, Pune.
4. Oliver, John E. (1973) : Climate and Man's Environment, John Wiley and Sons, New York.

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M.A., M.Sc. – Semester III

Gg-332: PRACTICALS IN ECONOMIC GEOGRAPHY

From June 2009

Sr. No.	Topic	Subtopics	Learning points	Practicals (3 Hrs)	No. of Sheets (minimum)
1.	Techniques in Agricultural Geography	Crop-combination and agricultural efficiency	1. Crop-combination techniques – Dois, Jasbir Singh 2. Measurement of Agriculture efficiency – Kendall 3. Crop Concentration and diversification – Bhatia	7	3
2.	Techniques in Industrial Geography	Location Analysis	Location Quotient, Lorenz Curve, Gini's coefficient, Von Thunean Model	7	4
3.	Techniques in Transport Geography	1. Graph theoretical measures 2. Models of spatial interaction	1. Graph theoretical measures of transport network 1. Gravity potential population surface. 2. Breaking point theory – Trade area delimitation, Law of retail trade gravitation.	6	5
4.	Visit to 2 Industrial units are of which has to be Agro based Industrial Unit.				

Reference Books:

1. Singh, J. and Dhillon, S. S. (1994) : Agricultural Geography, Tata McGraw Hills, New Delhi
2. Yeats, M. H. (1978) : An introduction to quantitative analysis in human geography
3. Monkhouse, F. J. and Wilkison, H. R. (1976) : Map and Diagrams, Methuen and Co.
4. Kansky, N. T. (1965) : Structure of Transport Network.

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M. A. M. Sc. – Semester III

Gg 333 : PRACTICALS IN POPULATION AND SETTLEMENT GEOGRAPHY

From June 2009

Sr. No.	Topic	Sub-Topic	Learning Points	Period Each Practical of 3 Hours
1	Population Geography	1. Demographic indices	1. Mean age at marriage and fertility relationship 2. Mean age at marriage and infant mortality rate 3. Underweight children of age 1- 47 months and under 5 years mortality rate. 4. % of woman married to blood relative and infant mortality.	10
		2. Determination of Demographic Transition	1. Demographic transition – applied to Maharashtra 2. Pull-push factors affecting volume of migration – simple correlation matrix. 3. Relationship between per capita income and infant mortality	
2	Settlement Geography	Indices	1. Delimitation of CBD by Vance and Murphy 2. Relationship between Basic/ Non-basic ratio and growth rate 3. Relationship between land values and land use. 4. Gravity model by W. J. Relly and Zipf, its application (Potential Population surfaces) 5. Primary Index (Jefferson) Multiple Primacy. 6. Stages according to urbanization Curve. 7. Rate of growth and level of Urbanization. 8. Rank size rule. 9. Huft's Model. 10. Gini's Coefficient concentration index	10

Books :

1. Economic and Political Weekly – Special issue of population survey
2. Liendzore J.M. Techniques in Human Geography
3. Martin Cad : Analytical Urban Geography
4. Siddhart, K and Mukherjee, S (1999) : Cities urbanization and urban system. Transworld Media and Communication, Patana.
5. Chandana, R.C. Population, Geography
6. Yeats, M.H. (1978) : An introduction to quantitative analysis in human geography.

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M.A., M.Sc. – Semester III

Gg-334 : PRACTICALS IN GEO-INFORMATICS

From June 2009

Sr. No.	Topic	Sub-topic	Learning Points	Practicals (3 hrs)	No. of sheets
1	Statistics, Projections and Survey	Statistics Projections GPS	Matrix Algebra Spherical Coordinate System, DMS, DD, UTM Zones, LCC and Plyconic Orientation and Navigation	3	5
2	Aerial Photography	Measurements Interpretation	Scale and height (using parallax bar) Visual Interpretation of single aerial photograph, interpretation of stereo pair using Stereoscope	3	3
3	Satellite Images	Interpretation	Visual interpretation of LISS, PAN, WiFS and Merged Images A WiFS and High Resolution Satellite Data, Cartosat Data, IKONOS and Quick Bird etc.	3	4
4	Spatial Database	Layer Generation	Raster: Full Grid, Chain Codes and Run Length Codes Vector: Manual Digitization, Digitization Errors and Topology Building	3	5
5	Digital Image Processing	Enhancement	Linear – Contrast Enhancement Non-Linear – Square, Square root, Cube, Cube root Spatial Filtering –Mean & Median Band Ratioing, NDVI Computation	3	5
6	Software based	Image Processing GIS	Image Registration, Enhancement, Supervised Classification Unsupervised Classification Georeferencing of scanned raster image, Digitization (vectorization), Rasterization, Attribute data linking, Thematic Layer Generation	5	10

Reference Books :

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

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M.A., M.Sc. – Semester IV

Gg-401: RESOURCE MANAGEMENT

From June 2009

Sr. No	Topic	**Sub- Topic**	**Learning Points**	Periods
1	Introduction	Concept, Models & Approaches	Introduction: concept, models & approaches to resource management	5
2	Classification	Physical & Cultural	Bases of classification of resources	3
3	Conservation & Management	Concept of resource Conservation & Management	1) Meaning of conservation & management 2) Methods of conservation of Natural resources: water, soil & minerals 3) Management of cultural resources, population, transportation 4) Application to Integrated Surveys of Natural Resources	9
4	Resource Appraisal & Policy Making	Appraisal of Resources & Use of new techniques	1) Appraisal of physical resources 2) Use of Remote – Sensing in Resource appraisal & management 3) Population as a resource: Importance of age structure, Sex- ratio, health, education & philosophy of population in resource management	8
5	Concept of Sustainable Management	Resource Development and Sustainable Management	1) Concept of resource development & sustainable management 2) Integrated Resource	8
6	Indian Resources & Development Policy	Distribution & Policies	1) Indian Resources: Water, Soil, forest, Population, Industries & their Development Policies.	7

Reference Books :

