CHOICE BASED CREDIT SYSTEM

P.G. Syllabus
First Semester

P.G. Department of Geography, Utkal University, Vani Vihar, Bhubaneswar

1st Semester
(500 Marks, 20 Credits)

THEORY	TITLE OF THE PAPER	MARKS	CREDITS
GEOG1 C01	GEOGRAPHICAL THOUGHT	100	04
GEOG1 C02	GEOMORPHOLOGY	100	04
GEOG1 C03	GEOGRAPHY OF INDIA	100	04
GEOG1 C04	ECONOMIC GEOGRAPHY	100	04
PRACTICAL			
GEOG1 C05	QUANTITATIVE & STATISTICAL TECHNIQUES (P)	100	04

1st Semester (500 Marks, 20 Credits)
GEOGRAPHICAL THOUGHT (GEOG1-C01)
(100 Marks) 4 Credit

Objective:

To make students to understand about the past, present and future of Geography.

Learning Outcomes:

After the completion of course, the students will have ability to:

1. Distinguish the paradigms in geography discipline through time
2. Understand the geographical thinking in different regions of world
3. Appreciate the past and future trends of world geography in general and Indian geography in particular

Course Content:

Unit- I Meaning, nature and scope of geography. Methods and approaches in Geography. Contribution of Greek, Roman, Arab, Chinese & Indian scholars.

Unit- II Contribution of Geographers – Bernhardus Verenius, Immanuel Kant, Alexander Von Humboldt, Carl Ritter, Scheafer & Hartshorne. Impact of Darwinian Theory on Geographical Thought.

Unit- III Dualism and Dichotomy in Geographical studies – Determinism and Possibilism, Physical vs. Human, Regional vs. Systematic, Qualitative vs. Quantitative, Ideographic vs. Nomothetic, Paradigm Shift and Model building in Geography Hypotheses, theories and Laws in Geography

Unit- IV Applied Geography – Concept, Methods, techniques and Application in Land use Planning, Regional Planning, Urban Planning and Natural Hazards. Recent trends in Geography – Scientific Method, Quantitative Revolution and Computer Application. Perspectives in Geography (Positivism, Behaviouralism, Humanism, Structuralism, Feminism and Postmodernism).

Suggested Readings:

1. Dickinson, R.E. (1969). *Makers of modern geography*. London: Routledge.
2. Gregory, D., & Walford, R. (1988). *Horizons in Human Geography*. London: Macmillan.
3. Harvey, D. (1973). *Social Justice and the City*. London: Arnold.
4. Peet, R. (1998). *Modern Geographical Thought*. Massachusetts: Blackwell Publishers.
5. Hussain, M. (1995): *Evolution of Geographical thought*, 3rd edition, Rawat Pub. Co., New Delhi
6. Ali, S.M. (1966). *The Geography of the Puranas*, People's Publishing House, Delhi

7. Pacione, M. (1987). *Historical Geography: Progress and Prospect*, Croom Helm, London

8. Baker, A.R.H (ed.) (1972). *Progress in Historical Geography*, David and Charles

9. Richard Hartshorne (1964). *Perspective on the nature of geography.* John Murray, Publisher.

10. Adhikari Sudipta (1995). *Fundamentals of Geographical Thought*. Chaitnya publication house, Allahabad.

11. Abler, P., Adams, J. S., & Grould, P (1972). *Spatial Organisation: The Geographer's view of the World*, Prentice Hall, London.

12. Dikshit, R.D (1997). *Geographical Thought*, prentice Hall of India, New Delhi.

13. Dickinson, R.E. & Hewerth (1969). *The Makers of Modern Geography*, London.

14. Dubey, B (1968). *Geographical concepts in Ancient India*, Varanasi.

15. Freeman, T. W. (1961). *Hundred Years of Geography,* Duckworth, London.

16. Gregory, D. (1978). *Ideology, Science and Human Geography,* London.

17. Harrey David (1984). *Explanation in Geography*, Arnold Heinemann, New Delhi.

18. Hartshorne, R. (1959). *Perspective on the Nature of Geography*, Chicago.

19. Haggett, P. (1966). Locational Analysis in Human Geography, London.

20. Johnston, R.J. (1983).*Geography and Geographers*, London.

21. James, P.E. (1972). *All Possible World: A History of Geographical Ideas*

22. Kuhm, T. S. (1970). *The Structure of Scientific Revolutions*, Chicago.

23. Minshul (1970). *Changing Nature of Geography, Theory and Practice*, Hutchinson, London.

24. Negi, B.S. (1994). *Geographical Thought,* Delh

GEOMORPHOLOGY (GEOG1-C02)

(100 Marks) - 4 Credits

Objective:

To provide knowledge on the processes going on the surface of the Earth.

Learning Outcome

After the completion of course, the students will have ability to:

1. Understand the functioning of Earth systems in real time and analyze how the natural and anthropogenic operating factors affects the development of landforms
2. Distinguish between the mechanisms that control these processes
3. Assess the roles of structure, stage and time in shaping the landforms, interpret geomorphological maps and apply the knowledge in geographical research.

Course Content:

Unit-I Fundamental Concepts, Nature and Scope of Geomorphology, Endogenetic and Exogenetic forces, Denudational Processes: Weathering and Mass Wasting. Theories and Processes of Slope Development. Cycle of erosion & evolution of landform (Davis & Penk)

Unit-II Earth movements (Seismicity, folding, faulting & Vulcanicity), Concept of Isostasy (Airy, Pratt and Heiskanen's view), Continental Drift theory, Sea Floor Spreading and Plate Tectonics, Geosyncline and theories of Mountain Building, Causes of Geomorphic hazards (Earthquake, Volcanoes, Landslides and Avalanches)

Unit-III Drainage basin, Drainage pattern. Laws of Morphometric Analysis, Fluvial Landforms-Materials and Processes in the fluvial System, Fluvial Landforms of erosion & deposition. Concept of coastal Zone, Coastal agents and Processes. Integrated Coastal Zone Management (ICZM).

Unit-IV Wind action and landforms of Aeolian topography. Processes in Karst topography, Karst landforms of erosion and deposition, Origin of limestone caves and related landforms, Landforms of glacial erosion and deposition, Periglacial landforms.

Suggest readings

1. Chorley, R.J. (1972). *Spatial Analysis in Geomorphology*, Methuen, London.
2. Cooke, R.U & Doornkamp, J.C. (1974). *Geomorphology in Environmental Management-An introduction*, Clarendon Press, Oxford.
3. Crag, R. G. (1982). *Applied Geomorphology*, Allen and Unwin, London.
4. Fairbridge, R.W. (1968). *Encyclopedia of Geomorphology*, Reinholdts, New York.
5. Goudie, A. (1993).*The Nature of the Environment*, Oxford and Blackwell, London.
6. Garner, H. F. (1974). *The Origin of landscape-A Synthesis of Geomorphology*, Oxford University Press, London.

7. Holmes, A. (1989). *Principles of Physical Geology*, ELBS, London.
8. Small, R.J. (1970). *The Study of Landforms*, Cambridge University press
9. Steers, J.A. (1979). *The Unstable Earth*, Kalyani publishers, Ludhinana.
10. Stoddart, D.R.(ed). (1996). *Process and Form in Geomorphology*, Routledge, New York.
11. Strahler, A.N. (1975). *Physical geography*, Wiley International Edition, New York.
12. Skinner, B.J. & Porter,S.C. (1995). *The Dynamic Earth*, John Wiley, New York.
13. Sparks, B.W. (1960). *Geomorphology*, Longman, London.
14. Sharma, H.S.(ed). (1980). *Perspective in Geomorphology*, Concept, New Delhi.
15. Singh, S. (1998). *Geomorphology*, Prayag Publication, Allahabad.
16. Thurnbury, W.D. (1960). *Principles of Geomorphology*, John Wiley, New York.

GEOGRAPHY OF INDIA (GEOG1-C03)
(100 Marks)- 4 Credits

Objective:

To teach the students about the geography of India about the physical, climatological, demography and mineral reserves and utilities for sustainable development.

Learning Outcomes:

After the completion of course, the students will have ability to:

1. Understand the physical profile of the country
2. Study the resource endowment and its spatial distribution and utilization for sustainable development
3. Synthesise and develop the idea of regional dimensions.

Course Content:

Unit-1

(a) Physiographic Divisions
(b) River System and their evolution
(c) Climate and mechanism of Indian monsoon
(d) Major soil types
(e) Natural vegetation

Unit-II

(a) Agriculture and its prospects and problem
(b) Factors affecting Indian agriculture
(c) Multipurpose river valley projects
(d) Agro-Climatic Zones, Green Revolution, Food Security and Right to Food
(e) Production and distribution of major crops(Rice, Wheat, Jute, Cotton, sugar tea and coffee)

Unit-III

(a) population-composition, growth and distribution
(b) Urbanization- determinants, trend and spatial pattern.
(c) Major mineral resources
(d) Power resources
(e) Conservation and management of resource.

Unit-IV

(a) Factors of location of Industries
(b) Mineral based industries (Iran steel, Aluminum)
(c) Agro based industries (Sugar and textile)
(d) Chemical industries (Petrochemical and fertilizer)
(e) Transport and communication (Air transport, Road transport and Rail Transport

ECONOMIC GEOGRAPHY (GEOG1-C04)
(100 Marks) - 4 Credits

Objectives:

To introduce various dimensions of economic geography with respect to global record.

Learning Outcomes:

After the completion of course, the students will have ability to:

1. The students will be acquainted with various dimension of economic geography.
2. Students will dig into resource geography, agricultural geography, industrial geography and transport geography.

Course Content:

UNIT-I: (Introduction)

a) Economic Geography: Definition, Scope and Concepts
b) Relation of Economic Geography with other branches of Social Sciences.
c) Economic activities (primary, secondary, tertiary and quaternary), and factors affecting it.

UNIT-II: (Resource geography)

a) Resources (classification, distribution and associated problems).
b) Natural Resources Management.
c) World Energy Crises in Developed and Developing Countries
d) Conservation of Natural Resources – Soil, Water, Forest.

UNIT-III: (Agricultural Geography)

a) Land capability classification, Land use planning and Cropping Pattern
b) Methods of delineating crop combination regions (Weaver, Doi, Rafiullah and Crop diversification, model of Von Thunen).
c) Agricultural Systems of the World. Measurement and Determinants of Agricultural Productivity.

