GOA UNIVERSITY
BACHELOR OF SCIENCE (F.Y.B.Sc. and S.Y.B.Sc.): REVISIED SYLLABUS
w.e.f. academic year 2007-08

F.Y.B.SC
GEOGRAPHY

SEMESTER I
GP:01: PRINCIPLES OF GEOMORPHOLOGY (CONCEPTS)

OBJECTIVE:
This introductory paper is intended to acquaint the students with distinctiveness of Geography as a field of learning. The philosophy of the subject is to be taught in order to develop a keen interest in the subject and to pursue it for higher studies.

UNIT NO.	COURSE CONTENT	MARKS WEIGHTAGE	TEACHING PERIODS
I	a) Origin of the Universe b) Big-Bang Theory, Nebular, Binary-Star Theory c) Origin, structure of Solar System d) Origin of Earth, formation and structure of Earth.	15	08
II	Concepts of First, Second and Third orders of Relief features. Concept of Isostasy, Wegner's Continental Drift Hypothesis. Shield Areas, Mobile Zones, Plate Tectonics (with special reference to Indian Sub- Continent)	15	08
III	Crustal Movements and Diastrophism. Orogenic and epeirogenic forces, folds, faults, earthquakes, volcanoes, structural landforms and volcanic landscapes e.g. Deccan Trap.	15	08
IV	Materials of the Earth's Crust: Minerals, rocks and mode of formation, Denudation: Agents of denudation, Mass wasting process, weathering and its types.	15	08
V	Current Issues: Natural Disaster Management with special reference to Earthquakes, Volcanoes, Tsunamis, landslides and Avalanches.	15	08

Weightage: I.S.A: 15 + S.E.E: 60 Total= 75.

INSTRUCTIONS
1. Maximum thrust may be given to local regional and national examples.
2. Questions should be set with due weightage to all the units as specified

Pedagogic suggestion: The Current topic of Regional & National interest have to be updated by referring to subject journals - Down to Earth, Current Science, Yojana and Other relevant materials.

REFERENCE

1. Wooldrige S. W. & Morgan R.S.: An outline of Geomorphology, Longman Green & Co., London
2. Thornbury W. D.: Principles of Geomorphology, Wiley & Sons.
3. Strahler A. N.: Physical geography, John Wiley & Sons
4. Sparks B. W.: Geomorphology, Longman Green & Co., London
5. Monkhouse F. J: Principles of Physical Geography, Hodder & Stoughton, London.
6. Steers J. A: The Unstable Earth, Kalyani Publishers, New Delhi
7. Tinch & Trewartha: Elements of Physical Geography, Kethuem, London/ N.Y.

PRACTICALS IN GEOMORPHOLOGY – I

OBJECTIVE:

To impart training on map-making techniques in geomorphology with laboratory exercises.

UNIT NO.	COURSE CONTENT	MARKS WEIGHTAGE	NO. OF PRACTICALS
I	Maps: Classification. Scales: Meaning and Definition. Types and construction of VS, RF and Linear Scales (Comparative and Diagonal)	10	5
II	Methods of Representation of Relief features – spot heights, Bench Marks, Hachures, Hill shading Contours diagrams with cross sections- hills, plateaus, mesa, cliff, V-shaped valley, waterfall, escarpment, spur, U-shaped valley, Hanging Valley, Volcano with crater, Ria coast, Fiord coast, Profile drawing and types.	10	5
III	Journal & Viva	5	

Weightage: 25

INSTRUCTION

1.Every candidate shall complete the laboratory course prescribed by the University entering all the experiment exercises in the laboratory journal, which shall be produced at the time of Practical Examination along with a certificate signed both by the course Teacher and the Head of the Department of Geography of the concerned college to the effect that he/she has completed the prescribed course in a satisfactory manner.

2. A batch shall consist of not more than 20 students.
3. Workload - one lab session of 2 hrs (i.e. 3 lectures per week per batch).
4. The duration of practical exam: 3 hrs carrying 50 marks. (weighted to 25)
5. Practical examination is to be conducted at the end of semester prior to the Theory (exam).

REFERENCE

i. Gopal Singh: Map works and practical Geography
ii Singh and Kanaujia : Elements of Practical Geography
iii Monkhouse F. J.: Maps and Diagrams
iv Raise: Principles of Cartography
v. Mishra R. P. and Ramesh: Fundamentals of Cartography

SEMESTER – I
GP:02: HUMAN GEOGRAPHY

OBJECTIVE:

1. To understand the evolution and distribution of man in relation to his environment
2. To understand cultural diversity in the world.

UNIT NO.	COURSE CONTENT	MARKS WEIGHTAGE	TEACHING PERIODS
I	Nature and scope of Human geography; Branches of Human geography; Man-Environment relationship; Approaches in Human Geography, Schools of Thought – Determinism, Possibilism – Neo-Determinism (Stop and Go Determinism)	15	08
II	Cradle of Man, Evolution of man and early development and diffusion. Races of the world-Basis of their classification, chief characteristics and distribution, Major ethnic and tribal groups of India.	15	08
III	Impact of environment on mode of life of primitive and progressive societies in selected regions, Equatorial Monsoons, Deserts, Taiga, Tundra.	15	08

IV	Culture and Geography - Definition and concept of culture - cultural diffusion - cultural realms. Acculturization, cultural diversity, regionalisation and cultural landscapes.	15	08
V	Contemporary Issues of Ethnic and racial conflicts. At least 2 case studies each from India and World.	15	08

Weightage: I.S.A: 15 + S.E.E: 60 Total= 75.

INSTRUCTIONS

1. Maximum thrust may be given to local regional and national examples.
2. Questions should be set with due weightage to all the units as specified

Pedagogic suggestion: The Current topic of Regional & National interest have to be updated by referring to subject journals - Down to Earth, Current Science, Yojna and Other relevant materials.

REFERENCE

1. Bergwan, Edward E.: Human Geography: Culture, Connections and Landscapes, Prentice Hall, N.J.
2. Carr M.: Pattern, Processes and Change in Human Geography, Macmillan, London.
3. Fellman J. L.: Human Geography: Landscapes of Human Activities, Brown & benchman, USA.
4. De Blij H. J. and Alexander: Human Geography, Culture, Society and Space, John Wiley, New York.
5. Majid Hussain: Human Geography, Rawat Publishers, Jaipur.

SEMESTER – I

PRACTICALS IN HUMAN GEOGRAPHY- II

OBJECTIVE:

To impart fundamental concepts and skills in map-making (Cartography) leading to advanced level.

UNIT NO.	COURSE CONTENT	MARKS WEIGHTAGE	NO. OF PRACTICALS
I	Sources of Population Statistics, Population Census and vital statistics; Method of Conducting population Census - Date System and Period System - Sample survey and analysis.	10	5
II	Calculation of Socio-Economic Indices-Crude Birth Rate, Fertility Rate, Age and Sex Ratio; Dependency Ratio Child –Woman ratio - Infant Mortality Rate - Crude Death Rate; Growth Rate; Population Literacy Rate; Population Concentration Index, Working and non working population and occupational structure.	10	5
III	Journal and Viva	5	

Weightage: 25

INSTRUCTIONS

1.Every candidate shall complete the laboratory course prescribed by the University entering all the experiment exercises in the laboratory journal, which shall be produced at the time of Practical Examination along with a certificate signed both by the course Teacher and the Head of the Department of Geography of the concerned college to the effect that he/she has completed the prescribed course in a satisfactory manner.

2. A batch shall consist of not more than 20 students.
3. Workload - one lab session of 2 hrs (i.e. 3 lectures per week per batch).
4. The duration of practical exam: 3 hrs carrying 50 marks. (weighted to 25)
5. Practical examination is to be conducted at the end of Semester prior to the Theory (exam)

REFERENCE

i. Gopal Singh: Map works and practical Geography

ii Singh and Kanawha : Elements of Practical Geography
iii Monkhouse F. J.: Maps and Diagrams
iv Raise: Principles of Cartography
v Mishra R. P. and Ramesh: Fundamentals of Cartography.

SEMESTER - I
EE:01: ENVIRONMENTAL EDUCATION – I

Objective: To bring in the actual experience of the nature and the environment, it is proposed that the students along with the faculty members will visit the outdoor nature and understand and acquaint with the man-nature interface.

UNIT NO.	COURSE CONTENT	MARKS WEIGHTAGE	TEACHING PERIODS
I	**The Multidisciplinary nature of environmental studies** Definition, scope and importance Need for public awareness.	5	5
II	**Natural Resources: Renewable and non-renewable resources:** Natural resources and associated problems. a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people. b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams benefits and problems. c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies e) Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies. f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.	15	10
III	Ecosystems Concept of an ecosystem. Structure and function of an ecosystem. Producers, consumers and decomposers. Energy flow in the ecosystem. Ecological succession. Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of the following ecosystem: a. Forest ecosystem b. Grassland ecosystem c. Desert ecosystem d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)	15	5

IV	**Biodiversity and its conservation** Introduction - Definition: genetic, species and ecosystem diversity. Biogeographical classification of India Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values Biodiversity at global, National and local levels. India as a mega-diversity nation Hot-spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts Endangered and endemic species of India Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.	15	5

Weightage: I.S.A: 10 + S.E.E: 40 Total= 50

INSTRUCTIONS

1 Maximum thrust may be given to local regional and national examples.

2.Questions should be set with due weightage to all the units as specified

Pedagogic suggestion: The Current topic of Regional & National interest have to be updated by referring to subject journals - Down to Earth, Current Science, Yojna and Other relevant materials.