1. Adams, W.M (1990): Green Development: Environment and Sustainability in the Third World, Rutledge & Chapman Hall, New York.
2. Granfelt .T.R (1999) Managing the Globalized Environmental J&L Composition Ltd., New York.
3. Holechek, J.L. etal (2000): Natural Resources: Eulogy Economics & Policy, Prentice Hall, New Jersey.
4. Hooja. R & Joshi R. (1994): Desert, Drought and Development, Studies in Resource Management and Sustainability; Rawat Publication Jaipur
5. Howard. M.C. (ed), (1993): Asia's Environmental Crisis, Westview Press, Prouldar,
6. Kates R.W. & Burton I.(eds)(1986): Geography, Resources and Environment, Vol. I & II University of Chicago Press, Chicago
7. Mc Laren, D.J. and Skinnet, B.J. (eds)(1986): Resources and World Development, John Wiley & Sons, New York
8. Newson, M.D. (1991) : Land, water and Development River Basin systems and Management Routledge Lodon.
9. Owen, S. and Owens, P.L. (1991): Environment Resources and Conservation Cambridge University Press, New York.
10. Peckford, John et. At (ed) : (1994) Water, Sanitation, Environment and Development, IT Publication, London
11. Rees, J. (1988): Natural Resources: Allocation, Economics and Policy, Methuen, London
12. Redielift, M (1987): Sustainable Development: Exploring the Contradiction: Methuen, London.
13. Simmons I.G. (1991): Earth, Aoir and Water Resources and Environment in Kate 20th Century Edward Arnold, New York.
14. Thoman Alan et.at (2001): Environmental Policies and NGO Influence, Routledge London.
15. A. Ramesh (1984); Contributions to Indian Geography, Heritage Publishers, New Delhi (India)

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M.A., M.Sc. – Semester - IV

Gg 402 : PRACTICALS IN REMOTE SENSING AND GIS

Sr. No.	Topic	Sub-topic	Learning Points	Practical (3hrs)	No. sheets (minimum)
1.	Aerial Photography	Concept, Measurements Interpretation	1. Electromagnetic spectrum 2. Geometry of aerial photograph: pp fiducial mark, flight line, overlap region, annotation strip 3. Determination of Scale and relative height {using parallax bar) 4. Measurement of area and distance. 5. Visual Interpretation of Stereo pair (BW and color) using Stereoscope. Preparation of maps (at least 4 stereo pairs)	6	6
2.	Satellite Images	Interpretation	1. Satellite images: Annotation strip 2. Visual Interpretation of Landsat, IRS-LISS,IRS-PAN images Preparation of maps (at least 1 for each type)	7	5
3.	GIS Analysis	Introduction to GIS operations	1. Introduction to GIS- definition, application and data models (vector and raster) 2. Manual exercises (minimum 4 layers) –digitization from a toposheet quadrant 3. Raster and vector overlay, map algebra (AND, OR).from a toposheet quadrant 4. Spatial interpolation from a toposheet quadrant	7	4

Reference Books:

10. George Joseph (2003): Fundamentals of Remote Sensing, Universities Press, Hyderabad
11. Chang Kang-tsung. (2002): Introduction to GIS, Tata McGraw Hill, New Delhi.
12. Burrough, P.A. and R.A. McDonnell (2000) : Principles of Geographical Information System, Oxford University Press.
13. Vaidyanadhan, R.(1973): Index to a set of 70 aerial stereopairs, UGC, New Delhi.

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M.A., M.Sc. – Semester IV

Gg. 403: ADVANCE PRACTICAL COURSE IN QUANTITATIVE TECHNIQUES IN GEOGRAPHY

From June 2009

(Note**:** Only those students who have opted for the specialization in Geoinformatics

Sr. No.	Topic	Sub-topic	Learning Points	Practical And sheets
1.	Query in GIS	Types	1. Simple and advanced 2. Spatial and non spatial 3. Topological 4. SQL	4(2)
2.	Network analysis	Principle and computation	1. Path finding. Shortest path. 2. Location Allocation: Supply and demand	4(2)
3.	Overlay Analysis	Principle and Computation	1. Raster and Vector Overlay 2. Logical 3. Arithmetic	4(2)
4.	Topographic analysis	Principle and computation	5. DME and DTM 6. Slope, Aspect 7. Visibility Analysis 8. Draping	4(2)
5.	Modeling in GIS	Principle and computation	1. Gravity model 2. Multicriteria model	4(2)

(Gg. 214,224,314,334), will be allowed to offer this practical course)

Reference Books:

14. P.A. Burrough and R. A. McDonnell, Principles of Geographical Information System, 2000.Oxford University Press.
15. C. P Lo and Albert K. W. Yeung, Concepts and Techniques of Geographic Information System,2002 Prentice – Hall, India.
16. Paul A. Lonfley, Michel F. Goodchild, D. J. Maguire and D. W. Rhind, Introduction to Geographic Information Systems and Science, 2002, John Wiley and Sons Ltd.
17. Kang – tsung- Chang, Introduction to Geographical Information System,2002, McGraw Hill.
18. George Joseph, Fundamentals of Remote Sensing, 2004, University Press Pvt. Ltd. Hyderabad.
19. J.R. Jensen, Remote Sensing of Environment, An Earth Resource Perspective,2003, Pearson Education Pvt. Ltd. . New Delhi.

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M.A., M.Sc. – Semester IV

Gg 420 : REGIONAL PLANNING AND DEVELOPMENT

From June 2009

Sr. No.	Topics	Lectures
1.	Regional planning: Role of Geography. Concept, scope, and process of Regional Planning	5
2.	Region: Definition and types	5
3.	Surveys for Regional Planning - Regional, techno-economic and diagnostic surveys	4
4.	Methodology and Techniques of Regional planning	4
5.	Regional Development and Planning Strategies - Concentration versus dispersal - Case studies from developed and developing countries	4
6.	Regional Policies in the Indian Five Year Plans, experience of Regional Planning in India - multi level planning (State, District and Block level Planning)	5
7.	Regionalization for planning of metropolitan regions, tribal and hill areas, command areas, river basins, National Capital Region.	6
8.	Regional Planning and regional disparities in India	7

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

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M.A., M.Sc. – Semester IV

Gg 421 : GEOGRAPHY OF WATER RESOURCES

From June 2009

Sr. No.	Topic	Sub-Topic	Learning Points	Periods
1.	Water Reousrce	Water Resources	Water as most important and renewable resource, Hydrological Cycle – Evaporation, Evapotranspiration, Precipitation, percolation and runoff. Distribution of World's surface and surface water resources including glaciers, ice caps, river channels, lakes and reservoirs and ground water.	8
2.	Water Supply and utilization	Utilization Methods Agriculture	Water supply and utilization methods of estimation – agricultural, industrial, municipal and domestic uses of water Agricultural cropping pattern – Water requirement of crop : Soil – water – crop relationships, moisture surplus and deficit regions – water balance and drought – measure and minor irrigation : methods of distribution of water to farms, water harvesting techniques, soil water conservation.	10
3.	Water Utilization	Industrial Utilization	Industrial demand for water and utilization typewise, regionwise industrial affluents, water pollution and treatment. Municipal demand and use of water – Commercial, Institutional and Domestic	8
4.	Water Resources	Problems	Problems of water resource – abundance and scarcity – floods and draughts. Measures of water managements – including afforestation , channel improvement, river embankments and land use regulation.	6
5.	Water Resource	Conservation and Planning	Conservation and planning for the development of water resource, integrated basin planning, special remedies for collection of rain water so as to increase of ground water level, water shed management, international, inter-state water disputes, treaties, accords and agreements, some case studies – India Water Trity, Farakka Barraze, Cauveri Water Dispute.	8