UNIT-IV: (Industrial Geography)

a) Classification of Industries and Factors of Industrial Location
b) Theories of Industrial Location (A. Weber, E. M. Hoover, August Losch, and D. M. Smith)
c) World Industrial Regions, Tourism Industry
d) World distribution and growth of Information And Communication Technology (ICT) and Knowledge Production (Education and R & D) Industries

UNIT-V (Geography of Transport and Trade)

a) Theories and Models of spatial interaction (Edward Ullman, M. E. Hurst and Gravity Model)
b) Globalisation and Liberalisation and its Impact on Less Developed Countries.
c) Problems and Prospects of Inter and Intra Regional Cooperation and Trade

Suggested Readings

1. Roy, Prithwish (2014). *Economic Geography: A study of resources*, New Central Book Agency, Publisher.
2. R. Knowles & J. Wareing (1990). *Economic and Social Geography*, Rupa Publisher.
3. Gautam, Alka, (2013). *Geography of Resources*, Sharda Pustak Bhawan, Allahabad.
4. Boyce, R. R. (1974).*The bases of economic geography*. New York: Holt, Rine Hart and Winston Inc,
5. Dreze, J., & Sen, A. (1996). *Economic development and social opportunity*. New Delhi: Oxford University Press.
6. Ramesh Singh (2016). *Indian economy for Civil service examination*, Tata McGraw-Hill, Publisher.
7. Anderson William P. (2012). *Economic Geography*, Routledge, London
8. Coe N. M., Kelly P. F. & Yeung H. W. C. 2007. *Economic Geography: A Contemporary Introduction*, Blackwell, Oxford.
9. MacKinnon D. & Cumbers A. (2007). *An Introduction to Economic Geography: Globalization, Uneven Development and Place*, Pearson/Prentice Hall, Harlow
10. Prager Jean-Claus & Thisse Jacques-Francois (2012). *Economic Geography and the Unequal Development of Regions*, Routledge, London
11. Bengtson, N.A. & Royen Willem Van (2012). *Fundamentals of Economic Geography*, Literary Licensing publisher.
12. Alexander, J.W. (1963). *Economic Geography*, Prentice Hall, Inc., U.S.A.
13. Smith, D.M (1981). *Industrial Location, An Economic Geographical Analysis*, John Willy & Sons, London.

STATISTICAL METHODS IN GEOGRAPHY (GEOG1-C05) (Practical)

(100 Marks) - 4 Credits

Objective:

To introduce inferential and descriptive statistics with uses in research methodology.

Learning Outcomes:

After the completion of course, the students will have ability to:

1. Understand the basics of data collection and processing for the meaningful outcomes.
2. Comprehend the representation and interpretation of the results.
3. Put into practice results obtained in representation as well as day-to-day life.

Course Content:

1. Measures of Central Tendencies: Arithmetic Mean, Median, Mode, and Their Characteristics. Measures of Dispersion and Variability: Range (Percentile and Quartile Range), Mean Deviation, Standard Deviation. Measure of Inequalities and Disparities: (Gini coefficient, Sopher Index)
2. Concept of Probability Distributions: Binomial Distributions, Normal Probability Distribution. Correlation: Pearson Product Moment Correlation Coefficient, Spearman's Rank Correlation Coefficient. Regression Analysis and Its Significance: Bi-Variate/Scatter, Linear Relationship (Straight Line Regression for Two Variables).
3. Hypothesis Testing: Formulation, Rejection Rule, One and Two Tailed Tests, Significance Level, Degrees of Freedom, Standard Error. Different Types of Significance Test: Chi-Square Test, Z- Test, T- Test.
4. Indicators Scale Free, Computation of Composite Index, Principal Component Analysis and Cluster Analysis.
5. Sampling Techniques and Determination of Sample Size
6. Demonstration and Use of SPSS Software for Statistical Analysis.
7. Field Study/Seminar (15 Marks)
8. Practical Records & Viva (10 Marks)

Suggested Readings

1) Miah, Abdul Quader (2016). Applied Statistics for Social and Management Sciences, Springer Publisher, Singapore.

2) Gregory, S. (1969). Statistical Methods and the Geographer, Longman.
3) Gilbert, Norma (1981). Statistics, Saunders College Publishing, Philadelphia.
4) Theakstone and Harrison (1970). Analysis of geographical Data, Heinemann; First Edition.
5) Matthews, John, A. (1979). Quantitative and Statistical Approaches to Geography, Pergamon Press.
6) C.B. Gupta & Vijay Gupta (2004). An Introduction to statistical Methods, Vikas Publishing House Pvt. Ltd., New Delhi.
7) Leslie, J. King (1969). Statistical Analysis in Geography, Prentice Hall, Engelwood Cliffs.
8) Silk, John (1979). Statistical concepts in Geography, Harper Collins Publishers Ltd, London.
9) John MacInnes (2017). An Introduction to Secondary Data Analysis with IBM SPSS Statistics, SAGE Publications, New Delhi.
10) Miah, Abdul Quader (2016). Applied Statistics for Social and Management Sciences, Springer Publisher, Singapore.
11) Gregory, S. (1969). Statistical Methods and the Geographer, Longman.
12) Gilbert, Norma (1981). Statistics, Saunders College Publishing, Philadelphia.
13) Theakstone and Harrison (1970). Analysis of geographical Data, Heinemann; First Edition.
14) Matthews, John, A. (1979). Quantitative and Statistical Approaches to Geography, Pergamon Press.
15) C.B. Gupta & Vijay Gupta (2004). An Introduction to statistical Methods, Vikas Publishing House Pvt. Ltd., New Delhi.
16) Leslie, J. King (1969). Statistical Analysis in Geography, Prentice Hall, Engelwood Cliffs.
17) Silk, John (1979). Statistical concepts in Geography, Harper Collins Publishers Ltd, London.
18) John MacInnes (2017). An Introduction to Secondary Data Analysis with IBM SPSS Statistics, SAGE Publications, New Delhi.

CHOICE BASED CREDIT SYSTEM

P.G. Syllabus
Second Semester

P.G. Department of Geography, Utkal University,
Vani Vihar, Bhubaneswar

2nd Semester
(500 Marks, 20 Credits)

THEORY	TITLE OF THE PAPER	MARKS	CREDITS
GEOG2 CO1	CLIMATOLOGY	100	04
GEOG2 CO2	HUMAN & SETTLEMENT GEOGRAPHY	100	04
GEOG2 CO3	ENVIRONMENTAL GEOGRAPHY	100	04
GEOG2 FE04	REGIONAL GEOGRAPHY OF ODISHA	100	04
PRACTICAL			
GEOG2 C05	CARTOGRAPHY (P)	100	04

Members Board of Studies, Geography **Chairman, BOS, Geography**

CLIMATOLOGY (GEOG2-C01)
(100 Marks) - 4 Credits

Objectives:

To establish a strong foundation on climatology with focusing on all the elements of atmosphere and resultant processes.

Learning Outcomes:

After the completion of course, the students will have ability to:

1. Understand the elements of weather and climate and its impacts at different scales.
2. Comprehend the climatic aspects and its bearing on planet earth.
3. Understand the mechanisms and genesis of various climatological disasters

Course Content:

Unit-I: Fundamental principles of climatology-Elements and factors of weather and climate, Composition and structure of atmosphere, Insolation and heat budget of the Earth. Temperature-Vertical and horizontal distribution, Temperature Inversion

Unit-II: Air Pressure & Winds – Basic Concepts, Pressure Measurement & Units, Factors affecting Air Pressure, Pressure Belts & Wind Circulation, Factors affecting general Circulation of Wind (Planetary Wind, Periodic & Local Wind), Atmospheric stability & Instability, Environmental lapse rate, Dry & Wet adiabatic lapse rate

Unit-III: Atmospheric Moisture**,** Climatic classifications- Koppen and Thornthwaite, Atmospheric Circulation (Air-masses, Fonts & Upper air Circulation), Cyclones & Anti-Cyclones (Tropical & Temperate). ENSO events (El Nino, La Nina and Southern Oscillations)

Unit-IV: Meteorological hazards & Disasters (Cyclones, Thunderstorms, Tornadoes, Hailstorms, Heat & Cold Waves, Drought & Cloudburst, Glacial Lake Outburst (GLOF). Climate change: Evidences and causes of Climate change in the past. Human Impact on Global Climate, Greenhouse Gases, Global warming, Ozone depletion and its impact on environment. Weather forecasting

Suggested Readings

1. Barry, R.G. & Chorley,P.J. (1998). *Atmosphere, weather and climate*, Routledge, London.
2. Critchfield, J.H. (1993). *General Climatology*, Prentice Hall, New Delhi.
3. Das, P.K. (1987). *Monsoons,* National Book Trust of India, New Delhi.
4. Fein, j.S. & Stephens, P.N. (1987). *Monsoons*, Wiley Interscience.
5. Griffith, J.F. (1978). *Applied Climatology*, Oxford University Press,
6. Hanwell, J. & Newson, M. (1973).*Technique in Physical Geography*, Palgrave Macmillan.
7. Indian Meteorological Department (1968). *Climatological Tables of observations in India*, Govt. of india.
8. Lal, D.S. (1985). *Climatology*, Chaitanya Publications, Allahabad,1986
9. Lydolph, P. E., Temple, D., & Temple, D. (1985). *The climate of the earth*. Government Institutes.

10. Menon.A. (1989). *Our weather*, National Book Trust of India, New Delhi.
11. Peterson,S. (1969). Introduction to Meteorology, Mc Graw Hill Book, London.
12. Robinson, P. J., & Henderson-Sellers, A. (2014). *Contemporary climatology*. Routledge.
13. Singh, S. (1994). Physical Geography, Prayag Pustak bhawan, Allahabad.
14. Strahler, A.N. (1975). *Physical Geography*, Wiley International Edition, Singapore.
15. Trewarth, G.T. & Horn, L.H. (1971). *An introduction to climate,* Mc Graw Hill Book Company.
16. Thompson, R. (1997). *Applied climatology: principles and practice*. Psychology Press.

HUMAN & SETTLEMENT GEOGRAPHY

(GEOG2-C02) (100 Marks) - 4 Credits

Objectives:

To recognize various aspects of human life and interrelation with geography.

Learning Outcomes:

After the completion of course, the students will have ability to:

1. Know the changing human and cultural landscape at different levels.
2. Understand patterns and processes of population growth and its implications.
3. Appreciate the nature and quality of human landscapes.

Course Content:

Unit-I Introduction

a) Human Geography: Contemporary Relevance, World Population Distribution & Growth (measures, patterns and determinants), Factors affecting population growth
b) Theories of Population Growth (Malthus, Sadler, and Ricardo) Theory of Demographic Transition with special reference to India.

