

**SRI VENKATESWARA UNIVERSITY::TIRUPATI**  
**S.V.U.COLLEGE OF SCIENCES**  
**DEPARTMENT OF GEOGRAPHY**

(Syllabus common for SV University College and affiliated by SVU Area)  
( Revised Scheme of Instruction and Examination, Syllabus etc., with effect from the  
Academic Years 2016-17 for I and II Semesters and 2017-18 for III and IV Semesters )

**M.Sc. GEOGRAPHY**  
**SCHEME OF INSTRUCTION AND EXAMINATION**  
**Semester – I**

SI. No	Course Code	Components of Study	Title of the Paper	Contact hours	No. of Credits	IA Marks	End SEM Exam Marks	Total
1	GEG -101	Core-Theory	Geomorphology	6	4	20	80	100
2	GEG -102	Core-Theory	Economic Resource Studies	6	4	20	80	100
3	GEG -103	Core-Practical	Maps, Scales and Map Projections	6	4	-	-	100
4	GEG -104	Core-Practical	Terrain Mapping Techniques	6	4	-	-	100
5	GEG -105	Compulsory Foundation (Related to Subject)	Advanced Cartography	6	4	20	80	100
6	GEG -106	Elective Foundation	Human Values and Professional Ethics- I	6	4	20	80	100
		<b>Total</b>		<b>36</b>	<b>24</b>			<b>600</b>

**Semester – II**

SI. No	Course Code	Components of Study	Title of the Paper	Contact hours	No. of Credits	IA Marks	End SEM Exam Marks	Total
1	GEG -201	Core-Theory	Climatology and Oceanography	6	4	20	80	100
2	GEG -202	Core-Theory	Principles of Remote Sensing	6	4	20	80	100
3	GEG -203	Core-Practical	Interpretation of Topographical (S.O.I., U.S and O.S) and Weather Maps	6	4	-	-	100
4	GEG -204	Core-Practical	Techniques of Mapping and Map Analysis	6	4	-	-	100
5	GEG -205	Compulsory Foundation (Related to Subject)	Geographical Thought	6	4	20	80	100
6	GEG -206	Elective Foundation	Human Values and Professional Ethics- II	6	4	20	80	100
		<b>Total</b>		<b>36</b>	<b>24</b>			<b>600</b>

NOTE:Practicals: Practical Exam : 80 Marks  
Record : 20 Marks

### Semester – III

Sl. No	Course Code	Components of Study	Title of the Paper	Contact hours	No of Credits	IA Marks	End sem Exam Marks	Total
1	GEG -301	Core-Theory	Urban Studies	6	4	20	80	100
2	GEG -302	Core-Theory	Geographical Information System (GIS)	6	4	20	80	100
3	GEG -303	Core-Practical	Geographical Information System (GIS)	6	4	-	-	100
4	GEG -304	Core-Practical	Statistical Techniques	6	4	-	-	100
5	GEG -305	Generic Elective * (Related to Subject)	(a) Agricultural Studies (b) Regional Geography of India with special Reference to Andhra Pradesh (c) Disaster Management Studies	6 6	4 4	20 20	80 80	100 100
6	GEG -306	Open Elective * (For other departments)	(a) Regional Geography of Andhra Pradesh (b) Geographical Information System (GIS) & Global Positioning System (GPS) and Applications	6	4	20	80	100
		Total		36	24			600

### Semester – IV

1	GEG -401	Core-Theory	Regional Planning	6	4	20	80	100
2	GEG -402	Core-Theory	Advanced Remote Sensing	6	4	20	80	100
3	GEG -403	Core-Practical	Research Techniques	6	4	-	-	100
4	GEG -404	Core-Practical	Remote Sensing Applications	6	4	-	-	100
5	GEG -405	Generic Elective * (Related to Subject)	(a) Water and Soil Resources Management (b) Environmental Studies (c) Geography for Research Extension (Society) and Industry	6 6	4 4	20 20	80 80	100 100
6	GEG -406	Open Elective * (For other departments)	(a) Regional Geography of India (b) Remote Sensing Principles and Applications	6	4	20	80	100
		Total		36	24			600

\* Among the Generic Electives a student shall choose two

NOTE: Practicals: Practical Exam : 80 Marks  
Record : 20 Marks

**SEMESTER – I**  
**CORE - THEORY**  
**GEG 101: GEOMORPHOLOGY**

**Unit I:** Nature, Definition, Scope and recent trends in Geomorphology: Rocks – Origin, Classification and distribution, Interior of the Earth. Geological time-scale.

**Unit II:** Earth movements: Epierogenic and Orogenic earth movements. Theories of continental drift, Isostasy and plate tectonics. Earthquakes, volcanoes and their distribution.

**Unit III:** Geomorphic agents and Processes: Weathering, Erosion, Mass wasting. Concept of cycle of erosion, Davis and Penck concepts in the evolution of Landforms.

**Unit IV :** Geomorphic Processes: Erosional and depositional landforms made by a) rivers, b) Glaciers, c) wind, d) underground water, e) waves & currents.

**Suggested Readings:**

1. Dayal, P. : A Text book of Geomorphology. Shukla Book depot, Patna, 1996.
2. Monkhouse, F.J.: Principles of Physical Geography, Hodder and Stoughton, London, 1960.
3. Sparks, B.W.: Geomorphology, Longmans, London, 1960.
4. Strahler, A.N. and Strahler, A.H. : Modern Physical Geography : John Wiley & Sons, Revised edition 1992.
5. Thornbury, W.D.: Principles of Geomorphology, Wiley Eastern, 1969.
6. Wooldridge, S.W. and Morgan, R.S. : The Physical Basis Geography – An outline of Geomorphology, Longman Green & Co, London, 1959.

**CORE - THEORY**  
**GEG 102: ECONOMIC RESOURCE STUDIES**

**Unit I** Scope, content and recent trends in economic geography, relation of economic geography with economics and other branches of social sciences, classification of economies; sectors of economy (Primary, secondary and tertiary).

**Unit II** Natural resources: Nature and classification – renewable and non-renewable, biotic and abiotic, conservation of resources, changing nature of economic activities; mining, forestry, agriculture, industry, trade and transport.

**Unit III** Agricultural Resources: Spatial distribution of major food and cash crops of the world (rice, wheat, coffee, tea). Minerals resources: Classification of minerals (ferrous and non-ferrous). Major industries: Iron and Steel, Textiles, ship-building and their distribution.