Reference Books :

1. John, J. A. (1997) : Global Hydrology : Processes, Resources and Environment Management, Longman Publishers
2. Law, B. C. (Ed. 1968) : Mountains and Rivers of India, IGU National Committee for Geography, Calcutta.
3. Matter, J. R. (1984) : Water Resources Distribution, Use and Management, John Wiley, Maryland.
4. Newson, M. (1992) : Land , Water and Development, River Basin Systems and their Sustainable Management, Rowfledge, London.
5. Rao, K. L. (1979) : India's Water Wealth, Orient Longman, New Delhi
6. Singh, R. A. and Singh, S. R. (1979) : Water Management Principles and Practices, Tara Publication, Varanasi
7. Kates, R. W. and Buston, T. (Ed. 1980) : Geography, Resources and Environment, Ottawa

8. Tideman, E. M. (1996) : Water Shed Management : Guidelines for Indian Conditions, Omeaga, New Delhi.
9. Agarwal, Anil and Sunita Narayan, (1997) : Dying Wisdom : Rise, Fall and Potentials of India's Traditional water Harvesting System.
10. Michel, A. M. (1978) : Irrigation : Theory and Practicles, Vikas Publishing House Pvt. Ltd., New Delhi

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M.A., M.Sc. – Semester IV

Gg 422 : BIOGEOGRAPHY

From June 2009

Sr. No.	Topic	Sub-Topic	Learning Points	Periods
01.	Introduction	Nature, Scope and Relevance	1. A basic biogeography processes 2. Role of biogeography in environmental Studies. 3. History of the discipline	3
02.	Biogeography patterns	Basic Patterns	1. Zoogeographical provinces. 2. Floral kingdom. 3. Altitudinal zonation. 4. Eco-geographic trends.	4
03	Biogeography processes	Basic Processes	1. Evolution and Adaptation. 2. Speciation. 3. Extinction. 4. Dispersal and colonization.	4
04	Distribution	Patterns	1. Habitats and Microhabitats 2. Limits of distribution. 3. Endemics. 4. Relicts. 5. Disjunction Patterns 6. Patterns of rarity 7. Patterns of biodiversity	5
05	Physical limitation of life	Limitations	1. Environmental gradients. 2. Interaction of factors. 3. Patterns of Climate. 4. Biomes and life forms 5. Soil. 6. Ecological succession 7. The ecosystem 8. Microclimates	5
06	Life on islands	Variety and problems	1. Island as an area of isolation, problems of Access. 2. Variety of island habitats 3. Hazards of island life 4. Opportunity for adaptive radiation.	5
07	Ancient patterns in distribution of plants and animals	Distribution	1. Evolution of life on Earth 2. Gondwanaland and Laurasia 3. The idea of continental drift 4. The evidence of palacomagnetism. 5. Changing patterns of continents 6. Effect on Climate	5
08	The Terrestrial Biomes	Major Biomes	Tundra, Taiga, Temperate Broadleaf Deciduous Forst, Tropical Broadleaf Evergreen Forest, Tropical Savanna, Desert scrub, Mid-latitude Grassland and Mediterranean Scrub (With reference to regional climate, vegetation structure, ecological succession, species richness, geographic affinities, soils, faunal adaptations, mapping at a global scale).	9

References Books :

1. Cox. C.D. and Moore P.D. (1993) : Biogeography : An Ecological and Evolutionary Approach 5th edn. Blackwell.
2. Huggett R.J. (2004) : Fundamentals of Biogeography, Routledge
3. Llies J. (1974) : Introduction to Zoogeography, McMillan, London.
4. Khoshoo T.N. and Sharma M. (edn.)(1991) : Indian Geosphere-Biospher Har-Anand Publication, Delhi.
5. Lapedes D.N. (ed)(1974): Encyclopedia of Environmental Science, McGraw Hill
6. Mathur H.S. (1998) : Essentials of Biogeography, Anuj Printers, Jaipur.
7. Pears, N. (1985) : Basic Biogeography 2nd edn. Longman, London,1985
8. Simmon I.G.(1974) : Biogeography, Natural and Cultural, Longman, London, 1985
9. Tivy, J (1992) : Biogeography : A study of Plants in Ecosphere, Oliver an Boyd
10. Ian N Healey, C Barry Cox, Peter D Moore (1972) : Biogeography an ecological and evolutionary approach, Blackwell, Oxford
11. Pielou E.C. (1973) : Biogeography, John Wiley. New York.
12. Husain M. (1994) : Biogeography, Anmol Publication, New Delhi.

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M.A., M.Sc. – Semester III

Gg. 423 : GEOGRAPHY AND ECOSYSTEM

From June 2009

Sr. No.	Topics	Subtopics	Learning points	Periods
1	General system	Geography and systems	General Systems: ecological concepts: geography as human ecology	1
2	Ecosystem	Concept and components	1. Ecosystem concept and components. Habitat and ecological niche 2, Spatial and temporal dimensions of ecosystem 3. Abiotic and biotic components 4. Uniformitarianism and life on earth	3
3	Structure and functioning of an ecosystem	Structure and functioning	1 Abiotic component – lithospheric (rock topography, soils), atmospheric (temperature, moisture rainfall etc.), hydrospheric (oceans, surface and ground water) 2. Biotic (autotrophs, heterotrophs, decomposers 3. Energy transfer, pyramid of energy 4. biogeochemical cycles – nitrogen, carbon-dioxide, oxygen, phosphorus 5. Trophic levels and food chains and foodwebs.	4
3	Terrestrial ecosystems	Major terrestrial ecosystems of the world	Major terrestrial ecosystems of the world: agriculture, forests, grassland and desert	5
4	Population and environment	Earth's resources and population	Population growth and environment, carrying capacity of the Earth. Land resources and world food security.	3
5	Man and environment relationship	Exploitation of resources	Man- environment relationship: Resource use and ecological imbalance with reference to soils, forests and energy resources Man-made ecoystems – Urban, Eco-Tourism, National Parks and Sanctuaries	5
6	Biodiversity	Preservation and conservation of the ecosystem	Biodiversity and its conservation Preservation and conservation of the ecosystem through resource management	3
7	Man-induced changes	Environmental and ecological changes by human activities	Case studies of man–induced environmental and ecological changes. Ecology of tropical farming systems; mountain ecosystem with specific references to Aravali hills, big dams with reference to Sardar Sarover, National Parks	8
8	Environmental legislations	Laws and Acts	The Stockholm Conference, the Earth Summit Environmental laws in India (the Wild Life Act. Water Act., Forest Act, Environment Protection Act and National Environment Tribunal Act)	8

Reference Books :