Unit-II Settlement Geography

a) Settlements (types, patterns and distribution), Contemporary Problems of Rural Settlements (rural-urban migration; land use changes; land acquisition and transactions), Urban settlements (types, characteristics patterns and distribution), Theories of Origin of Towns (Gordon Childe, Henri Pirenne, Lewis Mumford).
b) Urbanization in Developed and Developing Countries. Trends of Urbanisation, size, structure and functions of urban areas, Urban Systems (the law of the primate city and rank size rule) Central Place Theories (Christaller and Losch), Internal Structure of the City, Models of Urban Land Use (Burgess, Harris and Ullman, and Hoyt)
c) Concept of Megacities, Global Cities, Edge Cities and Smart Cities, Changing Urban Forms (peri-urban areas, rural-urban fringe, suburban ring and satellite towns), Manifestation of Poverty in the City (slums, informal sector growth, crime and social exclusion)

Unit-III Social and Cultural Aspects

a) Concept of Culture, Cultural Ecology, Cultural Convergence
b) Social Structure and Processes, Social Well-being and Quality of Life, Social Exclusion, Spatial distribution of social groups in India (Tribe, Caste, Religion and language).

Unit-IV Political Geography

a) Boundaries and Frontiers (with special reference to India)
b) Heartland and Rimland Theories

c) Geopolitics of Climate Change, Geopolitics of World Resources, Geo-politics of India Ocean & Neopolitics of World Natural Resources.
d) Regional Organisations of Cooperation (SAARC, ASEAN, OPEC, EU).

Suggested Readings:

1. Husain, Majid (2018). *Human Geography*, 5th edition, Rawat publication.
2. K Srinivasan (1998). *Basic demographic techniques and applications*, New Delhi; Sage Publications.
3. Binde & Kanitkar (2000). *The Principle of Population Studies*, Himalaya Publication.
4. Clarke, J.I. (1973): *Population Geography*, Pergamum press, Oxford.
5. Hassan, Mohammad. Izhar, (2020). *Population Geography: A systematic exposition*, Routledge Taylor and Francis publication, London.
6. Premi, M.K. (2006). *Social Demography: A systematic exposition,* Jawahar Publication, New Delhi.
7. Majumdar, P.K (2010). *Fundamentals of Demography*, Rawat publication, Jaipur
8. May, J.F. (2012). *World population policies: their origin, evolution, and impact*, Washington DC: Springer.
9. Premi, M.K and D.N. Das (2012). *Population of India, 2011*, BR Publishing House, New Delhi.
10. William M. Bowen & Robert E. Gleeson (2019). *The Evolution of Human Settlements: From Pleistocene Origins to Anthropocene Prospects*, Palgrave Macmillan, Switzerland.
11. Ghosh, S. (1998). *Introduction to Settlement Geography*, Sangam Books Ltd.
12. Carter, H. (1981). *The Study of Urban Geography*, 3rd edition Arnold-Heinemann, New Delhi.
13. Bhattacharya, B. (2006). *Urban Development in India*. New Delhi: Concept Publishing Company
14. Ramachandran R. (1992). *Urbanisation arid Urban Systems in India*. Oxford University Press, New Delhi
15. Taafee, E. J., & Gauthier, H. L. (1973). *Geography of Transportation*. New Delhi.
16. Taylor, Griffith (1949). *Urban Geography*, Methuen and Co. Ltd., London
17. Mcdonnell, M. J., Halns, A. K., & Breste, J. H. (2009). *Ecology of Cities and Towns*. Cambridge University Press
18. Sundaram, K.V. (1977). *Urban and regional planning in India*. New Delhi: South Asia Books
19. Tim Hall (1988). *Urban geography*, London: Routledge.
20. Michael, P. (2009). *Urban Geography: A Global Perspective*, Taylor & Francis, Great Britain.
21. Peter, Ellis & Mark Roberts (2016). *Leveraging Urbanization in South Asia: Managing Spatial Transformation for Prosperity and Livability*, World Bank Documents.
22. Ahmad, Aijazuddin (2002). *Social Geography,* Rawat Book.
23. Adhikari, Sudeepta (2017). *Political Geography*, Rawat Book.
24. Anderson, K., Domosh, M., Pile, S., & Thrift, N. (eds.). (*2002). Handbook of cultural geography,* Sage.
25. Cosgrove, D. (1984). *Social Formation and Symbolic Landscape*, London: Croom Helm.
26. Cosgrove, D., & Daniels, S. (Eds.), (1988). *The Iconography of Landscape: Essays on the Symbolic Representation, Design and Use of Past Environments*, Cambridge University Press.
27. Lorimer, H. (2005). Cultural geography: the busyness of being more-than-representational. *Progress in human geography*, *29*(1), 83-94.
28. Mitchell, D. (1996). California: The Beautiful and the Damned' from the *'Lie of the Land: Migrant Workers and the California Landscape,* 13-35, Minneapolis: University of Minnesota Press
29. Mitchell, D. (2000). *Cultural Geography: A Critical Introduction*, Blackwell
30. Rose, G. (2008). Looking at Landscape: The Uneasy Pleasures of Power. In *The Cultural Geography Reader* (pp. 183-187), Routledge.
31. Sauer, C. O. (1925). *The Morphology of Landscape.* University of California Publications, Geography 2, 19-54.
32. Valentine, G. (2014). *Social geographies: space and society*, Routledge.
33. Whatmore, S. (2006). Materialist returns: practising cultural geography in and for a more-than-human world, *Cultural geographies*, *13*(4), 600-609.
34. Agnew, J., & Muscarà, L. (2012). *Making political geography*. Rowman & Littlefield Publishers.

35. Mamadouh, V., & Dijkink, G. (2006). Geopolitics, international relations and political geography: The politics of geopolitical discourse. *Geopolitics*, *11*(3), 349-366.
36. Agnew, J. A. (2000). Global political geography beyond geopolitics. *International Studies Review*, *2*(1), 91-99.
37. Painter, J., & Jeffrey, A. (2009). *Political geography*. Sage.
38. Short, J. R. (2002). *An introduction to political geography*. Routledge.

ENVIRONMENTAL GEOGRAPHY
(GEOG2-C03)
(100 Marks) - 4 Credits

Objectives:

To recognize human and environmental interactions with global and national initiatives for sustainable future.

Learning Outcomes:

After the completion of course, the students will have ability to:

1. Understand the dynamic interactive relationship between man and environment.
2. Have sound understanding on distribution, utilization and proper management of natural resources at global level.
3. Make assessment and review of planning and policies related to environment and natural resources
4. Understand the fundamental concepts of coupled human-environment system.

Course Content:

UNIT- I

Man and Environment Interdependence and Interrelationship. Population, Poverty and Economic Development, Environmental Resources Problems, Cultural Changes and Sustainability (Agricultural Revolution, Industrial Revolution and Information/Globalization Revolution). Environmental Movements in India.

UNIT- II

Environmental and Social Impact Assessment: Alternative Concepts, Origin and Evolution, Process and Evaluation Methods. Goals and Principles of EIA/SIA, Perennial Problems in EIA/SIA Implementation. Effects of EIA/SIA on Development Projects; Case Studies and Examples.

UNIT- III

Air Pollution: Major Air Pollutants, Their Source and Health Effects, Current Levels of Air Pollution in major Cities in India, Indoor Air Pollution, Photochemical and Industrial Fog, Acid Deposition. Water Pollution: Sources, Types, Criteria and Effect on Human Health. Eutrophication, Total suspended solids (TSS) and Total Dissolved Solids (TDS) in water. Regional Scenario of Surface Water Pollution in India and Control Strategies. Environmental Hazards (Biological and chemical) and its Effect on Human Health. Solid Waste Management Act in India. Urban waste Management (Solid and liquid) in Major Cities in India and Odisha with Special Reference to Swatch Bharat Mission and Smart City Project.

UNIT - IV

Sustainable Development: Concept, History, Definition and Goal; Dimensions of Sustainable Development, Green Technology and Green Development, Ecofeminism. Sustainable Use of Natural Resources: Concept of Reuse, Recover, and Recycle (3Rs). Principles of Carrying Capacity and Eco-Development. National Programme and Policies in India: National Clean Air; National Action Plan on Climate Change, National Environmental Policies of India; International Treaties, Programmes and Polices on Environment. Case Studies from World/India/Odisha

Suggested Readings

1. United Nations, ESCAP (1991). Environmental Impact Assessment: A Management Tool for Development Projects, New York.
2. G. Miller and Scott Spoolman (2018). Environmental Science, Brooks/Cole; 16th edition.
3. Henk, A. Becker (1997). Social Impact Assessment: Method and experience in Europe, North America and the Developing World. UCL Press.
4. Frank Vanclay and Daniel A. Bronstein (1996). Environmental and Social Imapact Assessment, John wiley & Sons Ltd.
5. Y. Anjaneyulu and Valli Manickam (2007). Environmental Impact Assessment Methodologies, BS Publications, Hyderabad.
6. Sunita Nayan (2016). Why I should be Tolerant: On environment and environmentalism in the 21st century, Centre for science and Environment.
7. David Reid (1995). Sustainable Development CAU Introductory Guide. Earthscan Publication Ltd. London.
8. Jonathan Turk (1989). Introduction to Environmental Studies, Saunders College Publishing.
9. United Nations (1992). Agenda 21: Programme of Action for Sustainable Development (Rio Declaration on Environment and Development), New York.
10. Nicholas Polunin (1971). The Environmental Future, Macmillan, in 6. Nicholas Polunin (eds.) Proceedings of the first International Conference on Environmental Future, Palgrave Macmillan UK.
11. I.G. Simmons (1993). Interpreting Nature (Cultural Constructions of the Environment). Routledge. London and New York.
12. P.A. Merriman and C. W. A. Browitt (1993). Natural Disasters: Protecting Vulnerable Communities, Thomas Telford, London.
13. P.R. Ehvlich, A.H. Ehrlich & J. P. Holderen (1978). Eco-Science Population, Resources and Environment, W.H.Freeman & Co Ltd, Sanfrancisco.
14. Pears Nigel (1977). Basic Bio-Geography, Longman Publishers, London.
15. R., U. Cooke and J.C. Doornkamp (1974). Geomorphology in Environmental Management: An Introduction, Oxford University Press, London.
16. Savindra Singh (1991). Environmental Geography, Prayag Pustak Bhawan, Allahabad.

