Approved in 11(7) from Academic Session 2020-21

Chaudhary Ranbir Singh University, Jind

(Established by Govt. of Haryana Legislature Act No. 18 of 2014)
(Recognized under Section 12(b) & 2 (f) of UGC Act, 1956)

Syllabi of

Master of Science in Geography
(Choice Based Credit System)

w.e.f. Academic Session 2020-21

Department of Geography
Chaudhary Ranbir Singh University, Jind

DEPARTMENT OF GEOGRAPHY

Chaudhary Ranbir Singh University, Jind

Scheme of Examinations for M. Sc. Geography (CBCS) w.e.f. 2020-21

Semester-I

Course Code	Title of Course	Type of Course	Contact Hours			Marks			Credit
			L	T	P	Maximum	End Semester Exam	Internal Assessment	
20GEO-101	Climatology	Core Course	3	1	0	100	80	20	4
20GEO-102	Introduction to Geography of India	Core Course	3	1	0	100	80	20	4
20GEO-103	Quantitative Methods in Geography	Core Course	3	1	0	100	80	20	4
20GEO-104	i) Population Geography ii) Political Geography iii) Soil Geography	Elective Course	3	1	0	100	80	20	4
20GEO-105	Representation of Physical Data	Core Course	0	0	4	50	40	10	2
20GEO-106	Computer based data management and statistical diagrams	Skill Enhancement Core Course	0	0	4	50	40	10	2
Total			**24**			**500**	**400**	**100**	**20**

DEPARTMENT OF GEOGRAPHY

Chaudhary Ranbir Singh University, Jind

Scheme of Examinations for M. Sc. Geography (CBCS) w.e.f. 2020-21

Semester-II

Course Code	Title of Course	Type of Course	Contact Hours			Marks			Credit
			L	T	P	Maximum	End Semester Exam	Internal	
20GEO-201	Geographical Thought	Core Course	3	1	0	100	80	20	4
20GEO-202	Geomorphology	Core Course	3	1	0	100	80	20	4
20GEO-203	Biogeography	Core Course	3	1	0	100	80	20	4
20GEO-204	i) Regional Development and Planning (Indian reference) ii) Disaster Management and Geography iii) Social Geography	Elective Course	3	1	0	100	80	20	4
20GEO-205	Representation of Socio-Economic Data	Core Course	0	0	4	50	40	10	2
20GEO-206	Field Survey based Report Writing	Ability Enhancement Core Course	0	0	4	50	40	10	2
20GEO-207	General Geography of India	Open Elective Course-1	3	1	0	100	80	20	4
Total			**28**			**600**	**480**	**120**	**24**

DEPARTMENT OF GEOGRAPHY

Chaudhary Ranbir Singh University, Jind

Scheme of Examinations for M. Sc. Geography (CBCS) w.e.f. 2020-21

Semester-III

Course Code	Title of Course	Type of Course	Contact Hrs.			Marks			Credit
			L	T	P	Maximum	End Semester Exam	Internal	
20GEO-301	Research Methodology	Core Course	3	1	0	100	80	20	4
20GEO-302	Economic Geography	Core Course	3	1	0	100	80	20	4
20GEO-303	Fundamentals of Remote Sensing	Core Course	3	1	0	100	80	20	4
20GEO-304	i) Environmental Geography ii) Geography of Rural Settlements iii) Geography of Water Resources	Elective Course	3	1	0	100	80	20	4
20GEO-305	Dissertation/Project Work	Core Course	0	0	8	100	80	20	4
20GEO-306	General Geography of World	Open Elective Course-2	3	1	0	100	80	20	4
Total			**28**			**600**	**480**	**120**	**24**

DEPARTMENT OF GEOGRAPHY
Chaudhary Ranbir Singh University
Scheme of Examinations for M. Sc. Geography (CBCS) w.e.f. 2020-21
Semester-IV

Course Code	Title of Course	Type of Course	Contact Hrs.			Marks			Credit
			L	T	P	Maximum	External	Internal	
20GEO-401	Hydrology and Oceanography	Core Course	3	1	0	100	80	20	4
20GEO-402	Urban Geography	Core Course	3	1	0	100	80	20	4
20GEO-403	Introduction to Geographic Information System	Core Course	3	1	0	100	80	20	4
20GEO-404	i) Agriculture Geography ii) Geography of Health iii) Geography of Haryana	Elective Course	3	1	0	100	80	20	4
20GEO-405	Geoinformatics Technology (Practical)	Core Course	0	0	8	100	80	20	4
Total			**24**			**500**	**400**	**100**	**20**

Note:

- **Abbreviations:** 20GEO: 20 stands for the year of implementation, GEO stands for Geography.
- Core Courses are compulsory papers for the students,
- Elective course provide choice to the students for adoption of at least one paper (they will be officered as per availability of teachers in the department),
- Open Elective Course-1 & 2 are to be selected by students from the basket of papers provided by the university
- Each paper will include 20% marks as internal assessment (05 marks for attendance, 05 marks for assignment/presentation and 10 marks for mid termfr tests)
-

GEO-101

Climatology

End Sem. Max. Marks: 80
Time: 3 Hrs.