1. Ackerman, E.A. (1958) : Geography as a Fundamental Research Discipline. University of Chicago Research Papers. 1
2. Agarwal. A. and Sen. S. (1999): The Citizens Fifth Report . Centre for Science and Environment New Delhi
3. Bertalanfly. L. (1958): General Systems Theory, George Bragiller New York,

4. Bodkin E. (1982): Environmental Studies, Charies E. Merril Pub. Co., Columbus, Ohio
5. Chandna R.C.(1998): Environmental Awareness. Kalyani Publishers, New Delhi, 1998
6. Chorley, R.J. (1962): Geomorphology and General Systems Theory , U.S.G.S. Professional Paper, 500B,.
7. Eyre, S. R. and Jones, G.R.J. (eds.)(1966) , Geography as Human Ecology, Edward Arnold London.
8. Kormondy, E.J. (1989) : Concepts of Ecology, Prentice Hall
9. Manners, I.R. and Mikeseli, M.W.(eds.)(1974): Perspectives on Environment, Commission on College Geography, Publ. No.13, Washington, D.C.
10. Nobel and Wright (1976): Environmental Science, Prentice Hall , New York
11. Odum, E.P. (1971): Fundamentals of Ecology, W.B. Saunders, Philadelphia
12. Russwurm, L.H. and Sommerville, E. (eds.) (1985): Man's Natural Environment-A systems Approach, Duxbury, Massachusetts.
13. Sharma, H.S. (2000) : Ranthambhore Sanctuary- Dilemma of Eco-development, Concept, New Delhi
14. Simmons, I. G. (1981): Ecology of Natural Resources, Edward Arnold, London

UNIVERSITY OF PUNE

M.A., M.Sc. – Semester IV

Gg. 424: RESEARCH METHODOLOGY

From June 2009

Sr. No.	Topic	Sub-topic	Learning Points	Lectures
1.	Surveying And Map projections	Definition Importance and types	5. Plane and geodatic 6. Intersection and traverse 7. Principles and methods of Dumpy level and theodolite survey 8. UTM projection	6
2.	SOI Toposheet	Interpretation and use	3. Indexing 4. Data base creation for physical and cultural features 5. Drainage basin demarkation, terrain cross profiles	6
3.	Aerial photographs and satellite images	Interpretation and use	1. Concept of stereoscopic view 2. Geometry of Aerial photograph**:** flight line, overlap, fiducial marks, Measurement of relative heights 3. Data base creation from aerial photographs and satellite images	6
4.	Statistical methods	Application	3. Nature of data Geography 4. Descriptive and inferential statistics 5. Bivariate and multivariate correlation analysis 6. Testing of hypothesis: parametric and non parametric tests (Chi squared, ks, t, f)	6
5.	GIS	Principle and computation	1. Use of GIS in spatial data analysis and modelling	5
6.	Field work	Components	Field sampling Questionnaire, interviews, measurements and fields mapping.	5
7.	Report writing	Technique	Research problem, survey of literature, research methods applied, analysis, conclusions References and Bibliography	6

Reference Books:

1. Shaw G and Wheller D. (1985): Statistical techniques in geographical analysis. John Wiley and sons, New- York
2. Sumner G J (1978): Mathematics for physical geographers. Edward Arnols
3. Karlekar Shrikant and Kale Mohan (2005): Statistical analysis of Geographical data, Dimond publication
4. P. A. Burrough and R.A. McDonnell, Principle of Geographical Information System, 2000, Oxford University Press.
5. Geoge Joseph (2003): Fundamental of Remote Sensing, Universities Press, Hyderabad.
6. Ebdon David (1989): Statistical for Geographers
7. King, (1975): Statistical Geography
8. Norcliffe G. B. (1977): Inferential statistics for Geographers (Hutchinson, London)
9. Rogerson P. A. (2001): Statistics for Geography (SAGE pub., London, New Delhi}
10. Singh & Kanauja : Map work and Practical Geography.
11. Maslov A. V.Gordeev A. V. Batrakov Yu. G. (1984) : Geodetic surveying, Mir Publishers, Moscow
12. Kanetkar T. P. & Kulkarni S.V. 1986. Surveying & leveling, Pune Vidyarthi Griha Prakshan, Pune
13. V. Natarajan P., Adler Ron K:. Advanced Surveying, B. 1 Publ. Bombay
14. Richardus P., Adler Ron K (1972) : Map projections, North Holland publ. Co. Amsterdam
15. Maling .H. (1973) : Co ordinates systems and map projections, George Philip, London.

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M.A., M.Sc. – Semester IV

Gg-430: SOCIAL AND CULTURAL GEOGRAPHY

From June 2009

Sr. No.	Topic	Subtopics	Learning points	Periods
1.	Introduction	1. Nature, Scope and Development	1. Definitions 2. Early Contributions 3. Subject Matter 4. Conceptual and Methodological approaches 5. Trends and Development	4
2.	Philosophical bases in Social Geography and concept of Culture in Geography	Bases and Concepts	1. Positivism, Humanism, Idealism, Phenomenalism, Existentialism, Structuralism and Radicalism. 2. Origin and diffusion of Culture	4
3.	Space and Society	Structure and processes of Social Patterns	1. Individual's space, Intimate, Personal, Social and Public Space. 2. Theoretical space – organic, perceptive and symbolic space 3. Interaction and social relations	5
4.	Social Groups	1. Level of Activity 2. Concepts 3. Processes 4. Types and Structure	1. Primary and Secondary Groups 2. Group in Society 3. Social Structure, Models of Assimilation and Segregation 4. Industrialization, Migration, Urbanization, Modernization, Globalization and Sanskritization.	7
5.	Social – Culture Regions	1. Origin and diffusion of culture 2. Bases of region formation	1. Cultural Diversities 2. Role of Race, Religion, Cast, Ethnicity, Tribe and Language and Dialect 3. Itility in diversity Literacy, Level of Education, Economic Activity, Class, Power, Transformation and Change. 4. Cultural regions of the World and India	6
6.	Social Well-being	1. Concepts 2. Components and Indicators 3. Measurement and Patterns	1. Physical Quality of Life, Human Development 2. Basic Components and Regional and Socio Cultural Indicators, Human Development Index. 3. Methods of Measuring well-being by weighing indicators. 4. Patterns of social well-being – World, India and States	7
7.	Human Settlements	1. Relation to Ideology, Social Structure and Technology.	1. Social areas in Urban and Rural Settlements. 2. Social and Physical Infrastructure. 3. Rural urban contrasts in Housing, Health, Education and Other Social, Economic and Cultural Characteristics. Impact of Technology on Human Settlements. 4. Redistribution of Resource with Concept of Social Justice, Equality and Welfare.	7

Reference Books:

1. Anand Aijazuddin (1999) : Social Geography, Rawat Publications, New Delhi
2. Bulsara, J. F. (1970) : Patterns of Social Life in Metropilitan Areas, Popular Prakashan, Bombay
3. Censys of India (1974) : Economic and Socio-Cultural Dimensions of Rationalization Census Centenary, Monograph No. 7, Govt. of India, New Delhi
4. Coates, B. E. et. al. (1977) : Geography and Inequality, Oxford University Press, London
5. Orang, Mike (1998) : Cultural Geography. Routledge Publication, London

6. Dubey, S. C. (1991) : Indian Society, national Book Trust, New Delhi
7. Gregory, D. and Lassy, J. (1985) : Social Relations and Spatial Structures, McMillan
8. Harmondorf (1989) : Tribes of India : The Struggle for Survival, Oxford University Press, Delhi
9. Hutchinson and Smith, D. (1996) : Ethnicity : Oxford University Press, Delhi
10. Jordon and Lester, G. (1995) : The Human Mosaic, Harper and Row, New York
11. Maloney, Clarence (1974) : People of South Asia, Winston, New York
12. Massey, D. and Jess, P. (1995) : A Place in the World : Places, Cultures and Globalization, Oxford University Press, New York
13. Massey, D. et. al. (Eds) (1999) : Human Geography Today, Policy Press, Cambridge.
14. Mukherjee, A. B. and Ahmad, A. (1985) : India : Culture Society and Economy, Inter – India Publication, New Delhi
15. Schwartzberg, Joseph (1978) : A Historical Atlas of South Asia, University of Chicago Press, Chicago
16. Smith David (1980) : An Exploration of India. Cornell University Press, Ithasa
17. Sopher, David (1980) : An Exploration of India, Cornell university Press, Ithasa
18. Harvey, D. (1973) : Social Justice and the City, Arnold Publishers
19. Herbert, D.T. and Smith, D. M. (1979) : Social Problems and City Geographical Perspective, Oxford University Press, London
20. Hutchson and Smith, D (1996) : Ethnicity, Oxford University Press, Oxford
21. Jones, Emrys and Eyles, J. (1977) : An Introduction to Social Geography, Oxford University Press, London
22. Jones, Emrys (1975) : Readings in Social Geography, Oxford University Press, London
23. Jordon and Lester, G. (1995) : The Human Mosaic, Harper and Row, New York
24. Knoy, P. L. (1988) : Social Well-being – A Spatial Perspective, Oxford University Press, London
25. Kulkarni, K. M. (1990) : Geographical Patterns of Social Well-being Gujarath, Concept Publishing Co., New Delhi

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M.A., M.Sc. – Semester IV

Gg-431: COMPUTER GEOGRAPHY

From June 2009

Sr. No.	Topic	Subtopics	Learning points	Periods
1.	Introduction	1.Geography and computers 2. Computers	1.Application of Computers in Physical and Human Geography; Computer Cartography and GIS. Definitions, Applications in various discipline, Types, Anatomy, input – output devices, Languages, Software, Internet.	5
2.	Operating system	Windows	1. Introduction to Windows, icons, menus, files and folders. 2. Functions of operating system.	5
3.	Cartographic Applications of Paint	Map making	1. Applications of paint in map making. 2. Creating maps, editing, colour fill.	5
4.	Cartographic Application of CorelDRAW	Map making	1. Corel photo paint – image, re-sampling, cropping, Enhancement CorelDRAW / Trace 2. Significance of CorelDRAW in map making	10
5.	AutoCAD & GIS	Map making Introduction of GIS	1. Application of AutoCAD in Geography. 2. Digitization 1. Introduction of GIS & S/WS	5
6.	MS-Excel	Use of Excel Software	1. Use of Excel software for Data Analysis and Graphical Representation. 2. Use of Charts, Types of Charts / Graphs.	10

Reference Books:

1. Microsoft Excel Manual and help file.
2. Basics of Windows Operating System.
3. Basics of MS Paint.
4. Basics of AutoCAD.
5. Chang Kang Sung (2002), Introduction to GIS, Tata McGrow Hill, New Delhi.
6. Burrough, P.A. and R.A. McDonnell (2000), Principals of Geographical Information System, Oxford University Press.

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M.A., M.Sc. – Semester IV

Gg. 432: OCEANOGRAPHY

From June 2009

Sr. No.	Topic	Subtopics	Learning points	Periods
1.	Introduction	Nature and Scope	1.Definition and Meaning of Oceanography 2. Foundation of Modern Oceanography 3. Contribution of Oceanographers in the subject 4. Post-war Oceanography 5. Modern Trends	4
2.	Origin of the Ocean Basins	Global Plate Tectonics	1. Continental Drift 2. Seafloor Spreading 3. Plate Tectonics 4. World Oceans and their formations	6
3.	The Ocean Floor	Relief of the Ocean Bottom	1. Continental Margin 2. Oceanic Ridges and Rises 3. Abyssal Plains 4. Oceanic Trenches 5. Volcanoes, Coral Reefs and Atolls	3
4.	Properties of Sea Water	Temperature Density Salinity Dissolved gases Other physical properties	1. Factors affect temperature on water and distribution 2. Factors affecting density 3. Origin and composition of sea salt and residence time 4. Carbon dioxide and carbonate cycles 5. Viscosity 6. Surface tension	7
5.	Waves	Waves characteristics and properties	1. Ideal sea waves 2. Wave height, length and period 3. Formation of sea and swell 4. Capillary, gravity, shallow water and deep Water waves 5. Internal and standing waves 6. Seismic waves (Tsunami) and storm surges 7. Wave reflection, refraction and diffraction 8. Breaking of waves	5
6.	Tides Tidal Currents	Tidal forces and theories Tidal currents and effects	1. Tide generating forces 2. Equilibrium Theory of Tides 3. Dynamical Theory of Tides 4. Spring Tides 5. Neap Tides 6. Tidal Currents and their Channels 7. Tidal Bores 8. Tidal effects in coastal areas	5
7.	Ocean Currents	Ocean Circulation, Their causes and effects	1. Types of Currents, drift currents, geostrophic Currents, thermohaline circulation. 2. Factors responsible for ocean currents 3. Ocean current in Pacific, Atlantic and Indian Ocean	5
8.	Marine Sediments	Sediments on the ocean floor	1. Lithogenous particles (Derived from Rocks) 2. Biogenous particles (derived from organisms) 3. Hydrogenous particles (derived from water) 4. Distribution of sediment deposits 5. Oceanic ooze 6. Correlation and age determination	5

Reference Books:

1 Basu S.K. (2003) (ed): Handbook of Oceanography, Global Vision, Delhi
2 Davis Richard A. (1972): Oceanography, Addition Wesley Publishing Co.
3 Garrison Tom (1999): Oceanography, Brooks/ Cole Wadsworth, New York
4 Garrison Tom (2004): Essentials of Oceanography. Thompson, Australia
5 Grant Gross M. (1982): Oceanography, Prentice hall, Ince, New Jersey
6 King Cuchlain A. M (1962): Oceanography for Geographers (ED) Edward Arnold
7 Sharma & Vatal (1962): Oceanography for Geographers. Chaitanya Publishing House, Allahabad
8 Thurman Harold V. (1985): Introductory Oceanography. Bell & Howell Co. London
9 Weisberg J. and Howard P. (1974): Introductory Oceanography. McGraw Hill, Kogakusha, Tokyo.