REFERENCES

1.Agarwal, K.C.2001 Environmental Biology, Nidi Pub. Ltd. Bikaner.

2. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad - 380013, India, Emai1: mapin@icenet.net (R)

3. Brunner RC. 1989, Hazardous Waste Incineration, McGraw Hill Inc.480p

4. Clark RS., Marine Pollution, Clanderson Press Oxford (TB)

5. Cunningham, W.P.Cooper, TH.Gorhani, E & Hepworth, M.T2001, Environmental Encyclopedia, Jaico Pub!. House, Mumbai, 1196p

6. De A.K., Environmental Chemistry, Wiley Eastern Ltd.

7. Down to Earth, Centre for Science and Environment(R)

8. Gleick, H.P. 1993. Water in crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute. Oxford Univ. Press. 473p

9. Hawkins R.E, Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R)

10.Heywood, VH & Watson, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press 1140p.

11.Jadhav, H & Bhosale, VM. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284p.

12.Mckinney, M.L. & SchocJ', R.M. 1996. Environmental Science systems & Solutions, Web enhanced edition. 639p.

13. Mhaskar A.K, Matter Hazardous, Techno-Science Publications (TB)

14. Miller TG. Jr., Environmental Science, Wadsworth Publishing Co. (TB)

15. Odum, E.P. 1971. Fundamentals of Ecology. W.B.Saunders Co. USA, 574p

16. Rao M N.& Datta, A.K. 1987. Waste Water treatment. Oxford & IBH Pub!. Co. Pvt. Ltd. 345p

17. Sharma B.K., 2001. Environmental Chemistry. Goel Pub!. House, Meerut

18. Survey of the Environment, The Hindu (M)

19. Townsend C. , Harper J, and Michael Begon, Essentials of Ecology, Blackwell Science (TB)

20. Trivedi R.K., Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol I and II, Enviro Media (R)

21. Trivedi R.K. and P.K.Goel, Introduction to air pollution, Techno-Science Publications (TB)

22. Wagner K.D., 1998. Environmental Management. W.B. Saunders Co. Philadelphia, USA 499p

(M) Magazine

(R) Reference

(TB)Textbook

SEMESTER – II

GP:03: GEOMORPHIC PROCESSES

OBJECTIVE:

This introductory paper is intended to acquaint the students with distinctiveness of Geography as a field of learning. The philosophy of the subject is to be taught in order to develop a keen interest in the subject and to pursue it for higher studies.

UNIT NO.	COURSE CONTENT	MARKS WEIGHTAGE	TEACHING PERIODS
I	Geomorphic agents and Processes, Denudation: Agents of denudation, Mass wasting process, weathering and its types. Genetic classification of drainage system. River molded landscapes. Glacial Landscapes in mountains and plains. Aeolian landscapes in hot desert. Karst landscapes.	15	08
II	Cycle concepts: W.M.Davis & Walter Penck	15	08
III	Soils: Soil forming processes. Factors controlling forming processes, classification and world distribution of soil (w.r.t. India)	15	08
IV	i) Geomorphology and Environment ii) Geomorphology and Mining iii) Geomorphology and Agriculture iv) Geomorphology and settlements v) Geomorphology and Surface Transport	15	08
V	Human responses to Coastal developments: Coastal landforms, types of coasts, coastline of emergence, submergence, sea level changes. Contemporary issues of National/International Interests.	15	08

Weightage: I.S.A: 15 + S.E.E: 60 Total= 75.

INSTRUCTIONS

1. Maximum thrust may be given to local regional and national examples.
2. Questions should be set with due weightage to all the units as specified

Pedagogic suggestion: The Current topic of Regional & National interest have to be updated by referring to subject journals - Down to Earth, Current Science, Yojna and Other relevant materials.

REFERENCE

1. Wooldrige S. W. & Morgan R.S.: An outline of Geomorphology, Longman Green & Co., London
2. Thornbury W. D.: Principles of Geomorphology, Wiley & Sons.
3. Strahler A. N.: Physical geography, John Wiley & Sons
4. Sparks B. W.: Geomorphology, Longman Green & Co., London
5. Monkhouse F. J: Principles of Physical Geography, Hodder & Stoughton, London.
6. Steers J. A: The Unstable Earth, Kalyani Publishers, New Delhi
7. Tinch & Trewartha: Elements of Physical Geography, Kethuem, London/ N.Y.

SEMESTER – II

PRACTICALS IN GEOMORPHOLOGY- III

OBJECTIVE:

To impart training on map-making techniques in geomorphology with laboratory exercises

UNIT NO.	COURSE CONTENT	MARKS WEIGHTAGE	TEACHING PERIODS

I	Drainage Patterns, Density and order. Section drawing with vertical exaggeration for contour patterns. Slope analysis: 2 methods	5	4
II	Classification of S.O.I toposheets, Interpretation of S.O.I topographical Maps (5 exercises of 4 different themes. -Mountains, Plateaus, Plains, Coastal and Deserts), Detail study of topography, Drainage, Vegetation, Landuse pattern, settlement, transport and communication.	15	6
III	Journal and Viva	5	

Weightage: 25

INSTRUCTION

1.Every candidate shall complete the laboratory course prescribed by the University entering all the experiment exercises in the laboratory journal, which shall be produced at the time of Practical Examination along with a certificate signed both by the course Teacher and the Head of the Department of Geography of the concerned college to the effect that he/she has completed the prescribed course in a satisfactory manner.

2. A batch shall consist of not more than 20 students.

3. Workload - one lab session of 2 hrs (i.e. 3 lectures per week per batch).

4. The duration of practical exam: 3 hrs carrying 50 marks.

5. Practical examination is to be conducted at the end of Semester prior to the Theory (exam)

REFERENCE

i. Gopal Singh: Map works and practical Geography

ii. Singh and Kanaujia: Elements of Practical Geography

iii. Monkhouse F. J.: Maps and Diagrams

iv. Raise: Principles of Cartography

v. Mishra R. P. and Ramesh: Fundamentals of Cartography

SEMESTER – II
GP:04:GEOGRAPHY OF CULTURAL ENVIRONMENT

OBJECTIVES:

1.To understand the evolution and distribution of man in relation to his environment

2.To understand cultural diversity in the world

UNIT NO.	COURSE CONTENT	MARKS WEIGHTAGE	TEACHING PERIODS
I	Introduction to culture environment and regions. Basis of classification of cultural regions, Approaches to cultural geography and major themes.	12	8
II	Geography of Language-Global linguistic mosaic origin and characteristic, diffusion of languages and linguistic classification in India.	12	8
III	Geography of religion-Origin and distribution of religions, Religion Culture and Conflict. Case study- Global and India.	12	8
IV	Geography and development-Types of economies (LDC AND MDC) on social economic and demographic patterns	12	8
V	Contemporary Issues- Gender and inequality, Race- ethnicity and equality, Nutrition health and disease.	12	8

Weightage: I.S.A: 15 + S.E.E: 60 Total= 75.

INSTRUCTIONS

1 Maximum thrust may be given to local regional and national examples.

2.Questions should be set with due weightage to all the units as specified

Pedagogic suggestion: The Current topic of Regional & National interest have to be updated by referring to subject journals - Down to Earth, Current Science, Yojna and Other relevant materials.

REFERENCE

1. Bergwan, Edward E.: Human Geography: Culture, Connections and Landscapes, Prentice Hall, N.J.
2. Carr M.: Pattern, Processes and Change in Human Geography, Macmillan, London.
3. Fellman J. L.: Human Geography: Landscapes of Human Activities, Brown & benchman, USA.
4. De Blij H. J. and Alexander: Human Geography, Culture, Society and Space, John Wiley, New York.
5. Majid Hussain: Human Geography, Rawat Publishers, Jaipur.

SEMESTER – II
PRACTICALS IN HUMAN GEOGRAPHY- IV

OBJECTIVE:

To impart training on map-making techniques in geomorphology with laboratory exercises

UNIT NO.	COURSE CONTENT	MARKS WEIGHTAGE	NO. OF PRACTICALS
I	Cartographic Representation of Population Data- Line and Bar Graph and its types; Pie Diagram; Age-Sex Pyramid and types; Urban-Rural pyramid; Ergo graph (Circular), Tri-Linear Chart, Flow Diagrams.	10	5
II	Cartograms - Dot Maps, Isopleth, Choropleth, Proportional circles, Spheres, Pictograms and choro-chromatic maps.	10	5
III	Journal and Viva	5	

Weightage: 25.

INSTRUCTION

1.Every candidate shall complete the laboratory course prescribed by the University entering all the experiment exercises in the laboratory journal, which shall be produced at the time of Practical Examination along with a certificate signed both by the course Teacher and the Head of the Department of Geography of the concerned college to the effect that he/she has completed the prescribed course in a satisfactory manner.

2. A batch shall consist of not more than 20 students.
3. Workload - one lab session of 2 hrs (i.e. 3 lectures per week per batch).
4. The duration of practical exam: 3 hrs carrying 50 marks.
5. Practical examination is to be conducted at the end of semester prior to the Theory (exam)

REFERENCE

i.Gopal Singh: Map works and practical Geography
ii Singh and Kanaujia: Elements of Practical Geography
iii Monkhouse F. J.: Maps and Diagrams
iv Raise: Principles of Cartography
v Mishra R. P. and Ramesh: Fundamentals of Cartography.