**Unit IV** Industrial location theory – Alfred Weber: Geographical factors in the development of major industries.

**Suggested Readings**

1. Boesch, H. : A Geography of World Economy, D. Van Nostrand Co., New York, 1964.
2. Chapman, J.D. : Geography and Energy, Longman, London, 1989.
3. Gregor, H.F. : Geography of Agriculture, Prentice Hall, New Jersey, USA, 1970.
4. Griggs, D.B. : The Agricultural Systems of the World, Cambridge University Press, New York, 1974.
5. Hartshome, T.N. and Alexander, J.W. : Economic Geography, Prentice Hall, New Delhi, 1988.
6. Jones, C.F. and Darkenwald, G.G. : Economic Geography, McMilan Co., New York, 1975.
7. Millar E.: Geography of Manufacturing, Prentice Hall, New York, 1962.
8. Raza, M. and Agrawal, Y. : Transport Geography of India, Concept, New Delhi, 1986.
9. Smith, D.M. : Industrial Location – An Economic Geographical Analysis, John Willey, New York, 1971.
10. Thomas, R.S. : The Geography of Economic Activities, McGraw Hill, New York, 1962.

## **CORE - PRACTICALS**

### **GEG 103: MAPS, SCALES AND MAP PROJECTIONS**

**Unit I:** Maps, Scales, Projections: Meaning, Definitions' and uses; Methods of Scale Representation and Conversions.

**Unit II:** Zenithal Projections: Equi-distant; Equal area, Stereographics, Gnomonic.

**Unit III:** Cylindrical Projections: Equi-distant, Equal area, Mercator.

**Unit IV:** Conical Projections: One standard parallel, two standard parallel; Bonne's, polyconic.

**Unit V:** International map projection: Sinusoidal, interrupted. Sinusoidal - Molweides; Interrupted – molweides projections.

#### **Suggested Readings:**

1. Khan, Z.A. : Text book of practical geography : concept; New Delhi, 1998.
2. Misra, R.P. and Ramesh, A. : Fundamentals of Cartography, Concept, New Delhi, 1989.
3. Singh, R.L. : Map work and practical geography; central book depot; Allahabad, 1972.
4. Steers, J.A. : Map projections, University of London Press, London.

## **CORE - PRACTICALS**

### **GEG 104: TERRAIN MAPPING TECHNIQUES**

**Unit I** Interpolation of contours.

**Unit II** Landforms represented by contours.

**Unit III** Profiles: Serial, Superimposed, Projected, Composite.

**Unit IV** Slope Analysis : Smith's and Wentworth's Methods.

#### **Suggested Readings:**

1. Misra, R.P. and Ramesh, A. : Fundamentals of Cartography, concept, New Delhi, 1989.
2. Monkhouse, F.J.H.R. and Wilkinson : Maps and diagrams; Methuen and Co., London, 1984.
3. Peter Toyne & Peter Newby, T. : Techniques in human geography; MacMillan, London, 1972.

## **Compulsory Foundation Course (Related to Subject)**

### **GEG 105: ADVANCED CARTOGRAPHY**

**Unit I** Cartography – definition. Cartography is a science of human communication; Scales – Methods of representation & conversions; Map projections – classification and choice of projections. Merits and demerits of cylindrical, conical, zenithal and conventional projections.

**Unit II** Semiology – Kinds of symbols – Mapping qualitative and quantitative point, Line and Area symbols. Types of maps and their uses. Topographical maps: Elements of topographical maps, scales and numbering of Toposheets.

**Unit III** Map design and layout – Theory of visual perception – constraints and Restrictions in map design. Lettering and Toponymy. Mechanics of map construction: Drawing surfaces – Drawing Equipment.

**Unit IV** Mapping the qualitative and quantitative data. Thematic mapping; concept of map base, map compilations & generalizations. Concepts of Geographical Information System (GIS).

#### **Suggested Readings:**

1. Khan, Z.A. : Text book of practical geography, concept, New Delhi, 1998.
2. Monkhouse, F.J. & Wilkinson, H.R. : Maps and Diagrams, Methuen, London, 1994.
3. Steers, J.A. : Map Projections, University of London Press, London.
4. Burrough, P.A. : Principles of geographic information systems for land resource assessment, Oxford University Press, New York, 1986.
5. Fraser Taylor D.R. : Geographic Information Systems, Pergaman Press, Oxford, 1991.

6. Star J and J. Estes : Geographic information systems. An introduction, Prentice Hall, Englewood Cliff, New Jersey, 1994.
7. Misra, R.P. and Rames, A.: Fundamentals of Cartography, Mcmillan Co., New Delhi, 1986.
8. Robinson, A.H. et al.: Elements of Cartography, John Wiley & Sons, U.S.A., 1995.
9. Sarkar, A.K., Practical Geography : A systematic approach; Oriental Longman, Calcutta, 1997.
10. Singh, R.L. and Dutt, P.K. Elements of Practical Geography, Kalyani publishers, New Delhi, 1979.

### **Elective Foundation Course**

### **Geo 106: HUMAN VALUES AND PROFESSIONAL ETHICS – I**

**Unit I** Definition and Nature of Ethics – its relation to Religion, Politics, Business, Law, Medicine and Environment. Need and Importance of Professional Ethics-Goals – Ethical Values in various Professions.

**Unit II** Nature of Values-Good and Bad, Ends and Means, Actual and potential Values, Objective and Subjective Values, Analysis of basic moral concepts- right, ought, duty, obligation, justice, responsibility and freedom, Good behavior and respect for elders, Character and Conduct.

**Unit III** Individual and society: Ahimsa (Non-Violence), Satya (Truth), Brahmacharya (Celibacy), Asteya (Non Possession) and Aparigraha (Non-stealing). Purusharthas (Cardinal virtues)- Dharma (Righteousness), Artha (Wealth), Kama (Fulfillment Bodily Desires), Moksha (Liberation).

**Unit IV** Bhagavad Gita – (a) Niskama karma. (b) Buddhism – The Four Noble Truths – Arya astanga marga, (c) Jainism – Mahavratas and anuvratas. Values Embedded in Various Religions, Religious Tolerance, Gandhian Ethics.

**Unit V** Crime and Theories of punishment – (a) Reformatory, Retributive and Deterrent. (b) Views on Manu and Yajnavalkya.

#### **Books for Study:**

1. John S Mackenzie: A Manual of ethics.
2. "The Ethics of Management": by Larue Tone Hosmer, Richard D. Irwin Inc.
3. "Management Ethics – integrity at work" by Joseph A. Petrick and John F. Quinn, Response Books: New Delhi.
4. "Ethics in Management" by S.A. Sherlekar, Himalaya Publishing House.
5. Harold H. Titus: Ethics for Today.
6. Maitra, S.K: Hindu Ethics.
7. William Lilly: Introduction to Ethics.
8. Sinha: a Manual of Ethics.
9. Manu: Manu Dharma Sastra or the institute of Manu: Comprising the Indian system of Duties: Religious and Civil(ed) G.C. Haughton.
10. Susruta Samhita: Tr. Kaviraj Kunjanlal, Kunjanlal Brishagratha, Chowkamba Sanskrit Series.
11. Vol. I,II,III, Varanasi VOL. I OO, 16-20, 21-32, and 74-77 only.
12. Caraka Samita: Tr. Dr. Ram Karan Sharma and Vaidya Bhagavan Dash, Chowkamba Sanskrit Series Office, Varanasi. I,II,III VOL. I, PP 183-191.
13. Ethics, Theory and Contemporary issues, Barbara Mackinnon, Wads Worth/Thomson Learning 2001.
14. Analyzing Moral issues, Judith A. Boss, Mayfield Publishing Company, 1999.
15. An Introduction to Applied Ethics (Ed.) John H. Piet and Ayodhya Prasad, Cosmo Publications.
16. Text book for Intermediate logic, Ethics and Human Values, Board of Intermediate Education & Telugu Academic Hyderabad.
17. I.C Sharma Ethical Philosophy of India. Nagin & Co. Julundhar.

