

Outcome Based Education

SYLLABUS

for

Master of Arts / Science

in

GEOGRAPHY

UNDER

CHOICE BASED CREDIT SYSTEM



SESSION – 2025-27

SCHOOL OF GEOGRAPHY

GANGADHAR MEHER UNIVERSITY

AMRUTA VIHAR, SAMBALPUR -768004

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Post Graduate Programme Structure

The Master's programme is a two-year course divided into four semesters each of six-month duration. A student is required to complete 88 credits for the completion of course and the award of degree.

year	semesters	
First year	Semester I	Semester II
Second year	Semester III	Semester IV

The information about the title of courses, credit hours, division of marks etc. of all semester is given below.

Part-I: Semester-I

Papers		Marks			Total Marks	Duration (Hrs)	Credit Hours
Paper No	Title	Mid Term	Assignments	End Term			
101	Advanced Geomorphology	20	10	70	100	3	4
102	Geographical Thought	20	10	70	100	3	4
103	Population Geography	20	10	70	100	3	4
104	Geography of India	20	10	70	100	3	4
105	Cartographic Techniques (Practical)				100	3	4
Total					500		20

Part-I: Semester-II

Papers		Marks			Total Marks	Duration (Hrs)	Credit Hours
Paper No	Title	Mid Term	Assignments	End Term			
201	Climatology	20	10	70	100	3	4
202	Economic Geography	20	10	70	100	3	4
203	Statistical Methods in Geography	20	10	70	100	3	4
204	Fundamentals of GIS & Remote Sensing	20	10	70	100	3	4
205	Remote Sensing & GIS Applications (Practical)				100	3	4
DSE Papers*							
206 A	Geography of Tourism	20	10	70	100	3	4
206 B	Geography of Odisha	20	10	70	100	3	4
206 C	Political Geography	20	10	70	100	3	4
Total					600		24

*Discipline Specific Elective Paper. Any one paper can be opted by Masters students of School of Geography. Minimum student strength to run the course in each elective paper should be 8.

Part-II: Semester-III

Papers		Marks			Total Marks	Duration (Hrs)	Credit Hours
Paper No	Title	Mid Term	Assignments	End Term			
301	Oceanography	20	10	70	100	3	4
302	Socio and Cultural Geography	20	10	70	100	3	4
303	Settlement Geography	20	10	70	100	3	4
304	Remote Sensing and Image Processing	20	10	70	100	3	4
305	Field survey Methods (Practical)				100	3	4
IDSE Papers**							
306 A	Introduction to Geography	20	10	70	100	3	4
306 B	Human Geography	20	10	70	100	3	4
306 C	Economic Geography	20	10	70	100	3	4
Total					600		24

**Inter discipline specific elective paper. Any one paper can be opted by students of other Schools of G. M. University.

Part-II: Semester-IV

Papers		Marks			Total Marks	Duration (Hrs)	Credit Hours
Paper No	Title	Mid Term	Assignments	End Term			
401	Regional Development & Planning	20	10	70	100	3	4
402	Environmental Geography	20	10	70	100	3	4
403	Disaster Management	20	10	70	100	3	4
404	Urbanisation and Migration	20	10	70	100	3	4
405	Project work report and VIVA VOCE (practical papers)			50+50	100	3	4
Total					500		20
22 papers	Grand Total				2200		88

Semester	Core Courses			Discipline Specific Elective			Inter Discipline Specific Elective			Total No. of Papers	Credits (Per Paper)	Grand Total Credits
	No. of Papers	Credits (Per Paper)	Total Credits	No. of Papers	Credits (Per Paper)	Total Credits	No. of Papers	Credits (Per Paper)	Total Credits			
I	5	4	20	Nil	NA	NA	Nil	NA	NA	5	4	20
II	5	4	20	1	4	4	Nil	NA	NA	6	4	24
III	5	4	20	Nil	NA	NA	1	4	4	6	4	24
IV	5	4	20	Nil	NA	NA	Nil	NA	NA	5	4	20
Total	20	4	80	1	4	4	1	4	4	22	4	88

SEMESTER - 1

GEO – 101: Advanced Geomorphology

Credit = 4

F.M. = 100 [20 (Mid Term) + 10 (Assignment) + 70 (End Term Exam)]

Prerequisite Course / Knowledge (If any): Basic knowledge of Geomorphology

Aim of the Course:

is to train students in relevant topics of Advance Geomorphology covering its theoretical and practical aspects in order to use the understanding developed in spatial planning and management activities.

Course Outcomes:

After completion of this course, the students will be able to:

- I. Analyze complex geomorphic processes and landforms at an advanced level, including their formation, evolution, and interrelationships. Evaluate and apply advanced quantitative methods wherever required.
 - II. Critically assess the role of tectonics, climate, and human activities in shaping landscapes over various spatial and temporal scales.
 - III. Synthesize interdisciplinary knowledge to understand the holistic functioning of geomorphic systems and communicate effectively the outcomes.
 - IV. Apply principles of geomorphology to address real-world problems related to environmental management, land use planning, hazard mitigation, and natural resource conservation.
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Course Contents:

Unit 1. Perspectives in Geomorphology

- 1.1. Evolution of Geomorphological thoughts and ideas: A general review; Historical Benchmarks in Geomorphology; Progress of Geomorphology in India;
- 1.2. Concepts of scale: spatial, temporal, equilibrium and threshold; Morphogenetic regions;
- 1.3. Approaches to Geomorphology: Structural, climatic, applied and systems approach.
- 1.4. Principles of landform classification: Genetic and hierarchical.

(Covers OBE level – Remember, Understand and Apply)

Unit 2. Fundamental Concepts – I

- 2.1. Earth - A brief review of basics: Origin (Big-bang theory); shape, size and movements of earth; Age (geological history and clock), structure and composition (crust, mantle and core); Location of a place on earth; Rock and Minerals
- 2.2. Forces that produce landforms: Geomorphic process: Endogenetic and Exogenetic forces

(Covers OBE level – Remember, Understand, Apply and Analyse)

Unit 3. Fundamental Concepts – II

- 3.1. Movement of crust: Continental Drift Theory (A. Wegner); Plate tectonics theory; Mountain building theory (comparative assessment of Kober's and Jeffrey's)
- 3.2. Theories of Isostasy (comparative assessment of Airy, Pratt and Heiskanen)

- 3.3. Geomorphic Cycle and Land Forms; Weathering – concept, controlling factors and types; Erosion – concept, Cycle of erosion (Davis's model, Penck's model), interruptions in cycle and rejuvenation of cycle;

(Covers OBE level – Remember, Understand, Apply, Analyse and Evaluate)

Unit 4. Applied Geomorphology in –

- 4.1. Water and coastal management
- 4.2. Mineral exploration and engineering related works
- 4.3. Regional planning and urbanisation
- 4.4. Hazard and disaster management

(Covers OBE level – Remember, Understand, Apply, Analyse, Evaluate and Create)

Reading List

- 1. Allison, R. (2002). *Applied Geomorphology: Theory and Practices*, Wiley Europe,
 - 2. Bunnett, R.B. (1965), *Physical Geography in diagrams*, Orient Longman Limited
 - 3. Bridges E. M., 1990: *World Geomorphology*, Cambridge University Press, Cambridge.
 - 4. Christopherson, Robert W., (2011), *Geosystems: An Introduction to Physical Geography*, 8 Ed., Macmillan Publishing Company
 - 5. Gautam, A (2010): *Bhautik Bhugol*, Rastogi Publications, Meerut
 - 6. Hails, J.R. *Applied Geomorphology*, Elsevier, Amsterdam, 1977
 - 7. Kale V. S. and Gupta A., 2001: *Introduction to Geomorphology*, Orient Longman, Hyderabad.
 - 8. Kenneth, J.G. and Lewin, J. (2014). *The Basics of Geomorphology: Key Concepts*, Sage Publications, <http://dx.doi.org/10.4135/9781473909984>
 - 9. Selby, M.J., (2005), *Earth's Changing Surface*, Indian Edition, OUP
 - 10. Skinner, Brian J. and Stephen C. Porter (2000), *The Dynamic Earth: An Introduction to physical Geology*, 4th Edition, John Wiley and Sons
 - 11. Singh, S. (2009): *Physical Geography*, Prayag Pustak, Allahabad
 - 12. Starhler & Strahler: *Advanced Physical Geography*. John Wiley, New York
 - 13. Thornbury W. D., 1968: *Principles of Geomorphology*, Wiley.
 - 14. Wooldridge & Morgan (1968) – *Principle of Geomorphology*.
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GEO – 102: Geographical Thought

Credit = 4

F.M. = 100 [20 (Mid Term) + 10 (Assignment) + 70 (End Term Exam)]

Prerequisite Course / Knowledge (If any): Basic understanding of Geographic concepts.

Aim of the Course:

To provide basic conceptual understanding of evolution of geographical concepts and approaches.

Course Outcomes:

After completion of this course, the students will be able to:

- I. Analyze and evaluate the historical development of geographical thought from ancient to contemporary perspectives.
 - II. Examine the contributions of prominent geographers and thinkers to the evolution of geographical thought and Synthesize and compare diverse geographical perspectives
 - III. Identify and critically assess key theoretical frameworks and paradigms in geography.
 - IV. Apply geographical theories and concepts to analyse and interpret real-world phenomena, and Engage in critical reflection on the social, political, and cultural contexts that shape geographical knowledge production and dissemination and communicate effectively.
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Course Contents:

Unit 1. Introduction

- 1.1. Meaning, Philosophy & Purpose of Geography; Place of Geography in classification of science.
- 1.2. Changing paradigm – Environmental determinism, Possibilism, Aerial differentiation, Spatial Organization.
- 1.3. Dualism- Systematic vs Regional, Physical vs Human
- 1.4. Human-Environment Interaction;

(Covers OBE level – Remember and Understand)

Unit 2. Contribution of different school of thought

- 2.1. Geographic knowledge in ancient & medieval period.
- 2.2. Contribution of German and French School.
- 2.3. Contribution of British and American School.

(Covers OBE level – Remember, Understand, Apply and Analyse)

Unit 3. Contemporary Trends

- 3.1. Quantitative Revolution in Geography
- 3.2. Behaviouralism, Humanism & Radicalism
- 3.3. Structuralism & Post Structuralism; Mordenism & Postmodernism

(Covers OBE level – Remember, Understand, Apply and Analyse)

Unit 4. Future of Geography

- 4.1. Changing nature, concepts, approaches & methodologies of geography in globalizing world;
- 4.2. Progress in Indian Geography;
- 4.3. Contribution of Indian Geographers

(Covers OBE level – Remember, Understand, Apply and Analyse)

Reading list

1. Arentsen M., Stam R. and Thuijjs R., 2000: *Post-modern Approaches to Space*, ebook.
 2. Bhat, L.S. (2009) *Geography in India (Selected Themes)*. Pearson
 3. Bonnett A., 2008: *What is Geography?* Sage.
 4. Clifford, N.J (2002) – The Future of Geography, GEOFORUM, Vol.33, pp 431-436
 5. Dikshit R. D., 1997: *Geographical Thought: A Contextual History of Ideas*, Prentice– Hall India.
 6. Hartshorne R., 1959: *Perspectives of Nature of Geography*, Rand MacNally and Co.
 7. Holt-Jensen A., 2011: *Geography: History and Its Concepts: A Students Guide*, SAGE.
 8. Johnston R. J., (Ed.): *Dictionary of Human Geography*, Routledge.
 9. Johnston R. J., 1997: *Geography and Geographers, Anglo-American Human Geography since 1945*, Arnold, London.
 10. Kapur A., 2001: *Indian Geography Voice of Concern*, Concept Publications.
 11. Martin Geoffrey J., 2005: *All Possible Worlds: A History of Geographical Ideas*, Oxford.
 12. Soja, Edward 1989. *Post-modern Geographies*, Verso, London. Reprinted 1997: Rawat Publ., Jaipur and New Delhi.
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GEO – 103: Population Geography

Credit = 4

F.M. = 100 [20 (Mid Term) + 10 (Assignment) + 70 (End Term Exam)]

Prerequisite Course / Knowledge (If any): None.

Aim of the Course:

To provide basic conceptual understanding of demographic concepts, population theories and policies.

Course Outcomes:

After completion of this course, the students will be able to:

- I. Explore the nature, scope and evolution of population geography and the patterns, processes, and factors influencing the distribution, composition, and change of human populations over time and space.
 - II. Investigate the temporal trend and spatial distribution of population at various scales, from global to local, and examine the reasons behind them such exploring the complex relation between population and environment.
 - III. Learn demographic skills to analyse population data, including various related measures.
 - IV. Critique the role of government policies, both historical and contemporary, in shaping population dynamics, and evaluate their effectiveness in addressing demographic challenges.
-

Course Contents:

Unit 1. Defining the field and Data Sources:

- 1.1. Nature and scope of population geography.
- 1.2. Sources of population data; Population data from UN publications.
- 1.3. Population data sources in India-Census, National Sample Survey; Unique Identification Scheme (UID) & National Population Register (NPR).