Note: **There will be nine questions in all. Question No. 1 is compulsory and consists of 8 subparts (short notes not exceeding 50 words each). Short notes shall cover entire syllabus. There will be 8 long questions, two from each unit. The candidate shall attempt FOUR long questions, selecting one from each unit. All questions carry 16 marks each.**

Objective: It is an introductory course of climatology which is aimed at providing knowledge about the elements and processes of climates, different climatic types and climate change. Climate is one of the basic elements of physical environment which is a core area of interest for the students of geography.

Outcome: This course on climatology shall sharpen the understanding of students about different climatic systems found in the world. It shall develop scientific understanding about climates and their characteristics.

UNIT-I

Introduction to Atmospheric Sciences: Aerology, Meteorology and Climatology. Nature and Scope of climatology.
Origin of atmosphere. Solar Radiation: Heat budget of Earth and Atmosphere. Temperature: factor affecting and its horizontal and vertical distribution.

UNIT-II

Atmospheric pressure, its relation with temperature and other atmospheric factors, world pressure belts and global distribution pattern of pressure.
Atmospheric circulation: Major wind belts of earth, Walker circulation; El Nino, La Nina and ENSO, Monsoon: theories of its origin and characteristics of Indian monsoon.

UNIT-III

Precipitation: process, forms, and theories. Types and world distribution of rainfall. Stability and instability of atmosphere: air masses, fronts, origin and characteristics of extra tropical and tropical cyclones.
Climatic classification of world by Koeppen and Thornthwaite.

UNIT-IV

Climatic change: reconstruction of past climate (Dendrochronology and Pollen studies) and theories of climate change. Human induced climate change and Global warming. Impacts of climate change on agriculture and vegetation of world.

Suggested Readings:

1. Chritchfield, H. J. (2008): General Climatology, Prentice Hall of India, New Delhi.
2. Barry, R. G. and Chorley, R. J. (2010): Atmosphere, Weather and Climate, Routledge, London.
3. Lal, D. S. (2011): Climatology, Sharda Pustak Bhawan, Allahabad.
4. Das, P. K. (1995): The Monsoons, National Book Trust, New Delhi.
5. Singh S. (2013): Climatology, Pravalika Publications, Allahabad.

GEO - 102
Introduction to Geography of India

End Sem. Max. Marks: 80
Time: 3 Hrs.

Note: **There will be nine questions in all. Question No. 1 is compulsory and consists of 8 subparts (short notes not exceeding 50 words each). Short notes shall cover entire syllabus. There will be 8 long questions, two from each unit. The candidate shall attempt FOUR long questions, selecting one from each unit. All questions carry 16 marks each.**

Objective: India is a country with diversity in landscape, vegetation, soils, drainage network, economy, population characteristics and culture. It is rich in resources and has got many minerals and power resources, which are the main assets of the country and are also exported. Therefore it becomes immense important to make the students know about their country.

Outcome: After studying Geography of India, students will become aware about the country's beautiful and diverse landscapes. They will acquire knowledge about the economy and valuable resources. This would also sharpen their understanding about the unity in diversity in India.

UNIT-I

India: Geographical outline and physiographic divisions. Climate: characteristics, significance and climatic divisions of India as given by Koppen. Soil and natural vegetation: types, their distribution, characteristics and conservation.

UNIT-II

Agriculture: Major Characteristics and Problems of Indian agriculture; agro- climate region; Green revolution: its impact and drawbacks. Irrigation: development, means of irrigation, major, medium, micro irrigation projects and watershed management.

UNIT-III

Production, distribution, utilization and conservation of power resources: Coal, Petroleum, Hydropower. Production and distribution of (a) iron and steel (b) Cotton textile (c) IT and (d) Automobile industry. New industrial policy of India.

UNIT-IV

Population: Growth and density distribution; Population composition- age and sex ratio, Literacy, working and non working population (dependency ratio), Population problems of India and population policy.

Suggested Readings:

1. Singh, S. and Saroha, J. (2019): Geography of India, G. K. Publications, New Delhi.
2. Singh, S. and Saroha, J. (2019): Bharat ka Bhugol, G. K. Publications, New Delhi.
3. Tiwari, R. C. (2016): Geography of India, Prayag Pustak Bhawan, Allahabad.
4. Hussain M. (2015) Geography of India, Mc Graw Hills Education Pvt. Ltd. Delhi.
5. Khullar, D. R. (2018): Geography of India, Mc Graw Hills Education Pvt. Ltd. Delhi.
6. Spate O. H. K. and Learmonth A. T. A (2018): India and Pakistan: A General and Regional Geography, Routledge, London.