**SEMESTER-II**  
**CORE - THEORY**  
**GEG 201: CLIMATOLOGY AND OCEANOGRAPHY**

**Unit I** Nature and scope of climatology. Composition and structure of the Atmosphere – Insolation – heat balance, green house effect – vertical and horizontal distribution of Temperature.

**Unit II** Atmospheric Pressure – Pressure gradient – Pressure belts – vertical and Horizontal distribution of pressure – winds – monsoons and cyclones.

**Unit III** Water vapour- Humidity – Relative, absolute and specific humidity – condensation and types – cloud types – types of Rainfall – Koppen’s and Thornthwaites scheme of climatic classification.

**Unit IV** Nature and scope of Oceanography –Distribution of Land and water. General features of Bathymetry. Ocean currents: Atlantic, Pacific and Indian Ocean: Salinity; Ocean deposits and coral reefs.

**Suggested Readings**

1. Crittch Field, J.H. : General Chimatology, Prentice Hall, India, New Delhi, 1993.
2. Lal, D.S. : Climatology, Chaitanya Publishing House, Allahabad, 1986.
3. Garrison, T. : Oceanography – An introduction to Marine Science. Books / Cole, Pacific Groue, USA, 2001.
4. Sharma & Vatal : Oceanography for Geographers Chaitanya Publishing House, Allahabad.
5. Lal.D.S. Oceanography, chaitanya Publishing House, Allahabad,1994

**CORE - THEORY**  
**GEG 202: PRINCIPLES OF REMOTE SENSING**

**Unit I** Introduction to Remote Sensing: History and concepts; Energy sources and Radiation principles– Energy Interactions in the Atmosphere; Electromagnetic spectrum, Atmospheric windows. Energy interactions with Earth surface features; spectral reflectance patterns of earth surface features in different wavelengths.

**Unit II** Aerial Remote Sensing: History and types of photographs, scales of aerial photographs; scale distortions, photographic resolution. Aerial photo interpretation techniques – Photo recognition Elements, photo interpretation equipment.

**Unit III** Satellite Remote Sensing: Different Satellites; Remote sensing platforms. Resolutions: spectral, Spatial, Temporal and Radiometric resolutions of Satellites. Sensors: Scanning mechanism and orbiting mechanism. Characteristics of IRS.

**Unit IV** Principles of Image Interpretation: Elements of Image Interpretation, Visual Interpretation Techniques. Marginal information and decoding. Advantages of Remote Sensing over conventional Surveys. Development of Remote Sensing in India. Thrust areas of Remote Sensing.

**Suggested Readings:**

1. American Society of Photogrammetry : Manual of Remote Sensing, ASP, Falls Church, V.A. 1983.
2. Barrett, E.C. and L.F. Curtis : Fundamentals of Remote Sensing and Air Photo Interpretation, Mcmillan, New York, 1992.
3. Campbell, J. : Introduction of Remote Sensing, Guilford, New York, 1989.
4. Curran, Paul, J. : Principles of Remote Sensing, Longman, London, 1985.
5. Leuder D. : Aerial Photographic Interpretation: Principles and Application, McGraw Hill, New York, 1959.

- Rao D.P. (eds.) : Remote Sensing for Earth Resources, Association of Exploration Geophysicist, Hyderabad, 1998.
- Thomas M. Lillesand and Ralph W. Kefer, Remote Sensing and Image Interpretation. John Wiley & Sons, New York, 1994.

### **CORE - PRACTICALS**

#### **GEG 203: INTERPRETATION OF TOPOGRAPHICAL (S.O.I., U.S and O.S) AND WEATHER MAPS**

**Unit I** Elements of Indian Topographical Maps – Scales – Layout and Numbering of Toposheets.

**Unit II** Interpretation of physical features of different terrains (SOI Maps).

**Unit III** Interpretation of cultural features (SOI Maps).

**Unit IV** Interpretation of U.S. and O.S. Toposheets.

**Unit V** Interpretation of Weather maps (India) : elements and interpretation.

#### **Suggested Readings:**

- John Bygott : An introduction to map work and practical geography, University Tutorial Press Ltd., London, 1974.
- Mishra, R.P. and Ramesh, A. : Fundamentals of Cartography, Concept, New Delhi, 1989.
- Singh, R.L.: Map work and practical geography, control Book depot, Allahabad, 1972.

### **CORE - PRACTICALS**

#### **GEG 204: TECHNIQUES OF MAPPING AND MAP ANALYSIS**

**Unit I** : Bar Diagrams : Simple, Compound, Superimposed.

**Unit II** : Graphs : Trilinear, Semi-log; Log-log.

**Unit III:** Diagrams : Pyramid, Pie.

**Unit IV:** Hyther-graph, Climograph, Ergo-graph, Band-graph.

**Unit V** : Thematic mapping : Dot method, isopleths and iso-chromatic methods; choropleth and choro-chromatic methods; flow method.

#### **Suggested Readings**

- John Bygott: An introduction to map work and practical geography; University Tutorial Press Ltd. London, 1974.
- Monk House, F.J.H.R. and Wilkinson : Maps and Diagrams; Methuen and Co., London, 1984.
- Peter Toyne and Peter Newby, T. : Techniques in Human geography; Macmillan, London, 1972.

### **Compulsory Foundation Course (Related to Subject)**

#### **GEG 205: GEOGRAPHICAL THOUGHT**

**Unit I** Ancient Geography – Contributions of Greeks and Romans, Medieval Geography – contributions of Arab Geographers, Modern Geography – Contribution of Immanuel Kant, Alexander Von Humboldt and Carl Ritter.

**Unit II** Contributions of German Geographers : Friedrich Ratzel, Ferdinand Von Ritschthofen, Albrecht Penck and Alfred Hettner and French geographers: Vidal de la blasche, Elisee Reclus, Jean Brunhe and Emmanuel de Martonne.

**Unit III** Dualism in Geography - Systematic and regional Geography. Determinism and possibilism; Geography as a natural science and social science.