SEMESTER - II

EE:02: ENVIRONMENTAL EDUCATION- II

Objective: To bring in the actual experience of the nature and the environment, it is proposed that the students along with the faculty members will visit the outdoor nature and understand and acquaint with the man-nature interface.

UNIT NO.	COURSE CONTENT	MARKS WEIGHTAGE	TEACHING PERIODS
I	**Environmental Pollution** a) Definition a) Air pollution b) Water pollution c) Soil pollution d) Marine pollution e) Noise pollution f) Thermal pollution g) Nuclear hazards **Solid waste Management:** Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies. **Disaster management**: floods, earthquake, cyclone and landslides.	10	8
II	**Social Issues and the Environment** From Unsustainable to Sustainable development Urban problems related to energy Water conservation, rain water harvesting, watershed management. Resettlement and rehabilitation of people; its problems and concerns. Case studies. Environmental ethics: Issues and possible solutions. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies. Wasteland reclamation. Consumerism and waste products. Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and control of Pollution) Act Wildlife Protection Act Forest Conservation Act Issues involved in enforcement of environmental legislation. Public awareness	15	8
III	**Human Population and the Environment** Population growth, variation among nations. Population explosion - Family Welfare Programme. Environment and human health. Human Rights. Value Education. HIV; AIDS. Women and Child Welfare. Role of information Technology in Environment and human health. Case Studies.	15	8

IV	**Field work** Visit to a local area to document environmental assets-river /forest/ Grassland/ hill/ mountain Visit to a local polluted site - Urban! Rural! Industrial! Agricultural Study of common plants, insects, birds. Study of simple ecosystems-pond, river, hill slopes, etc. (Field work Equal to 5 lecture hours).	10	6

Weightage: I.S.A: 10 + S.E.A: 40 Total= 50.

INSTRUCTIONS

1 Maximum thrust may be given to local regional and national examples.

2.Questions should be set with due weightage to all the units as specified

Pedagogic suggestion: The Current topic of Regional & National interest have to be updated by referring to subject journals - Down to Earth, Current Science, Yojna and Other relevant materials.

3. Duration of Local trip is not more than two days for FY/SY B.A.B.Sc

Duration for long tour for TYBA/B.Sc will not be more than 3 to 12 days.

The Deputed faculty members will be entitled for the T.A/D.A

REFERENCES

1.Agarwal, K.C.2001 Environmental Biology, Nidi Pub!. Ltd. Bikaner.

2. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad - 380013, India, Emai1: mapin@icenet.net (R)

3. Brunner RC., 1989, Hazardous Waste Incineration, McGraw Hill Inc.480p

4. Clark RS., Marine Pollution, Clanderson Press Oxford (TB)

5. Cunningham, W.P.Cooper, TH.Gorhani, E & Hepworth, M.T2001, Environmental Encyclopedia, Jaico Pub!. House, Mumbai, 1196p

6. De A.K., Environmental Chemistry, Wiley Eastern Ltd.

7. Down to Earth, Centre for Science and Environment(R)

8. Gleick, H.P. 1993. Water in crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute. Oxford Univ. Press. 473p

9. Hawkins R.E, Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R)

10.Heywood, VH & Watson, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press 1140p.

11.Jadhav, H & Bhosale, VM. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284 p.

12.Mckinney, M.L. & SchocJ', R.M. 1996. Environmental Science systems & Solutions, Web enhanced edition. 639p.

13. Mhaskar A.K, Matter Hazardous, Techno-Science Publications (TB)

14. Miller TG. Jr., Environmental Science, Wadsworth Publishing Co. (TB)

15. Odum, E.P. 1971. Fundamentals of Ecology. W.B.Saunders Co. USA, 574p

16. Rao M N.& Datta, A.K. 1987. Waste Water treatment. Oxford & IBH Pub!. Co. Pvt.Ltd.

17. Sharma B.K., 2001. Environmental Chemistry. Goel Pub!. House, Meerut

18. Survey of the Environment, The Hindu (M)

19. Townsend C. , Harper J, and Michael Begon, Essentials of Ecology, Blackwell Science (TB)

20. Trivedi R.K., Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol I and II, Enviro Media (R)

21. Trivedi R.K. and P.K.Goel, Introduction to air pollution, Techno-Science Publications (TB)

22. Wagner K.D., 1998. Environmental Management. W.B. Saunders Co. Philadelphia, USA 499p

(M) Magazine

(R) Reference

(TB) Textbook

S.Y.B.Sc.
GEOGRAPHY
SEMESTER – III
GP:05: CLIMATOLOGY AND OCEANOGRAPHY

OBJECTIVE

1. Climatology have been of major significance not only of rather academic pursuit but widely known area of study as Climatic change, Global warming are burning issues of the modern economy.
2. There are few global weather phenomena like El-Nino & La Nina, Tsunami, Cyclones which have received much media coverage: The remarkable growth of the World Wide Web/World Weather Watch (WWW) and it gives a multitude of home pages dealing with weather and climate.
3. To make aware of these developments about climate to the forefront of popular science, not to sorting out fact from speculation with readily available climatic data and appropriate statistical

UNIT NO.	COURSE CONTENT	MARKS WEIGHTAGE	TEACHING PERIODS
I	Atmosphere in general: Weather and climate; Meaning and definition and Significance of Climatology, Climatic elements. The Atmosphere - its composition & structure, Insolation: Horizontal & Vertical Distribution.	15	08
II	Factors affecting temperature: Temporal distribution of temperature, inversions horizontal heat transport, Theories of precipitation and spatio-temporal patterns of precipitation.	15	08
III	Dynamics of Atmosphere. Atmospheric motion: Laws of horizontal motion, types of winds, Divergences, vertical motion; local winds, global pressure variations and wind belts; seasonal shifts, recent views on circulation: Jet streams; Air masses, Fronts and Depressions: Concept, classification, properties, frontogenesis, warm and cold fronts, Occlusions, Zones of frontal development - frontal depressions.	15	08
IV	Atmospheric Disturbances: Tropical Weather; climate; Tropical and temperate cyclones: characteristics, origin, tracks with special reference to Indian seas. The Asian and Indian monsoon: recent views, jet stream. Classification: Basis of Koppen's and Thornthwaite's climatic classification and types.	15	08
V	Oceanography Oceans: Their configuration and relief, A detailed study of Indian Ocean relief. Water characteristics; salinity, density, temperature, their regional and global distributional patterns. Ocean Circulations: Waves, tides, currents, their effects, tide theories. Surface current, circulation of the Pacific, Atlantic and Indian Oceans; deep-water circulation, natural catastrophes of Lithosphere, Atmosphere, Hydrosphere	15	08

Weightage: I.S.A: 15 + S.E.E: 60 Total= 75.

INSTRUCTION

1. Wherever possible quantitative expression is mandatory.
2. Diagram & Quantitative boxes are explicatory.
3. Sample data be used to illustrate basic concepts.

REFERENCE

1. Barry,R.G. and Chorley P.J.: Atmosphere, Weather and Climate, Routledge, London and New York, 1998.

2. Critchfield, J.H.: General Climatology, Prentice Hall, India, New Delhi, 1993.
3. Das, P.K.: Monsoons National Book Trust, New Delhi, 1987.
4. Fein, J. S. and Stephens, P. N.: Monsoons Wiley Interscience, 1987.
5. India Met. Deptt: Climatology Tables of Observatories in India, Govt. of India, 1968.
6. Lal, D.S.: Climatology, Chaitanya Publications, Allahabad, 1986.
7. Lydolph, P.E.: The Climate of the Earth, Rowman, 1985.
8. Menon, P.A.: Our Weather, N.B.T., New Delhi, 1989.
9. Peterson , S.: Introduction to Meteorology, Mc Graw Hill Book, London, 1969.
10. Robinson, P.J. and Henderson S.: Contemporary Climatology, Henlow, 1999.
11. Thompson, R.D. and Perry, A (ed): Applied Climatology, Principles and Practice, Routledge, London, 1997.

PRACTICAL- V
CLIMATOLOGY AND OCEANOGRAPHY

OBJECTIVE:
To impart training in measurement skills in Climatological studies.

UNIT NO.	COURSE CONTENT	MARKS WEIGHTAGE	NO. OF PRACTICALS
I	Weather Instruments- Traditional and modern.	10	5
II	Calculation of temperature and pressure reduced to sea level. Interpolation of Isotherms, Isobars and Isohyets. Hypsometric Curves, Profiles of shore lines-2 exercises, Salinity measurement	10	5
III	Field work/report – To collect weather information and data from important organization like NIO and IMD, Panaji.	5	

Weightage: 25

INSTRUCTION

1.Every candidate shall complete the laboratory course prescribed by the University entering all the experiment exercises in the laboratory journal, which shall be produced at the time of Practical Examination along with a certificate signed both by the course Teacher and the Head of the Department of Geography of the concerned college to the effect that he/she has completed the prescribed course in a satisfactory manner.
2. A batch shall consist of not more than 20 students.
1. Workload - one lab session of 2 hrs (i.e. 3 lectures per week per batch).
4. The duration of practical exam: 3 hrs carrying 50 marks.(finally weighted to25)
5.Practical examination is to be conducted at the end of Semester prior to the Theory (exam)in the lab.