17. A. N. Strahler and A. H., Strahler (1977). Geography & Man's Environment, John Wiley & Sons, New York.
18. H.H. Singh, Prithvish Nag, V.K. Kumra and Jagdish Singh (1985). Geography & Environment: Issues and Challenges, Concept Publishing Company, New Delhi.
19. Desh Bandhoo & Ekalvya Chauhan (1977). Current Trends in Indian Environment, Today & Tomorrow Publisher, New Delhi.
20. A. N. Strahler & A. H. Strahler (1973). Environmental Geo-Sciences - Interaction Between Natural System and Man, Wiley International Edition, Hamilten Publishing Company, Santa Barbara, California.
21. K. S. K. Valdiya (1987). Environmental Geography-Indian Context, Tata McGraw Hill Publishing Company, New Delhi.
22. Daniel D. Chiras (1997). Environmental Science Action for a Sustainable Future, The Benjamin/Cummings Publishing Company, Inc.
23. United Nations (2015). Integrating the three dimensions of sustainable development: A framework and tools.
24. UNEP (1997). Global Environment Outlook Oxford University Press, New York.
25. Govt. of India (2018). Smart Cities Mission. (http://smartcities.gov.in/content/).
26. Govt. of India (2018). Swachh Bharat Urban. (http://swachhbharaturban.gov.in/)

REGIONAL GEOGRAPHY OF ODISHA

(GEOG2-FE04)

(100 Marks) - 4 Credits

Objectives:

To study the physical, economical and social geography of Odisha. .

Learning Outcomes:

After the completion of course, the students will have ability to:

1. Students will lean in to the physiography, drainage, climate and agricultural scenario of Odisha
2. Know the industrial and mineral availability in Odisha with knowing the natural vegetation intensity.
3. Students will understand the natural hazards and vulnerability of Odisha against the multi-hazards (Covid-19 included)
4. Understand the demography and spatial distribution of various tribes in Odisha.

Course Content:

Unit-I

1- Introduction (Location, Administrative History)

2- Physiographic divisions, Geological structure

3- Climate – Climatic regions & Rainfall regions

4- Soil (Types, Distribution, Conservation Measures)

5- Natural Vegetation (Forest Types, Distribution, Forest Products and NTFPs Collection, Wild Life - Bio-sphere reserve, National Park, Wild Life Sanctuary and Eco-Tourism)

Unit-II

1- Drainage System, Drainage Basins & its Salient Features

2- Irrigation System, Multi-Purpose Irrigation Project (Major, Medium, Minor), Ground Water (Qualitative and quantitative) & its Distribution

3. Energy Resources

4- Agriculture (Types & Characteristics, Spatial Distribution, Production), Agro-Climatic Zones

5- Natural Hazards and Disasters in Odisha (Cyclones, Floods, Droughts, Earthquakes, Heat waves, Lightening etc., Biological Disaster – COVID 19 & Its Impact, Disaster Management & Policies, Coastal Zone Management

Unit-III

1-Mineral Resources (Iron, Manganese, Bauxite, Coal)

2-Industries (Large Scale, Medium Scale, Small Scale-Cottage, Handicraft), Industrial areas, Industrial Policies

3-Transport (Types & Distribution)

4-Tourism (Types, Important Tourist Place, Road Maps, Earnings from Tourism), Geomorphosites, Geo-heritages & their prospects in Odisha

5-Economic Development and Planning (Backward Region Planning-KBK), Geopolitics

Unit-IV

1- Demographic Division (Distribution, Density, Growth & Migration)

2- Population Composition (Sex Composition, Age Structure, Regional Composition, Rural/Urban Composition-Literacy, Occupational Structure), Problems and Prospects of Education in Odisha (Primary, Secondary & Higher Education)

3- People, Society & Culture (Spatial Distribution of Social Groups-Tribes, Tribal development Plan), Religion, Caste, Languages & Cultural Practices)

4- Health Care Planning & Problems in Odisha,

5- Urbanization in Odisha and Associated Problems (Urban Flooding, Slums, Pollution-Water, Air, Noise)

Suggested Readings

1. Sinha. B.N - Geography of Orissa
2. Ray G.C - Geography of Orissa
3. Economic Survey of Odisha

CARTOGRAPHY
(GEOG2-C05) (Practical)
(100 Marks) - 4 Credits

Objective:

To involve students with practical understanding on cartography.

Learning Outcomes:

After the completion of course, the students will have ability to:

1. Read and prepare maps.
2. Comprehend locational and spatial aspects of the earth surface.
3. Use and importance of maps for regional development and decision making.

Course Content:

1. Cartographic Data, Types of Measurement (Ordinal, Nominal, Interval & Ratio) Cartographic (Visual) Variables, Symbolization, Use of Point, Line and Area Symbols.

2. Preparation of Base Map, Map design and Layout.

3. Isopleths & Choropleth Maps,

4. Grouping Techniques & Classification of Cartographic Data. Calculation of Composite Index and Presentation by Choropleth Map.

5. Drawing and Interpretation of the following Thematic Maps.

(i) Population Distribution by Uniform & Multiple Dots.
(ii) Distribution of Urban Population spheres & proportional circles.
(iii) Climograph, Hythergraph, Ergograph.
(iv) Use of Composite Bars for distribution of data.

6. Map Projection

(i) Theory of Map Projections
(ii) The fundamental prosperities of a Map projection
(iii) The aspect of Map projection.
(iv) The special properties of a map projection
(v) Classification of map projections with special reference to construction of Universal Transverse Macerator's (UTM) projection, Conical with two standard Parallel, Sinusoidal and Polyconic projections.

7. Field Study / Seminar (15 Marks)

8. Practical Record and Viva (10 Marks)

Suggested Readings

1. Sarkar Ashis (2009). Practical Geography: A Systematic Approach, Orient BlackSwan.
2. International Cartographic Association (1984 & 1988). Basic Cartography for students and Technicians, Vol.I and Vol.2.
3. Muchrke, Philip, C. (1978). Map Use Reading, Analysis and Interpretation, J.P. Publications, Madison.

4. Monkhouse, F.J. and W.R. Wilkinson (1976). Maps and Diagrams, Methuen & Co., Ltd. London.
5. Robinson, A. (2002). Elements of Cartography, John Willey & Sons, New York.
6. Raisz, E. (1962). Principles of Cartography, McGraw-Hill Book Company, New York.
7. Mishra, R.P. (2014). Introduction to Cartography, Concept Publishing Co.
8. Singh, R.L. (2005). Elements of Cartography, Kalyani Publishers.

CHOICE BASED CREDIT SYSTEM

P.G. Syllabus
Third Semester

P.G. Department of Geography, Utkal University, Vani Vihar, Bhubaneswar

3rd Semester
(500 Marks, 20 Credits)

PRACTICAL	TITLE OF THE PAPER	MARKS	CREDITS
GEOG3 CO1	Quantitative & Spatial Methods (P)	100	04
	THEORY		
GEOG3 CO2	Oceanography	100	04
GEOG3 CO3	Basics of Remote Sensing & GIS	100	04
GEOG3 FE04	Research Methodology	100	04
GEOG3 FE05	Natural Hazards & Disaster Management	100	04

Members Board of Studies, Geography **Chairman, BOS, Geography**

QUANTITATIVE & SPATIAL MODELS
(GEOG3-C01) (P)
(100 Marks)-4 Credits

Objectives:

To orient students with quantitative and spatial models used in Geographical analysis.

Learning Outcomes:

After the completion of course, the students will have ability to:

1. Have sound knowledge regarding the classification and elements of maps.
2. Have proper utilization of maps for the development.
3. Appreciate the preparation of various thematic maps with the application of various techniques.
4. Put into practice the results obtained for spatial analysis of results and to apply various statistical software for the study.

Course Content:

1. Morphometric Analysis of Fluvial Landscape: Laws of Morphometry (Stream Order, Length, Area, Slope and Allometric Growth), Drainage Density, Sinuosity Index, Basin Circularity Ratio and Form Factor, Profiles, Clinographic Curve, Hypsographic Curve and Altimetric Frequency Graph
2. Mapping Vulnerability, Hazards and Disaster Risk Reduction (DRR) of Odisha
3. Rural and Urban Settlement Pattern: Nearest Neighbour Distance Technique and Chi-Square Test for Pattern Analysis, Centrographic Study of Settlements, Rank Size Relationships of Central Places, Population Potential and Interaction Model.
4. Network Analysis of Transport: Alpha, Beta and Gamma Indices, Degree of Circuitry, Detour Index and Degree of Development.
5. Measure of Agricultural Productivity (S.S Bhatia's Productivity Index and Mohd. Shafi's Modified Productivity Coefficient Index); Crop Combination Region (Weaver).
6. Population Projection (AP, GP, Gibbs and Registrar General of India Methods, Logistic Curve Fittings and Statistical Estimation).
7. Field Study/Seminar (15 Marks)
8. Practical Record and Viva. (10 Marks)

Suggested Readings

1. Strahler Alan (2016). Introducing Physical Geography, Wiley; Sixth edition.
2. Peter Hagget, Andrew Cliff and Allan Frey (1977). Locational Analysis in Human Geography, Edward Arnold, London.
3. Mahmood, Aslam (1998). Statistical Methods in Geographical Studies, Rajesh publication, New Delhi.
4. M.H. Yeates (1968). An Introduction to Quantitative Analysis in Economic Geography, McGraw-Hill, New York.
5. C., P. Cole & C. A. M. King (1969). Quantitative Geography , John Wiley and Sons Ltd., London.
6. R.J.Chorley and P. Hagget (1968). Models in Geography, Methuen and C.O. Ltd..
7. Garrison, W.L., and Marble, D.F. (1967). Quantitative Geography, N.W. University, Illinois.
8. Walter Isard (1968). Methods of Regional Analysis, MIT Press and Associates.
9. Peter Toyne (1971). Techniques in Human Geography, Macmillan.
10. K. Srinivasan (2013). Training Manual on Demographic Techniques, Census of India and UNFPA publication, Office of the RGI.

OCEANOGRAPHY

(GEOG3-C02)

(100 Marks) - 4 Credits

Objective:
To create a deeper understanding on oceanic landforms and processes with their global distribution keeping challenges encountered in the past and future scenario of the ocean lives.

Learning Outcomes:
After the completion of course, the students will have ability to:

1. Understand the oceanic process and availability of resources
2. Understand the evolution of various oceanic topography and features.
3. Know various process related to oceanic circulation and effect on globe.

Course Content:

UNIT-I

Meaning, nature and scope of Oceanography, Tectonic evolution of ocean basins, Bottom Relief of Oceans, Relief Features of Atlantic, Indian and Pacific

UNIT-II

Composition of sea water, Temperature, Density, Salinity of Oceans, its distribution & Determinants, T-S Diagram. Ocean Deposits – Classification & Distribution, Factors controlling the deposition and distribution of oceanic sediments.