**Unit IV** Quantitative revolution – causes and consequences. Behavioural geography. Laws, Theories and Models in Geography.

#### **Suggested Readings:**

- Dikshit, R.D. (ed.) : The Art & Science of Geography – Integrated Readings, Prentice Hall of India, New Delhi, 1994.

2. Hartshome, R. : Perspective on nature of Geography, Rand McNally & Co., 1959.
3. Husain, M. : Evolution of Geographic thought, Rawat Pub., Jaipur, 1984.
4. Minshull, R. : The Changing nature of Geography, Hutchinson University Library, London, 1970.

**Elective Foundation Course**  
**Geo 206: HUMAN VALUES AND PROFESSIONAL ETHICS – II**

**Unit I** Value Education –Definition – relevance to present day – Concept of Human Values – Self introduction – Self esteem. Family Values – Components, structure and responsibilities of family Neutralization of anger – Adjustability – Threats of family life – Status of women in family and society – Caring for needy and elderly – Time allotment for sharing ideas and concerns.

**Unit II** Medical ethics- views of Charaka, Sushruta and Hippocrates on moral responsibility of medical practitioners. Code of ethics for medical and healthcare professionals. Euthanasia, Ethical obligation to animals, Ethical issues in relation to health care professionals and patients. Social justice in health care, human cloning, problems of abortion. Ethical issues in genetic engineering and Ethical issues raised by new biological technology or knowledge.

**Unit III** Business ethics- Ethical standards of business-Immoral and illegal practices and their solutions, Characteristics of ethical problems in management, ethical theories, causes of unethical behavior, ethical abuses and work ethics.

**Unit IV** Environmental ethics- Ethical theory, man and nature – Ecological crisis, Pest control, Pollution and waste, Climate change, Energy and population, Justice and environmental health.

**Unit V** Socioethics- Organ trade, Human trafficking, Human rights violation and social disparities Feminist ethic, surrogacy/pregnancy. Ethics of media- Impact of Newspapers, Television Movies and Internet.

**Books for Study:**

1. John S Mackenzie: A Manual of ethics.
2. “The Ethics of Management”: by Larue Tone Hosmer, Richard D. Irwin Inc.
3. “Management Ethics – integrity at work” by Joseph A. Petrick and John F. Quinn, Response Books: New Delhi.
4. “Ethics in Management” by S.A. Sherlekar, Himalaya Publishing House.
5. Harold H. Titus: Ethics for Today.
6. Maitra, S.K: Hindu Ethics.
7. William Lilly: Introduction to Ethics.
8. Sinha: a Manual of Ethics.
9. Manu: Manu Dharma Sastra or the institute of Manu: Comprising the Indian system of Duties: Religious and Civil(ed) G.C. Haughton.
10. Susruta Samhita: Tr. Kaviraj Kunjanlal, Kunjanlal Brishagratha, Chowkamba Sanskrit Series.
11. Vol. I,II,III, Varanasi VOL. I OO, 16-20, 21-32, and 74-77 only.
12. Caraka Samita: Tr. Dr. Ram Karan Sharma and Vaidya Bhagavan Dash, Chowkamba Sanskrit Series Office, Varanasi. I,II,III VOL. I, PP 183-191.
13. Ethics, Theory and Contemporary issues, Barbara Mackinnon, Wads Worth/Thomson Learning 2001.
14. Analyzing Moral issues, Judith A. Boss, Mayfield Publishing Company ,1999.
15. An Introduction to Applied Ethics (Ed.) John H. piet and Ayodhya Prasad, Cosmo Publications.
16. Text book for Intermediate logic, Ethics and Human Values, Board of Intermediate Education & Telugu Academic Hyderabad.
17. I.C Sharma Ethical Philosophy of India. Nagin& Co. Julundhar.



**SEMESTER-III**  
**CORE - THEORY**  
**GEG 301: URBAN STUDIES**

**Unit I** Nature and scope of urban studies; Definitions of urban settlements; census; definition of urban population; Metropolis; Megalopolis and Conurbation, The concept of Smart Cities.

**Unit II** Origin and evolution of cities : The origin of early cities; Impact of the Industrial revolution, current factors behind urban growth, location, spacing and size of urban settlements.

**Unit III** Urban Hierarchy, Rank – size relationship, Nearest Neighbour analysis – classification of towns with special reference to functional classification. Theories of urban structure and growth.

**Unit IV** Rural – urban relationships, the concept of city – region; pattern of world urbanization with special reference to India, urban decay, urban renewal.

**Suggested Readings**

1. Johnson, J.H., Urban Geography. An Introductory Analysis, Pergamon Press, Oxford, 1967.
2. Murphy, R. : The American City : an Urban Geography McGraw Hill, 1966.
3. Dickinson, R.E. : City and Region, Routledge and Kegan, Paul Ltd., London, 1964.
4. Mayer and Cohen : Readings in Urban Geography, Central Book Depot., Allahabad.

**CORE - THEORY**  
**GEG 302: GEOGRAPHICAL INFORMATION SYSTEM (GIS)**

**Unit I GIS:** Definitions and Development – Computer Components of GIS (Hardware and Software) – General Data Base concepts of Spatial and Non-spatial data - Elements of Spatial data - Sources of Spatial data – Data quality for GIS – Errors and Error variations in GIS.

**Unit II GIS** Data Management: Data Base Management Systems (DBMS) Data Base Models. Data input methods – Spatial Data structures: Raster data and Vector data – Structures – GIS Data Analysis: Spatial measurement methods Reclassification – Buffering – Overlay Analysis.

**Unit III** Modelling Surfaces: Generation of DEM, DTM and TIN models – Spatial Interpolation – GIS output generation – Integration of Remote Sensing and GIS Principles of Global Positioning System (GPS).

**Unit IV** GIS applications: GIS as a Decision Support System – GIS as a Land Information System – GIS as a Disaster Management and Emergency Response System - Resource management applications - Facility Management application – Urban Management application.

**Suggested Readings:**

1. Aronoff S. Geographic Information System : A Management Perspective, DDL Publication, Ottawa. 1989.
2. Burrough P.A. Principles of Geographic Information Systems for Land Resource Assessment. Oxford University Press, New York, 1986.
3. Fraser Taylor D.R. Geographic Information System. Pergamon Press, Oxford, 1991.
4. Maquire D. J.M.F. Goodchild and D.W. Rhind (eds.) Geographic Information Systems : Principles and Application. Taylor & Francis, Washington, 1991.
5. Mark S. Monmonier. Computer – assisted Cartography. Prentice – Hall, Englewood Cliff, New Jersey, 1982.
6. Peuquet D.J. and D.F. Marble, Introductory Reading in Geographic Information Systems. Taylor & Francis, Washington, 1990.
7. Star J. and J. Estes. Geographic Information Systems : An Introduction. Prentice Hall, Englewood, Cliff, New Jersey, 1994.