(Covers OBE level – Remember and Understand)

Unit 2. Population-Resource Relationship:

- 2.1. World distribution of population; Factors affecting population distribution.
- 2.2. World population growth and density.
- 2.3. Population-Resource Regions of the world.
- 2.4. Malthus theory of Population.

(Covers OBE level – Remember, Understand and Apply)

Unit 3. Population dynamics:

- 3.1. Determinants, measures and theories of fertility
- 3.2. Determinants and measures of Mortality and Morbidity
- 3.3. Determinants, measures and theories of Migration
- 3.4. Demographic transition theory

(Covers OBE level – Remember, Understand, Apply and Analyse)

Unit 4. Population problems, Prospects and Policies:

- 4.1. Changing Population composition (age, sex & occupation) and its socioeconomic implications.
- 4.2. Population problems of developed and developing countries.
- 4.3. Causes and consequences of Aging.
- 4.4. Population policies of developed and developing countries with a special focus on India.

(Covers OBE level – Remember, Understand, Apply and Analyse)

Reading list

1. Barrett H. R., 1995: *Population Geography*, Oliver and Boyd.
 2. Bhende A. and Kanitkar T., 2000: *Principles of Population Studies*, Himalaya Publishing House.
 3. Chandna R. C. and Sidhu M. S., 1980: *An Introduction to Population Geography*, Kalyani Publishers.
 4. Clarke J. I., 1965: *Population Geography*, Pergamon Press, Oxford.
 5. Hassan, M.I. 2020 : *Population Geography: A Systematic Exposition*, Routledge, New York.
 6. Jones, H. R., 2000: *Population Geography*, 3rd ed. Paul Chapman, London.
 7. Lutz W., Warren C. S. and Scherbov S., 2004: *The End of the World Population Growth in the 21st Century*, Earthscan
 8. Newbold K. B., 2009: *Population Geography: Tools and Issues*, Rowman and Littlefield Publishers.
 9. Pacione M., 1986: *Population Geography: Progress and Prospect*, Taylor and Francis.
 10. Wilson M. G. A., 1968: *Population Geography*, Nelson.
 11. Panda B P (1988): *Janasankya Bhugol*, M P Hindi Granth Academy, Bhopal
 12. Maurya S D (2009) *Jansankya Bhugol*, Sharda Putak Bhawan, Allahabad
 13. Chandna, R C (2006), *Jansankhya Bhugol*, Kalyani Publishers, Delhi
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GEO – 104: Geography of India

Credit = 4

F.M. = 100 [20 (Mid Term) + 10 (Assignment) + 70 (End Term Exam)]

Prerequisite Course / Knowledge (If any): Basic understanding about India would be helpful.

Aim of the Course:

is to provide essential and advanced understanding of Geography of India that could be used in analyses during simultaneous modules.

Course Outcomes:

After completion of this course, the students will be able to:

- I. Gain comprehensive understanding of the physical geographical features of India including physiography and climate.
 - II. Evaluate human geographical features of India including demographic characteristics, population distribution, rural and urbanization trends, and socio-cultural diversity of India.
 - III. Investigate the economic activities, resource base, industries, agriculture, trade networks, and development challenges in different regions of India.
 - IV. Discuss the role spatial planning, urban growth, infrastructure development, and regional disparities in India.
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Course Contents:

Unit 1. Physiographic and climatic characteristics of India

- 1.1. Physiographic division of India;
- 1.2. Soil types and distribution;
- 1.3. Vegetation - types and distribution in India;
- 1.4. Climatic characteristics of India, Monsoon mechanism in India

(Covers OBE level – Remember and Understand)

Unit 2. Social composition of India

- 2.1. Population: distribution and growth and associated basic characteristics;
- 2.2. Social composition of India: Religion, Language; Tribe; Caste system in India
- 2.3. Settlement Pattern – urban and rural

(Covers OBE level – Remember, Understand and Apply)

Unit 3. Mineral resources and industries in India

- 3.1. Distribution, pattern and utilization of coal, Iron ore, Bauxite, Petroleum, Natural gas
- 3.2. Major Industries - Iron and Steel, Aluminum Industry, Automobile, Cotton Textile Industry

(Covers OBE level – Remember, Understand, Apply and Analyse)

Unit 4. Agricultural resources in India

- 4.1. Production and distribution of rice, Wheat, Cotton;
- 4.2. Agro-climatic region of India

(Covers OBE level – Remember, Understand, Apply and Analyse)

Reading List -

1. Deshpande C. D., 1992: India: A Regional Interpretation, ICSSR, New Delhi.
 2. Johnson, B. L. C., ed. 2001. Geographical Dictionary of India. Vision Books, New Delhi.
 3. Mandal R. B. (ed.), 1990: Patterns of Regional Geography – An International Perspective. Vol. 3 – Indian Perspective.
 4. Sdhasuk Galina and P Sengupta (1967): Economic Regionalisation of India, Census of India
 5. Sharma, T. C. 2003: India - Economic and Commercial Geography. Vikas Publ., New Delhi.
 6. Singh R. L., 1971: India: A Regional Geography, National Geographical Society of India.
 7. Singh, Jagdish 2003: India - A Comprehensive & Systematic Geography, Gyanodaya Prakashan, Gorakhpur.
 8. Spate O. H. K. and Learmonth A. T. A., 1967: India and Pakistan: A General and Regional Geography, Methuen.
 9. Tirtha, Ranjit 2002: Geography of India, Rawat Publs., Jaipur & New Delhi.
 10. Pathak, C. R. 2003: Spatial Structure and Processes of Development in India. Regional Science Assoc., Kolkata.
 11. Tiwari, R.C. (2007) Geography of India. Prayag Pustak Bhawan, Allahabad
 12. Sharma, T.C. (2013) Economic Geography of India. Rawat Publication, Jaipur
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GEO – 105: Cartographic Techniques

(Practical)

Credit = 4

F.M. = 100 [20 (Project Work) + 10 (Assignment) + 70 (End Term Exam)]

Prerequisite Course / Knowledge (If any): Basic understanding of mapping would be helpful.

Aim of the Course:

is to provide essential cartographic skills to the students and educate them in effective map-making as per the requirement.

Course Outcomes:

After completion of this course, the students will be able to:

- I. Understand the fundamental principles of Cartography and Map Design and Layout to create aesthetically pleasing and effective maps.
 - II. Expert in managing geographic data and cartographic process to create different types of maps using different geographic data using various techniques.
 - III. Enhance Visualisation as well as Spatial Thinking skills to visualize and analyse spatial relationships and patterns using maps and spatial data.
 - IV. Develop the ability to effectively communicate through maps and interpret maps critically.
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Course Contents:

Unit 1. Overview of Cartography

- 1.1. Need and scientific basis of map-making (Cartography); History of Cartography
- 1.2. Types of maps – brief review of general-purpose map and thematic maps (Choropleth, Isopleth, Chorochromatic, proportional symbol, dot maps including multiple dots, flow maps, and cartograms);
- 1.3. Basic elements of map
- 1.4. Use of Diagrams in Geography Use of Diagrams in Geography- Climograph, Hydergraph, and Ergograph

(Covers OBE level – Remember, Understand and Apply)

Unit 2. Fundamentals of Map-making

- 2.1. The reference system – Geographic Coordinate system; Datum;
- 2.2. Map projections: need, properties (four distortions –direction, distance, shape and size) and classification;
- 2.3. Key projections (brief review): Conical projection (one standard & two standard parallels), Cylindrical Projection (Equal Area), Universal Transverse Mercator's projection (UTM).

(Covers OBE level – Remember, Understand, Apply and Analyse)

Unit 3. Designing the map

- 3.1. Preparation before mapping: Audience, medium and purpose of the map; Steps in map production;
- 3.2. Basic elements of map: Major (main body of map), Marginal information (Graticules and Grids, legend/index, title, north arrow, scale, labels and map specifications)
- 3.3. Design principles: hierarchy and balance
- 3.4. Symbolization of data (Quantitative and Qualitative) using key components –
 - 3.4.1. Geometry (Point, line and Area) and
 - 3.4.2. Visual Variables (Shape, size, Hue and Value)
- 3.5. Final map layout: Cartographic considerations (placing major and minor components on map)

(Covers OBE level – Remember, Understand, Apply, Analyse, Evaluate and Create)

Unit 4. Map Interpretation

- 4.1. Morphometric Analysis: Stream order, Sinuosity Index and Bifurcation Ratio; Drainage Density
- 4.2. Topographic & Weather Maps interpretation

(Covers OBE level – Remember, Understand and Apply)

Record & Viva would carry 20 % of marks of Total

Reading List

1. Anson R. and Ormelling F. J., 1994: *International Cartographic Association: Basic of Cartographic Vol.* Pregmen Press.
2. Gupta K. K. and Tyagi V. C., 1992: *Working with Maps*, Survey of India, DST, New Delhi.
3. Kraak M.-J. and Ormeling F., 2003, 2020: *Cartography: Visualization of Geo-Spatial Data*, Prentice-Hall.
4. Mishra R. P. and Ramesh A., 1989: *Fundamentals of Cartography*, Concept, New Delhi.
5. Manson, S. M. (ed) (2017). *Mapping, Society, and Technology*. Minneapolis, Minnesota: University of Minnesota Libraries Publishing. URL: <https://open.lib.umn.edu/mapping>
6. Monkhouse F. J. and Wilkinson H. R., 1973: *Maps and Diagrams*, Methuen, London.
7. Sharma J. P., 2010: *Prayogic Bhugol*, Rastogi Publishers, Meerut.
8. Robinson A. H., 2009: *Elements of Cartography*, John Wiley and Sons, New York.
9. Singh R. L. and Singh R. P. B., 1999: *Elements of Practical Geography*, Kalyani Publishers.
10. Bhopal Singh R L and Duttta P K (2012) *Prayogatama Bhugol*, Central Book Depot, Allahabad

Online Resource:

1. Commonwealth of Australia on behalf of ICSM, 2021. *Fundamental of Mapping* [online]. Available at - <https://www.icsm.gov.au/education/fundamentals-mapping> [Accessed on: 11/06/2021]
 2. Gimond, Manuel, 2021. *Intro to GIS and Spatial Analysis* [online]. Available at - <https://mgimond.github.io/Spatial/index.html> [Accessed on: 11/06/2021]
 3. Manson, S. M. (ed) (2017). *Mapping, Society, and Technology*. Minneapolis, Minnesota: University of Minnesota Libraries Publishing. URL: <https://open.lib.umn.edu/mapping>
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SEMESTER - II

GEO – 201: Climatology

Credit = 4

F.M. = 100 [20 (Mid Term) + 10 (Assignment) + 70 (End Term Exam)]

Prerequisite Course / Knowledge (If any): Basic knowledge of high school physics and math

Aim of the Course:

It aims to provide students with an integrated knowledge on the Earth's climate, understanding of physical climate processes and principles and laws that govern climate.

Course Outcomes:

After completion of this course, the students will be able to:

- I. List the composition and structure of atmosphere; describe insolation and heat budget; explain the greenhouse effect, relate insolation and heat budget of an area.
 - II. Tell reasons of spatial variation in temperature on earth surface, explain the reason of thermal inversion, apply the concept of thermal inversion for solving air pollution; apply the concept of insolation to temperature variations and analyze its impact on atmospheric variables like pressure and wind at different spatial scale.
 - III. Relate heat and water content through atmospheric process of evaporation, condensation, cloud formation; apply the concept of saturation and dew point in humidity, compare the different types of humidity, classify and distinguish rain causing clouds and precipitation and rainfall.
 - IV. Outline the different types of airmass; understand and compare the development and effect of extreme weather condition like cyclone, front; Appraise the use of different climate classification system
-

Course Contents:

Unit 1. Earth's atmosphere and heat budget

- 1.1 Composition & Structure of Atmosphere; Chemical Composition of Atmosphere- Homosphere & Heterosphere
- 1.2 Insolation and Factors affecting distribution of insolation;
- 1.3 Heat Budget of Earth

(Covers OBE level – Remember, Understand and Apply)

Unit 2. Temperature variation and its effect

- 2.1 Temperature and factors controlling distribution of temperature; Horizontal & Vertical Distribution of temperature, Cause and effect Temperature Inversion
- 2.2 Atmospheric pressure and its measurement, Horizontal distribution of pressure & pressure belt
- 2.3 Wind and its types, Planetary Wind, Effect of Coriolis force on wind, Jet stream, Monsoon.