UNIT-III

Ocean Circulation – Ocean Currents Waves & Tides – Types & Characteristics.
Factors associated with origin of Ocean Currents and its Impacts. Ocean Currents of Atlantic, Indian & Pacific Oceans.

UNIT – IV

Sea-level processes and sea-level change, transgression, regression, relative and eustatic sea level change, causes and consequences of sea level change, Pleistocene sea level. Hazards: Tsunami & Cyclone. Coral reefs & atoll: types & theories of origin. Marine Resources – Human Impact on Marine Communities. Coastal pollution & its impact on marine biodiversity including fisheries.

Suggested Readings

1. Basu, S. K. (2003). *Hand book of Oceanography*. Global Vision, Delhi.
2. Bird, E. (2000). *Coastal geomorphology-An introduction*. John Wiley & Sons.

3. Davis Richard, A. C. (1972). *Oceanography.* Addition Wesky Publishing Co.
4. Garrison, T. M. (1999). *Oceanography*. Barooks/Cole Wadsworth, New York.
5. Garrison, T. N. (2004). *Essentials of Oceanography*. Thompson. Australia.
6. Grant Gross, M. (1982). *Oceanography, Prentice*. Hall Ince, New Jersey.
7. King Cuchlain, A. M. (1962). *Oceanography for Geographers.* Edward Arnold.
8. Pethic John (1984). *An Introduction to coastal Geomorphology*. Arnold Heinemann, London.
9. Sharma and Vatal (1962). *Oceanography for Geographers*. Chaitnaya Publishing House, Allahabad.
10. Singh Savindra. (2012). *Oceanography.* Prayag Pustak Bhawan, Allahabad
11. Thurman Harold, V. (1985). *Introductory Oceanography*. Bell and Howell Co, London.
12. Tooley, M. M. and Shennan. (1987). *Sea Level Change*, Basil Blackwell, Oxford, U. K

BASICS OF REMOTE SENSING AND GIS
(GEOG3-C03)
(100 Marks) - 4 Credits

Objectives:

To create a basic understanding on remote sensing and Geographical Information System (GIS)

Learning Outcomes:

After the completion of course, the students will have ability to:

1. Know the concept and history of remote sensing
2. Understand various components and principles of GIS
3. Appreciate the strength and application of remote sensing
4. Develop the skill so as to use digital satellite data using software
5. Prepare the maps based with satellite data to compare with the ground realities.

Course Content:

Unit – I Basics of Computer

Basics of Computer & File Management, Understanding MS office, excel & PowerPoint
Text editing, Files & Folders
Data management & overview of GIS and RS Software's

Unit-II Remote Sensing

Concepts, History Development, Stages in RS-EMR, EMR Spectrum, Theories of EMR, Types of RS and Laws of Radiation.
Interaction of EMR: Interaction with Earth's atmosphere
Spectral Signature: Interaction with soil, water and vegetation
Platforms, Sensors, Orbits: Types of platform, types of sensors, cameras and satellite orbits
Principles of aerial photography and Satellite Data Generation, formats and Satellite & Aerial Photograph data products
Digital Elevation Model (DEM), Application Remote Sensing in Natural Resource Management.

Unit-III GIS

Introduction to GIS (Definitions, evolution, components)
Hardware & Software requirements
Spatial data: Types of Geographic data, Spatial data models, Representation of Geographic features in vector, raster data models. Concept of arc, node, vertices and topology.
Non-Spatial data Database and Data base Management System. Conceptual implementation

models, Hierarchical, Network, Relational models. RDBMS: components, concept, database Spatial data input - Digitization, error identification. Errors: Types, sources,
Concepts of GPS: Introduction to GPS & types, navigation systems and Applications

Unit-IV Exercise on GIS & RS

Spatial Data inputs – Georeferencing & Digitization
Spatial and Non-Spatial data management,
Identification of features in the field using aerial photographs and/or satellite images, GPS Field Survey
Spatial data manipulation and editing
Creation of Thematic map

Suggested Readings:

1. Agrawal, N.K. (2004). *Essentials of GPS*, Spatial Networks PVT Ltd. Hyderabad.
2. Burrough, P.A & Mcdonnell. R.A (2000). *Principles of Geographic Information system*, Oxford University Press New York.
3. Burrough, P.A. (1987). *Principles of Geographical Information System for Land Resources*, Assessment Clarendon Press, Oxford.
4. Fazal Shahab (2008). *GIS Basics*. New Age International Publishers, New Delhi.
5. George, B & Korte.P.E (2001). *The GIS Book*, Thomson Asia PVT Ltd, Singapore.
6. Haywood Ian. (2011). *An Introduction to Geographical Information System*, Person Education. Singapore
7. Hurn Jeff (1993). *Differential GPS Explained*. Trimble Navigation Publication.
8. Kumar S.(2005). *Basics of Remote Sensing and GIS*. Firewall Media.
9. Lemmens Rob (20003). *Internet GIS Applications*. ITC.
10. Lillisand, Kaifer & Chipman (2015). *Remote Sensing and image interpretation*, Wiley Publication, London
11. Paul J Curran (1983). *Principles of Remote Sensing*. Wiley publication, London.
12. Paul. R Wolf (2013). *Elements of Photogrammetry*. McGraw Hill Education.
13. Rabinson. A & others (1978). *Elements of Cartography.* John Willey and Sons New Delhi.
14. Raize E.(1962). *Principles of Cartography.* McGraw Hill Book Company, New Delhi.
15. Ramphal, K.K.(1999). *Hand Book of Arial Photography and Interpretation.* Concept Publications, New Delhi
16. Reddy, M. A. (2001). *Remote Sensing and Geographical Information Systems*. B. S. Publications, Hyderabad.
17. Sahu, Kali Charan (2007). *Text Book of Remote Sensing and Geographical Information Systems*. Atlantic Publishers and distributers, New Delhi
18. Singh. RL & Rana, P.B. (2011). *Elements of Practical Geography.* Kalyani Publishers, New Delhi.

RESEARCH METHODOLOGY

(GEOG3-FE04)

(100 Marks) - 4 Credits

Objective:

To strengthen the understanding of research methods applied in social sciences among the students.

Learning Outcomes:

After the completion of course, the students will have ability to:

1. Know the fundamentals of social science research and research process model
2. Understand various aspect of conducting preliminaries of a scientific research
3. Grasp the techniques of data collection and compilation
4. Prepare systematic literature review and plagiarism

Course Content:

Unit – I

1.1 Concept and Definition of Social Science Research, Salient Features of Students Research, Classification of Research, Basic Norms of Scientific Community

1.2 Research Process Model: Steps and Interpretation

Unit – II

2.1 Selecting and Justifying a Research Topic

Source of suggestions for Topics, Techniques for Generating Research Topics

2.2 Preliminaries of Research

The Issue, Problem Identification or Statement of Problem, Research Rationale, Scope and Limitation, Assumption or Premise, Research Objectives, Research Question and Hypothesis, Budgeting and Working with a Supervisor, Development of a Research Proposal.

Unit –III

3.1 Coordination Schema (Assembling the components of a research e.g. Objectives, Parameters, Variables and Values), Utility, Format, Fitting, Approach, Steps, Construction

3.2 Methods of Data Collection, Source (Primary and Secondary), Types, Reconnaissance, observation, survey, interviews (Structure and Unstructured and Scheduled), Group Discussion, Key Informants, Methods for Developing a Structured Questionnaire and Survey.

UNIT – IV

4.1 Literature Review

Finding the literature (Types Searching Skills etc), Managing the Literature (Keeping Track, Annotating, Summary and Critical Comment), Using the Literature (Exploring a Topic, Developing a Research Question, Articulating a Rationale and Designing Method), The Formal Literature Review (Purpose, Coverage, The Writing Process, Style and Tone), Plagiarism and how to avoid it.

4.2 Planning for the Research Project

Need, Network Planning, Resources and Scheduling, Role of Network Planning in Research

Suggested Readings

1. James A. Black & Dean J. Champion, John (1976). *Methods and Issues in Social Research*. Wiley and Sons.
2. Delbert C. Miller (1983). *Handbook of Research Design and Social Measurement*. Longman, USA
3. Karl E. Weber & I.P. Tiwari (1992). *Research and Survey Format Design: An Introduction*. AIT, Bangkok.
4. Thomas L Bruton & Gordon E. Chery (1970). *Social Research Techniques for Planners*. Routledge, London
5. Ranjit Kumar (2011). *Research Methodology: A Step by Step Guide for Beginners*. Sage Publications India New Delhi.
6. Zina O' Leary (2010). *The Essential Guide to Doing Your Research Project*. Sage Publications India, New Delhi.
7. Bridget Somekh and Cathy Lewin (2010). *Research Methods in Social Sciences*. Vistar Publications, New Delhi.
8. Gerard Guthire (2010). *Basic Research Methods*. Sage Publications India, New Delhi.
9. Michael Jay Polonsky and David S. Waller (2010). *Designing and Managing Research Project*. Sage Publications India, New Delhi.
10. Britha Mikkelsen (2005). *Methods for Development Work and Research: Anew Guide for Parishioners*. Sage Publications India, New Delhi.
11. Uwe Flick (2010). *An Introduction to Qualitative Research*. 4th edition, Sage Publications India, New Delhi.

NATURAL HAZARDS & DISASTER MANAGEMENT

(GEOG3-FE05)

(100 Marks) - 4 Credits

Objectives:

Making students to understand all the dimensions of natural and man-made disasters and disaster management framework.