**CORE - PRACTICALS**  
**GEG 303: GEOGRAPHICAL INFORMATION SYSTEM (GIS)**

- Unit I** GIS Capabilities  
**Unit II** Introduction to ARC GIS Software  
 Arc Map  
 Arc Catalogue  
 Arc Tool box  
 TABLE of Contents  
 Arc Scan  
**Unit III** Geo-Referencing.  
**Unit IV** Creation of File Geo data base, Personal Geo-data base, shape file. – Data Base generation – Spatial data generation – Digitization (Polygon, line and point) and Non-spatial data.  
**Unit V** GIS-Analysis Methods  
 Buffering  
 Map overlay  
 Interpolation  
 Contours  
 Slope  
 DEM  
**Unit –VI** Attribute data base and linkage of data Base.

**Suggested Readings:**

1. Ian Heywood et al. An Introduction to Geographical Information Systems, Addison Wesley Longman Ltd. 1998.
2. Mishra, H.C.; GIS Handbook, GIS India, Hyderabad, 1996.
3. Peter A. Burrough and Rachael A. McDonnell; Principles of Geographical Information Systems; Oxford University Press, New York, 1998.
4. Star J and J. Estes; Geographic Information Systems; An Introduction, Prentice Hall, Englewood Cliff, New Jersey, 1994.

**CORE - PRACTICALS**  
**GEG 304: STATISTICAL TECHNIQUES**

- Unit I:** Frequency Distribution.  
**Unit II:** Measures of Central Tendency  
 1.Arithmetic Mean                      2. Median                      3. Mode  
 4. Geometric Mean                      5. Harmonic Mean  
**Unit III:** Graphical Representation  
 1.Histogram                      2. Frequency polygon  
 3. Frequency curve                      4. Ogive curve  
 5. Less than and more than Ogive curve  
**Unit IV:** Measures of dispersion  
 Mean deviation  
 Quartile deviation  
 Standard deviation  
**Unit V :** Correlation- Rank Correlation  
**Unit VI:** Sampling methods: Meaning, need for sampling, types of sampling.

**Suggested Readings:**

1. Aslam Mahmood – Statistical Methods in Geographical Studies, Rajesh Publication, New Delhi, 1977.
2. Cole, J.P. & King, DAM – Quantitative Methods in Geography, John Wiley and Sons, New York, 1968.
3. Singh, R.L. Elements of Practical Geography, Kalyani Publishers, 1992.
4. Toyne, P. and Newby, Techniques of Map, Longman, London, 1965.

**Generic Elective (Related to Subject)**  
**GEG 305(a) AGRICULTURAL STUDIES**

**Unit I:** Nature, Scope, significance and development of Agricultural Geography. Approaches to the study of agricultural geography; Origin and evolution of agriculture.

**Unit II :** Determinants of agriculture – Physical, Socio-economic, technological and political; concepts and methods of land use classification.

**Unit III:** Concepts and methods of Agriculture: Crop combination; Crop concentration; crop diversification; agricultural productivity; agricultural typology.

**Unit IV:** Agricultural location theory – Von Thunen and its modifications. Concepts of agricultural region and agricultural regionalisation. Whittlesey's agricultural systems of the world. Agricultural regions of India. Green revolution; Problems and prospects of Indian agriculture.

**Suggested Readings**

1. Bayliss Smith, T.P. : The Ecology of Agricultural Systems. Cambridge University Press, London, 1987.
2. Berry, B.J.L. et al. : The Geography of Economic Systems. Prentice Hall, New York, 1976.
3. Dyson, T. : Population and Food – Global Trends and Future Prospects. Routledge, London, 1996.
4. Gregor, H.P. : Geography of Agriculture. Prentice Hall, New York, 1970.
5. Grigg, D.B. : The Agricultural Systems of the World. Cambridge University Press, New York, 1974.
6. Hartshorn, T.N. and Alexander, J.W. : Economic Geography. Prentice Hall, New Delhi, 1988.
7. Morgan, W.B. and Norton, R.J.C. : Agricultural Geography. Mathuen, London, 1971.
8. Singh, J. and Dhillon, S.S. : Agricultural Geography, Tata McGraw Hill Pub., New Delhi, 1988.
9. Tarrant, J.R : Agricultural Geography. Wiley, New York, 1974.

**Generic Elective (Related to Subject)**  
**GEG 305(b) – REGIONAL GEOGRAPHY OF INDIA WITH SPECIAL REFERENCE  
ANDHRA PRADESH**

**Unit I** India: Location and Geographical Setting of India – Major Physiographic Divisions, Soils, Vegetation, drainage. Climatic Regions and their Characteristics in India.

**Unit II** India: Mineral Resources – Coal, Iron Ore and petroleum, Industries Iron and Steel, Oil Refinery and Paper industries; Industrial Regions of India; Transport; Land, Water and Air, Imports and Exports.

**Unit III** India: Population Distribution; Density growth problems, over population and population policies in India; Agriculture Types; Irrigation and Power; Multipurpose projects. Major food grain crops; Rice and Wheat; Major commercial crops – Coffee and Tea.

**Unit IV** Andhra Pradesh: Relief, climate, soils and vegetation. Major Regions; Major Crops; Mineral wealth and industrial development; population.

**Suggested Readings**

1. Spate, O.H.K. and Learmonth, A.T.A. India and Pakistan, Third Edition, Methuen, London, 1967.
2. Memoria, C.B. : Economic and Commercial Geography of India, Shirlal Agarwal and Co., Agra, 1991.
3. Krishnan, M.B. : Geology of India, Higginbothams, Madras.
4. Alam, S.M. : Planning atlas of Andhra Pradesh.
5. Khullar: India, A comprehensive Geography. Kalyani Publishers , New Delhi.1989.

**Generic Elective (Related to Subject)**

**305(c): DISASTER MANAGEMENT STUDIES**

**Unit I:** Disaster: Meaning and Concept, types of Disasters. Natural disasters: Earthquakes – Hazardous effects, Volcanic eruptions – Hazardous effects. Certain case studies.

**Unit II:** Cyclones and floods : cyclone related parameters and effects on land and sea-damage assessment. Causes of flood and food prone area analysis – damage assessment. Certain case studies.

**Unit III:** (a) Droughts and desertification : Types of droughts – factors influencing droughts – landuse and groundwater level changes – delimiting drought prone areas.

(b) Main induced disasters: Deforestation and environmental degradation, urbanization, industrial development and environmental pollution. Types of pollution : air pollution, water pollution, land / soil pollution and sound / noise pollution.

**Unit IV:** Disaster management: Pre and post disaster operations of Earthquakes, cyclones, floods, droughts, forest fires. The role of GIS in disaster management studies.