(Covers OBE level – Remember, Understand, Apply and Analyse)

Unit 3. Atmospheric water

- 3.1 States of water and latent heat, and Evaporation; Condensation;
- 3.2 Water Vapour - concept of saturation, Dew point, Humidity measurement, Absolute Humidity, relative Humidity, Specific Humidity
- 3.3 Classification of Cloud; Forms of precipitation; Types of Rainfall and its measurement

(Covers OBE level – Remember, Understand, Apply and Analyse)

Unit 4. Applied Climatology in –

- 4.1 Meaning, properties and source of Airmass
- 4.2 Fronts, its Classification, development and effect
- 4.3 Origin, characteristics and effects of Tropical and Extra Tropical Cyclone
- 4.4 Climate classification basic, Koeppen's and Thornthwaite's Classification of Climate
- 4.5 Effect of pollution, urbanization and natural disaster on climate.

(Covers OBE level – Remember, Understand, Apply and Analyse and evaluate)

Reading List

- 1. Barry R. G. and Carleton A. M., 2001: Synoptic and Dynamic Climatology, Routledge, UK.
- 2. Barry R. G. and Corley R. J., 1998: Atmosphere, Weather and Climate, Routledge, New York.
- 3. Critchfield H. J., 1987: General Climatology, Prentice-Hall of India, New Delhi
- 4. Lutgens F. K., Tarbuck E. J. and Tasa D., 2009: The Atmosphere: An Introduction to Meteorology, Prentice-Hall, Englewood Cliffs, New Jersey.
- 5. Oliver J. E. and Hidore J. J., 2002: Climatology: An Atmospheric Science, Pearson Education, New Delhi.
- 6. Trewartha G. T. and Horne L. H., 1980: An Introduction to Climate, McGraw-Hill.
- 7. Lal, D S (2006): Climatology, Sharda Pustak Bhawan, Allahabad
- 8. Vatal, M (1986): Bhautik Bhugol, Central Book Depot, Allahabad
- 9. Singh, S (2009): Climatology, Prayag Pustak Bhawan, Allahabad

GEO – 202: Economic and Resource Geography

Credit = 4

F.M. = 100 [20 (Mid Term) + 10 (Assignment) + 70 (End Term Exam)]

Prerequisite Course / Knowledge (If any): Basic knowledge of economic development and natural resources

Aim of the Course:

to provide a critical understanding of resource available to be used by humans and how they can be conserved and managed sustainably.

Course Outcomes:

After completion of this course, the students will be able to:

- I. Gain comprehensive understanding of the fundamentals of Economic and Resource Geography and debate surrounding it.
 - II. Investigate Spatial patterns of Economic development by examining the factors affecting and concepts of economic development as well as assessing theories for growth and localisation.
 - III. Evaluate different resource geography models and appraise, relate, compare, and differentiate them particularly the models related to natural resources
 - IV. Appraise and Interpret different resources in terms of their conservation and management and summarise their challenges and sustainability
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Course Contents:

Unit 1. Basics of Resource Geography

- 1.1. Nature, Scope and Significance of Economic Geography
- 1.2. Nature, Scope and Significance of Resource Geography;
- 1.3. Definition and Concept of Resources; Classification of Resources.
- 1.4. Concept and types of economic activities;

(Covers OBE level – Remember and Understand)

Unit 2. Spatial patterns of Economic development

- 2.1. Factors affecting location of economic activities-Von Thunen's Agricultural Location Theory; Industrial Location Theory of Weber and Smith.
- 2.2. Economic Development: Concept and Indicators; Global Patterns of development- Classification of countries.
- 2.3. Rostow's stage model of economic growth
- 2.4. Environment vs Development Debate

(Covers OBE level – Remember, Understand, Apply and Analyse)

Unit 3. Natural Resources: Review, models and contemporary debates

- 3.1. Brief review of natural resources –Land, Water and Forest
- 3.2. Models in Resource Geography: Zimmermann's Primitive and Advance Models of Natural Resource Process; Kirk's Decision Model; Brookfield System Model.
- 3.3. Impact of globalization on resources; Future Prospects of Natural Resources

(Covers OBE level – Remember, Understand, Apply and Analyse)

Unit 4. Conservation and Management of Natural Resources

- 4.1. Meaning and Concept of Conservation of Natural Resources;
- 4.2. Conservation and Management Methods of Natural Resources (Land, Water and Forest);
- 4.3. Sustainable Natural resource Management – History; Goals (emphasizing SDGs);
- 4.4. Problems of Natural Resource Management in India.

(Covers OBE level – Remember, Understand, Apply, Analyse and Evaluate)

Reading List

1. Alexander J. W., 1963: *Economic Geography*, Prentice-Hall Inc., Englewood Cliffs, New Jersey.
2. Bagchi-Sen S. and Smith H. L., 2006: *Economic Geography: Past, Present and Future*, Taylor and Francis.
3. Coe N. M., Kelly P. F. and Yeung H. W., 2007: *Economic Geography: A Contemporary Introduction*, Wiley-Blackwell.
4. Eliot Hurst, M.E. (1972) *A Geography of Economic Behaviour: An Introduction*, Duxbury Press, California.
5. Gautam, Alka, (2013): *Geography of Resources*, Sharda Pustak Bhawan, Allahabad.
6. Guha, J.L. and P.R.Chattopadhyay (1994) *Economic geography- A Study of Resources*, The World Press Pvt. Ltd. Calcutta
7. Gurjar, R.K. and Jat, B.C. (2012): *Sansadhan Bhugol*, Panchsheel Prakashan, Jaipur.
8. Haroon Mohamad. (2007) *Geography of Resources*, Vasundhara Parkashan, Gorakhpur (Hindi Edition)
9. Martin, R.H. and F.L. Warren. (1959) *Natural Resources*. McGraw Hill Book Co. London.
10. Maurya, S.D. (2015) *Economic Geography*. Parwalika Publications, Allahabad (Hindi Edition).
11. Mitchell B., 1997: *Resource and Environmental Management*, Longman Harlow, England.
12. Mitra, A. (2000): *Resource Studies*; Shridhar Publiders., Kolkata.
13. Negi, B.S.(2000) *Geography of Resources*, Kedar Nath and Ram Nath, Meerut
14. Owen, Oliver, S.(1971) *Natural Resource Conservation : A Ecological Approach*. McMillan New Delhi.
15. Ramesh, A. (1984) *Resource Geography* (Ed.) R.P. Misra, Contribution to Indian Geography, Vol 5, Heritage Publishers, New Delhi.
16. Singh, A and Raja, M. (1982) *Geography of Resources and Conservation* (Hindi Edition) Pargati Parkashan, Meerut.

Online Resources

1. Mitchell, Bruce, 1980. *Models of resource management*, Sage Publication
 2. United Nations, 2021. *Sustainable Development Goals* [online]. Available at: <https://sdgs.un.org/goals> [Accessed on 14th June 2021]
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GEO – 203: Statistical Methods in Geography

Credit = 4

F.M. = 100 [20 (Mid Term) + 10 (Assignment) + 70 (End Term Exam)]

Prerequisite Course / Knowledge (If any): Basic knowledge of statistics

Aim of the Course:

is to provide an understanding on the statistical interpretation of geographical data to unfurl geographical patterns and relationships and enable students to derive a meaningful inference from the different dimensions of geographical studies.

Course Outcomes:

After the completion of the course, student will be able to

- V. Show proficiency in describing and interpreting geographical data and apply basic statistical skills to sort data and Compare different statistical methods and select the apt tool based on the nature of data and purpose of study.
 - VI. Explain basic descriptive statistics to calculate and apply measures of location and measures of dispersion -- grouped and ungrouped data in geographical problems.
 - VII. Compute and interpret the results of Bivariate and Multivariate Regression and Correlation Analysis, for forecasting; Examine Test of Hypothesis for a population parameter; Demonstrate the practice of statistical thinking by taking a real-life problem; evaluate whether the procedure can be safely applied, explain the implications of statistical outcomes on the geographical study at-hand
 - VIII. Demonstrate ability to write reports of the results of statistical analyses (both descriptive and inferential) of geographic questions/problems/issues; Develop statistical software skills to solve geographical issues.
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Course Contents:

Unit 1: Data and data sampling

- 1.4 Types of data, scale of data measurement, data presentation, Selection of class interval for mapping.
- 1.5 Sampling techniques for geographical analysis; sample units and design, sampling frame and procedures, standard error and sample size, testing the adequacy of samples.
- 1.6 Scaling techniques-rank score; Weighted score; Nearest-neighbour analysis.
- 1.7 Drawing of histogram, Frequency curve, Frequency polygon, Bar diagram, Ogive using statistical tool (Excel or SPSS)

(OBE level to be achieved – Remembering, understanding, Applying)

Unit 2: Measures of central tendency and dispersion

- 2.4 Measurement of Mean, Median and mode, Quartile.

- 2.5 Measurement of Range, quartile deviation, mean deviation,
- 2.6 Measurement of Standard deviation; coefficient of variation, Lorenz Curve and Gini's Coefficient; location Quotient.
- 2.7 Graphical estimation and presentation of central tendency and dispersion using statistical tool (Excel or SPSS)

(OBE level to be achieved – Remembering, understanding, Applying)

Unit 3: Correlation and regression

- 3.1 Forms of relation and measuring the strength of association, use of scatter diagram; Spearman's Rank Difference and Karl Pearson's Product Moment Correlation Coefficients, Coefficient of determination.
- 3.2 Regression analysis- regression equations, construction of regression line-interpolation, prediction, explanation; residual-statistical tests of significance of the estimates; computation of residuals
- 3.3 Drawing of scatter plot, Estimation of coefficient of correlation, coefficient of determination, fitting of regression line using statistical tool (Excel or SPSS)

(OBE level to be achieved – Remembering, understanding, Applying, Evaluating)

Unit 4. ANOVA and Hypothesis testing

- 4.6 Hypothesis Testing: Needs and types of hypotheses-goodness of fit and significance and confidence levels-parametric and non-parametric procedures:
- 4.7 Contingency tables, Chi-square test, t-test, Analysis of Variance (ANOVA) and its estimation using statistical tool (Excel or SPSS)

(OBE level to be achieved – Remembering, understanding, Applying, Evaluating)

Reading List

- 1. David, U. (1981): Introductory Spatial Analysis, Methuen, London.
- 2. Ebdon, D. (1983): Statistics in Geography: A Practical Approach, Blackwell, London.
- 3. Gregory, S. (1978): Statistical Methods and the Geographer (4th Edition), Longman, London.
- 4. Gupta, S.P. (2010): Statistical Methods, Sultan Chand and Sons, Latest Edition
- 5. Hammond, R. and McCullagh, P.S. (1974), Quantitative Techniques in Geography: An Introduction, Clarendon Press, Oxford.
- 6. John P. Cole and Cuchlaine, King, A. M. (1968): Quantitative Geography, Wiley, London
- 7. Mathews, J.A. (1987): Quantitative and Statistical Approaches to Geography, Practical Manual, Pergamon, Oxford.
- 8. Pal, S.K. (1998): Statistics for Geoscientists; Techniques and Applications, Concept Publishing, New Delhi.
- 9. Sarkar, A. 2015. Practical Geography: A Systematic Approach, 3rd ed, Orient

GEO – 204: Fundamentals of Remote Sensing and GIS

Credit = 4

F.M. = 100 [20 (Mid Term) + 10 (Assignment) + 70 (End Term Exam)]

Prerequisite Course / Knowledge (If any): Basic knowledge of Remote Sensing and GIS

Aim of the Course:

is to train students in relevant topics of Remote Sensing and GIS covering its theoretical and practical aspects in order to use the understanding of basic principles of Remote Sensing, satellite image processing, Geographical Information System and its application to natural resource management.