Learning Outcomes:

After the completion of course, the students will have ability to:

1. Understand processes and impact of disaster
2. Understand both the natural and man-made disaster and human negligence in context of environment
3. Gain a perspective of disasters and various dimensions of disaster management
4. Have comprehensive knowledge of various natural and manmade disasters in India
5. Examine the response and mitigation measures of disasters

Course Content:

UNIT-I

Natural Hazards and Disasters: Meaning and Concept, Dimensions and Implications of Disasters. Disaster management: Legislation, Institutional/organizational Frameworks and Disaster management Policies with Special Reference to India and Odisha

UNIT-II

Type, Occurrence and Characteristics of Disaster: Earthquake, Flood, Cyclone, Drought, Volcanic Eruption, Tsunami, Landslide, Bushfire, Epidemic, Hailstorms, Heat wave. Case Studies from Odisha/India

UNIT- III

Vulnerability and Risk: Concept, Assessment Methods; Vulnerability Analysis; Major Requirements for Coping with Disaster. Role of NGOs, Warning System, Public Awareness and Community Participation in Disaster Management

UNIT-IV

Concept and components of Disaster Management Cycle: Long Term Measures (Prevention and Mitigation); Prior to Disaster Impact (Preparedness), Response to Disaster Impact (Response), Post Impact Factors (Recovery, Post Disaster Review and Development). Case Studies from Odisha/India

Suggested Readings

1. P.A. Merriman and C. W. A. Browitt (Edited) (1993). Natural Disasters: Protecting Vulnerable Communities. Thomas Telford, London.
2. Carter, W. Nick, (1991). Disaster Mitigation: A Disaster Manager's Handbook. Asian Development Bank.
3. Asian Development Bank (1991). Disaster Mitigation in Asia and Pacific. Asian Development Bank, Manila, Philippines.
4. Government of India (2009). National Policy on Disaster Management, Ministry of Home Affairs
5. Government of India (2005). The Gazette on disaster management Act, 2005.
6. P.R. Ehrlich, A.H. Ehrlich & J. P. Holderen (1972). Eco-Science Population, Resources and Environment. Freeman and Company, Sanfrancisco.
7. G.F., White (1974). Natural Hazards: Local, National & Global (Ed). Oxford University Press, London.
8. Cooper, M. (2019). Seven Dimensions of Disaster: The Sendai Framework and the Social Construction of Catastrophe. In K. Samuel, M. Aronsson-Storrier, & K. Bookmiller (Eds.), The Cambridge Handbook of Disaster Risk Reduction and International Law (pp. 17-51). Cambridge: Cambridge University Press. doi:10.1017/9781108564540.004
9. UN (2009). UNISDR Terminology on Disaster Risk Reduction.
10. Du, Y., Ding, Y., Li, Z., & Cao, G. (2015). The role of hazard vulnerability assessments in disaster preparedness and prevention in China. Military Medical Research, 2(1), 1-7.
11. Rehman, S., Sahana, M., Hong, H., Sajjad, H., & Ahmed, B. B. (2019). A systematic review on approaches and methods used for flood vulnerability assessment: framework for future research. Natural Hazards, 96(2), 975-998.
12. Building Materials and Technology Promotion Council (2019). VULNERABILITY ATLAS OF INDIA. (https://bmtpc.org/DataFiles/CMS/file/VAI2019/background.pdf).

CHOICE BASED CREDIT SYSTEM

P.G. Syllabus
Fourth Semester
Special Paper
Urban and Regional Planning

P.G. Department of Geography, Utkal University, Vani Vihar, Bhubaneswar

SPECIAL PAPER

1. **URBAN AND REGIONAL PLANNING**
2. **REMOTE SENSING AND GIS**

THEORY	**TITLE OF THE PAPER**	**MARKS**	**CREDITS**
GEOG4 CO1	1. Urban Planning 2. Cartography	100	04
GEOG4 CO2	1. Regional Planning 2. Remote Sensing And Its Applications	100	04
GEOG4 CO3	1. Rural Development Planning 2. GIS Applications	100	04
GEOG4 CO4	1. Urban And Regional Planning (P) 2. Aerial Photography Remote Sensing GPS And GIS (P)	100	04
GEOG4 CO5	Dissertation	100	04

Members Board of Studies, Geography **Chairman, BOS, Geography**

M.A/M.Sc. Geography Syllabus Fourth Semester

2021-2022

P.G Department of Geography,
Utkal University, Vani Vihar,
Bhubaneswar

The Course shall comprise Three Theory papers each of these hours duration carrying 100 Marks one dissertation with presentation and viva-voce carrying 100 marks and one Practical Paper of not less than six hours duration carrying 100 marks. The students have to opt for one special paper offered in the department.

Semester-IV

Special Paper

(A) Urban and Regional Planning

(B) Remote Sensing And GIS

Title of the paper **Marks**

Theory

Paper-Geog4 C01 **100 Marks -4 Credits**

(A) Urban Planning

(B) Cartography

Paper-Geog4 C02 **100 Marks -4 Credits**

(A) Regional Planning

(B) Remote Sensing and Its Applications

Paper-Geog4 C03 **100 Marks -4 Credits**

Practical

Paper-Geog4 C04

(A) Urban and Regional Planning Practical

(B) Aerial Photography Remote Sensing, GPS and GIS Practical

Paper-Geog4 C05 Dissertation **100 Marks -4 Credits**

Special Paper
URBAN AND REGIONAL PLANNING
GEOG4-CO1 (A)
Urban Planning
100 Marks,-4 Credits

Objective:
To deeply analyze the process of urbanization and urban dynamicity in world and India.

Learning Outcomes:
After the completion of course, the students will have ability to:

1. Learn the role of urbanization and urban studies as a distinct fields of human geography
2. Have sound knowledge of key concept, different components of urbanization along with its drivers
3. Examine dynamics of urbanization and characteristic with contemporary issues
4. Understand the fundamentals and patterns of urbanization process
5. Learn the functional classification of cities and Central Place Theory
6. Know contemporary problems of Delhi, Mumbai, Kolkata and Chennai

Course Content:

Unit I

Urban Geography-Meaning. Concepts, scope and Approaches Development of Urban Geography (world and India), Oridin and Evolution of Towns (Factors, Stages of Evolution) in India And World (Ancient Medieval and Modern)

UNIT-II

Urbanization process cycle of Urbanization, Trend of Urbanization in India .Factors Influencing Urban Morphology, Types of Urban Morphology, Theories of Urban Morphological Growth Axiate Theory, Concentric Zone Theory, Sector Theory, Multiple Nuclei Theory. Composite Theory Functional Classification of Towns -Basic & Non Basic functions, Quantitative and Qualitative Classification of Towns

Unit-III

Functional Zones-C.B.D, Urban System Analysis Rank-Size Rule, City Primacy , Umlaland , Morphology of Indian cities (Vanarasi,, Dwelhi, Kolkata , Chandigarh , Bhubaneswar)

Unit-IV

Urban Issues And Planning- Landuse, Transport, Water Sanitation, Drainage And Sewage And Slums, National Urbanization Policies and 74th Constitutional Amendment Act-Salient Features. Urban poverty.

Special Paper
URBAN AND REGIONAL PLANNING
GEOG4-C02 (A)
REGIONAL PLANNING
100 Marks, 4 Credits.

Objective:

To introduce various aspects of a region and regional planning processes with prioritizing the planning initiatives implemented in India.

Learning Outcomes:

After the completion of course, the students will have ability to:

1. Identify notable lagging regions and solutions for their overall development
2. Have comprehensive understanding regarding the different regions and application of different models and theories for integrated regional development.
3. Select appropriate indicators for the measurement of socio-economic regional development.

Course Content:

Unit-I

Concept of Region and Regioanl Planning (Concept, Scope, Content and Types of Reginal Planning) Historical Delelopment of Regional Planning (Regional Planning in Developed. Less Developed World India and Current Status of Regioal Planning.
Regional Development Models/Theories (Spatial, Non Spatial Models, Strategies for Development).

Unit-II

Regional Planning through the Development of a Central place. Growth polo and Growth centers in Regional Development Strategy. Theories of Regional Growth and Location, E. Hoover, A. Losch.

Unit-III

Regional Imblance and Disparity in India. Planning Regions of India. Problem and Prospects of Regional Planning (Conceptual Problems, Probelm Related to Methodology and Techniques. Geographic Inforamtion system for Regional Planing.

Unit-IV

Multi-Purpose River Basin Planning with Focus on Damodar Valley Region. Decentralized Planning with Emphasis on Districts Planning in India. Social Dimensions of Regional Development. Delineation of Planning Region, Intra state Planning Region, planning For Tribal Developent of odisha.

References:

Glason, J. (1974). *An Introduction to Regional Planning*. Huutchinson & Coia Ltd. London
Mishra R.P. (1971). *Regional Planning*

Mishra R.P. (1978) *Regional Planning and National Development*.
Routray, J.K. (1992). *Decentralization Process and its Impact of Area Development in Selected Blocks of Orissa, India*. Asian Institute of Technology. Bangkok.
Sethy, K.M. (2013). *Regional Planning*. Enkey Publishing House. New Delhi
Sundaram, K.V. (1997). *Decentralized Multi Level Planning (Principles And Practice: Asian And African Experiences)*. Concept Publishing Company. New Delhi.
Sundaram. K.V. (1977). *Urban and Regional Planning in India*.

Special Paper
URBAN AND REGIONAL PLANNING
Paper -GEOG4-C03 (A)
Rural Development Planning
100 Marks, 4 Credits.

Objective:
To implement a broad framework in grassroot level of planning in India and the challenges encountered.

Learning Outcomes:

After the completion of course, the students will have ability to:

1. Appreciate the concepts, needs and various approaches to rural development;
2. Understand the strong economic bases of rural areas of India;
3. Appreciate the area based and target group based approaches and provision of services to rural development.

Course Content:

Unit-I
Concept of Rural Developemnt , Basic Elements of Rural Development ,
Retionale of Rural Development , Growth varsus Development Rising Expectations and Development . Development and Change Dilemmas in Developmnet , Approaches to Study of Rural Development

Unit-II
Rural Poverty: Concept. Causes, Nature, Biases (Spatial Project, Person, Season Diplomatic and Professional). Cluster of Disadvantages and Deprivation Trap Rural Poverty Aleviation Measures , Rural Poverty Scenario in India

unit-III
Rural Development Policies , Regional and Rural Development Poicies and Programes in India (Past and Present)

Unit-IV
Rapid Rural Appraisal and Participatory Rural Appraisal The 73rd Constitution Amendment Act. And its impact on Rural Development. Peoples Participation and Role of Voluntary Organizations in Rural Development.

Special Paper

URBAN AND REGIONAL PLANNING

GEOG4-CO4 (A)

Urban and Regional Planning Practical

100 Marks, 4 Credits.

Objective:

To make students acquainted with the practical aspect of regional planning.

Learning Outcomes:

After the completion of course, the students will have ability to:

1. Understand the basics of data collection and, processing for the meaningful outcomes
2. Understand the selection of proper sampling techniques for the collection of data

Course Content:

Section I Practical Exercises on the following problems-80 Marks

(a) Delimitation of C.B.D

(b) Delimitation of City Region.

(c) Rural Service Center Planning

(d) Delimitation of Agricultural Regions

(e) Delimitation of Planning regions

(f) Development of a Structured Questionnaire and observation Schedule for Research Data Collection.

Section-II Practical Record & Viva-Voce-20 Marks

Paper-GEOG4 CO5

Dissertation (Documentation+ Presentation + Viva) 100 Marks Credits

Special Paper

URBAN AND REGIONAL PLANNING

GEOG4-CO5 (A)

Urban and Regional Planning Practical

100 Marks, 4 Credits.

Objective:

To encourage students for pursuing research in the post-Graduation level.