REFERENCE

i. Gopal Singh: Map works and Practical Geography
ii Singh and Kanaujia: Elements of Practical Geography
iii Monkhouse F. J.: Maps and Diagrams
iv Raise: Principles of Cartography
v Mishra R. P. and Ramesh: Fundamentals of Cartograph

SEMESTER – III
GP:06:GEOGRAPHY OF NATURAL RESOURCE AND DEVELOPMENT

OBJECTIVE:
To acquaint the students with the bases of spatial and temporal aspects of economic activity.

UNIT NO.	COURSE CONTENT	MARKS WEIGHTAGE	TEACHING PERIODS
I	Economic Geography Today: Bases of world Economy- Physical, Cultural and Technological, Economic bases of Economic activities. Functional Classification of Economic activities.	15	08
II	Historical Evolution of world economic systems. Medieval feudal economies. The rise of Mercentilism & its economic benefits. Emergence of colonialism & its economic benefits. Mechanism of modern economic systems.	15	08
III	World Agriculture: Types of Agriculture – a) Intensive and Extensive farming b) Subsistence and commercial farming, c) Mixed and Plantation Agriculture. Crops: Cereals - Rice & Wheat Cash Crops: Beverages-Tea, Coffee Industrial Crops: Cotton, Sugarcane.	15	08
IV	A) World Fisheries: factors & distribution of major fishing grounds B) Forest Resources: Tropical & Temperate Forestry. C) Forest Products.	15	08
V	Natural Resources: Distribution and Development of a) Metallic: Ferrous - Iron Ore Mining, Non-Ferrous - Bauxite Mining b) Fuel & Power resources: Fossil Fuels - Coal, Petroleum and Natural gas Renewable: Hydel power. c) Non-Conventional Energy Resources - Solar, Tidal, Wind & Geothermal	15	08

Weightage: I.S.A: 15 + S.E.E: 60 Total= 75.

INSTRUCTIONS

1.Maximum thrust may be given to local regional and national examples.
2.Q. No. 1 being objective it should include questions from all units of the term.
3.Questions should be set with due weightage to all the units as specified
4. Due weightage for maps, diagrams in teaching as well as in paper setting are mandatory.

REFERENCE

1. Borsch, H: A Geography of World Economy, Van Nostrand Co., New York, 1964.
2.Chapman J. D.: Geography and Energy, Longman, London, 1989.
3.Hartshorne T.N. & Alexander J.W.: Economic Geography, Prentice Hall, New Delhi, 1988.
4. Jones C. F. and Darkenwald G.G: Economic Geography, Macmillan & Co, New York, 1975
5.Smith, D. M: Industrial location: An Economic Geographical Analysis, John Wiley, New York, 1971.
6.Bengston & Van, G. H. Royan: Fundamentals of Economic Geography, Prentice Hall, New Delhi, 1988
7.G.C.Leong & G. H. Morgan - Human and Economic Geography, Oxford University Press - New York.

SEMESTER – III
PRACTICALS - VI
ADVANCED STATISTICAL METHODS IN GEOGRAPHY - I

UNIT NO.	COURSE CONTENT	MARKS WEIGHTAGE	TEACHING PERIODS

I	Measurement scales in Geography a) Natural symbols and Nature of Geographical data b) Types of measurements i) Nominal Measurement, ii) Ordinal Measurements, iii) Interval Measurements iv) ratio Measurements and others.	10	5
II	a) Classification and Tabulation of data, Tabular and Graphical form, typical pattern of frequency distribution and skewness b) Measures of Central Tendency: Mean, Median, Mode and skewness, Quartiles, Deciles, Percentiles.	10	5
III	Journal and Viva	5	

Weightage: 25

INSTRUCTION

1.Every candidate shall complete the laboratory course prescribed by the University entering all the experiment exercises in the laboratory journal, which shall be produced at the time of Practical Examination along with a certificate signed both by the course Teacher and the Head of the Department of Geography of the concerned college to the effect that he/she has completed the prescribed course in a satisfactory manner.

2. A batch shall consist of not more than 20 students.

3.Workload - one lab session of 2 hrs (i.e. 3 lectures per week per batch).

4. The duration of practical exam: 3 hrs carrying 50 marks.

5.Practical examination is to be conducted at the end of Semester prior to the Theory (exam).

REFERENCE

1. Statistical Techniques: A Basic approach to Geography - Saroj K. Pal
2. Multivariate Statistical Analysis in Geography - R. J. Johnston
3. Practical Geography - M Ishtiag
4. Maps and Diagrams - Wilkinson and Monkhouse
5. Statistical Methods and Geography - Gregory
6. Map work and Practical Geography - Gopal Singh

SEMESTER-III
FC:01: REMOTE SENSING

OBJECTIVE

- **To introduce to the students the basic principles of Remote Sensing;**
- **To indicate the methods of visual and digital interpretations of satellite imageries.**
- **To outline the application value of remote sensing.**

UNIT NO.	COURSE CONTENT	MARKS WEIGHTAGE	TEACHING PERIODS
I	1. Development of the Remote Sensing Technology. 2. Definition and scope of Remote Sensing. 3. Application of Remote Sensing technology in Geography 4. Nature and limitations of Remote Sensing techniques.	10	10
II	1. Basic concepts of Remote Sensing - energy and radiation principles. 2. Remote Sensing platforms and Sensors.	10	10

III	Photogrammetry 1. Aerial Photographs 2. Aerial Cameras and Films - Characteristics. 3. Geometric fundamentals of photography scale coverage, resolution, angle of photographs, relief displacement, image parallax, stereo models, photo mosaic and orthophotos. 4. Elements of airphoto interpretation: Shape, size, tone, texture, pattern, shadow.	20	10
IV	1. Types of satellites 2. Satellite Imaging 3. Advantages & limitations of the major satellites. 4. Visual image interpretation & mapping techniques. 5. Change detection using toposheets and Remote Sensing Data products.	20	10
V	1. Introduction to thermal Remote Sensing 2. Microwave and Radar Remote Sensing 3. Integration of Remote Sensing with GIS.	15	10

Weightage: I.S.A: 15 + S.E.E: 65 Total= 75.

REFERENCES:

1. Ian Haywood, Sarah Cornelius and Steve Carver (2000), An introduction to Geographical Information System, Addision Wesley Longman Ltd., New York.
2. Arnoff, S. (1991), Geographic Information Systems - A management perspective, WDL Publications, Ottawa, Canada.
3. Kang Tsung Chang (2002), Introduction to Geographical Introduction Systems, Tata McGraw Hill Publishing Co. Ltd., New Delhi.
4. Star, J. and J.E. Estes, (1990), Geographical Introduction Systems: An introduction, New Jersey, Prentice Hall.
5. David J. Maguire, Michael F. Goodchild and David W. Rhind ed. (1991), Geographical Introduction Systems, Longman Scientific and Technical Co. Published in the USA with John Wiley and Sons, Inc., New York
6. Pail J. Gibson, (2000), Introductory Remote Sensing, Routledge, New York.
7. Lillesand, T. and Keifer (2000), Introduction to Remote Sensing and Image Interpretation, John Wiley and Sons, Inc., New York.
8. Avery, T.E. and G. L. Berlin (1992), Fundamentals of Remote Sensing and Air Photo Interpretation, McMillan Publishing Co., New York.
9. James B. Campbell (1996), Introduction to Remote Sensing, Taylor & Francis, London.
10. Rampal, K.K. (1999), Handbook of Aerial photography and interpretation, Concept Publishing Co., New Delhi.
11. Jensen, J.R. (2003), Remote Sensing of the Environment, Pearson Education Ltd., Delhi.
12. Joseph, G. (2003), Fundamentals of Remote Sensing, Universities Press, Hyderabad.

SEMESTER – IV

GP:07:CLIMATOLOGY AND BIOSPHERE

UNIT NO.	COURSE CONTENT	MARKS WEIGHTAGE	TEACHING PERIODS

I	Global Circulation of the Atmosphere i. The General Circulation ii. Regional, tropical, mid-latitude & polar circulation iii. Seasonal changes in the global pattern- Monsoons, Asian Monsoons, North American Monsoons	10	8
II	Ocean current & variations in climate. i. The Walker Circulation of the Equatorial Pacific Ocean, EL-NINO, La- NINA, impacts & Fore-casting of El- Nino. ii. Inter-annual variations in Monsoons.	10	8
III	Airmasses of Synoptic Climatology, Air masses, Fronts, Cyclones. Cyclogenesis, Satellite Climatology. i. Tropical cyclones- causes & consequences. E.g. U.S. & India ii. Thunderstorms- Tornadoes and associated hazards. iii.Genetic & Empirical system of climatic classification.	10	8
IV	Global Warming i. Evidences of Global Warming, e.g. Earth's Global environment, ice age, Glaciers, Sea level changes. ii. Processes contributing to Global warming	10	8
V	The Human Response to climate i. The physiological response Bio - meteorological indexes ii. Climate & Health iii. Urban Climates iv Agriculture, Industry, Transportation, tourism & Climate.	10	8

Weightage: I.S.A: 15 + S.E.A: 60 Total= 75.

INSTRUCTIONS

1.Maximum thrust may be given to local regional and national examples.