Course Outcomes:

After completion of this course, the students will be able to:

- I. To learn the basic concepts of remote sensing, understand the fundamental concepts of satellites, platforms, resolution, sensors and its processes
 - II. To learn the concept of visual image interpretation and digital image processing
 - III. To understand the application of remote sensing and GIS in natural resource management
 - IV. Explore a range of spatial analysis techniques and tools available in GIS and Remote sensing integrated in GIS to solve real-world spatial problems and support decision-making processes.
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Course Contents:

Unit 1. Principles of Remote Sensing, Satellite and Sensors

- 1.1. Introduction to Remote Sensing: Fundamental Principle of Remote Sensing; Types of Remote Sensing; Advantages and limitations of Remote Sensing
- 1.2. Electromagnetic Radiation (EMR); Electromagnetic Spectrum; Energy interacts with the Atmosphere; Energy interacts with the Earth Surface; Spectral Reflectance Curve
- 1.3. Platforms: Ground based platform; Aerial platform; Satellite platform
- 1.4. Satellite Orbits: Geostationary Satellites; Sun-synchronous Satellites
- 1.5. Resolution: Spatial Resolution; Radiometric Resolution; Spectral Resolution; Temporal Resolution
- 1.6. Multispectral Scanning: Across Track Scanning; Along Track Scanning
- 1.7. Data Reception, Transmission and Processing

(Covers OBE level – Remember, Understand and Analyse)

Unit 2. Image Interpretation and Digital Image Processing

- 2.1. Visual Image Interpretation; Elements of Visual Image Interpretation
- 2.2. Image Pre-processing: Radiometric correction; Geometric correction; Atmospheric correction
- 2.3. Image Enhancement: Filtering; Band Ratioing, Principal Component Analysis
- 2.4. Image Classification: Supervised Classification; Unsupervised Classification

(Covers OBE level – Remember, Understand, Analyse, Apply and Evaluate)

Unit 3. Remote Sensing Applications

- 3.1. Landuse and Landcover Mapping; Urban Sprawl Mapping
- 3.2. Agriculture: Crop Type Mapping and Inventory; Crop Monitoring and Damage Assessment
- 3.3. Forestry: Deforestation, Afforestation Mapping; Species Identification and Mapping; Forest Fire Monitoring and Mapping
- 3.4. Hydrological Mapping: Ocean and Coastal Area Monitoring and Mapping
- 3.5. Geology: Geological Mapping

(Covers OBE level – Remember, Understand, Analyse, Apply and Evaluate)

Unit-4. Introduction to Geographical Information System (GIS)

- 4.1. Definition of GIS; Components of GIS; Spatial and Non-Spatial Data; Digitization
- 4.2. Raster and Vector Data; Spatial Analysis; Spatial Statistics; GIS Applications
- 4.3. Global Positioning System (GPS): Concepts; GPS Positioning Types; GPS Systems
- 4.5. Multi Criteria Decision Making

(Covers OBE level – Remember, Understand, Analyse, Apply and Evaluate)

Reading List

1. Joseph, G. (2004) Fundamentals of Remote Sensing, Universities Press Pvt. Ltd
 2. Lillesand, T.M. and Kiefer, R.W. (2002) Remote Sensing and Image Interpretation, John Wiley and Sons, New Delhi
 3. Jensen, J.R. (2003) Remote Sensing of Environment: An Earth Resource Perspective, Pearson Education Pvt. Ltd
 4. Haywood, L. Comelius, S. and S, Carver. (1988) An introduction to Geographical information system, Addison Willey, New York
 5. Chrisman, N.R. (1997) Remote sensing and Geographical information systems
 6. Sabbins, F. F, (1987) Remote sensing: principles and interpretations, W.H. Freeman and Co, New York
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GEO – 205: Remote Sensing and Geographical Information System Applications (Practical)

Credit = 4

F.M. = 100 [20 (Mid Term) + 10 (Assignment) + 70 (End Term Exam)]

Prerequisite Course / Knowledge (If any): Basic knowledge of Remote Sensing and GIS

Aim of the Course:

is to train students in relevant topics of Remote Sensing and GIS covering practical aspects in order to use the understanding of basic principles of Remote Sensing, satellite image processing, Geographical Information System and its application to natural resource management.

Course Outcomes:

After completion of this course, the students will be able to:

- I. Overall understanding of potential of Remote Sensing, GIS and GPS
 - II. Understanding of image interpretation and digital image processing
 - III. Exploring Remote Sensing applications in various domains of Natural Resource Management
 - IV. Applying GIS analysis workflow and integrated applications in various domains of Natural Resource Management
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Course Contents:

Unit 1. Basics of Remote Sensing

- 1.1. Display of satellite images; Import and export of file; Layer stacking of image; Geo-referencing (map to image and image to map); Subset of image using AOI; Mosaic of images
- 1.2. Radiometric correction of image; Geometric correction of image
- 1.3. Masking of image; Re-project of image

(Covers OBE level – Remember, Understand, Analyse, Apply and Evaluate)

Unit 2. Digital Image Processing

- 2.1. Visual interpretation of satellite images
- 2.2. Image Enhancement: Radiometric Enhancement; Spectral Enhancement; Image Filtering; Band Ratioing, Principal Component Analysis
- 2.3. Unsupervised Classification of Image (K-Mean and Isodata); Supervised Classification of Image (Maximum Likelihood and Minimum Distance to Mean); Accuracy Assessment; Model making

(Covers OBE level – Remember, Understand, Analyse, Apply and Evaluate)

Unit 3. Remote Sensing Application in Natural Resource Management

- 3.1. Landuse and landcover classification
- 3.2. Forest Cover Classification and area estimation
- 3.3. Agriculture mapping and acreage area estimation
- 3.4. Forest Fire and Burnt Area Mapping
- 3.5. Flood Delineation and Mapping
- 3.6. Coastal Erosion Mapping
- 3.7. Urban Sprawl Mapping

(Covers OBE level – Remember, Understand, Analyse, Apply and Evaluate)

Unit 4. Geographical Information System (GIS)

- 4.1. Geographic Data, Input, Storage and Editing: Spatial data and Non-spatial data integration; Editing of data; Building of topology
- 4.2. Digitization: point, line and polygon; storage and manipulation of GIS data bases; vector and raster-based models; presentation of GIS output.
- 4.3. Coordinate systems and map projections.
- 4.4. Multi Criteria Decision Making.

(Covers OBE level – Remember, Understand, Analyse, Apply and Evaluate)

Reading List

1. NY. Burrough P.A. (1986) Principles of GIS for land assessment. University press London
 2. Burrough, P.A. and McDonnell, R.A. (1998) *Principles of Geographic Information Systems*, Oxford University Press
 3. Chang, K-t. (2006) *Introduction to Geographic Information Systems*, Tata McGraw-Hill
 4. DeMers, M. (2009) *Fundamentals of Geographic Information Systems*, 4th Edition, John Wiley & Sons.
 5. Heywood, I. Cornelius, S. Carver, S. (2011) *An Introduction to Geographic Information Systems*, 4th Edition, Pearson Education.
 6. Jensen, J.R. (2006) *Remote Sensing of the Environment: An Earth Resource Perspective*, 2nd Edition, Pearson Education
 7. Joseph, G. (2005) *Fundamentals of Remote Sensing*, Orient Blackswan.
 8. Lillesand, T.M., Kiefer, R.W. and Chipman, J.W. (2004) *Remote Sensing and Image Interpretation*, 5th Edition, Wiley.
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INTER DISCIPLINE SPECIFIC ELECTIVE (IDSE)

GEO (DSE) – 206 [A]: Geography of Tourism

Credit = 4

F.M. = 100 [20 (Mid Term) + 10 (Assignment) + 70 (End Term Exam)]

Prerequisite Course / Knowledge (If any): Familiarity with Tourism.

Aim of the Course:

to examine geographies of tourism on different scales (global, national and local) along with their impacts (economic, social, cultural, political, and environmental).

Course Outcomes:

After completion of this course, the students will be able to:

- I. Define, describe and relate the basic characteristics and trends of tourism covering India and world
 - II. Review, classify and distinguish classification and characteristics of tourism
 - III. Relate and Analyze spatial variation in tourism
 - IV. Evaluate opportunities, impact and management of tourism
-

Course Contents:

Unit 1. Basics of Tourism

- 1.1. Tourism: Definition, nature and scope;
- 1.2. Factors affecting tourists' flow and movements;
- 1.3. Recent trends in tourists' flow and movements;
- 1.4. Traditional and recent tourist destinations of India and world

(Covers OBE level – Remember)

Unit 2. Classification and characteristics of tourism

- 2.1. Types of tourism;
- 2.2. Tourism demand and supply;
- 2.3. Tourists' motivations - recent trends and role of social media

(Covers OBE level – Remember and Understand)

Unit 3. Spatial variation in tourism

- 3.1. Factors affecting tourism development across countries;
- 3.2. Major and minor tourism generating countries, and their tourism policies;

(Covers OBE level – Remember, Understand, Apply and Analyse)

Unit 4. Tourism – Opportunities, Impact, management

- 4.1. Tourism opportunities (e.g. eco-tourism, mining tourism, adventure tourism, home stay local tourism)

- 4.2. Impacts of tourism on economies, societies, and environments;
- 4.3. Planning and management issues associated with tourism.

(Covers OBE level – Remember, Understand, Apply, Analyse and Evaluate)

Reading List -

1. Dhar, P.N. (2006) International Tourism: Emerging Challenges and Future Prospects. Kanishka, New Delhi.
 2. Hall, M. and Stephen, P. (2006) Geography of Tourism and Recreation – Environment, Place and Space, Routledge, London.
 3. Kamra, K. K. and Chand, M. (2007) Basics of Tourism: Theory, Operation and Practise, Kanishka Publishers, Pune.
 4. Page, S. J. (2011) Tourism Management: An Introduction, Butterworth-Heinemann- USA. Chapter 2.
 5. Raj, R. and Nigel, D. (2007) Morpeth Religious Tourism and Pilgrimage Festivals Management: An International perspective by, CABI, Cambridge, USA, www.cabi.org.
 6. Tourism Recreation and Research Journal, Center for Tourism Research and Development, Lucknow
 7. Singh Jagbir (2014) “Eco-Tourism” Published by - I.K. International Pvt. Ltd. S-25, Green Park Extension, Uphaar Cinema Market, New Delhi, India (www.ikbooks.com).
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GEO (DSE) – 206 [B]: Geography of Odisha

Credit = 4

F.M. = 100 [20 (Mid Term) + 10 (Assignment) + 70 (End Term Exam)]

Prerequisite Course / Knowledge (If any): Basic knowledge of Geography of Odisha

Aim of the Course:

is to train students in relevant topics of Geography of Odisha covering theoretical aspects in order to use the understanding of basic knowledge about Geography of Odisha and its Natural Resource Management.

Course Outcomes:

After completion of this course, the students will be able to:

- I. Review the basic knowledge about Odisha Geography such as Physiography, Climate, Soil, Vegetation, Drainage System, Natural Hazards, Coastal Erosion
 - II. Explore the types of crops and its production, agricultural problems of Odisha
 - III. Evaluate the study of demography, Transportation and Tourism of Odisha
 - IV. Discuss spatial planning principles, land use policies, infrastructure development, and urban growth management strategies in Odisha
-

Course Contents:

Unit 1. Physiography of Odisha

- 1.1. Location
- 1.2. Physiography Divisions
- 1.3. Geology
- 1.4. Drainage Systems
- 1.5. Natural Hazards
- 1.6. Coastal Erosion

(Covers OBE level – Remember, Understand and Analyse)

Unit 2. Climate, Soil and Vegetation of Odisha

- 2.1. Climate
- 2.2. Soil
- 2.3. Natural Vegetation

(Covers OBE level – Remember, Understand and Analyse)

Unit 3. Agricultural Crops of Odisha

- 3.1. Production and distribution of Rice, Pulses, Oilseed
- 3.2. Agricultural Problems in Odisha

(Covers OBE level – Remember, Understand and Analyse)

Unit 4. Demography, Transportation and Tourist Spots of Odisha

- 4.1. Population Distribution; Population Growth
- 4.2. Urban Growth
- 4.3. Development of Roadways
- 4.4. Major Religious, Cultural and Natural Tourist Spots in Odisha: Puri, Konark, Similipal and Huma

(Covers OBE level – Remember, Understand and Analyse)

Reading List

- 1. Sinha, B.N. (2014) Geography of Odisha, National Book Trust Publication.
 - 2. Roy, G.C. (2006) Geography of Odisha, Kalyani Publication.
-

GEO (DSE) – 206 [C]: Political Geography

Credit = 4

F.M. = 100 [20 (Mid Term) + 10 (Assignment) + 70 (End Term Exam)]

Prerequisite Course / Knowledge (If any): None.

Aim of the Course:

is to provide a thorough understanding of role of geography in the political evolution of the world.