Learning Outcome:

1. While preparing their dissertation students will be advised regularly by the Guides and will be submitting their collected data and analysis.
2. This dissertation will show a student's knowledge on research methodology and application of remote sensing and GIS in real world.

Course Content:

1. **Dissertation** **100**

   Marks

Text Books and Reference

Special Paper
Urban and Regional Planning

1. Harold M. Mayer and Clyde F., Kohn (Edited) Readings in Urban Geography, Central Book Development , Allahabed ,1967
2. Arthur B. Gallions and Simon, Eisuer-The Urban Pattern (City Planning and Design) Van Nostrand Lreinhold Company. The New Your, 1969.
3. Melville C.- Branch Comprehensive City Planning , Planners Press American Planning Association, Washington ,D.C., 1985
4. Harold Carter -The Study of Urban Geography, Edward Arnold, London, 1982.
5. Murphyu, R.E. -The American City.
6. Dickinson. L.R.-City and Region.
7. Dickinson, E,- The West European City.1968.
8. Berry, B.J.I. Geographic Prespective of Urban Systems, 1970.
9. Bourne, I.S.- Internal Structure of Cities , Readings in Space Environment.
10. Goodman, W.-Principles and Parctices of Urban Planning 1968
11. Hancock, J.- Urban Development and Planning ,1980
12. Harbert , I.D.T.- Uran Geography.1982
13. Mishra, R.P- Million Cities of India, 1978
14. Sinha, B.N-Sirsi-AN Urban Study.1970
15. Sinha, B.N-Urban Studies- An Aid to Research, 1970.
16. Tripathy, S.N-Cuttack-Bhubaneswar Urban Complex (in Bhubaneswar An Urban Survey) 1975
17. Sinha, R.L-Banaras-A Study in Urban Geography,1955
18. Sinha, B.N. -Bangalore-AN Urban Study , 1955
19. Singh. R.L- Urban Geography in Developing Countries, 1973.
20. Singh,S.B-Emerging Frontiers of Urban Settlement Geography, 1995
21. Smile, A.K.E-The Geography of Towns,1962
22. Tasneja, K.I-Morphology of India Cities1971
23. Taylor. G- Urban Geography's 1964
24. Thakur. M.S-India's Urban Problems 1962.
25. Walkar. M.L Urban Blight and Slums,1938
26. Nroa, K-Control and Urban and Regional Planning, 1973
27. Rame Gowda. K.S-Urban and Regional Planning, 1972.
28. Adams. T- Outline of Town & Country Planning, 1935
29. Harorld Carter Introduction Urban Historical Geography. Edward Arnold, London 1983.
30. Raza, Moonis -Edited Regional Development Heritage Publishers , New Delhi 1988
31. Sundaram, K.V-decentralized Multi Level Planning (Principles and Practice Asian and African Experiences). Concept Publishing Company, New Delhi .1997.
32. Friedmann. J. and William Alonso (Edited) Regional Development and Planning the MTT Press Cambridge Massachusetts-1964.
33. Glasson, J.-An Introduction to Reginal Planning. Hutchinson & Coia (Publishers) Ltd London 1974
34. Friadman, J and clyde Weaver-Territory and Function (The Evolution of Regions planning), Edward Arnold. 1979
35. Gore, C- Regions in Question (Space, Development Theoty and Regional Policy) Mahesh-.London and New York,1984
36. Chand, Mahesh-Regional Planning in India, 1983.
37. Mishra, R.P.- Regional Planning ,1971.

38. Mishra R.P Regional Planning and national Development ,1978
39. Sundaram, K.V. Urban & Regional Planning in India, 1977.
40. Sharma, P.R. -Regional Policies and Development in the Third world,1994
41. Sharma, B.D. The web of Poverty, 1989.
42. UNO (Escap) Guidelines for Rural Center Planning, 1979.
43. Dixon, C-Rural Development in the Third World, Routledge, London and New York, 1990.
44. Routry, J.K.-Geogrpahy of Regional Disparity in Orissa, HSD Program. Asian Institute of Technology Bangkok, 1993.
45. Routray J.K. Decentralization Process and Its Impact of Area Development in Selected Blocks of Orissa India, Asian Institute of Technology, Bangkok, 1992.
46. Routray, J.K.-G.B.Thapa and A. Ahmed, Participatory Planning Frame Work for Disrict development , Hsd Program, Asian Institute of Technology , Bangkok 1996.
47. Barabara Harriss and et. al (edited) Poverty in India ,Research and policy Oxford University Press, Bombay,1990.

CHOICE BASED CREDIT SYSTEM

P.G. Syllabus
Fourth Semester

Special Paper
Remote Sensing and GIS

P.G. Department of Geography, Utkal University,
Vani Vihar, Bhubaneswar

Members Board of Studies, Geography **Chairman, BOS, Geography**

M.A/M.Sc. Geography Syllabus Fourth Semister-2021-2022
P.G. Department of Geography
Utkal University Vani Vihar, Bhubaneswar

The course shall comprise three theory Papers each of three hours duration carrying 100 Marks , one dissertation with presentation and Viva-voce carrying 100 marks and one Practical Paper of not less than six hours duration carrying 100 marks . The students have to opt for one special paper offered in the department

Semester-IV (B) Remote sensing And GIS
Special paper

Title of the paper	**Marks**

Theory

Paper-Geog4CO1 **100 Marks-4Credits**
(B) Cartography

Paper-Geog4CO2 **100 Marks-4Credits**
(B) Remote Sensing and its Applications

Paper-Geog4CO3 **100 Marks-4Credits**
(B) GIS & its Applications

Practical

Paper-Geog4CO4 **100 Marks-4Credits**
(B) Aerial Photography Remote Sensing, GPS and GIS Practical

Paper-Geog4CO5
(B) Dissertation **100 Marks-4Credits**

Special Paper

REMOTE SENSING AND GIS
Cartography
GEOG4 C01 (B)-100 Marks-4 Credits.

Objective:
To make students understand the modern ways of cartography and techniques.

Learning Outcomes:
After the completion of course, the students will have ability to:

1. Students will understand the science behind cartography.
2. Know coordination system used in mapping with digital map making.
3. Know various mapping techniques (compilation, map production).

Course Content:

Unit I: Science of Cartography
Introduction to cartography, Scope and nature. History of development of cartography Modern cartography and technology changes, Sources of cartographic data-ground survey, remote sensing, census and data from sample surveys.

Unit-II: Measuring the Earth
Properties of sphere, the earth, its shape and size, coordinate reference system on the sphere-Cartesian coordinates and rectangular coordinates. Geographical coordinate's grid systems, UTM grids, Map scale; Types. Utility, determining the scale of a map,

Unit-III: Graphic means of communication
Cartographic design; objectives of map design, scope of design, control of map design and design planning, symbolization; visual variables in symbolization, symbolizing geography features points, lines and areas. Colour and pattern use; function of colour and pattern in map design, enhanced design effectiveness, special colour design problems. Typography and lettering.

Unit-IV: Mapping techniques
Map compilation ; the compilation process, compilation worksheet , accuracy and reliability rights and responsibility, Map reproduction; reflection, transmission, digital lithography, plate making press work, trend in map reproduction, cartographic techniques and methods in preparation of diagrams and maps; qualitative thematic maps; soil and vegetation maps, quantitative thematic maps: choropleth, isopleths, proportional symbol, dots methods, Automation and computer assisted cartography; Cartography and GIS.

Books Recommended

1. Bailey, T. and Gatrell, A.C (1995): Interactive Spatial Data Analysis. Longman, Harlow. Dorling, D. and Fairbron, D. (1997): Mapping ways of responding the world. Longman, Harlow. Fraser taylor, D.R. (1980): the Computer in contemporary Cartography. John wiley and sons, New yourk.

2. Fraser Taylor, D.R. (ed). (1983): Graphic Communication and Design in Contemporary Cartography. John wiley and sons, New York.
3. Griffith, D.A. and Amehein (1997): Multivariate Statistical Analysis for Geographers. Prentice Hall,
4. Englewood Cliffs, New Jersey.
5. Griffith, D.A and amehein (1997): Statistical Analysis for Geographers. Prentice Hall, Englwood Cliffs, New jersey.
6. Kanetakar, T.P. and kulkarni, S.V. (1967): Surveying and Levlling, Part II, A.V.G. Prakashan, Poona. Keates, J.S. (1973): Cartographic Design and Production, Logman Group Ltd.
7. Monkhouse, F.J. and Wilkinson, H.R (1962): Maps and Diagrams, Methuen and Company ltd and Company Ltd., London.
8. Nag, P. (ed.) (1984): Census Mapping survey, Concept publishing company, New Delhi,
9. Nair, N. B. (1996): Encyclopaedia of Surveying, Mapping and Remote Sensing. Rawat Publications. Jaipur and New Delhi.
10. Reisz, E (1962): Principles of Cartography. Mc Graw Hill Books Company, Inc., New York.
11. Misra, R.P. and Ramesh, A. (1999): Fundamentals of Cartography. Concept Publishing Company, London.
12. Robinson, A. H. H., Sale R., Morrison J. and Muehrcke, P.C (1984): Elemnets of Cartography. 6th edition john wiley and Sons, New York.
13. Shaw, G. and Wheeler, D. (1994): Statistical Techniques in Geographical analysis Prentice Hall, Englwwood Cliffs, New Jersey.
14. Ludhiana and New Delhi. (English and Hindi Editions).
15. Strahler, A.N. (1971): the Earth Sciences. Harper and Row Publishers; New York.
16. Thrower, N. (1996): Maps and Civilization. Cartography. Culture and Society. University of Chicago Press, Chicago.
17. Wnwin, D. (1982): Introductory spatial Analysis. Methuen and Company ltd, London.

Special paper

REMOTE SENSING AND GIS
GEOG4 CO2 (B)-100 Marks-4 Credits
Remote sensing and Applications

Objective:

To align the students with the modern ways of capturing remotely sensed data and techniques to use in real life.

Learning Outcomes:

After the completion of course, the students will have ability to:

1. Know the concept and history of remote sensing
2. Understand the aspects related to satellites and digital image processing (image enhancement, contrast manipulation, image classification) with the application of SLAR, SAR and Lidar data.
3. Know about remote sensing satellites and sensors.
4. Understand the fundamentals of aerial photography and their application in in Land Use Landcover (LULC), mapping of vegetation and agriculture.