**Suggested Readings:**

1. Savindra Singh, Environmental Geography, Prayag Pintak Bhavan, Allahabad, 2006.
2. Singh, L.R., Singh, Savindra, Tiwari, R.C. and Srivastava, R.P.: Environmental Management (edited), Allahabad University, 1983.
3. Singh, Savindra : Flood hazards and environmental degradation; A case study of the Gomathi River, in environmental management, Allahabad University, 1983.
4. John, A. Mattlews : Natural hazards and environmental change. Bill Mcguire, Ian Mason, 2002.
5. Nimpuno, K : Disasters and Social Response, ITC, 1989.
6. Hooja, R. and Joshi, R. : Desert, Drought and Development Studies in Resource Management and Sustainability: Rawat Publications, Jaipur, 1994.
7. Aronoff, S : Geographic Information Systems; A Management Perspective, DDL Publications, Ottawa, 1989.
8. Barrett, E.C. and Curtis, L.F.: Fundamentals of Remote Sensing and Air photo interpretation, Mcmillan, New York, 1992.
9. Bring, N., Dhal and Ms. Sunita Dhal : Can GIS and Disaster Management System help, GIS India? Vol.9, No.1, January-February, 2000.

**Open Elective (For other departments)**

**GEG 306 (a) – Regional Geography of Andhra Pradesh**

**Unit-I:** Re-organization of Andhra Pradesh -2014- Location and physical setting – Major Physiographic Divisions – Soils, Vegetation, and Drainage – Climate Regions and their Characteristics.

**Unit-II:** Population Distribution; Density, growth and problems. Agriculture Types. Irrigation and power; Multipurpose Projects, Major food grain crops. (Paddy, Jower and Ragi), major Commercial Crops (Cotton, Groundnut and Mango).

**Unit -III:** Mineral Resources: Iron ore, Limestone and Petroleum, Industries: Iron and Steel, Cotton and IT. Industrial Regions in Navy Andhra Pradesh.

**Unit-IV:** Transportation and Communication – Road, Rail, Water, (special reference to coastal Transport) and Air Transport.

**Reference:**

1. Take from 401, 4, 5 from old syllabus.
2. Structure, growth and prospects of Industries in Andhra Pradesh. lotus publications, Varanasi -1989.
3. Regional Geography of Andhra Pradesh – Telugu Academy.
4. Andhra Pradesh year book -2010-2015.

**Open Elective (For other departments)**

**GEG 306 (b) – Geographical Information System (GIS) & Global Positioning System (GPS) and Applications**

**Unit I:** GIS: - Definition, History, Development and components. GIS Data Generation :- Spatial and Non Spatial Data; Data structures : Raster and Vector; Geo coordinate system ;Data analysis:- Measurement & Connectivity, Interpolation , Classification, , TIN, DTM ,DEM Modals.

**Unit II:** GIS Applications: - GIS as a decision support system, management of information system, land information system, Urban planning management, Disaster management and Emergency Response System, Resource management applications, Network applications, facility management applications.

**Unit-III** Overview of GPS: Basic concept, system architecture, space segment, user segment; GPS Signals:- Signal structure, anti spoofing (AS), selective availability; GPS coordinate frames Time references: Geodetic and Geo centric coordinate systems, world geodetic 1984 (WGS 84), GPS time.

**Unit-IV** GPS Applications:- Field Data collection, Navigation, Aviation , Marine, Rail, Roads and highways, Space, Survey mapping, Defense, Agriculture, Environment.

**Suggested Readings:**

1. Burrough, P.A., 1986, Geographical Information System for land Resources System, Oxford Univ. Press, UK.
2. Fotheringham, S.; Rogerson, P. (ed.), 1994. Spatial analysis and GIS. Taylor and Francis, London, UK.
3. Laurini, Robert and Dierk Thompson, 1992, Fundamentals of Spatial Information Systems, Academic Press, ISBN 0-12-438380-7.
4. Maguire, D.J.; Goodchild, M.F.; Rhind, D.W. 1991. Geographical information System, Longman, London, UK
5. Siddiqui, M.A.; 2006, Introduction to Geographical Information System, Sharda Pustak Bhavan, Allahabad.
6. Siddiqui, M.A.; 2011, Concepts and Techniques of Geoinformatics, Sharda Pustak Bhavan, Allahabad.
7. G S RAO, Global Navigation Satellite Systems, McGraw-Hill publications, New Delhi, 2010
8. B. Hoffman – Wellen Hof, H. Liehtenegger and J. Collins, ‘GPS – Theory and Practice’, Springer – Wien, New York (2001).
9. James Ba – Yen Tsui, ‘Fundamentals of GPS receivers – A software approach’, John Wiley & Sons (2001).
10. Bradford W. Parkinson, James J. Spiker Jr, 1996. Global Positioning System: Theory and Applications, Vol I and II, American Institute of Aeronautics and Astronautics: Washin

**SEMESTER-IV**  
**CORE - THEORY**  
**GEG 401: REGIONAL PLANNING**

**Unit I** Concept of Region; Changing concept of the region from an inter-disciplinary view – point; concepts of regionalism and regionalization. Types of Regions: Formal and functional, uniform and Nodal, single purpose and composite regions, regional hierarchy and special purpose regions.

**Unit II** Types of Planning; Sectoral, temporal; short term, long term and Multilevel planning and planning process.

**Unit III** Decentralised Planning: Peoples participation in the Planning process; Panchayathi Raj system.

**Unit IV** Physical resource and special purpose regions: River valley regions, hilly and tribal regions, drought prone regions and metropolitan regions.

**Suggested Readings:**

1. Sundaram, K.V. : Urban and Regional Planning, Vikas Publishing house, New Delhi, 1977.
2. Misra, R.P. and Sundaram, K.V. : Rural Area Development, Sterling Publishers, New Delhi, 1979.
3. Misra, R.P., Urs, D.V. and Nataraj, V.K. : Regional Planning and National Development, Vikas Publishers, New Delhi, 1978.
4. Misra, R.P. : Regional Planning Concepts, Techniques and case studies, Prasaranga Press, University of Mysore, Mysore, 1969.
5. Sengupta, P. and Galina Sdasyuk : Economic Regionalisation of India: Problems and Approaches, Census of India, Monogram, New Delhi, 1968.
6. Planning Dept. Government of Andhra Pradesh : Planning and Development of Backward Regions – A Case Study of Rayalaseema.
7. Mishra, R.P. et al. Multi-Level Planning : Heritage Publishers, Delhi, 1980.
8. Bhat, L.S. et al. Micro-Level Planning : A Case Study of Kamal Area, Haryana, K.B Publications, New Delhi, 1976.
9. Friedmann, J. and Alonso, W. : Regional Development and Planning – A Reader, M.I.T. Press, Cambridge Mass, 1967.
10. Kuklinski, A.R. (ed.) : Growth Poles and Growth Centres in Regional Planning, Mouton, The Hague, 1972.