Course Outcomes:

After completion of this course, the students will be able to:

- I. Recognize and state basic concepts of Political Geography
 - II. Understand, discuss and describe fundamental concepts involved in Political Geography
 - III. Review, understand, discuss and analyse global strategies and implications
 - IV. Review, understand, discuss and describe political geography of India
-

Course Contents:

Unit 1. Introduction to Political Geography

- 1.1. Nature and Scope, Development of Political Geography;
- 1.2. Approaches to the Study of Political Geography with special reference to German, British and American Schools;
- 1.3. The State and Nation; Anatomy of States

(Covers OBE level – Remember)

Unit 2. Fundamentals -

- 2.1. Geographical perspectives of formation of State, Nation and Nation-State;
- 2.2. Core and Peripheral areas, Capitals, Frontiers and Boundaries, Buffer zones, Buffer states and Land locked areas;
- 2.3. Core Areas and Capitals Frontiers and Boundaries
- 2.4. Colonialism, decolonialism and neo-colonialism;

(Covers OBE level – Remember and Understand)

Unit 3. Global Strategies

- 3.1. Heartland and Rimland: Geo-static ideas of Mackinder and Spykeman, Strategic view of Deseveresky, their contemporary relevance; Changing pattern of Superpower;
- 3.2. Politics of world resources; Political and Economic blocks, Political Geography of foreign trade;
- 3.3. Impress of Politics upon the environment frameworks (such was Sustainable Development Goals)

(Covers OBE level – Remember, Understand, Apply and Analyse)

Unit 4. Political Geography in India

- 4.1. Partition of India and its geopolitical implication;
- 4.2. Organization of Indian States since independence

(Covers OBE level – Remember, Understand, Apply and Analyse)

Reading list

1. Agnew J., 2002: *Making Political Geography*, Arnold.
 2. Agnew J., Mitchell K. and Toal G., 2003: *A Companion to Political Geography*, Blackwell.
 3. Busted, N.A. : *Developments in Political Geography*.
 4. Chauhan, P.R. : *Rajnitik Bhoogol*, Gorakhpur.
 5. Cox K. R., Low M. and Robinson J., 2008: *The Sage Handbook of Political Geography*, Sage Publications.
 6. Cox K., 2002: *Political Geography: Territory, State and Society*, Wiley-Blackwell.
 7. Dixit, R.D. : *Political Geography : A Contemporary Perspective*, New Delhi.
 8. Dwivedi, R.L. : *Political Geography*, Allahabad.
 9. Gallaher C., et al, 2009: *Key Concepts in Political Geography*, Sage Publications.
 10. Glassner M., 1993: *Political Geography*, Wiley.
 11. Glassner, M.I. & Blij H.J.De : *Systemic Political Geography*, New York
 12. Jones M., 2004: *An Introduction to Political Geography: Space, Place and Politics*, Routledge .
 13. Mathur H M and M M Cernea (eds.) *Development, Displacement and Resettlement – Focus on Asian Experience*, Vikas, Delhi.
 14. Kasperson, R.E. & Minghi, J.V. : *Structure of Political Geography*, London.
 15. Painter J. and Jeffrey A., 2009: *Political Geography*, Sage Publications.
 16. Shrivastava, R.M. – *Rajnitik Bhoogol*, Allahabad.
 17. Taylor P. and Flint C., 2000: *Political Geography*, Pearson Education.
 18. Verma M K (2004): *Development, Displacement and Resettlement*, Rawat Publications, Delhi
 19. Hodder Dick, Sarah J Lloyd and Keith S McLachlan (1998), *Land Locked States of Africa and Asia* (vo.2), Frank Cass
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SEMESTER – III

GEO – 301: Oceanography

Credit = 4

F.M. = 100 [20 (Mid Term) + 10 (Assignment) + 70 (End Term Exam)]

Prerequisite Course / Knowledge (If any): Basic knowledge of Oceanography

Aim of the Course:

is to train students in relevant topics of Oceanography covering its theoretical and practical aspects in order to understand different process in ocean water and its related studies.

Course Outcomes:

After completion of this course, the students will be able to:

- I. Review, interpret and describe different perspectives of relief features of ocean basins.
 - II. Review, interpret, discuss, relate and critic different fundamental concepts of ocean temperature and salinity and its processes
 - III. Identify the concept of understanding in oceanographic studies developed in Unit 2, 3 and 4
 - IV. Review, interpret, discuss, relate and critic different fundamental concepts and perspectives of Oceanography as well as Oceanic environment
-

Course Contents:

Unit 1. Perspectives in Oceanography

- 1.1. Introduction to ocean and its relief features: A general view of ocean; Continental Shelf; Continental Slope; Deep Sea Plain; Mid Oceanic Ridges; Submarine Canyons; Sea Mounts; Sea Guyots
- 1.2. Bottom Relief of Ocean: Atlantic Ocean; Pacific Ocean; Indian Ocean
- 1.3. Ocean-Atmosphere Interaction: significance of ocean atmosphere interaction; coupling phenomenon; concept of boundary layers; ocean –atmosphere interaction near the tropics

(Covers OBE level – Remember, Understand and Analyse)

Unit 2. Fundamental Concepts – I

- 2.1. Ocean Temperature and Salinity: Factors affecting horizontal distribution of temperature of ocean water; Controlling factors of the density of ocean water
- 2.2. Factors controlling distribution of salinity; Horizontal and Vertical distribution of Salinity

(Covers OBE level – Remember, Understand, Analyse and Apply)

Unit 3. Fundamental Concepts – II

- 4.1. Tide: Concept of Tides; Types of Tide; Progressive Wave Theory on Tide; Equilibrium Theory on Tide
- 4.2. Ocean Current: Concept of ocean current; Factors associated with ocean current; Currents of Atlantic Ocean; Currents of Pacific Ocean; Currents of Indian Ocean
- 4.3. Concept of El-Nino; La-Nino effects

(Covers OBE level – Remember, Understand, Analyse and Apply)

Unit 4. Perspectives in

- 4.1. Coral Reef: Coral reef; Types of Coral reef; Ideal Condition for the growth of Coral reef
- 4.2. Theory of Coral reef: Subsidence theory of Darwin; Standstill theory of Murray; Coral Bleaching; Marine resource and its types

(Covers OBE level – Remember, Understand, Analyse, Apply and Evaluate)

Reading List

- 1. Davis, R.J.A. (1986) Oceanography: An Introduction to Marine Environments, Winc-Brown Publication, Iowa
 - 2. Sharma, R.C. and Vatal, M. (2018) Oceanography: Surjeet Publications, New Delhi
 - 3. Lal, D.S. (2008) Climatology and Oceanography, Sharada Pustak Bhawan, Allahabad, 2008
 - 4. Garrison, T.S. (2015) Oceanography: An Invitation to Marine Science, Cengage Publication
 - 5. Siddartha, K. (2016) Oceanography, *Kitab Mahal Publication*
 - 6. Singh, S. (2009) Physical Geography, Pravalika Publications, Allahabad
 - 7. Khullar, D.R. (2012) Physical Geography, Kalyani Publishers, New Delhi
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GEO – 302: Social and Cultural Geography

Credit = 4

F.M. = 100 [20 (Mid Term) + 10 (Assignment) + 70 (End Term Exam)]

Prerequisite Course / Knowledge (If any): None.

Aim of the Course:

is to provide essential understanding of the social and cultural side of Geography with emphasis on India.

Course Outcomes:

After completion of this course, the students will be able to:

- I. Recognise, define and describe the evolution and relevance of Social Geography
 - II. Identify, summarise and compute elements of Social Geography, particularly for India
 - III. Recognise, define and describe the evolution and relevance of Cultural Geography
 - IV. Identify, summarise and compute elements of Cultural Geography with particular emphasis on India
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Course Contents:

Unit 1. Social Geography- evolution and relevance

- 1.1. Definition: Nature and Scope and evolution of Social Geography;
- 1.2. Philosophical Bases of Social Geography (Positivism, Structuralism);
- 1.3. Social Structure & Social Processes;
- 1.4. Concept of Social Space;

(Covers OBE level – Remember and Understand)

Unit 2. Elements of Social Geography (with emphasis on India)

- 2.1. Ethnicity, Tribe, Dialect, Language, Caste & Religion;
- 2.2. Socio-Cultural Regions of India;
- 2.3. Linguistic Elements in India.

(Covers OBE level – Remember, Understand and Apply)

Unit 3. Cultural Geography-evolution and relevance

- 3.1. Definition: Nature and Scope and evolution of Cultural Geography;
- 3.2. Culture: Definition, Elements & Components;
- 3.3. Themes and Concepts in Cultural Geography: Culture Area, Cultural Region, Cultural Diffusion and Assimilation, Cultural ecology, Cultural Interaction, Cultural Landscape
- 3.4. Concepts of Culture –Traits, Diffusion, Acculturation;

(Covers OBE level – Remember and Understand)

Unit 4. Components of Cultural Geography (with emphasis on India)

- 4.1. Types and Pattern of World Cultural regions;
- 4.2. Language, Religion, Ethnicity;
- 4.3. Cultures and cultural regions in India;
- 4.4. Ethnicities in India

(Covers OBE level – Remember, Understand and Apply)

Reading List

- 1. Ahmad, A. (1999). Social Geography. Jaipur: Rawat Publications.
 - 2. Crang, Mike (2013). Cultural Geography. London: Routledge.
 - 3. Dreze. Jean and A. Sen (2004). An Uncertain Glory: India and its Contradiction. New Delhi: Penguin India
 - 4. Eyles, John (1979). An Introduction to Social Geography, London: OUP
 - 5. Mitchell, D. (2000). Cultural Geography: A Critical Introduction, Oxford: Blackwell Publishers Ltd.
 - 6. Price, M., and M. Lewis (1993). "The Reinvention of Cultural Geography". Annals of the Association of American Geographers, 83 (1):1-17.
 - 7. Robertson, I. and Richards, P. (2003). (eds.): Studying Cultural Landscapes. London: Arnold
 - 8. Subbarao, Bendapudi (1958). The Personality of India, Faculty of Arts, Baroda: MS University
 - 9. Khilnani, Sunil (2004). The Idea of India. Delhi: Penguin India
 - 10. Thrift, Nigel (2005) Cultural Geography: Critical Concepts in the social Sciences. London: Routledge
-

GEO – 303: Settlement Geography

Credit = 4

F.M. = 100 [20 (Mid Term) + 10 (Assignment) + 70 (End Term Exam)]

Prerequisite Course / Knowledge (If any): None.

Aim of the Course:

is to provide a thorough understanding of settlements across the globe including their importance, trends and growth.

Course Outcomes:

After completion of this course, the students will be able to:

- I. Examine basic concepts of Settlement Geography and Explore the historical development of settlements from ancient to modern times
 - II. Understand, discuss and describe fundamentals of Rural and Urban Settlement
 - III. Examining contemporary challenges and issues facing human settlements
 - IV. Encouraging students to critically analyse and evaluate settlement patterns and processes, policies and to develop solutions to real-world settlement-related problems.
-

Course Contents:

Unit 1. Introduction to Settlement Geography

- 1.1. Nature, scope, significance and approaches to study Settlement Geography;
- 1.2. Development of Settlement Geography;
- 1.3. Theories of evolution of settlements and Geographical factors affecting growth of settlement distribution;
- 1.4. Types of Settlement: Rural and Urban Rural-urban dichotomy and continuum

(Covers OBE level – Remember)

Unit 2. Rural Settlement

- 2.1. Site, location, types and pattern;
- 2.2. Morphology of rural settlement;
- 2.3. Rural House types: planned and architectural style in different geographical environment;
- 2.4. Types and pattern of rural settlements

(Covers OBE level – Remember and Understand)

Unit 3. Urban Settlement

- 3.1. Origin of the cities: Ancient and Medieval;
- 3.2. Industrial growth and urban expansion;
- 3.3. Functional classification of urban centres: Harris and Nelson
- 3.4. Functional classification of Indian cities: Ashok Mitra and others

(Covers OBE level – Remember, Understand and Apply)

Unit 4. Settlement Hierarchy and Policies

- 4.1. Rural service centre;
- 4.2. Central Place theory (Christaller);
- 4.3. Theory of Losch and its application
- 4.4. Issues and policies of Settlements, settlement planning

(Covers OBE level – Remember, Understand, Apply and Analyse)

Reading List

- 1. Ambrose, Peter, Concepts in Geography Vol.-I Settlement Pattern, Longman 1970.
 - 2. Baskin, C., (Translator), Central Places in Southern Germany, Prentice-Hall Inc.
 - 3. Fyfe N. R. and Kenny J. T., 2005: *The Urban Geography Reader*, Routledge.
 - 4. Graham S. and Marvin S., 2001: *Splintering Urbanism: Networked Infrastructures, Technological Mobilities and the Urban Condition*, Routledge.
 - 5. Hall T., 2006: *Urban Geography*, Taylor and Francis.
 - 6. Haggett, Peter, Andrew D. Cliff and Allen Frey (editor), *Locational Models* Arnold Heinemann 1979.
 - 7. King, Leslie, J., *Central Place Theory*, Saga Publications, New Delhi 1986.
 - 8. Mayer, M. Harold and Clyde F. Kohn (editors), *Readings in Urban Geography*, Central Book Depot, Allahabad 1967.
 - 9. Nangia, Sudesh, *Delhi Metropolitan Region*, K.B. Publications, New Delhi 1976.
 - 10. Prakasa, Rao, V.L.S., *Urbanisation in India; Spatial Dimensions*, Concept Publishing Co., New Delhi 1983.
 - 11. Ramachandran, R., *Urbanisation and Urban Systems in India*, Oxford University Press, New Delhi 1992.
 - 12. Singh R.L. and Kashi, Nath Singh (editors), *Readings in Rural Settlement Geography*, National Geographical Society of India, Varanasi 1975.
 - 13. Sinha, VPN, Usha Verma and Anuradha Sahay, *Introduction to Settlement Geography*, Rajesh Publication, 2017. (ISBN 10: 938368433X / ISBN 13: 9789383684335)
 - 14. Srinivasan, K. and M. Vlassoff, (editors), *Population-Development Nexus in India: Challenges for the New Millennium*, Tata McGraw-Hill Publishing Co. Ltd., New Delhi 2001.
 - 15. Ucko, M.J., Ruth Tringham and G.W. Dimbleby (editors), *Man, Settlement and Urbanism*, Duckworth 1972.
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GEO – 304: Remote Sensing and Image Processing

Credit = 4

F.M. = 100 [20 (Mid Term) + 10 (Assignment) + 70 (End Term Exam)]

Prerequisite Course / Knowledge (If any): Basic knowledge of remote sensing and statistics

Aim of the Course:

is to introduce fundamental and advanced tools and techniques for satellite image processing on digital platform. This includes basic understanding satellite image to information extraction, information analysis, and processing using various analytical tools.