2.Questions should be set with due weightage to all the units as specified

3. Due weightage for maps, diagrams in teaching as well as in paper setting are mandatory.

REFERENCE

1. 1. Barry,R.G. and Chorley P.J.: Atmosphere, Weather and Climate, Routledge, London and New York, 1998.
2. Critchfield, J.H.: General Climatology, Prentice Hall, India, New Delhi, 1993.
3. Das, P.K.: Monsoons National Book Trust, New Delhi, 1987.
4. Fein, J. S. and Stephens, P. N.: Monsoons Wiley Interscience, 1987.
5. India Met. Deptt: Climatology Tables of Observatories in India, Govt. of India, 1968.
6. Lal, D.S.: Climatology, Chaitanya Publications, Allahabad, 1986.
7. Lydolph, P.E.: The Climate of the Earth, Rowman, 1985.
8. Menon, P.A.: Our Weather, N.B.T., New Delhi, 1989.
9. Peterson , S.: Introduction to Meteorology, Mc Graw Hill Book, London, 1969.
10. Robinson, P.J. and Henderson S.: Contemporary Climatology, Henlow, 1999.
11. Thompson, R.D. and Perry, A (ed): Applied Climatology, Principles and Practice, Routledge, London, 1997.

SEMESTER – IV
PRACTICALS-VII
PRACTICALS IN CLIMATOLOGY

UNIT NO.	COURSE CONTENT	MARKS WEIGHTAGE	TEACHING PERIODS

I	Study of weather symbols and IMD weather charts. Interpretation of IMD weather charts (atleast 2 maps of each season) Preparation of weather Station Model.	10	5
II	Cartographic representation of weather and climatic data – Climograph, Hythergraph, Ergograph, Wind Rose and its types.	10	5
III	Journal & Viva, Field trip - 1-2 days	5	

Weightage: 25

INSTRUCTION

1.Every candidate shall complete the laboratory course prescribed by the University entering all the experiment exercises in the laboratory journal, which shall be produced at the time of Practical Examination along with a certificate signed both by the course Teacher and the Head of the Department of Geography of the concerned college to the effect that he/she has completed the prescribed course in a satisfactory manner.

2. A batch shall consist of not more than 20 students.

2. Workload - one lab session of 2 hrs (i.e. 3 lectures per week per batch).

4. The duration of practical exam: 3 hrs carrying 50 marks.(finally weighted to 25)

5.Practical examination is to be conducted at the end of Semester prior to the Theory (exam).

REFERENCE

i. Gopal Singh: Map works and Practical Geography

ii Singh and Kanaujia : Elements of Practical Geography

iii Monkhouse F. J.: Maps and Diagrams

iv Raise: Principles of Cartography

v Mishra R. P. and Ramesh : Fundamentals of Cartography

SEMESTER - IV

GP:08:GEOGRAPHY OF SECONDARY AND TERTIARY ACTIVITIES

UNIT NO.	COURSE CONTENT	MARKS WEIGHTAGE	TEACHING PERIODS
I	Manufacturing theories & trends, Manufacturing processes & locations, Classical locations principles- 1)Least Cost Theory 2) Profit Maximisation Theory 3) Behavioural Location Theory. 4) Structural Approach.	15	8
II	Changing order in Textile Apparel Production, Capital intensive Steel & Automobile Industry. Knowledge intensive high technology activities: Electrical, Electronic, Biotechnology & Telecommunication industry	15	8
III	Cities as service centres: World City patterns, Rank Size Rule, Central Place Theory, Break Point Theory, Trade areas anaylsis, Changing physical structures-emerging polycentric city ribbon corriders, metropolitan hierarchies, Wholesale and Retail structures.	15	8
IV	World Transport System: Land (Road & Railways) Water (North Atlantic and Suez Routes) (Canals; Suez & Panama) Air Transportation Communication System: Importance of Media, Newspaper, Radio, T.V., Satellite, Remote Sensing, IT Revolution	15	8

V	World Trade: Geography of International Business: Dynamics, Strategies, changing form of international business, Free trade initiatives and WTO.	15	8

INSTRUCTIONS

1.Maximum thrust may be given to local regional and national examples.
2.Questions should be set with due weightage to all the units as specified
3. Due weightage for maps, diagrams in teaching as well as in paper setting is mandatory.

REFERENCE

1. Boesch, H : A Geography of World Economy, Van Nostrand Co., New York, 1964.
2.Chapman J. D. : Geography and Energy, Longman, London, 1989.
3.Hartshorne T.N. & Alexander J.W.: Economic Geography, Prentice Hall, New Delhi, 1988.
4. Jones C. F. and Darkenwald G.G : Economic Geography, Macmillan & Co, New York, 1975
5.Smith, D. M : Industrial location: An Economic Geographical Analysis, John Wiley, New York, 1971.
6.Bengston & Van, G. H. Royan : Fundamentals of Economic Geography, Prentice Hall, New Delhi, 1988
7.G.C.Leong & G. H. Morgan - Human and Economic Geography, Oxford University Press - New York.

SEMESTER – IV
PRACTICALS- VIII
ADVANCED STATISTICAL METHODS IN GEOGRAPHY - II

UNIT NO.	COURSE CONTENT	MARKS WEIGHTAGE	TEACHING PERIODS
I	Measures of dispersion a) Absolute measures: Range, Quartile deviation, Mean deviation, Standard deviation, Variance. b) Relative measures of Dispersion: i) Graphical: Line graph and scatter diagram. ii) Algebric: Pearson's Product Moment Co-relation, Spearman's Rank order and Kendall's Rank Co-relation, Co-relation Co-efficient. iii) Regression lines iv) Moving Averages	10	5
II	Hypothesis testing: Types of Hypothesis- Chi- square test, Variance Analysis.	10	5
III	Field Survey and Report (Field trip of 1-2 days.	5	

Weightage: 25

INSTRUCTION

1.Every candidate shall complete the laboratory course prescribed by the University entering all the experiment exercises in the laboratory journal, which shall be produced at the time of Practical Examination along with a certificate signed both by the course Teacher and the Head of the Department of Geography of the concerned college to the effect that he/she has completed the prescribed course in a satisfactory manner.
2. A batch shall consist of not more than 20 students.
3.Workload - one lab session of 2 hrs (ie 3 lectures per week per batch).
4. The duration of practical exam: 3 hrs carrying 50 marks.
5.Practical examination is to be conducted at the end of Semester prior to the Theory (exam).

REFERENCE

7. Statistical Techniques: A Basic approach to Geography - Saroj K. Pal
8. Multivariate Statistical Analysis in Geography - R. J. Johnston
9. Practical Geography - M Ishtiag

10. Maps and Diagrams - Wilkinson and Monkhouse
11. Statistical Methods and Geography - Gregory
12. Map work and Practical Geography - Gopal Singh

SEMESTER IV

FC:02: GEOGRAPHIC INFORMATION SYSTEM

OBJECTIVES:

- **To introduce GIS (Geographic Information System) as a tool of spatial science.**
- **To indicate the basic elements of GIS and methodology of GIS.**
- **To outline the steps and areas of application of GIS.**

UNIT NO.	COURSE CONTENT	MARKS WEIGHTAGE	TEACHING PERIODS
I	1. Spatial aspects of Geography - maps and spatial information. 2. Definition and development of GIS. 3. Elements of GIS 4. Application of GIS.	10	10
II	1. Elements of spatial data 2. Sources of geographical data-primary & secondary. 3. Spatial data types & models - Raster and vector. 4. Attribute data.	20	10
III	1. Fundamentals of Cartography - projection and datum. 2. Visualization in GIS. 3. Digitization of point, line and aerial boundaries, Preparation of choropleth maps.	20	10
IV	1. Integration of GIS and Remote Sensing. 2. GPS technology - scope and limitations.	15	10
V	1. GIS softwares & hardwares. 2. Present trends in GIS development 3. Scope of GIS	10	10

Weightage: I.S.A: 15 + S.E.A: 60 Total= 75.

REFERENCES:

1. Ian Haywood, Sarah Cornelius and Steve Carver (2000), An introduction to Geographical Information System, Addision Wesley Longman Ltd., New York.
2. Arnoff, S. (1991), Geographic Information Systems - A management perspective, WDL Publications, Ottawa, Canada.
3. Kang Tsung Chang (2002), Introduction to Geographical Introduction Systems, Tata McGraw Hill Publishing Co. Ltd., New Delhi.
4. Star, J. and J.E. Estes, (1990), Geographical Introduction Systems: An introduction, New Jersey, Prentice Hall.
5. David J. Maguire, Michael F. Goodchild and David W. Rhind ed. (1991), Geographical Introduction Systems, Longman Scientific and Technical Co. Published in the USA with John Wiley and Sons, Inc., New York
6. Pail J. Gibson, (2000), Introductory Remote Sensing, Routledge, New York.
7. Lillesand, T. and Keifer (2000), Introduction to Remote Sensing and Image Interpretation, John Wiley and Sons, Inc., New York.
8. Avery, T.E. and G. L. Berlin (1992), Fundamentals of Remote Sensing and Air Photo Interpretation, McMillan Publishing Co., New York.
9. James B. Campbell(1996), Introduction to Remote Sensing, Taylor & Francis, London.
10. Rampal, K.K. (1999), Handbook of Aerial photography and interpretation, Concept Publishing Co., New Delhi.

11. Jensen, J.R. (2003), Remote Sensing of the Environment, Pearson Education Ltd., Delhi.
12. Joseph, G. (2003), Fundamentals of Remote Sensing, Universities Press, Hyderabad.