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M.A., M.Sc. – Semester IV

Gg 433 : NATURAL AND MANMADE HAZARDS

From June 2009

Sr. No.	Topics	Subtopics	Learning points	Periods
1.	Introduction to natural hazard and disasters. Risk and risk assessment.	Definition	Definition, types of hazards Definition, Hazard, Risk and Vulnerability Assessment	2
2.	Climatic Hazards	Storms as Hazards	Causes, probability of occurrence, areas affected and effects of cyclonic storms, dust storms, thunderstorms lightning and hail.	4
		Drought as a Hazard	Causes, probability of occurrence, areas affected and effects of droughts	4
		Floods as Hazards	Causes and effects and areas affected by high magnitude floods and flash floods.	4
3.	Geological Hazards	Earthquakes and Tsunamis	Cause and effects and areas affected by earthquakes and tsunamis	3
4.	Geomorphic Hazards	Land instability	Cause and affects and areas affected by landslides, subsidence, erosion, deposition	2
5.	Man-made Hazards	Introduction	Types of man induced hazards – physical, chemical, biological, and pollution. Factors contributing to man-made hazards.	3
		Physical Hazards	Cause and effects of Landslides, Soil erosion, forest fires, desertification etc. Impact of large river projects such as the Sardar Sarovar, the Tehri Dam etc., impact of excessive irrigation, effects of thermal and hydel power stations.	5
		Chemical Hazards	Nuclear Hazards, release of toxic elements in the air, soil and water, oil spills etc.	4
		Biological Hazards	Effects of Population growth – its impact on biodiversity, effects of over exploitation of resources, ecological disturbances – such as soil development, hydrological cycle, pollution etc.	5
6.	Global issue and National issues	Global Warming	Effects of global warming, ozone depletion Pollution of rivers with religious importance in India.	2
7.	Disaster Management and Measures	Structural and Non-structural Measures	Disaster prevention, mitigation, preparedness, response, recovery and rehabilitation	2

Reference Books :

1. Turk J. (1985) : Introduction to Environmental Studies, Saunders, College Publication, Japan
2. Singh Savindra (2000) : Environmental Geography, Parag Pustak Bhavan, Allahabad
3. Morrisawa M (Ed) (1994) : Geomorphology and Natural Hazards, Elsevier, Amsterdam
4. Hart M. G. (1986) : Geomorphology, Pure and Applied, George Allen and Unwin, London
5. Valdiya K. S. (1987) : Environmental Geology, Tata McGraw Hill, New Delhi
6. Bryant Edward (2000) : Natural Hazards, Cambridge University Press
7. Daly Herman E. (1996) : Beyond Growth, Beacon Press, Boston

8. Daly Herman E and Twonseed Keneth N (Ed) (1993) : Valuing the earth – Economics, Ecology and Ethics, MIT Press, London
9. Agarwal Anil and Narain Sunita (Ed) (1999) : State of India's Environment The Citizens Report, Centre for Science and Environment, New Delhi
10. Rangachari R, Sengupta Nirmal, et al (2000) : WCD Case Study Large Dams : India's Experience Final Report, Secretariate of World Commission on Dams
11. Dupont, R.R. Baxter, T.E. and Theodore, L. (1998) : Environmental Management :- Problems and Solutions, CRC Press
12. Smith, K. (2001) : Environmental Hazards : Assessing Risk and Reducing Disaster, Routledge.

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M.A. M.Sc. – Semester III

Gg 440 : DISSERTATION

From June 2009

2- The students shall declare the option of dissertation at the beginning of the 3rd semester.

3- A Post Graduate recognized teacher in a department is eligible to guide the students.

Write up : General Guide Lines :-

1. The final report should cover the following aspects.
   a. Introduction to the problem.
   b. Aims and objectives of the study.
   c. Methodology
   d. Analysis, description and interpretation.
   e. Results
   f. Conclusions
   g. References.
2. Every table, figure, photograph should have a caption.
3. The list of references should be given at the end and all the references should be complete in all respects (author(s)) name, year, title of the article or book, name of the journal, name of the publisher of the book and place of publication, volume of journal and page numbers)
4. The total number of pages should be minimum 50, including text, figures, tables, photographs, references and appendices.
5. At the time of viva-voce presentation may be given with the help of equipments which are available in the respective department.

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M.A., M.Sc. – Semester IV

Gg 441: REGIONAL GEOGRAPHY OF EUROPE

From June 2009

Sr. No.	Topics	Subtopics	Learning points	Periods
1.	Physical Settings	1. Location and Geological Structure 2. Relief, Climate, Soils and Vegetation	1. Location 2. Geological Settings 3. Geostrategic importance 1. Relief and drainage 2. Climate – Major Climatic types & Characteristics 3. Soils – Major Soil types & distribution 4. Vegetation – Major Vegetation types and distribution	8
2.	Resources and Agriculture	1. Resources 2. Agriculture	1. Resource appraisal 2. Energy resources 3. Mineral resources 4. Water and Land resources 1. Salient features of agriculture 2. Irrigation 3. Problems & prospects of agriculture	6
3.	Industries	Industries	1. Development of industrial activities and evolution of industrial regions. 2. Major Industries and their distribution 3. Problems and Prospects of Industrialization.	5
4.	Trade and Transportation	Trade and Transportation	1. International Trade 2. Trading Partners, Membership of International Trade treaties EEC, G-7/G-8 3. Balance of Trade 4. Globalization 5. Development of Transportation.	5
5.	Population and Settlement	Population	1. Growth and distribution of population 2. Population composition (Age, Sex, Education, Occupation) 3. Migrations 4. Population resource	5
6	Settlements	Settlements	1. Growth and distribution of settlement 2. Urbanization 3. Problems of urbanization 4. Development of megalopolis	5
7	Tourism	Tourism activities	1. Development of Tourism 2. Scope of Tourism 3. Tourist Centers 4. Importance of Tourism	2
8	Special Issues	Political and Economic Issues	1. Impact of Ist and IInd World Wars 2. Industrial Revolution 3. European Common Market 4. Euro-Currency	4

Reference Books :