Course Outcome:

After the completion of the course, student will be able to

- I. Understand the various satellite image format and preparation of colour composite; Analyze and interpret remotely sensed satellite images to understand topographical and cultural variations on the Earth's surface.
 - II. Understand, select and perform the required image pre-processing and processing techniques to improve the visual quality of satellite imagery; compare the different image processing techniques for their suitability for visual extraction of desired information from satellite image
 - III. Understand multi-dimensional feature space of satellite imagery; compare the various classification methods for their suitability for feature extraction; evaluate the accuracy of image classification; perform necessary post editing and estimate classification statistics for a given satellite imagery based geographical study
 - IV. Demonstrate the ability to explain the spatial aspect of geographical issue and deliver a solution to the same using a remote sensing approach.
-

Course Contents:

Unit 1: Satellite image and its interpretation

- 1.1 Remote sensing Introduction; Types of resolution; spectral response curve, Public domain satellite data sources, Satellite image format- BIL, BSQ, and BIP Formats.
- 1.2 Image processing display systems, Initial statistical extraction - univariate and multivariate statistics, histogram and its significance in remote sensing data.
- 1.3 Introduction to major software packages; Satellite image interpretation, Generating True, False and Pseudo Colour Composite, Interpretation keys.

(OBE level to be achieved – Remembering, understanding, Applying)

Unit 2: Satellite data Pre-processing

- 2.1 Principles of Digital Image Processing: System Design Considerations; Pre-Processing of Satellite Image
- 2.2 Source and correction of radiometric error, missing scan lines, desk tripping methods

- 2.3 Source and correction of geometric error, geometric correction and registration
- 2.4 Atmospheric correction, illumination and view angle effects.

(OBE level to be achieved – Remembering, understanding, Applying)

Unit 3: Spectral and Spatial enhancement

- 3.1 Introduction- Look-Up Tables, concept of spectral frequency and spatial frequency, point and neighbourhood operation; local and global operations
- 3.2 Spectral enhancement Image reduction, image magnification, contrast enhancement; linear, non-linear enhancement
- 3.3 Spatial enhancement- Filtering–Low pass & High Pass and Directional/Non-Directional; edge detection filter, edge enhancement; linear, nonlinear, Low pass filters, high pass filters, edge detection filter.
- 3.4 Image transformation- Arithmetic operations'-based image transforms, principle component analysis, discriminate analysis, density slicing, Fourier transforms, Fast Fourier frequency domain filters, spectral indices for important earth features,

(OBE level to be achieved – Remembering, understanding, Applying, Evaluating)

Unit 4. Image transformation and Classification

- 4.1 Data Processing techniques, N-Dimensional Scatter plots, Spectral angle mapping, Spectral mixture analysis
- 4.2 Images classification methods, Unsupervised Classification- K-mean clustering, ISODATA; Supervised Classification- training sample selection, minimum distance classifier, parallelepiped classifier, centroid classifier, maximum likelihood method, Hybrid methods and decision - tree classifiers; Use of external data, contextual information, feature - sub-feature study.
- 4.3 Ground truth, Accuracy Assessment; post classification editing; Image Statistics Generation
- 4.4 Change detection - the nature of change detection, change detection algorithms, image differencing, and image rationing and classification comparisons.

(OBE level to be achieved – Remembering, understanding, Applying, Evaluating)

Reading List

- 1. John R.Jenson, 1986, Introductory digital image processing - A Remote Sensing perspective, , Prentice Hall.
 - 2. Paul M. Mather, 1987, Computer Processing of Remote Sensed Images, John Wiley & Sons.
 - 3. Rosenfeld A. and A.C. Kak, 1976, Digital Picture Processing, New York – Academic Press.
 - 4. Pratt. W.K. , 1976, Digital Image Processing Wiley Intersciences.
 - 5. Allen and Unwin Gibson, P.J. 2000: Digital Image Processing. Routledge Publication.
 - 6. Joseph George, 2003: Fundamentals of Remote Sensing. Universities Press
 - 7. Lillesand, T.M., and Kieffer, R.M., 1987: Remote Sensing and Image Interpretation, John Wiley.
 - 8. Nag P. and Kudrat M. 1998: Digital Remote Sensing. Concept Publication
-

GEO – 305: Field Survey Methods

(Practical)

Credit = 4

F.M. = 100 [20 (Mid Term) + 10 (Assignment) + 70 (End Term Exam)]

Prerequisite Course / Knowledge (If any): Basic understanding of surveying and field requirements would be preferable.

Aim of the Course:

is to provide essential field related skills to the students in order to take cutting-edge research of any problem in real world (preferably local at this education stage).

Course Outcomes:

After completion of this course, the students will be able to:

- I. Understand basics of field work and identify field techniques to be used.
 - II. Compare, differentiate and evaluate the data to be collect from field and their method of collection.
 - III. Demonstrate proficiency in field-based techniques for geomorphic mapping, data collection, and analysis, incorporating GPS/GIS technologies.
 - IV. Assess and synthesize the information collected during field work and summarise the outcome leading to design and develop field reports
-

Course Contents:

Unit 1. Field Survey - basics

- 1.1. Basics of Field work: objective of field work (physical or socioeconomic), Identifying the case-studies and defining the field model (conceptual geographical model)
- 1.2. Identification of field techniques to be used:
 - 1.2.1. Measurement – nature of measurement (nominal, ordinal, interval and ratio); Key aspects (validity, reliability, Precision and Accuracy)
 - 1.2.2. Sampling – Key elements (Population, bias, sample size etc.); methods (simple random, stratified and systematic), errors

Practical: Study area is to be conveniently finalized as per the identified objective of field work for stressing on any local problem or any contemporary issue. Field model should be determined.

(Covers OBE level – Remember, Understand, Apply and Analyse)

Unit 2. Collecting data from field

- 2.1. Data source and collection – primary and secondary;
- 2.2. Surveying (Physical) – Plane Table Survey; Prismatic Compass Survey; Theodolite, and Dumpy level; Global Positioning System (GPS)

- 2.3. Surveying (Socioeconomic) - Observation (Participants and non-participants), Questionnaire (Open, close, structured and non-structured) and interview (individual and focus groups)

Practical: Identify data source and collection methods as per the designed field model for the selected problem in unit 1. Collect data. Note: Field work must not exceed 7 days.

(Covers OBE level – Remember, Understand, Apply, Analyse and Evaluate)

Unit 3. Field report writing

- 3.1. Text of the Report should ideally be divided into the following sections: Introduction and Statement of problem(s), Aim and Objectives, Materials and methods, Analysis and Results, Discussions, Conclusion, References/ Bibliography (API for Harvard Format) and Appendices (if any).

Practical: Perform the analyses from collected data and write a report with Figures and Tables captioned properly. Note: Report should not exceed 5,000 words (max 15 pages excluding references).

(Covers OBE level – Remember, Understand, Apply, Analyse, Evaluate and Create)

Unit 4. Final report

- 4.1. Seminar Presentation (based on socioeconomic survey) would carry 20% of total marks.
4.2. Record & Viva would carry 20% of total marks

Note: Final copy of the report (along with soft copy) must be submitted to the department.

Reading List

1. Bhopal Singh R L and Dutta P K (2012) Prayogatama Bhugol, Central Book Depot, Allahabad
2. Rice, S. 2003. Ch 17: *Sampling in Geography*. In: Clifford, N., French, S., Valentine, G. (Eds) *Key Methods in Geography*, London: Sage Publication.
3. Robinson A. H., 2009: *Elements of Cartography*, John Wiley and Sons, New York.
4. Sharma J. P., 2010: *Prayogic Bhugol*, Rastogi Publishers, Meerut.
5. Singh R. L. and Singh R. P. B., 1999: *Elements of Practical Geography*, Kalyani Publishers.
6. Stoddard, R.H. 1982: *Field Techniques and Research Methods in Geography*, National Council for Geographic Education Pacesetter Series, Lonsbury/Sommers/Fernald.

Online Resources:

1. Brunet, R. 2001. *Models in geography? A sense to research*, CyberGeo, 204.
<https://doi.org/10.4000/cybergeogeo.4288>
 2. Rana, L. 2021. Models, Theory & Systems Analysis In Geography [online]. Available at:
http://ags.geography.du.ac.in/Study%20Materials_files/Lalita%20Rana_SC.pdf
 3. Manson, S. M. (ed) (2017). *Mapping, Society, and Technology*. Minneapolis, Minnesota: University of Minnesota Libraries Publishing. URL: <https://open.lib.umn.edu/mapping>
-

DISCIPLINE SPECIFIC ELECTIVE (DSE)

GEO (IDSE) – 306 [A]: Introduction to Geography

Credit = 4

F.M. = 100 [20 (Mid Term) + 10 (Assignment) + 70 (End Term Exam)]

Prerequisite Course / Knowledge (If any): None.

Aim of the Course:

is to provide a thorough understanding of Geography to the students from different background.

Course Outcomes:

After completion of this course, the students will be able to:

- I. Recognize and state basic concepts of Geography
 - II. Understand, discuss and describe fundamental concepts of Geography
 - III. Understand, discuss and describe fundamental concepts associated with climate
 - IV. Analyses the environmental challenges and disasters occurring on the global
-

Course Contents:

Unit 1. Basics about Geography

- 1.1. Concept and branches of Geography; Elements of Geography (space, place and time);
- 1.2. Concept of landscape in Geography - relation between physical and cultural landscapes;

(Covers OBE level – Remember)

Unit 2. Fundamental concepts related to Earth

- 2.1. Earth History and Earth Interior;
- 2.2. Rocks and faults
- 2.3. Drifting Continents and Plate Tectonics

(Covers OBE level – Remember and Understand)

Unit 3. Fundamental concepts related to Climate

- 3.1. Atmospheric pressure and winds, Atmospheric disturbances;
- 3.2. Factors affecting climate, factors affecting climate of India
- 3.3. Global Climatic classification with special focus on India
- 3.4. Biomes

(Covers OBE level – Remember, Understand and Apply)

Unit 4. Environmental challenges and Disasters

- 4.1. Major environmental issues of the world – Climate Change, Sustainability
- 4.2. Disasters: Volcanoes & Earthquakes, Tsunami;

(Covers OBE level – Remember, Understand, Apply and Analyse)

Reading List

- 1. Singh, Savinder (2009) – Physical Geography, Prayag Pustak, N.Delhi.
 - 2. Chorley, R.J., et al. (1984). Geomorphology. New York: John Wiley and Sons.
 - 3. Hugget, R.J. (2011). Fundamentals of Geomorphology. London: Routledge.
 - 4. Kale, V.S and Gupta A. (2010). Introduction to Geomorphology. New Delhi: Cambridge University Press.
 - 5. Strahler, A. (2006). Introduction to Modern Physical Geography. New York: John Wiley & Sons.
 - 6. Thornbury, W. D. (2004). Principles of Geomorphology. New Delhi: CBS.
 - 7. Trewartha G. T. and Horne L. H., 1980: An Introduction to Climate, McGraw-Hill.
 - 8. Lal, D S (2006): Climatology, Prayag Pustak Bhavan, Allahabad
 - 9. Council, N. R. (2006). Facing Hazards and Disasters: Understanding Human Dimensions. Washington: National Academies Press.
 - 10. Damon, P. Copola, (2006) Introduction to International Disaster Management, Butterworth Heineman.
-

GEO (IDSE) – 306 [B]: Human Geography

Credit = 4

F.M. = 100 [20 (Mid Term) + 10 (Assignment) + 70 (End Term Exam)]

Prerequisite Course / Knowledge (If any): None.