BACHELOR OF SCIENCE (T.Y.B.Sc.) GEOGRAPHY
PROPOSED SYLLABUS

SEMESTER V

Course Code	Course Title	Marks
	Theory	
GP:01	Fundamentals of Coastal Geomorphology	100
GP:02	Principles and Techniques of Watershed Management-I	100
GP:03	Fundamentals of Geoinformatics: Remote Sensing & Photogrammetry	100
GP:04	Geography and Planning-I	100
	Practical	
GP:05	Map Analysis and Interpretation Techniques	50
GP:06	Basics in Statistics	50
GP:07	Introduction to CAD	50
GP:08	Practicals in Remote Sensing	50
GP:09	Computer Cartography	50

Instructions:

1. All theory papers are compulsory.
2. Students can opt any four practical paper among GP:05 to GP:09

SEMESTER VI

Course Code	Course Title	Marks
	Theory	
GP:01	Environmental Geomorphology	100
GP:02	Principles and Techniques of watershed Management-I	100
GP:03	Fundamentals of Geoinformatics: GIS & GPS	100
GP:04	Geography and planning-II	100
	Practical	
GP:05	Advanced Statistics	50
GP:06	Practicals in Surveying	50
GP:07	Practicals in GIS	50
GP:08	C Programming	50
GP:09	Project Work	100

Instructions:

1. All theory and Practical papers are compulsory.
2. GP-09: Project work carrying 100 marks is compulsory part of the curriculum which will be evaluated as per the university norms.

SEMESTER V
GP:01 Fundamentals of Coastal Geomorphology

OBJECTIVE:
This introductory paper is intended to acquaint the students with distinctiveness of Geography in terms of coastal features. The theory will enhance the practical gain required in various Coastal applications

UNIT NO.	COURSE CONTENT	MARKS WEIGHTAGE	TEACHING PERIODS
I	Introduction to coastal landforms, Costal landforms, types of coastline, waves-formation, drifts and tides, costal erosion, costal deposition	20	08
II	Beach Geomorphology, Coastal wetlands, understanding coral reefs and marine environment	20	08
III	Coasts of India	20	08
IV	Coastal Geomorphology Modeling and Analysis	20	08
V	Coastal Ecosystem Management, Coastal Hazard Management	20	08

Weightage: I.S.A: 20 + S.E.E: 80 Total= 100.

REFERENCES:

1.Eric Bird: Coastal Geomorphology: An Introduction, John Wiley & Sons; 1 edition (November 7, 2000), ISBN-10: 0471899771 , ISBN-13: 978-0471899778
2.Gerhard Masselink , Michael Hughes :An Introduction to Coastal Processes and Geomorphology (Hodder Arnold Publication), ISBN-10: 0340764112 , ISBN-13: 978-0340764114
3.Richard Davis Jr. , Duncan Fitzgerald : Beaches and Coasts, Wiley-Blackwell; 1st edition (July 15, 2004), ISBN-10: 0632043083 , ISBN-13: 978-0632043088
4.Timothy Beatley , Anna K. Schwab , David Brower :An Introduction to Coastal Zone Management, Island Press; REV edition (April 1, 2002), ISBN-10: 1559639156
ISBN-13: 978-1559639156

SEMESTER V

GP:02 Principles and Techniques of Watershed Management-I

OBJECTIVE:
The primary objective of this course is to develop a process-based understanding of how changes to land surface characteristics will affect fluxes of mass and energy within a watershed, so that science-based management principles may be effectively applied to watershed systems.

UNIT NO.	COURSE CONTENT	MARKS WEIGHTAGE	TEACHING PERIODS
I	Introduction to Watershed Management : Definition, Principals, objectives, Need of watershed management,	20	08
II	Characteristics of Watershed : Delineation, Geomorphological Characteristics,	20	08
III	Linear aspects, Aerial aspects and Relief, Land use, Runoff characteristics	20	08
IV	Hydrological Process in Watershed : Hydrological Cycle, Precipitation, Interception, Infiltration, Evaporation,	20	08
V	Evapotranspiration, Surface Runoff, Ground water-flow, Water budget	20	08

Weightage: I.S.A: 20 + S.E.E: 80 Total= 100.

REFERENCES:

1. Watershed Planning and Management, 2nd Edition, Dr. Rajvir SIngh, Yash Publishing House, Bikaner, India.
2. Watershed Management, V. V. Dhruvanarayana, G. Sastry, U. S. Patnik.
3. Watershed Manual – A Guide for Watershed Development Practitioners and Trainers, B. K. Kakde, BAIF Development Research Foundation, Pune.
4. Soil and Watershed Conversation Engineering, 2nd Edition, R. Suresh – Standard Publication Distributors, Delhi.
5. Soil and Water Conservation Engineering, 4th Edition, G. O. Schwab, etc. John Wiley & Sons.

SEMESTER V

GP:03 Fundamentals of Geoinformatics: Remote Sensing & Photogrammetry

OBJECTIVE:

The cutting edge technology has been introduced to develop student's interest for future studies, applications and research.

UNIT NO.	COURSE CONTENT	MARKS WEIGHTAGE	TEACHING PERIODS
I	Introduction to Remote Sensing, definition, development and recent trends	20	08
II	Quantum Theories, Laws of Radiation, Reflectance, Transmittance and Absorption, Atmospheric Window, Spectral Signatures	20	08

III	Remote Sensing Systems, Sensors and Platforms, ISRO, ESA. NASA missions	20	08
IV	Visual interpretation keys , Applications of Remote Sensing	20	08
V	Introduction to Photogrammetry, Definition, Scale, Accuracy , Relief Displacement and Visual Interpretation	20	08

Weightage: I.S.A: 20 + S.E.E: 80 Total= 100.

REFERENCES:

1. Campbell, J.B. (2002). Introduction to remote sensing, 3rd ed., The Guilford Press. ISBN 1-57230-640-8.
2. Burrough, P.A. and McDonnell, R.A. (1998) Principles of geographical information systems. Oxford University Press, Oxford, 327 pp.
3. Chang, K. (2007) Introduction to Geographic Information System, 4th Edition. McGraw Hill.
4. Curran Paul J Principles of Remote Sensing UK: ELBS,
5. Elangovan,K (2006) GIS: Fundamentals, Applications and Implementations. New India Publishing Agency, New Delhi"208 pp.
6. Jensen, J.R. (2000). *Remote sensing of the environment: an Earth resource perspective*. Prentice Hall. ISBN 0-13-489733-1.
7. Joseph, George Fundamentals of Remote Sensing Universities Press India
8. Lillesand, T.M.; R.W. Kiefer, and J.W. Chipman (2003). Remote sensing and image interpretation, 5th ed., Wiley. ISBN 0-471-15227-7.
9. Muralikrishna V Geographical Information Systems and Remote Sensing Applications Allied Publsihers Private Limited
10. Nag P and Kudrat M Digital Remote sensing New Delhi: Concept Publishing

SEMESTER V
GP:04 Geography and Planning-I

OBJECTIVE:

To understand and evaluate the concept of region in geography, development and its role and relevance in region planning.

UNIT NO.	COURSE CONTENT	MARKS WEIGHTAGE	TEACHING PERIODS
I	Regional concepts in Geography, conceptual and theoretical framework, merits and limitations for application to regional planning and development; changing concept of the region from an inter-disciplinary view-point, concept of space, area and locational attributes.	20	08
II	Types of regions; formal and functional; uniform and nodal, single purpose and composite region, in the context of planning; regional hierarchy; special purpose regions.	20	08
III	Physical regions, resources regions, regional divisions according to	20	08

	variations in levels of socio-economic development; special purpose regions-river valley regions, metropolitan regions, problem regions- hilly regions, tribal regions, regions of drought and floods.		
IV	Approaches to delineation of different types of regions and their utility in planning. Planning process- sectoral, temporal and spatial dimensions; short-term and long term perspectives of planning,	20	08
V	Planning for a region's development and multi-regional planning in a national context. Indicators of development and their data sources, measuring levels of regional development and disparities- case study of India.	20	08

Weightage: I.S.A: 20 + S.E.E: 80 Total= 100.

REFERENCES:

1. Mishra, R.P, Sundaram, K.V., and Prakasarao, V.L.S (1976): Regional Development Planning in India, Vikas Publishers., New Delhi.
2. Chandana, R. C. (2005): Regional Development and Planning. Kalyani Publishers, New Delhi.
3. Chand, M. and Puri V.K. (2004): Regional planning in India; Allied Publishers, New Delhi, reprint.
4. Friedman, J. and Alonse, W. (eds.) (1968): Regional Development and Planning, M.I.T. Press, Cambridge-Massachusetts.
5. Kuklinski, A.R. (ed.) (1975): Regional Development and Planning: International Perspectives, Sijthoff-Leyder.

SEMESTER V
GP:05: Map Analysis & Interpretation Techniques

OBJECTIVE:
To understand and interpret maps and develop a basic logic to correlate the geographic phenomena

UNIT NO.	COURSE CONTENT	MARKS WEIGHTAGE	TEACHING PERIODS
I	Basics of Map, Fundamentals of direction, scale, types, sources	10	08
II	Elementary Geodesy: Coordinate systems and transformations. Spheroid and Geoid. Geocentric Datum, datum and map projections. 3D coordinates transformations	10	08
III	Elements of map reading and Interpretation of Toposheets, Relief features and profiles (serial, superimposed, composite and projected), Reduction and enlargement of maps.	10	08
IV	Thematic Cartography Characteristics of geographical phenomena – Symbolizing Spatial data, Visual Graphics, Cartograms and maps	10	08
V	Introduction to Digital Maps	10	08

Weightage: I.S.A: 10 + S.E.E: 40 Total= 50.