**CORE - THEORY**  
**GEG 402– ADVANCED REMOTE SENSING**

**Unit I** Photogrammetry : Introduction; Geometric elements of vertical photographs; scales of Aerial photographs; scale distortions; Flight planning; Relief displacement; parallax measurement; Orthophotography and rectification– principles and procedures.

**Unit II** Digital Image Processing: Introduction to digital image processing; Image processing system characteristics: Hardware and Software; Image restoration Techniques: Restoring line dropouts, Restoring periodic line striping, Restoring line offsets, Filtering random noise; Radiometric corrections and Geometric corrections in image processing.

**Unit III** Image Enhancement Techniques: Contrast enhancement, Density slicing, Edge enhancement, Merging data sets, Synthetic stereo images; Digital mosaics. Information extraction techniques: Principal – component (P.C) transformation analysis, Ratio images, Multispectral classification, Change-detection images.

**Unit IV** Remote Sensing Applications to Geographical Studies: Landuse/Landcover mapping; water resources; Geomorphological, waste land studies, Urban and Regional Planning.

**Suggested Readings**

1. American Society of Photogrammetry : Manual of Remote Sensing, ASP, Falls Church, V.A. 1983.
2. Barrett, E.C and L.F. Curtis : Fundamentals of Remote Sensing and Air Photo Interpretation, Mcmillan, New York, 1992.
3. Compbell, J. : Introduction to Remote Sensing, Guilford, New York, 1989.
4. Curran, Paul, J. : Principles of Remote Sensing, Longman, London, 1985.
5. Hord, R.M. : Digital Image Processing of Remotely Sensed Data; Academic New York, 1989.
6. Luder D. : Aerial photography Interpretation : Principles and Applications, McGraw Hill, New York, 1959.
7. Pratt, W.K Digital Image Processing, Wiley, New York, 1978.
8. Rao, D.P. (Eds) : Remote Sensing for Earth Resources, Associate of Exploration Geophysicist, Hyderabad, 1998.
9. Thomas, M. Lillesand and Ralph W. Kefer : Remote Sensing and Image Interpretation, John Willey & Sons, New York, 1994.

**CORE - PRACTICALS**  
**GEG 403: RESEARCH TECHNIQUES**

**Unit I:** Introduction to Research Techniques.

**Unit II:** Network analysis: Alfa, Beta, Gama, Eta, Theta indices, Centrality, Connectivity, shortest path matrix analysis and Traffic flow Diagram.

**Unit III:** Nearest neighbour distance analysis, Rank size relationship.

**Unit IV:** Detour index, shape index.

**Unit V:** Drainage basin morphometry – Water Balance.

**Unit VI:** Crop combination Techniques, Agricultural Landuse efficiency.

**Suggested Readings:**

1. Gregory, K.J. and Walling, D.E. Drainage basin form and process: A Geomorphological approach; Arnold; London 1973.
2. Peter Davis: Science in geography, Science Series – 3, Data description and presentation, Oxford University Press, London, 1975.
3. Peter Toyne and Peter Newby, T.: Techniques in Human geography, Mac Millan, London, 1972.
4. Peter Toyne and Peter Newby, T. : Techniques in Physical geography; Mac Millan, London, 1972.
5. Singh Jasbir and Dhillon, S.S. : Agricultural geography, TATA Mc Graw Hill, New Delhi, 1984.
6. Singh, R.L. Mapwork and practical geography, central book depot, Allahabad, 1972.

**CORE - PRACTICALS**  
**GEG 404: REMOTE SENSING APPLICATIONS**

**Unit I** Techniques of Visual Interpretation;

**Unit II** Marginal Information of Satellite Imageries

**Unit III** Interpretation of Satellite Imageries: Visual Interpretation; Water Resources, Lineaments, Landuse / Land cover – Landforms – Waste Land. Digital Image Interpretation: subset Supervised classification and un Supervised classification, change Detection.

**Unit IV** Aerial photo interpretation  
Vision test – Stereo Test with Stereoscopes  
Interpretation of Physical Features  
Interpretation of Cultural Features

### **Suggested Readings**

1. Curran, Paul, J. : Principles of Remote Sensing: Longman, London, 1985.
2. Gautam N.C. et al. Space Technology and Geography ; National Remote Sensing Agency, Hyderabad, 1994.
3. Thomas M. Lillesand and Ralph, W. Keffer; Remote Sensing and images interpretation, John Willey & Sons, New York, 1994.

### **Generic Elective (Related to Subject)**

#### **GEG 405(a) : WATER AND SOIL RESOURCES MANAGEMENT**

**Unit I** Water as a focus of geographical interest, Inventory and distribution of world's water resources (Surface and Subsurface); World Hydrological cycle; precipitation and its Measurement, water balance studies.

**Unit II** Groundwater: Origin, Occurrence and Vertical distribution; water quality: Physical, biological and chemical properties for irrigation, domestic and industrial purposes.

**Unit III** Water Resources Management: conjunctive use of surface and ground water resources; watershed management. Methods of irrigation. Water harvesting techniques: Neeru – Chettu and Water percolating programmes.

**Unit IV** Soils: Process of soil formation and soil development. Soil profile development. Properties of soil – Physical, morphology, texture, structure and chemical properties. Soil erosion – degradation and conservation. Management of saline and alkaline soils.

### **Suggested Readings**

1. Dakshinamurthy, C. et al., Water Resources of India and their utilization in Agriculture, Indian Agriculture Research Institute, New Delhi, 1973.
2. Bunting, B.T. : The Geography of Soils; Hutchinson, London, 1973.
3. Foth, H.D and Turk, L.M. : Fundamentals of Soil Sciences, John Wiley, New York, 1972.
4. Jones, J.A. : Global Hydrology : Processes, Resources and Environmental Management, London, 1997.
5. Matter, J.R. Water Resources Distribution, Use and Management, John Wiley, Marylane, 1984.
6. Singh, R.A and Singh, S.R. Water Management. Principles and Practices, Tara Publication, Varanasi, 1979.
7. Tideman, E.M. Watershed Management : Guidelines for Indian Conditions, Omega, New Delhi, 1996.
8. Todd, D.K.: Ground Water Hydrology, John Wiley, New York, 1959.
9. Sarma, Hyrdogy, Dhanpat Roy & Sons, New Delhi.

### **Generic Elective (Related to Subject)**

#### **GEG 405 (b): ENVIRONMENTAL STUDIES**

**Unit I** Nature, Scope and Significance of Environmental Studies; Concepts of Ecology, Ecological balance and the need for Ecological Approach.

**Unit II** Concepts of Ecosystem : Structure, Classification and functioning of the ecosystem, Biomes, food web, food pyramid, Nutrient cycle, hydrological cycle.

**Unit III** Impact of population growth on ecosystem. Agriculture, green revolution, HYV and pesticides. Man's impact on land, mining, coastal areas and transport.