Aim of the Course:

is to provide a thorough understanding of distribution and compositions of humans.

Course Outcomes:

After completion of this course, the students will be able to:

- I. Recognize and state basic concepts of Human Geography
 - II. Review, understand and summarise population dynamics
 - III. Review and analyse demographic characteristics
 - IV. Examine social composites
-

Course Contents:

Unit 1. Basics about Human Geography

- 1.1. Definition, nature and scope of Human Geography;
- 1.2. Culture - meaning and elements; Cultural Regions of the world;
- 1.3. Races of the world

(Covers OBE level – Remember)

Unit 2. Population dynamics

- 2.1. World Population: Growth and Distribution;
- 2.2. Rural and Urban composition – world and India;

(Covers OBE level – Remember and Understand)

Unit 3. Demographic characteristics

- 3.1. Age, sex, literacy, fertility, mortality, occupational structure and migration.
- 3.2. Demographic Transition Theory;

(Covers OBE level – Remember, Understand, Apply and Analyse)

Unit 4. Social composites

- 4.1. Race, Religion and language;
- 4.2. Settlements - Types and patterns
- 4.3. Trends and Patterns of Urbanization – world and India

(Covers OBE level – Remember, Understand, Apply and Analyse)

Reading List –

1. Chandna, R.C. (2010) Population Geography, Kalyani Publisher.
 2. Hassan, M.I. (2005) Population Geography, Rawat Publications, Jaipur
 3. Daniel, P.A. and Hopkinson, M.F. (1989) The Geography of Settlement, Oliver & Boyd, London.
 4. Johnston R; Gregory D, Pratt G. et al. (2008) The Dictionary of Human Geography, Blackwell Publication.
 5. Jordan-Bychkov et al. (2006) The Human Mosaic: A Thematic Introduction to Cultural Geography. W. H. Freeman and Company, New York.
 6. Kaushik, S.D. (2010) Manav Bhugol, Rastogi Publication, Meerut.
 7. Maurya, S.D. (2012) Manav Bhugol, Sharda Pustak Bhawan. Allahabad.
 8. Hussain, Majid (2012) Manav Bhugol. Rawat Publications, Jaipur
-

GEO (IDSE) – 306 [C]: Economic Geography

Credit = 4

F.M. = 100 [20 (Mid Term) + 10 (Assignment) + 70 (End Term Exam)]

Prerequisite Course / Knowledge (If any): None.

Aim of the Course:

to provide a balanced understanding of economic geography to students of different disciplinary background.

Course Outcomes:

After completion of this course, the students will be able to:

- I. Explore and critique nature, scope and concept of Economic Geography
 - II. Gain foundational understanding of Economic Geography, including its key concepts, theories, methods of analysis, activities and regions
 - III. Interpret, compare and examine different factors of economic activities and relate them with location and development of the economic activities, particularly in India.
 - IV. Assess the regional disparity of economic development particularly in case of India keeping the history of Indian economic development in context.
-

Course Contents:

Unit 1. Introduction to Economic Geography

- 1.1. Economic Geography: Definition, nature and scope
- 1.2. Concept of economic activities

(Covers OBE level – Remember and Understand)

Unit 2. Types of economic activities and regions

- 2.1. Economic activities: Primary activities (Agriculture- Subsistence and Commercial), forestry, fishing and mining; Secondary activities (Manufacturing- Cotton textile, and Iron and Steel); Tertiary activities: Transport, trade and services
- 2.2. Regions: Special economic zones and Technology Parks

(Covers OBE level – Remember and Understand)

Unit 3. Economic activities: factors, location and development

- 3.1. Factors affecting Location of economic activity (special reference to Agriculture, Industry and Services) such as Land, Labour, Capital, Transportation and Economies of scale
- 3.2. Location of economic activity Models (Von Thunen and Weber's models); case study: Location of iron and steel industries/cotton industries
- 3.3. Economic Development (Spatial and temporal aspects):

- 3.3.1. Spatial: Measures, Classification of countries.
- 3.3.2. Temporal: Stages of economic growth: Rostow's models

(Covers OBE level – Remember, Understand, Apply and Analyse)

Unit 4. Economic Development in India

- 4.1. Regional disparity: Natural and cultural factors
- 4.2. Stages of economic growth in India: Pre and Post-Independence, Green revolution, privatisation and globalisation.

(Covers OBE level – Remember, Understand, Apply and Analyse)

Reading List

1. Alexander J. W., 1963: *Economic Geography*, Prentice-Hall Inc., Englewood Cliffs, New Jersey.
 2. Bagchi-Sen S. and Smith H. L., 2006: *Economic Geography: Past, Present and Future*, Taylor and Francis.
 3. Coe N. M., Kelly P. F. and Yeung H. W., 2007: *Economic Geography: A Contemporary Introduction*, Wiley-Blackwell.
 4. Hodder B. W. and Lee Roger, 1974: *Economic Geography*, Taylor and Francis.
 5. Combes P., Mayer T. and Thisse J. F., 2008: *Economic Geography: The Integration of Regions and Nations*, Princeton University Press.
 6. Durand L., 1961: *Economic Geography*, Crowell.
 7. Hanink, D. M. (1997). *Principles and Applications of Economic Geography, Economy, Policy, Environment*, John Wiley and Sons, New York
 8. Hartshorne, T.A. and J.W. Alexander (1988) – *Economic Geography*, Prentice Hall.
 9. Janaki. V.A. (1985) – *Economic Geography*, Concept Publishing Co.
 10. Knox, P. and J. Agnew (1998) – *The Geography of the World Economy*. Arnold, London
 11. Thomas, Conkling and Yeates (1974) – *Geography of Economic Activity*, Mc Graw Hill, New York.
 12. Wheeler J. O., 1998: *Economic Geography*, Wiley.
 13. Willington D. E., 2008: *Economic Geography*, Husband Press.
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SEMESTER - IV

GEO – 401: Regional Development and Planning

Credit = 4

F.M. = 100 [20 (Mid Term) + 10 (Assignment) + 70 (End Term Exam)]

Prerequisite Course / Knowledge (If any): None.

Aim of the Course:

is to provide essential understanding of the social and cultural side of Geography with emphasis on India.

Course Outcomes:

After completion of this course, the students will be able to:

- I. Recognise, define and describe the basic elements of Regional development and planning
 - II. Outline, distinguish and relate theories, models and indicators of Regional Planning
 - III. Examine planning regions with particular emphasis on India
 - IV. Examine, compare and explain different concepts and contemporary issues with particular emphasis on India
-

Course Contents:

Unit 1. Basics elements

- 1.1. Concept of Planning;
- 1.2. Types of Planning;
- 1.3. Concept of Regional Planning;
- 1.4. Region: Types of Region;
- 1.5. Methods of Delineation of Different Types of Region.

(Covers OBE level – Remember and Understand)

Unit 2. Regional Planning Theories, models and indicators (With emphasis on India)

- 2.1. Growth Pole Theory;
- 2.2. Spatial Diffusion Theory;
- 2.3. Cumulative Causative Model;
- 2.4. Human Development Index & its Indicators;
- 2.5. Regional Disparity in India;

(Covers OBE level – Remember, Understand and Apply)

Unit 3. Planning Regions (With emphasis on India)

- 3.1. Planning Regions of India (Macro, Meso & Micro);
- 3.2. Planning for Command Area Development;
- 3.3. Watershed Management; Hill & Tribal Area Development.

(Covers OBE level – Remember, Understand, Apply and Analyse)

Unit 4. Concepts and contemporary issues (With emphasis on India)

- 4.1. Concept of Multi-Level Planning
- 4.2. Decentralised Planning;
- 4.3. People Participation in Planning Process;
- 4.4. Panchayati Raj System;
- 4.5. Environmental Issues in Regional Planning;
- 4.6. Sustainable Development Planning.

(Covers OBE level – Remember, Understand, Apply and Analyse)

Reading list

1. Chand, M., & Puri, V. K. (1983). Regional Planning in India. New Delhi: Allied
 2. Dawkins, D. J. (2003). Regional Development Theory: Conceptual Foundations, Classic Works, and Recent Developments. *Journal of Planning Literature*, 18 (2), 131-172.
 3. Issard, W. (1956). Location and Space Economy. Massachusetts: MIT Press.
 4. Issard, W. (1971). Methods of Regional Analysis : An Introduction to Regional Science. Cambridge: MIT
 5. Maboguje, A. L., & Mishra, R. P. (1995). Regional Development Alternatives: International Perspectives. Nagoya: United Nations Centre for Regional Development Series (1-7), on Regional Development.
 6. Mishra, R. P. (1992). Regional Planning: Concepts, Tools, Techniques and Case Studies. New Delhi (Revised Edition): Concept.
 7. Mitra, A. (1968). Levels of Development in India, Census of India 1961. Monograph No.7.
 8. Mohapatra, A. C., & Pathak, C. R. (2003). Economic Liberalisation and Regional Disparities in India. Shillong: Star Publication House.
 9. Sundaram, K. V. (1985). Geography and Planning. New Delhi: Concept. 10. Richardson, H. W. (1969). Urban and Regional Economics. London: World Univ Press.
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GEO – 402: Environmental Geography

Credit = 4

F.M. = 100 [20 (Mid Term) + 10 (Assignment) + 70 (End Term Exam)]

Prerequisite Course / Knowledge (If any): Basic knowledge of Environmental studies

Aim of the Course:

is to train students on fundamental issues that raised due to the intersection of geography and environmental science, with a precise focus on different geographical approaches, humans' impact on physical environment and initiatives to control modification of environment.

Course Outcome:

On completion of the course, student will able to

- I. Tell the components of environment with their geographical aspect; interpret the historical geographical perspective on man-environment interaction, choose and compare the different geographical approach for complex environmental problems.
 - II. Classify the source of major environmental pollutions, identify their effect; compare different pollution control measurements and decide the right way to control the pollution in a geographical set up.
 - III. Recognize the role of global warming for climate change; show how these global environmental phenomena pose threat to sustainability; outline the actionable measurement that can be taken at local to global scale to combat the problem of climate change and global warming; Explain the cause and effect of natural hazards and its interlinkage with global environmental problem; Prepare an action plan for reducing the effect of natural disaster in different geographical set up.
 - IV. Outline the various global initiatives towards making earth a sustainable planet by measurable actions of member nations; outline the various national laws for safeguards natural environment; Formulate the scope and procedures for assessing the environmental effect of any developmental project across its life cycle
-

Course Contents:

Unit 1. Concept and approach to Environmental Geography

- 1.1 Fundamentals of environment; components of environment, Environmental Geography- Concept, Significance, objective and scope;
- 1.2 Man-environment relationship on historic perspective; Environmental deterministic approach; Possibilistic approach.

(OBE level to be achieved – Remembering, understanding, Applying)

Unit 2. Environmental pollution

- 2.1 Sources and effect of Water Pollution. Water pollution control, Water Conservation Strategies;
- 2.2 Source and cause of Air pollution and impact on health; Measure to control air pollution
- 2.3 Sources, characteristics and control of Noise Pollution; solid waste pollution and its management.

(OBE level to be achieved – Remembering, understanding, Applying, Evaluating)

Unit 3. Environmental challenges

- 3.1 Concept of Life cycle assessment, carbon footprint and carbon credit; Atmospheric ozone depletion;
- 3.2 The concept of Climatic Change; Global Warming- cause, effect and remedies;
- 3.3 Desertification, land degradation, Loss of Biodiversity, Sea water intrusion.

(OBE level to be achieved – Remembering, understanding, Applying, Evaluating)

Unit 4. Environmental initiative and Legislation

- 4.1 Earth Summit 1992 and its subsequent proceedings such as Rio+10 and Rio+20
- 4.2 Wildlife protection act of India 1972, The environment protection act of 1986, National Environmental Tribunal Act of India 1995.
- 4.3 The concept, scope, procedure of Environmental Impact Assessment (EIA).

(OBE level to be achieved – Remembering, understanding, Applying, Evaluating)

Reading List

1. Chandna R. C., 2002: Environmental Geography, Kalyani Publication, Ludhiana.
2. Cunningham W. P. and Cunningham M. A., 2004: Principals of Environmental Science: Inquiry and Applications, Tata Macgraw Hill, New Delhi.
3. Goudie A., 2001: The Nature of the Environment, Blackwell Publication, Oxford.
4. Miller G. T., 2004: Environmental Science: Working with the Earth, Thomson BrooksCole, Singapore.
5. MoEF, 2006: National Environmental Policy-2006, Ministry of Environment and Forests, Government of India.
6. Odum, E. P. et al, 2005: Fundamentals of Ecology, Ceneage Learning India.
7. Singh S., 1997: Environmental Geography, Prayag Pustak Bhawan. Allahabad.
8. UNEP, 2007: Global Environment Outlook: GEO4: Environment for Development, United Nations Environment Programme.
9. Trivedy R. K., 2009: Handbook of Environmental Laws, Acts, Guidelines, Compliances & Standards, EM International, Pune
10. Shrivastava A.K., 2021: Text Book of Disaster Management, Scientific Publishers

GEO – 403: Disaster Management

Credit = 4

F.M. = 100 [20 (Mid Term) + 10 (Assignment) + 70 (End Term Exam)]

Prerequisite Course / Knowledge (If any): None.