REFERENCES:

1. Monkhouse, F. J. and Wilkinson, F.J. (1985): Maps and Diagrams. Methuen, London
2. Raisz, E. (1962): General Cartography. John Wiley and Sons, New York. 5th edition.
3. Sarkar, A. K. (1997): Practical Geography: A Systematic Approach. Orient Longman, Kolkata.
4. Sharma, J. P. (2001): Prayogik Bhugol., Rastogi Publication, Meerut 3rd. edition.
5. Singh, R.L. and Singh Rana P.B. (1993): Elements of Practical Geography. (Hindi and English editions). Kalyani Publishers, New Delhi,.
6. Singh, L.R (2006): Fundamentals of Practical Geography, Sharda Pustak Bhawan, Allahabad.
7. MacEachren, A.M. (1994). Some Truth with Maps: A Primer on Symbolization & Design. University Park: The Pennsylvania State University

SEMESTER V
GP:06 Basic Statistics

OBJECTIVE:

Imparting the basic knowledge of Practical Statistics to understand the quantitative aspect of geographic phenomena.

UNIT NO.	COURSE CONTENT	MARKS WEIGHTAGE	TEACHING PERIODS
I	Introduction, the concept of spatially related statistics, integrated approach, advantages and disadvantages	10	08
II	Measures of Central Tendency and Dispersion	10	08
III	Time series	10	08
IV	Correlation & Regression	10	08
V	Prediction and interpolation : Spatial Interpolation, Spatial classification, Kriging types and application, prediction and validation, normalization	10	08

Weightage: I.S.A: 10 + S.E.E:40 Total= 50.

REFERENCES:

1 Simon W. Houlding, (2000) Practical Geostatistics: Modeling and Spatial Analysis, Springer, Berlin

2 Ricardo A. Olea (1999) Geostatistics for Engineers and Earth Scientist, Kluwer Academic Publishers, Boston

3 Richard Webstar and Margaret A. Oliver : Geostatistics for Environmental Scientists, Statistics in Practice (2^{nd} ed) J. Wiley

4 Ott, T. and Swiaczny, F. (2001). Time-integrative GIS. Management and analysis of spatio-temporal data. Berlin / Heidelberg / New York: Springer.

5 Thurston, J., Poiker, T.K. and J. Patrick Moore. (2003). Integrated Geospatial Technologies: A Guide to GPS, GIS, and Data Logging. Hoboken, New Jersey: Wiley.

6 Roy, P.S. (2006). Geoinformatics for Tropical Ecosystems Bishen Singh Mahendra Pal Singh, Dehradun

SEMESTER V
GP:07 Introduction to CAD

OBJECTIVE:
The basics Production software helps to understand the map making process.

UNIT NO.	COURSE CONTENT	MARKS WEIGHTAGE	TEACHING PERIODS
I	Introduction to CAD, common commands	10	08
II	Draw toolbars, digitization, layers creations, 2D creations, rendering, shades	10	08
III	DBMS	10	08
IV	Introduction to 3D models	10	08
V	Map making process, Layout making, extensions and plug-ins	10	08

Weightage: I.S.A: 10 + S.E.E:40 Total= 50.

REFERENCES:

1. David Byrnes :AutoCAD 2010 For Dummies, For Dummies (May 11, 2009) ISBN-10: 0470433450 , ISBN-13: 978-0470433454
2. Sham Tickoo :AutoCAD 2010: A Problem Solving Approach, Purdue University Calumet,Autodesk Press, USA,ISBN 13: 978-1-4390-5567-0,ISBN 10: 1-4390-5567-X
3. Beginning Autocad 2010 Exercise Workbook, Industrial Press; 1st edition (May 1, 2009), ISBN-10: 0831134046 , ISBN-13: 978-0831134044

SEMESTER V

GP:08 Practicals in Remote Sensing & Photogrammetry

OBJECTIVE:

The practical session of remote sensing is a hybrid approach. Visual as well as digital interpretation would help student to understand the depth of imagery concepts

UNIT NO.	COURSE CONTENT	MARKS WEIGHTAGE	TEACHING PERIODS
I	Types of images, TCC, FCC,NCC, digital data, Key elements in imagery, ISRO,ESA,NASA images	10	08
II	Visual Interpretation of Satellite images	10	08
III	Digital Data –Formats ,Feature space, Histogram	10	08
IV	Stereoscopic Image Interpretation	10	08
V	Scale, Accuracy, Relief Displacement Calculations	10	08

Weightage: I.S.A: 10 + S.E.E:40 Total= 50.

REFERENCES:

1. Gonzalez, Rafael C.; Richard E. Woods (1992). Digital Image Processing. ISBN 0-201-50803-6.
2. Jensen John R (2007). Introductory Digital Image processing: Remote Sensing Perspective New Jersey: Prentice Hall
3. Joseph, George (2007). Fundamentals of Remote Sensing Universities Press India
4. Lillesand, T.M.; R.W. Kiefer, and J.W. Chipman (2007). Remote sensing and image interpretation, 5th ed., Wiley. ISBN 0-471-15227-7.
5. Pratt, William K. (1978). Digital Image Processing. ISBN 0-471-01888-0.
6. Romeny, Bart M. (2003). Front-End Vision and Multi-Scale Image Analysis. ISBN1-4020-1507-0.
7. Umbaugh, Scott E (2005). Computer Imaging: Digital Image Analysis and Processing. ISBN 0-84-932919-1.
8. Burger, Wilhelm; Mark J. Burge (2007). Digital Image Processing: An Algorithmic Approach Using Java. Springer. ISBN 1846283795.
9. Campbell, J.B. (2002). Introduction to remote sensing, 3rd ed., The Guilford Press. ISBN 1-57230-640-8.
10. Damen MCJ, Sicco Smith G and Kerstappen(Ed) (). Remote Sensing for Resources Development and Environmental Management 3rd.volume Set Netherlands: Balkema

SEMESTER V
GP:09 Computer Cartography

OBJECTIVE:
To understand the digital techniques in map making

UNIT NO.	COURSE CONTENT	MARKS WEIGHTAGE	TEACHING PERIODS
I	Introduction to Computers, Hardware and Softwares	10	08
II	MS Excel: Graphical Representation- Bar diagram, Histogram, Frequency polygon, Frequency curve, Cumulative frequency curve or Ogive	10	08
III	MS Access: database management	10	08
IV	Introduction to Coral Draw Vector Graphics Programme	10	08
V	Introduction to Open Source Softwares	10	08

Weightage: I.S.A: 10 + S.E.E:40 Total= 50.

REFERENCES:

1. Monkhouse, F. J. (1985): Maps and Diagrams. Methuen, London.
2. Raisz, E. (1962): Principles of Cartography, McGraw Hill, New York.
3. Robinson, A. H, Sale. R. D, Morrison, J. L. and Muehrcke, P. C (1984): Elements of Cartography. 5th edition, John Wiley and Sons, Inc. New York.
4. Sarkar, A. K. (1997): Practical Geography: A Systematic Approach. Orient Longman, Kolkata.
5. Sharma, J. P. (2001): Prayogik Bhugol., Rastogi Publication, Meerut 3rd. edition.
6. Singh, R.L. and Singh Rana P.B. (1993): Elements of Practical Geography. (Hindi and English editions). Kalyani Publishers, New Delhi.
7. www.vectorials.com/
8. www.corel.com/
9. office.microsoft.com/en.../training-FX101782702.aspx

SEMESTER VI
GP :01 Environnemental Geomorphology

OBJECTIVE:

To obtain the knowledge on environmental facets of geomorphology, their currents issues and understand the evaluation techniques.

UNIT NO.	COURSE CONTENT	MARKS WEIGHTAGE	TEACHING PERIODS
I	Nature and scope of Environmental geomorphology, Dynamic Equilibrium	20	08
II	Weathering and Erosion	20	08
III	Urbanization and Land degradation, Desertification , Urban effects on Landslides and River Networks, Glacier Receding,	20	08
IV	Evaluation and Development of River valleys: Dams and Canal constructions	20	08
V	Geomorphic Environmental Issue Assessment	20	08

Weightage: I.S.A: 20 + S.E.E:80 Total= 100.

REFERENCES:

1. Mario Panizza: Environmental geomorphology, Elsevier, 1996, ISBN 0444898301, 9780444898302
2. Mauro Marchetti, Victoria Rivas:Geomorphology and environmental impact assessment, Taylor & Francis, 2001, ISBN 9058093441, 9789058093448
3. Robert J. Allison:Applied geomorphology: theory and practice, John Wiley and Sons, 2002, ISBN0471895555, 9780471895558
4. Singh S. (2004): Geomorphology, Prayag Pustak Bhawan, Allahabad
5. B.W.(1969) : Geomorphology. Longman, London.

SEMESTER VI
GP:02 Principles and Techniques of Watershed Management-II

OBJECTIVE:

The primary objective of this course is to develop a process-based understanding of soil and watershed, land capability and application of RS in watershed management.