1. Ian Gottman (1989) : A Geography of Europe. 4th edition, Holt Reinhert 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. Jordon Terry G. (1973) : The European Culture Area – A Systematic Geography, Harper International Ed., Harper and Row Publishers, New York

UNIVERSITY OF PUNE

M. A. M. Sc. – Semester IV

Gg 442 : REGIONAL GEOGRAPHY OF SOUTH EAST ASIA

From June 2009

Sr.No.	Topic	Sub-Topic	Learning Points	Period
1	Physical Setting	1) Location and Geological Structure 2) Relief, Climate, soils and vegetation	1) Location - significance 2) Geological Structure 3) Geostrategic Importance 4) Relief and Drainage Climate; Climatic types & Characteristics 5) Major vegetation types and distribution. 6) Soils – Major soil types & distribution	8
2	Resources and Agriculture	1) Resources 2) Agriculture	1) Resource appraisal 2) Energy resources 3) Water and land resources 4) Mineral resources 1) Salient features of agriculture 2) Irrigation 3) Problems and prospects of Agriculture.	6
3	Industries	Industries	1. Development of industrial activities 2. Major Industries and their distribution 3. Problems and prospects of Industrialization.	5
4	Trade and Transportation	Trade and Transportation	1) Internal Trade 2) International Trade 3) Balance of Trade 4) Development of Transportation	5
5	Population	Population	1) Growth and Distribution of Population 2) Population composition (Age, Sex, Literacy and Occupation) 3) Population as a resource.	5
6	Settlements	Settlements	1) Growth and distribution of settlements 2) Urbanization 3) Problems of Urbanization 4) Development of Megalopolis	5
7	Special Issues		1) Modern Economic Policy of Malaysia (Liberalization) and its advantages and disadvantages. 2) The Military regime in Myanmar 3) Plantation Agriculture in South – East Asia. 4) Singapore as a tourist attraction 5) Growth of Fundamentalists in Malaysia and Indonesia.	4
8	Tourism	Tourism Activities	1. Development of Tourism 2. Scope of Tourism 3. Tourist Centers 4. Importance of Tourism	2

Reference Books:

1) Fisher, Charles A., South East Asia.
2) Dobbey, E.H.G., South East Asia. .
3) Ginsburg Norton, The Pattern of Asia.
4) East, spate and Fisher, Changing Map of Asia.
5) Farmer B. H., An Introduction to South Asia.

UNIVERSITY OF PUNE

M. A. M. Sc. – Semester IV

Gg - 443 : GEOGRAPHY OF NORTH AMERICA

From June 2009

Sr.No.	Topic	Sub-Topic	Learning Points	Period
1	Introduction	Location and Significance	1. Geographical Location & Significance 2. Geostrategic Importance 3. Characteristics of Size	2
2	Physical Setting	1. Relief Drainage & Climate 2. Soil & Vegetation	1. Geological Setting 2. Relief Features 3. Drainage 4. Climate – Major Climate Types 5. Soil – Major Types and Distribution 6. Vegetation – Types and Distribution	6
3	Resources	Resources	1. Resources appraisal 2. Energy Resources 3. Mineral Resources 4. Water and Land Resources	4
4	Agriculture	Agriculture	1. Salient Features of Agriculture 2. Irrigation 3. Agricultural Regions 4. Problems and Prospects of Agriculture	4
5	Industries	Industries	1. Development of Industrial Activities 2. Major Industries and their Distribution 3. Problems and Prospects of Industrialization	4
6	Trade & Transport	Trade & Transport	1. International Trade 2. Trading Partners, Membership of International Trade Treaties. 3. Balance of Trade 4. Globalization 5. Development of Transportation	4
7	Population	Population	1. Growth & Distribution of Population 2. Population Composition (Age, Sex, Education, Occupation) 3. Migration 4. Ethnic Diversion 5. Population Resources	4
8	Settlement	Settlement	1. Growth & Distribution of Settlement 2. Urbanization 3. Problems & Urbanization 4. Development & Megalopolis	4
9	Tourism	Tourism Activities	1. Development of Tourism 2. Scope of Tourism 3. Tourist Centers 4. Importance of Tourism	4
10	Special Issues	Political and Economic Issues	1. Membership of various military, political and economic international organizations 2. U.S.A.'s involvements in International issues in post cold war period 3. U.S.A. and Canada relationship (Political, Economics & Racial)	4

Reference Books:

1) George T. Miller & Parkins B. Hudgis, Geography of North America
2) E. S. Shaw & J. M. Fariand, Anglo America – A Regional Geography
3) G. H. Dury & Mathescu, United States and Canada
4) C. Londgdom, J. Fscue, Regional Geography of Anglo America
5) Charies B. Hunt, Physiography of the United States
6) J. W. Watson, The United States
7) John Fraser Hart, Regions of the United States

UNIVERSITY OF PUNE

M.A., M.Sc. – Semester IV

Gg. 444 : GEOGRAPHY OF JAPAN

From June 2009

Sr. No.	Topic	Subtopics	Learning points	Periods
1.	Introduction	1. Historical Geography.	The Geographical factors which controlled the development of 'JAPAN' upto 18th century.	4
		2. Geology and Geographical Location.	Plate Tectonics and Location of JAPAN - Geographical – Location of Japan – 'Britain of the East' Major and Minor Islands.	
2.	Physiography	1. Relief 2. Drainage 3. Climate 4. Soil 5. Vegetation	Mountains and Plains (Central Eastern, Western). Characteristics of rivers, and Western Rivers flowing to sea of Japan, Rivers flowing to Pacific. Climate Types, Temperatures, Rainfall distribution, Factors affecting climate. Summer/ Winter. Types – Distribution – Importance. Types – Distribution – Importance.	6
3.	Natural Hazards		Types and Management of Hazards.	2
4.	Natural Resources	Minerals	Major – minerals – distribution and importance Hydel Power.	4
5.	Agriculture	Technology and Agriculture.	Major Crops, Agri Regions-Problems, Prospects, Factors affecting Agriculture of Japan.	4
6.	Marine Resources	Types of Oceanic Resources.	Fishing Industry – Importance, Technology Fishing Industry – Problems and Prospects.	2
7.	Industries	Problems and Prospects.	Factors affecting industrial development of Japan. Industrial Regions. Major Industries – IT and Electronic Industries of Japan.	4
8.	Trade	1. Trade 2. Transport	Export and Import Partners. Nature of Trade. Govt. Policies. Roads, Railways, Airways - costal -Ocean transport Major Ports.	4
9.	Population and Settlement	1. Composition Structure.	Characteristics of Population, Govt. Policies and Problems. i) Density ii) Sex Ratio iii) Literacy iv) Migration v) Religion vi) Languages.	4
		Settlements	Rural and Urban Settlements. Problems of Urban Areas With Reference to Million Cities.	2
10.	Important Issues	India/Japan	i) Relations with India. ii) Role of National and International Policies in the development of Japan. iii) Education, Tourism, International Relations.	4