Course Content:

Unit-I

Concept & historical development of remote sensing. Stages in Remote Sensing, Electro-magnetic radiation; Electro-magnetic Spectrum, Types of Remote Sensing & Laws of Radiation, Interaction of EMR with atmosphere and Earth's surface features (Water, Soil & Vegetation), Spectral Signature

Unit-II Satellite Orbit, Sensors, Platforms & Its Types, Resolution of remote sensing data, Digital image processing; Digital images & its types, Image rectification ,image enhancement, contrast manipulation, Image classification; supervised and unsupervised, Microwave remote sensing: concepts and Principles, active and passive microwave remote sensing, SLAR, SAR and application of microwave remote sensing, Lidar: definition, components and applications.

Unit-III Remote sensing satellites and sensors: Satellite remote sensing: history and development of various types of satellites and space programme with special reference to Indian space research programme, Earth resource satellites and data products; IRS series of satellites and data products , Satellite Image Interpretation, techniques of visual image interpretation, ground verification Application of remote sensing in Land use/land cover Mapping, Water Resources and Disaster Management, Global Positioning system - fundamental concepts, GPS Components (Space, Ground control and receiver segments) and signals, Classification of GPS receivers and GPS applications. DGPS

Unit-IV Aerial Photography: Introduction to aerial photography: definition, history of aerial photography, scale, projection, flight planning and overlap, Types of aerial photographs and stereoscopic vision Geometry of aerial photographs: over flat terrain and variable terrain, Airphoto interpretation and application: Landuse/land cover, mapping of vegetation and agriculture.

Books Recommended:

1. Agrawal, N.K.: Essentials of GPS, Spatial Network Pvt . Ltd Hydrabad .2004
2. American Society Photogrammetry: Manual of Remote Sensing ASP, Falls church , VSA. 1993, Vol. I,II
3. Barrett, E.C. & L.F.Curtis: Fundamentals of Remote Sensing and Air Photo Interpretation, Mc Millan, New York, 1992
4. Compbell,J.: Introduction of Remote Sensing , Guilford, New York,1989
5. Curran, Paul J.: Principles of Remote Sensing, Longman, London, 1985
6. Hord, R.M.: Digital Image processing of Remotely SensData, Academic, New York, 1989
7. Hurn Jeff. Differential GPS Explained, Trimble
8. Luder, D: Aerial Photography Interpretation : Principles and Application, McGraw Hill, New York,1959
9. Pratt, W.K: Digital Image Progessing. Willey, New York,1978
10. Ramphal, K.K.(1999) Hand Book of Aerial Photography and Interpretation, Concept Publications, New Delhi.
11. Rao. D.P.(eds.) : Remote sensing for Earth Resources, Association of Exploration, Geophysicist , Hydrabad,1998
12. Thomas, M. Lillesand & Ralph W.Kefer: Re mote Sensing and image Interpretation, John Willey &U sons, New York,1994
13. Wolf Paul, K.: Element of Photogrammetry , McGraw Hill Book. Co.
14. Chouhan, T.S. & K.N. Joshi: Applied R.S. and Photo Interpretation , Vigyan Prakashan Jodhpur.
15. Gautam, N.C.: SPGU-Technology of Geography, N.R.S.A . Hydrabad
16. Singh, S.: Remote Sensing Technology, Scientific Publication, Jodhpur
17. Rao, D.P.(eds.) Remote Sensing for Earth Resources, Association of Exploration Geophysists, Hydrdabad.1998

Special Paper
REMOTE SENSING AND GIS
GEOG4 CO3 (B)100 Marks-4 Credits
GIS and its applications

Objectives:

To familiarize students with the GIS and its application in Geographical analysis.

Learning Outcomes:

After the completion of course, the students will have ability to:

1. Understand various components and principles of GIS
2. Construct the thematic maps using different digital layers
3. Have comprehensive understand of GIS for the construction of maps and their use the development planning

Course Content:

Unit-I Introduction to GIS

GIS: Definition, Concept, Evolution components, Objective and scope, Hardware and software requirements, General data base concept: Spatial and Non spatial data

Unit-II GIS Database

Geographic data sources; Land survey, remote sensing, census and sampling, Data Quality, Sources of error & Natural variations, Data conversions; Relational Database model, data compression, GIS functioning ; Data-digitizing and scanning-preprocessing-Data manipulation, analysis

Unit-III GIS data structure and management

Data Structure; Raster and Vector, Database Management Systems, Concept of DEM, DTM & DSM. Digital Elevation Models (DEM); Characteristics and applications, Web-based GIS; Definition, methods and applications

Unit-IV GIS Applications

Integration of GIS and Remote sensing, GIS as decision making tools, GIS application areas; Urban Planning and Environmental Planning. Disaster Management, Agriculture. Google Earth Applications

References:

1. Anjali Reddy , M. Remote sensing and Geographical information Systems Book Syndicate Hydrabad, 2000
2. Arnoff S.: Geographic information Systems: A Management Perspective. DDL Publication Ottawa.1989.

3. C.P.Lo and Albert K.W. Yeung. Concepts and Techniques of Geographic Information System.2002 Prentice-,Hall India,
4. ESRI. Understanding GIS-Redlands, USA:ESRI
5. Fazal shahab.GIS Basics, New Age International Publishers, New Delhi.
6. Fraser Taylor D.R Geographic Information Systems. Pergamon Press Oxford,1991
7. Geoge B Korte, P.E. The GIS Book, Thomson Asia Pte Ltd, Singapore
8. Heywood I (el.) An Introduction to Geographical Information Systems Pearson(2011)
9. Lan Heywood, Sarah Cornelius, Steve Carver: An introduction to Geographical Information Systems, Longman,1998.
10. Kang-Tsung-Chang, Introduction to Geographical Information Systems,2002 McGRaw Hill. Lemmerns Rob, Internet GIS Applications ITC.
11. Maquire D.J, M.F. Goodchild and D.W Rhind(eds). Geographic information Systems: Principles and Application. Taylor and Francis, Washington , 1991
12. Mark S Mononier. Computer Assisted Cartography Pretice Hall, Engleword Cliff, New Jesey,1982
13. P.A Burrough and R.A. McDonnell, Priciples of Geographical Information System,2000 Oxford University Press.
14. Paul A Lonfley, Michel F. Goodchild, dJ. Maguire and D.W. Rhind, Introduction to Geographic Information Systems and Science ,2002, John Wiley and Sons Ltd
15. Peuquet D.J. And D.F. Marble. Introductory Reading in Geographic information Systems, Taylor & Francis Washington,1990.
16. Sahu, Lali Charan. Text Book of Remote Sensing and Geographical Information Systems. Atlantic publishers and distributers, New Delhi.
17. Star, J. and J. Estes. Geographic Information Systems: An Introduction. Prentice Hall Englewood cliff, New Jersey, 1994.

Special Paper

REMOTE SENSING AND GIS
GEOG4 CO4 (B) 100 Marks-4 Credits
Aerial Photography, Remote Sensing, GPS and GIS Practical

Section I: Practical Exercises on the following problems -80 Marks

Objective:

To encourage students to understand and carryout practical applications of GIS, Remote sensing.

Learning Outcomes:

After the completion of course, the students will have ability to:

1. Appreciate the strength and application of remote sensing
2. Map the resources, their location and availability
3. Develop the skill so as to use digital satellite data using software
4. Prepare the maps based with satellite data to compare with the ground realities.
5. Classify digital data for the land use/land cover and urban studies
6. Apply GIS in various geographical studies

Course Content:

Unit-I Remote Sensing Applications

Satellite Image Interpretation (Visual Image Interpretation and Digital Image Interpretation), Identification of ground truth locations on satellite imagery, GPS survey Area mapping, road mapping. Digital image analysis technique (Supervised & Un-Supervised Classification) Mapping form satellite imagery- Land use/ Land cover, Wet land Mapping, Watershed Delineation through DEM, Terrain Evaluation (Elevation, Slope, Aspect etc), Estimation of Land Surface Temperature Bhavan – an Overview, Google Earth Application

Unit-II Aerial Photography Applications

Testing of stereo vision, Determination of Scale of Aerial photographs, Determination of object height on aerial photographs, Interpretation of stereo pair of aerial photographs Elements of image characteristics and interpretation of images, Mapping of landforms, Drainage, urban and rural settlements, agriculture and industry,

Unit-III GIS Applications

Spatial and Non -Spatial data management, Exercise of GIS soft were, Map Layouts, designs and output generation, GIS single layer operations-clip, split, dissolve, map join,

buffering, overlay functions in GIS-union, intersection creation of thematic maps choropleth and dot methods charts, Integration of RS and GIS

Section-II Practical Record and Viva-Voce 20marks

Paper-GEOG4-CO5 - Internship Project on RS & GIS Application Areas

Dissertation -100 Marks-4 Credits

Objective:

To encourage students for pursuing research in the post-Graduation level.

Learning Outcomes:

1. While preparing their dissertation students will be advised regularly by the Guides and will be submitting their collected data and analysis.
2. This dissertation will show a student's knowledge on research methodology and application of remote sensing and GIS in real world.

Course Content:

1. **Dissertation** **100 Marks**

References:

1. Campbell, J.B)2002) Interduction to Remote Sensing, Taylor and Francis London
2. Francis. H.Moffitt: Photogrammetry, International Text Books Co.Scranton, Pennsylvania 1959.
3. Heywood I., Cornelius S., Carrer S., An Introduction to Geographical Information Systems person Education Pvt Ltd., 2002.
4. Kang-Tsung-Chang, Introduction to Geographical Information Systems,2002 McGRaw Hill. Lemmerns Rob, Internet GIS Applications ITC.
5. Lattman & Ray. Aerial Photographs in Field Geology . Holt. Reinhart & Winston, New York 1965.
6. Leuder, D.R Aerial Photographic interpretation . McGraw Hill , New Your,1960.
7. Lillesand, T.M. And Ralph, K.W. (1999): Remote Sensing and Image Interpretation john wiley and Sons, Singapore.
8. Lo C.P., and Yeung A. W.,-Concepts and Techniques of Geographical Inforamation Systems. Prentice Hall of India Pvt Ltd,.2002
9. Remote Sensing-An Introductory Text Book, The International Institute for Geoinformation Science-Nethrelands
10. Sabins. F.F(1996): Remote Sensing: Principles and Interpretation , Freeman and Company, san Francisco
11. Schowengerdt. R.A(2006): Remote Sensing: and Methods for Image Processing Academic Press , Boston. Taylor D.R.F, GIS: The Micro Computer and Modern Cartography , Pergamon Press, Oxford
12. Tempfi, K., Kerle , N., Huurneman, G. and Janssen, L.F.(Eds) (2009): Principles of Remote Sensing -An introductory Text Book , The International Institute for Geoinformation Science- Netherlands