UNIT	COURSE CONTENT	MARKS	TEACHING

NO.		WEIGHTAGE	PERIODS
I	Soils in a Watershed: - Soil characteristics- Physical, Hydrological - Processes of soil erosion- Erosion due to water and wind,	20	08
II	Measurement and Estimation of soil erosion – Universal Soil Loss Equation.	20	08
III	Correlation Characteristics	20	08
IV	Land Capability Classification : Criteria, methods & Need	20	08
V	Application of RS in Watershed Management	20	08

Weightage: I.S.A: 20 + S.E.E:80 Total= 100.

REFERENCES:

1. Watershed Manual – A Guide for Watershed Development Practitioners and Trainers, B. K. Kakde, BAIF Development Research Foundation, Pune.
2. Soil and Watershed Conversation Engineering, 2nd Edition, R. Suresh – Standard Publication Distributors, Delhi.
3. Soil and Water Conservation Engineering, 4th Edition, G. O. Schwab, etc. John Wiley & Sons.
4. Integrated Watershed Management: A Field Manual for Equitable, Productive and SustainableDevelopment. Rajesh Rajora. Rawat Publicatios, Jaipur.

SEMESTER VI
GP:03 Fundamentals of Geoinformatics: GIS & GPS

OBJECTIVE:

To introduce the student this state of the art vibrant mode of technology used in Geography

UNIT NO.	COURSE CONTENT	MARKS WEIGHTAGE	TEACHING PERIODS
I	Introduction to GIS and History and development, Components and Applications trends of GIS	20	08

II	Data type, structure, Spatial and attribute, point, line, polygon- arc, nodes, vertices, and typology. Attribute data, sources and types	20	08
III	Introduction to DBMS	20	08
IV	Introduction to GPS, History of Positioning System GPS System Description, Error Sources & Receiver	20	08
V	Introduction to open source GIS	20	08

Weightage: I.S.A: 20 + S.E.E:80 Total= 100.

REFERENCES:

11. Campbell, J.B. (2002). Introduction to remote sensing, 3rd ed., The Guilford Press. ISBN 1-57230-640-8.
12. Burrough, P.A. and McDonnell, R.A. (1998) Principles of geographical information systems. Oxford University Press, Oxford, 327 pp.
13. Chang, K. (2007) Introduction to Geographic Information System, 4th Edition. McGraw Hill.
14. Curran Paul J Principles of Remote Sensing UK: ELBS,
15. Elangovan,K (2006) GIS: Fundamentals, Applications and Implementations. New India Publishing Agency, New Delhi"208 pp.
16. Jensen, J.R. (2000). *Remote sensing of the environment: an Earth resource perspective*. Prentice Hall. ISBN 0-13-489733-1.
17. Joseph, George Fundamentals of Remote Sensing Universities Press India
18. Lillesand, T.M.; R.W. Kiefer, and J.W. Chipman (2003). Remote sensing and image interpretation, 5th ed., Wiley. ISBN 0-471-15227-7.
19. Muralikrishna V Geographical Information Systems and Remote Sensing Applications Allied Publsihers Private Limited

SEMESTER VI
GP:04 Geography and Planning-II

OBJECTIVE:

To identify the issues relating to the development of the region through the process of spatial organization of various attributes and their inter relationship.

UNIT NO.	COURSE CONTENT	MARKS WEIGHTAGE	TEACHING PERIODS
I	Regional Development strategies- concentration vs dispersal	20	08
II	Case studies for plans of developed and developing countries, Regional Plans of India	20	08
III	Concepts of Multi-level planning, decentralized planning, peoples participation in the planning process; Panchayati Raj system; role and relationship of PanchayatiRaj institutions (Village Panchayat, Panchayat	20	08

	Samithi and Zila Parishad) and administrative structure (Village, Block and District)		
IV	Regional Development in India-Problems and Prospects.	20	08
V	Application of RS in geography and planning	20	08

Weightage: I.S.A: 20 + S.E.E:80 Total= 100.

REFERENCES:

1. Sundaram, K.V. (1977): Urban and Regional Planning in India, Vikas Publishers. New Delhi.
2. Sundaram, K.V. (1997): Decentralized Multilevel Planning: Principles and Practice. Asian and African Experience. Concept Publishing Company, New Delhi
3. Bhat, L.S.(1972): Regional Planning in India, Indian Statistical Institute, Calcutta.
4. Sharma, P.R., (ed.) (1993): Regional Policies and Development in the Third World. Rishi Publication., Varanasi.

SEMESTER VI

GP:05 Advanced Statistics

OBJECTIVE:

To understand the advanced techniques used to understand and evaluate geographic phenomena.

UNIT NO.	COURSE CONTENT	MARKS WEIGHTAGE	TEACHING PERIODS
I	Spatial Processes: Covariance, Variogram and Semivariogram	10	08
II	Modeling Variogram, Experimental variogram and Nested sampling	10	08
III	Predictive models, Latent Variable Models	10	08
IV	Introduction to open source Statistical softwares: SAS	10	08
V	Introduction to open source Statistical softwares: SPSS	10	08

Weightage: I.S.A: 10 + S.E.E:40 Total= 50.

REFERENCES:

1. Simon W. Houlding, (2000) Practical Geostatistics: Modeling and Spatial Analysis, Springer, Berlin
2. Ricardo A. Olea (1999) Geostatistics for Engineers and Earth Scientist, Kluwer Academic Publishers, Boston

3. Richard Webstar and Margaret A. Oliver : Geostatistics for Environmental Scientists, Statistics in Practice (2nd ed) J. Wiley
4. Ott, T. and Swiaczny, F. (2001). Time-integrative GIS. Management and analysis of spatio-temporal data. Berlin / Heidelberg / New York: Springer.
5. Thurston, J., Poiker, T.K. and J. Patrick Moore. (2003). Integrated Geospatial Technologies: A Guide to GPS, GIS, and Data Logging. Hoboken, New Jersey: Wiley.
6. Roy, P.S. (2006). Geoinformatics for Tropical Ecosystems Bishen Singh Mahendra Pal Singh, Dehradun

SEMESTER VI
GP:06 Practicals in Surveying

OBJECTIVE:

Understanding the traditional as well as modern surveying methods

UNIT NO.	COURSE CONTENT	MARKS WEIGHTAGE	TEACHING PERIODS
I	Surveying: Total Station	10	08
II	Dumpy Level Surveying: Leveling	10	08
III	GPS Survey	10	08
IV	Incorporating Survey in Computers	10	08
V	Field Survey and Report writing	10	08

Weightage: I.S.A: 10 + S.E.E:40 Total= 50.

REFERENCES:

1. Khan,M.Z.A (1998) Text Book of Practical Geography. Concept Publishing House, New Delhi
2. Misra, R.P and A. Ramesh (2002) Fundamentals Cartography. Concept Publishing House, New Delhi.
3. Sharma, J.P (2008) Prayogik Bhoogol. Rastogi Publications, Meerut.
4. Singh,L.R(2008) Fundamentals of PracticalGeography. Sharda Pustak Bhawan, Allahabad.
5. Singh, G (2005) Mapwork and Practical Geography. Vikas Publishing House, New Delhi.
6. Singh, R.L. and R.B.P. Singh(1999) Elements of Practical Geography.

Kalyani Publishers, New Delhi.
7. Shukla, R.S (2008) Prayothmak Bhoogol. Sharda Pustak Bhawan,Allahabad.
8. Tiwari,R.C evam Tripati, S (2007) Abhinav Prayothmak Bhoogol. Prayag Pustak Bhawan, Allahabad.

SEMESTER VI
GP:07 Practicals in GIS

OBJECTIVE:
To gain the command on GIS Softwares

UNIT NO.	COURSE CONTENT	MARKS WEIGHTAGE	TEACHING PERIODS
I	Map Interface and basic terminology	10	08
II	Raster and Vector	10	08
III	Open source GIS: Mapwindow GIS	10	08
IV	Open source GIS: GRASS	10	08
V	Open source GIS: QGIS	10	08

Weightage: I.S.A: 10 + S.E.E:40 Total=50.

REFERENCES:

1. Chang, K. (2007) Introduction to Geographic Information System, 4th Edition. McGraw Hill.
2. www.mapwindow.org/
3. opensourcegis.org/
4. grass.fbk.eu/
5. www.qgis.org/

SEMESTER VI
GP:08 C Programming

OBJECTIVE:
Programming is subjected to impart and develop the logical thinking behind the geographic process. C programming; being a base to all the programming language will help student to cope up with the object oriented programming required in applied geographic sectors.

UNIT NO.	COURSE CONTENT	MARKS WEIGHTAGE	TEACHING PERIODS
I	Introduction to Programming, History , Development and Latest trends in C	10	08
II	Getting started, variables, arrays , libraries, control structures	10	08
III	Structures and functions	10	08
IV	Graphics	10	08
V	Pilot Project	10	08

Weightage: I.S.A: 10 + S.E.E:40 Total= 50.

REFERENCES:

1. Brian W. Kernighan and Dennis M. Ritchie :C Programming Language :Prentice Hall; 2 edition (April 1, 1988)
2. Yashwant kanitkar:Let us C , BPB Publications (2008) 9th edition
3. Greg M. Perry: Absolute Beginner's Guide to C ,Sams; 2 edition (April 18, 1994) ISBN-10: 0672305100 , ISBN-13: 978-0672305108
4. Steve Oualline :Practical C Programming, O'Reilly Media; Third Edition edition (August 1, 1997) 3rd Edition

SEMESTER VI
GP:09 Project Work

Weightage: Project Report: 50 + Presentation: 50 Total= 100.