Reference 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. Ryuziractetal: Geography of Japan
9. Trewartha Glenn T.: Japan

10. Hall R.B (1970) : Japan, Industrial Power of Asia, Pall Mall Press, London
11. Kornhuser D.H : Japan
12. Olson Lawrence: Japan in Postwar Asia

UNIVERSITY OF PUNE

M.A., M.Sc. – Semester IV

Gg 445 : GEOGRAPHY OF INDIA

From June 2009

Sr. No.	Topic	Sub-Topic	Learning Points	Periods
01.	Introduction	a) Geographical Location b) Economic Position c) Geological Structure d) Geological Structure	1.Geographical and relative location of India. 1.Economic position of India in Relation to World. 1. Salient features of geological structure of India.	5
02.	Physiography and drainage	a) Main Physiographic Divisions b) Drainage Systems	1. The northern mountains. 2. The north Indian Plain. 3. The peninsular plateau 4. The coastal lowlands and islands. 1. East flowing rivers: Ganga, Bhrahmaputra, Godavari, Krishna. 2. West Flowing Rivers: Sindhu, Tapti, Narmada. 3. Major river systems of Maharashtra: east Flowing and west flowing rivers.	5
03	Climate	Seasons and Climatic regions	1. Various seasons and associated weather conditions. 2. Mechanism of Monsoon. 3. Major Climatic regions of India.	5
04	Soils	Soil Types	1. Major soil types and their distribution in India. 2. Soil degradation and soil conservation.	3
05	Forest	Forest Types	1. Major forest types and their distribution in India. 2. Deforestation and conservation of forest.	3
06	Mineral and Power Resources	Distribution and Utilization	1. Iron over, manganese, bauxite. 2. Coal, Petroleum, Natural gas. 3. Major power projects in India. (Hydro, Thermal, Atomic.)	4
07	Agriculture	Distribution and Production of Major Crops	1. Rice, Wheat, Jawar, Cotton, Sugarcane. 2. Green revolution in India; its socio-economic And ecological importance.	4
08	Industries	Major Industries and Development	1. Account of development of distribution of Cotton Textile, sugar, chemical, fertilizers and Engineering. 2. Problems related to industrial development.	4
09	Population	Growth and Distribution	1. Growth and distribution of population in India. 2. Population Composition.	4
10	Regional Development	Development of Different Regions	1. Different regions of India: Telengna, Chhota Nagpur, Sourashtr5a, North-eastern.	3

N.B. According need of topics, maps are expected.

Reference Books :

1. Agrawal A. N. - Indian economy, Problems of Development and Planning.
2. Chopra S. N. - India, An Area Study.
3. Dubey and Negi - Economic Geography of India.
4. Gopal Singh - India.
5. Memoria I.B. - Geography of India.
6. R. L. Singh - Regional Geography of India.
7. Sharma and Continuo - Economic and Commercial Geography of India.

Equivalence of Syllabus in Geography to be effective from June 2009.
M.A./ M.Sc.

Old Syllabus- Semester III		New Syllabus –Semester III	
Gg-301	Theoretical and Applied Geography	Gg-301	Theoretical and Applied Geography
	One of the following according to Specialization		One of the following according to Specialization
Gg -310	Coastal Geomorphology	Gg -310	Coastal Geomorphology
Gg-311	Applied Climatology	Gg-311	Applied Climatology
Gg-312	Trade and Transport Geography	Gg-312	Trade and Transport Geography
Gg-313	Urban Geography	Gg-313	Urban Geography
Gg-314	Geo-informatics –III	Gg-314	Geo-informatics –III
	One of the following		One of the following
Gg-320	Multivariate Statistics	Gg-320	Multivariate Statistics
Gg-321	Political Geography	Gg-321	Political Geography
Gg-322	Soil Geography	Gg-322	Soil Geography
Practical-1	One of the following according to specialization	Practical -1	One of the following according to Specialization
Gg-330	Practicals in Geomorphology	Gg-330	Practicals in Geomorphology
Gg-331	Practicals in Climatology	Gg-331	Practicals in Climatology
Gg. 332	Practicals in Economic Geography	Gg. 332	Practicals in Economic Geography
Gg. 333	Practicals in Population and Settlement Geography	Gg. 333	Practicals in Population and Settlement Geography
Gg.334	Practicals in Geo-informatics	Gg.334	Practicals in Geo-informatics
	(Note: Fieldwork/ Field visit for a duration of not more than 7 days should be undertaken)		*(Note: Fieldwork/ Field visit for a duration of not more than 7 days should be undertaken)*
Practical Gg-302	Interpretation of Topographical Maps and Village Survey	Practical Gg-302	Interpretation of Topographical Maps and Village Survey / Project work

	Semester IV		Semester IV
Gg-401	Resource Management	Gg-401	Resource Management
	One of the following		One of the following
Gg-420	Regional Planning and Development	Gg-420	Regional Planning and Development
Gg-421	Geography of Water Resources	Gg-421	Geography of water Resources
Gg-422	Biogeography	Gg-422	Biogeography
Gg-423	Geography and Ecosystem	Gg-423	Geography and Ecosystem
	One of the following		One of the following
Gg-424	Research Methodology	Gg-424	Research Methodology
Gg-430	Social and Cultural Geography	Gg-430	Social and Cultural Geography
Gg-431	Computer Geography	Gg-431	Computer Geography
Gg-432	Oceanography	Gg-432	Oceanography
Gg-433	Natural and Man-made Hazards	Gg-433	Natural and Man-made Hazards
	One of the following		One of the following
Gg-440	Dissertation	Gg-440	Dissertation
Gg-441	Regional Geography of a Meso Region-Europe	Gg-441	Regional Geography of Europe
Gg-442	Regional Geography of Meso Region- South Asia	Gg-442	Regional Geography of South East Asia
Gg-443	Regional Geography of Meso Region-North America	Gg-443	Regional Geography of North America
Gg-444	Geography of Japan	Gg-444	Geography of Japan
Gg-445	Geography of India	Gg-445	Geography of India
Gg-402	Practicals in Remote Sensing and GIS	Gg-402	Practicals in Remote Sensing and GIS
Gg-403	Advanced Practical Course in Quantitative Techniques in Geography (Note : Only those Students who have opted for the specialization in Geoinformatics(Gg214,224,314,334), will be allowed to offer above practical course Gg 403).	Gg-403	Advanced Practical Course in Quantitative Techniques in Geography (Note : Only those Students who have opted for the specialization in Geoinformatics (Gg 214,224,314,334), will be allowed to offer above practical course Gg 403).