**Unit IV** Environmental impact assessment, Environmental reconstruction, management and planning, the need for interdisciplinary approach. The Role of GIS and Remote Sensing in Environmental Management.



### **Suggested Readings**

1. Turk. : Introduction to Environment Studies, Sanndora, 1980.
2. Detwyler : Man's Impact on Environment, 1971.
3. Strahler & Strahler, Geography of Man's Environment Wiley, 1977.
4. Bennet : Man and Earth's Ecosystem, Wiley, 1975.
5. Leopold and Lune (Ed) : A procedure for evaluating environmental impact.
6. Savindra Singh : Environmental geography – Prayagpustak Bhavan, Allahabad, 2000.
7. Dikshit, R.D. : Geography and Teaching of the environment, geography department, Poona University, 1984.
8. Agarwal, D.P. Man and Environment in India through ages, Book & Books, 1992.
9. Gaur, R. : Environment and Ecology of Early Man in Northern India, R.B. Publication Corporation, 1987.
10. Hoyt, J.B. Man and the Earth, Prentice Hall, U.S.A.; 1992.
11. Singh, S. : Environmental Geography, Prayag Publications, Allahabad, 1991.
12. Smith, R.L. : Man and his Environment : An Ecosystem approach, Harper & Row, London, 1992.

### **Generic Elective (Related to Subject)**

#### **GEG 405 (c) GEOGRAPHY FOR RESEARCH, EXTENSION (SOCIETY) AND INDUSTRY**

**Unit I:** Methodology of Research : Meaning and Functioning of Research, Different types of Research, Identification of Research Problem, Tools for Collection of Data, Data Analysis, Interpretation of Results, The design and Execution of Research, Writing of Research Report.

**Unit II:** Use of techniques in geographical research : Statistical techniques, Research techniques, Computer techniques, Remote sensing technology and Geographical information system.

**Unit III:** Land use planning and extension activities: Land use and land cover planning, conservation of soils and irrigation, Wasteland development, watershed management and ground water exploration methods.

**Unit IV:** Computer and GIS techniques and industry interactions: Computer techniques, Remote sensing, technology, Global positioning system, Geographical information system and Photogrammetry and their interaction to that of soft ware training centres, software industries and planning institutions.

### **Suggested Readings**

1. Rajammal, P. Devadas, Kulandaivel (edited): A Hand book of Methodology of Research, Sri Ramakrishna Vidyalaya, Coimbatore, 1976.
2. Simpson and Kafka: Basic statistics (Revised edition)W.W. Norton and Company, INC, 1965.
3. Elmer, B. Mode: Elements of Statistics (Third edition), Prentice Hall of India Private Limited, New Delhi, 1971.
4. Gautham, N.C.: Methodology for Landuse planning, a systematic approach, Centre for land use management, Hyderabad, 2002.
5. Hridayaram Yadav: Genesis and Utilization of Waste lands, Concept Publishing Company, New Delhi, 1986.
6. Tideman, E.M. : Watershed Management; Guidelines for Indian conditions, Omega Scientific Publishers, New Delhi, 1996.
7. Aronoff, S : Geographic Information System; A Management Perspective, DDL Publications, Ottawa, 1989.

8. Brig, N. Dhal and Ms. Sunita Dhal : Can GIS and Disaster Management System help GIS India? Vol.9, No.1, Jan.-Feb. 2000.
9. Barrett, E.C. and L.F. Curtis: Fundamentals of Remote Sensing and Air photo Interpretation, McMillan, New York, 1992.
10. Thomas, M. Lillesand and Ralph W. Kefer: Remote Sensing and Image Interpretation, John Wiley & Sons, New York, 1994.

**Open Elective (For other departments)**  
**GEG 406(a) – REGIONAL GEOGRAPHY OF INDIA**

**Unit I** India: Location and Geographical Setting of India – Major Physiographic Divisions, Soils, Vegetation, Drainage. Climatic Regions and their Characteristics in India.

**Unit II** India: Mineral Resources – Coal, Iron ore and petroleum, Industries: Iron and Steel, Oil refinery and Paper industries; Industrial Regions of India.

**Unit III** India: Population Distribution; Density growth problems, over population and population policies in India; Agriculture Types; Irrigation and Power; Multipurpose projects. Major food grain crops; Rice and Wheat; Major commercial crops – Coffee and Tea.

**Unit IV** Transport; Land, Water and Air, Imports and Exports. concept of Swatch Bharath.

**Suggested Readings:**

1. Spate, O.H.K. and Learmonth, A.T.A. India and Pakistan, Third Edition, Methuen, London, 1967.
2. Memoria, C.B. : Economic and Commercial Geography of India, Shirlal Agarwal and Co., Agra, 1991.
3. Krishnan, M.B. : Geology of India, Higginbothams, Madras.
4. Alam, S.M. : Planning atlas of Andhra Pradesh.
5. Khullar: India, A comprehensive Geography. Kalyani Publishers , New Delhi.1989.

**Open Elective (For other departments)**  
**GEG 406(b) – Remote Sensing Principles and Applications**

**Unit I** Introduction: Definitions, concepts and types of Remote Sensing, Historical developments, Stages and advantages. Energy Sources, Energy and Radiation.

**Unit II** Satellite Remote Sensing: Types of platforms; Ground Observation Platforms, Airborne Observation platforms, Space Borne observation platforms. Remote Sensing Satellites orbits; Geosynchronous orbit, Sunsyneronous orbit and Shuttle orbit, Different Satellites: - LANDSAT, SPOT, IRS, IKONOS, QUICK BIRD. CARTOSAT – 2.

**Unit III** Digital Image Processing: Image processing systems, data formats of digital Image, preprocessing, Image enhancement, multi spectral Images Visual Image Interpretation, elements of Visual Image Interpretation, Interpretation keys, and generating thematic maps.

**Unit IV** Applications of Remote Sensing: Remote Sensing Applications in Landuse Land cover Mapping, Water Resources, Wasteland studies, Urban and Regional Planning.

**Suggested Readings**

1. American Society of Photogrammetry : Manual of Remote Sensing, ASP, Falls Church, V.A. 1983.
2. Barrett, E.C. and L.F. Curtis : Fundamentals of Remote Sensing and Air Photo Interpretation, Mcmillan, New York, 1992.
3. Compbell, J. : Introduction of Remote Sensing, Guilford, New York, 1989.
4. Curran, Paul, J. : Principles of Remote Sensing, Longman, London, 1985.
5. Leuder D. : Aerial Photographic Interpretation: Principles and Application, McGraw Hill, New York, 1959.
6. Rao D.P. (eds.) : Remote Sensing for Earth Resources, Association of Exploration Geophysicist, Hyderabad, 1998.
7. Thomas M. Lilles and and Ralph W. Kefer, Remote Sensing and Image Interpretation. John Wiley & Sons, New York, 1994.

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