Aim of the Course:

To provide basic conceptual understanding of disasters, approaches to manage disasters in order to build skills to respond to disasters.

Course Outcomes:

After completion of this course, the students will be able to:

- I. Recognize, discuss and distinguish basic elements and types of disasters
 - II. Understand, discuss and discover cycle of disaster management
 - III. Review and appraise measures for Rehabilitation, Reconstruction and Recovery
 - IV. Assess the role of information technology in disaster management
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Course Contents:

Unit 1. Introduction

- 1.1. Concept of Hazard, Risk and Disaster;
- 1.2. Classification of Disaster;
- 1.3. Meaning and Dimensions of Disaster Management.
- 1.4. Major categories: Hydrological Disasters (Flood and Drought); Geological Disasters (Earthquakes and Landslides); Meteorological Disasters (Cyclone, Tidal waves); Manmade Disasters (Chemical disasters, Biological disasters, Radiological disasters, Nuclear disasters).

(Covers OBE level – Remember and Understand)

Unit 2. Disaster Preparedness, Mitigation and Response

- 2.1. Concept and Nature of disaster preparedness;
- 2.2. Disaster Preparedness Plan.
- 2.3. Disaster Mitigation and Disaster Mitigation Strategies.
- 2.4. Disaster Response Plan, Role of Multiple Stakeholders in Disaster Response.

(Covers OBE level – Remember, Understand and Apply)

Unit 3. Rehabilitation, Reconstruction and Recovery

- 3.1. Damage Assessment, Reconstruction and Rehabilitation
- 3.2. Role of various government and non-governmental agencies in Recovery Measures.

(Covers OBE level – Remember, Understand, Apply and Analyse)

Unit 4. Role of Information Technology in Disaster Management

- 4.1. Disaster management Information System;
- 4.2. Role of Geospatial Technologies;
- 4.3. Role of Communication in Disasters management –HAM radio, Satellite, Video Conferencing, Electronics devices, social media.

(Covers OBE level – Remember, Understand, Apply, Analyse and Evaluate)

Reading list

1. Blaikie, P., Cannon, T., & Davis, I. (1994). At Risk: Natural Hazards, People's Vulnerability, and Disasters. London: Routledge.
 2. Council, N. R. (2006). Facing Hazards and Disasters: Understanding Human Dimensions. Washington: National Academies Press.
 3. Damon, P. Copola, (2006) Introduction to International Disaster Management, Butterworth Heineman.
 4. Disaster Management Guidelines, GOI-UND Disaster Risk Program (2009-2012)
 5. Documents, G. O. (Various Years). Vulnerability Atlas (2004), Disaster Management Act (2005), Disaster Management Policy (2009).
 6. Flynn, S. (2007). The Edge of Disaster: Rebuilding A Resilient Nation. New York: Random House.
 7. Gupta A.K., Niar S.S and Chatterjee S. (2013) Disaster management and Risk Reduction, Role of Environmental Knowledge, Narosa Publishing House, Delhi.
 8. Modh S. (2010) Managing Natural Disasters, Mac Millan publishers India LTD.
 9. Murthy D.B.N. (2012) Disaster Management, Deep and Deep Publication PVT. Ltd. New Delhi.
 10. Pal, I., & Shaw, R. (2017). Disaster Risk Governance in India and Cross Cutting Issues, Singapore: Springer.
 11. Paraswamam, S., & Unikrishnan, P. V. (2000). India Disaster Report. New Delhi: Oxford.
 12. Platt, R. H. (1999). Disasters and Democracy: The Politics of Extreme Natural Events. Washington: Island Press.
 13. Quarantelli, E. (1998). What is a Disaster? Perspectives on the Question. London: Routledge.
 14. Schneid, T., & Collins, I. (1998). Disaster Management and Preparedness. UNU-EHS. Various years. World Risk Reports. Washington: Lewis.
 15. Wisner, B., Blaikie, P., Cannon, T., & Davis, I. (2004). At Risk: Natural Hazards, People's Vulnerability and Disasters (2nd Ed.). London and New York: Routledge
 16. United Nations, 2021. Sustainable Development Goals [online]. Available at: <https://sdgs.un.org/goals> [Accessed on 14th June 2021]
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GEO – 404: Urbanization and Migration

Credit = 4

F.M. = 100 [20 (Mid Term) + 10 (Assignment) + 70 (End Term Exam)]

Prerequisite Course / Knowledge (If any): Familiarity with concepts of urbanization and migration.

Aim of the Course:

To acquaint students with the concepts of urbanization, its theories, processes and measurements; concepts of internal and international migration their types, streams, patterns, theories and measurement and implications of migration trends on urbanization.

Course Outcomes:

After completion of this course, the students will be able to:

- I. Gain comprehensive understanding of the processes and patterns of urbanization, including its historical evolution, causes, and consequences as well as patterns at national and global scale.
 - II. Acquire broad understanding of the migrants their national and international patterns, cause and consequences along with various theories associated with it
 - III. Explore the structure, organization and growth of urban systems in terms of associated contexts, types, concepts and theories.
 - IV. Evaluate the problems and prospects of urbanization and migration and discuss their various policy dynamics
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Course Contents:

Unit 1. The Process of Urbanization

- 1.1. Urbanization: Definition and concept; Factors influencing Urbanization; measurement of urban growth
- 1.2. Global patterns of urbanization
- 1.3. Urbanisation in India- The emergence of Indus urbanisation; Urbanisation in post-independent India

(Covers OBE level – Remember)

Unit 2. Migration

- 2.1. Definition of the migrants: Internal and international migration; Migration selectivity: Streams; distance; age; gender; education and skills; Measurement of migration.
- 2.2. Theories of migration: Revenstein; Stouffer; Lee; Zelensiky;
- 2.3. Causes and consequences of migration, relevance of push and Pull factors.

(Covers OBE level – Remember and Understand)

Unit 3. Urbanization and Development

- 3.1. Urbanisation, industrialisation and economic Development in historical context

- 3.2. Slums: concept, typologies and theories;
- 3.3. Growth of slums in India
- 3.4. Urban informal sector.

(Covers OBE level – Remember, Understand, Apply and Analyse)

Unit 4. Urbanisation, Migration and Sustainable Development Agenda

- 4.1. Urbanisation and the urban problems
- 4.2. Urbanisation and the Agenda for sustainable development
- 4.3. Migration and the Agenda for sustainable development

(Covers OBE level – Remember, Understand, Apply, Analyse and Evaluate)

Readings List

1. Aijaz, R. 2017. Measuring Urbanisation in India, ORF Issue Brief, Issue no 2018 [IB # 218 \(orfonline.org\)](#) [Accessed on 5th Sept 2021]
2. Beall, Jo and Fox, Sean (2009): Cities and Development, Routledge Perspectives on Development, Routledge, London 2. Birch, Eugenie L. and Wachter, Susan M. (2011): Global Urbanization: The City in the Twenty-First Century, University of Pennsylvania Press 3. Carter, Harold (2010): The Study of Urban Geography, Rawat Publications, Jaipur, 4th Edition.
3. Bhagat, R.B. and Mohanty, S., 2009. Emerging pattern of urbanisation and the contribution of migration in urban growth in India. Asian Population Studies, 5(1), pp.5-20.
4. Bhagat, R.B. 2017. Urbanisation in India: Trend, Pattern and Policy Issues, IIPS Working Paper No-12. IIPS, Mumbai.
5. Chandrasekhar, S. and Sharma, Ajay (May 2014): "Urbanization and Spatial Patterns of Internal Migration in India", Indira Gandhi Institute of Development Research, Mumbai, WP-2014-016, Available at: <http://www.igidr.ac.in/pdf/publication/WP-2014-016.pdf>
6. Davis, Kingsley. 1961. Urbanisation in India: Past and Future in Roy Turner (ed.) India's Urban Future, University of California Press, Berkeley, pp. 3-26
7. Fyfe N. R. and Kenny J. T., 2005: *The Urban Geography Reader*, Routledge.
8. Graham S. and Marvin S., 2001: *Splintering Urbanism: Networked Infrastructures, Technological Mobilities and the Urban Condition*, Routledge.
9. Hall T., 2006: Urban Geography, Taylor and Francis.
10. Possehl, G.L. 1990. Revolution in the urban revolution: the emergence of Indus urbanization, Annual Review of Anthropology, 19:261-82.
11. Kundu, Amitabh (2011): "Trends and Processes of Urbanisation in India", Urbanization and Emerging Population Issues – 6, Human Settlements Group, IIED Population and Development Branch, UNFPA
12. Morris, R.N. (2007): Urban Sociology, George Allen and Unwin Ltd., London
13. Prakasa, Rao, V.L.S., Urbanisation in India; Spatial Dimensions, Concept Publishing Co., New Delhi 1983.
14. Ramachandran, R., Urbanisation and Urban Systems in India, Oxford University Press, New Delhi 1992.
15. United Nations, 2021. Sustainable Development Goals [online]. Available at: <https://sdgs.un.org/goals> [Accessed on 14th June 2021]

16. Young, A. F. (2013). Urbanization, environmental justice, and social-environmental vulnerability in Brazil. In *Urbanization and Sustainability* (pp. 95-116). Springer Netherlands
 17. UN, 2009. *The World Urbanisation Prospects: The 2009 Revision*, Department of Economic and Social Affairs, Population Division, UN, New York.
 18. UN, 2019. *The World Urbanisation Prospects: The 2018 Revision*, Department of Economic and Social Affairs, Population Division, UN, New York.
 19. UN, 2003. *The Challenge of Slums Global Report on Human Settlements 2003*, UN-HABITAT, Earthscan publication Ltd, London.
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GEO – 405: Project Work Report and Viva-voce

(Practical papers)

Credit = 4

F.M. = 50+50

Prerequisite Course / Knowledge (If any): Basic idea of research methods.

Aim of the Course:

is to provide essential research skills to the students in order to take cutting-edge research of any problem in real world (up to regional scale at this education stage).

Course Outcomes:

After completion of this course, the students will be able to:

- I. Design a research project for any topic of choice
 - II. Manage data and perform analyses under designed research
 - III. Write report on the outcome and explain the limitations and future prospect of the research carried out and Summarise and represent the research outcomes to audiences (OBE level to be achieved – Create).
 - IV. Communicate effectively about advanced Geographic concepts and research findings through written reports, oral presentations, and visual media.
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Course Contents:

Unit 1. Dissertation –

The student will do research on a given topic of his/her choice. S/he will research on it for 12-16 under the supervision of prescribed guide and will provide a report on it at the end of semester.

In general, the student will follow the time-line given below:

- i. 0-4 Weeks – Identification of the problem; literature review and conceptual model of research
- ii. 5-10 Weeks – Finalizing methods; data collection
- iii. 11-16 Weeks – Data analyses and results
- iv. 16- 20 weeks –Report writing; submission at the end of working day of 20th Week.

Note: Research progress should be reported at the end of each phase.

Following is the general guidelines for report preparations:

→ The final report should cover the following structure:

- a. Cover page
- b. Declaration
- c. Certificate
- d. Acknowledgement
- e. Abstract
- f. Introduction to the problem with Aim and objectives of the study
- g. Literature review (aim and objective of study could also come here if not in previous section)
- h. Material and Methods
- i. Results
- j. Discussion
- k. Conclusions
- l. References/Bibliography

→ The final report should be computer typed and should be approved by supervisor in due time.

- Report should be typed with 1.5 Line Spacing, Arial/ Times New Roman/ Calibri Font, and 12 Font Size (Table and Figure captions 11 Font Size).
- The list of references should be given at the end in the API or Harvard format.
- Every table, figure, photograph should have a caption and source (if any).
- The total word should not exceed 10,000 in number (maximum 50 including text, figures, tables, photographs, references and appendices).

→ The two copies of report should be printed and, duly signed by the candidate and supervisor, submitted to the department along with its soft copy.

(Covers OBE level – Remember, Understand, Apply, Analyse, Evaluate and Create)

Unit 2. Seminar and Viva

The students will

- Present the research carried out in the departmental seminar.
- Face a Viva Voce based on their research.

The student will also present the work during seminar to experts and fellow students.

The ppt should contain all major sections of report including – problem statement, aim and objectives, and results. It shall not exceed 10 slides.

(Covers OBE level – Remember, Understand, Apply, Analyse, Evaluate and Create)