GEO-103
Quantitative Methods in Geography

End Sem. Max. Marks: 80
Time: 3 Hrs.

Note: **There will be nine questions in all. Question No. 1 is compulsory and consists of 8 subparts (short notes not exceeding 50 words each). Short notes shall cover entire syllabus. There will be 8 long questions, two from each unit. The candidate shall attempt FOUR long questions, selecting one from each unit. All questions carry 16 marks each.**

Objective: The objective of the course is to introduce the students to statistical tools for summarizing and analyzing quantitative information and data. The course includes various tools and techniques used in the analysis of geographical data.

Outcome: The course shall equip the students with statistical tools for summering, analyzing and finding spatial pattern from the geographical and other time series data.

UNIT-I

Descriptive Statistics: Histogram and Frequency Curve, Measures of Central Tendency: Mean, median, mode, Partitioned values: Quartiles and deciles, Measures of Dispersion: Range, Quartile Deviation, Mean deviation, Standard deviation, Relative measure of dispersion: Coefficient of variation

UNIT-II

Normal curve as a probability distribution: Its characteristics and area under curve. Measure of inequality: (i) Location quotient (ii) Lorenz curve.
Sampling: Theory of sampling, Sampling Methods; probability and non-probability, Spatial Sampling –Area, Line & Point Sampling.

UNIT-III

Bivariate Analysis: Scatter diagram, correlation analysis, Spearman's rank correlation and Karl Pearson's correlation coefficient, Test of significance. Simple Linear Regression Model, Coefficient of Determination.

UNIT-IV

Residuals and their mapping, Basics of multivariate analysis: Correlation matrix, partial and multiple correlation. Cluster analysis, Nearest neighbor analysis.

Suggested Readings:

1. Sarkar, A. (2013): Quantitative Geography: Techniques and Presentations, Orient Black swan Private Limited, New Delhi.
2. Rogerson. P. A. (2014): Statistical Methods for Geography: A Student's Guide, Sage Publication, New Delhi
3. Gregory S. (2006): Statistical Methods and the Geographers, Longman, London.
4. Jack Levin and Fox J.A. (2006): Elementary Statistics in Social Research, Pearson Education, New Delhi.
5. Gupta C. B. (2004): An Introduction to Statistical Methods, Vikas Publishing House, Delhi.
6. Mahmood, A. (1999): Statistical Methods in Geographical Studies, Rajesh Publications, New Delhi.
7. Blalock, H. M. (1979): Social Statistics, McGraw Hill Education Pvt. Limited, Europe.

GEO-104 (i)
Population Geography

End Sem. Max. Marks: 80
Time: 3 Hrs.

Note: **There will be nine questions in all. Question No. 1 is compulsory and consists of 8 subparts (short notes not exceeding 50 words each). Short notes shall cover entire syllabus. There will be 8 long questions, two from each unit. The candidate shall attempt FOUR long questions, selecting one from each unit. All questions carry 16 marks each.**

Objective: The objective of the course is to acquaint the students with the sources of population data, dynamics of population and their determinants and assessment of the impact of policy interventions

Outcome: The students shall learn about the population data sources and various theories models and measures of population dynamics and international community' efforts to improve quality of human resource.

UNIT-I

Nature, scope and historical development of population geography. Population Data: sources, Quality, Reliability and data problems in mapping of population data. Concepts of Population Growth.

UNIT-II

Concepts, Determinants and World Pattern of the following attributes of population: Growth, Distribution, Density of population, birth rate and death rate. Population composition: Age, Sex, Literacy, Occupation. Migration: Theories, causes and consequences.

UNIT-III

Population and Resource: Population Resource Regions, Over Population, Under Population and Optimum Population. Theories of Population: Malthus, Ricardo and Marx population theory. Demographic transition theory.

UNIT-IV

Meaning and Definition of population policy. A review of Population Policy of India, China, and Japan. Population Problems and Environmental Implications.

Suggested Readings:

1. Singh, S. and Saroha, J. (2020): Human and Economic Geography, Pearson Publishing House, Noida.
2. Saroha, J. (2020): Population Geography, R K Publications, New Delhi.
3. Chandna, R. C. (2015): Geography of Population: Concepts, Determinants and Patterns, Kalyani Publishers, New Delhi.
4. Hassan, I. (2010): Population Geography, Rawat Publications, Jaipur.
5. Mahajan, N. (2014): Population Geography, R K Publications, New Delhi.
6. Newbold, K. Bruce. (2016): Population geography: Tools and Issues, Rowman & Littlefield Publishers, United States.
7. Qazi, S.A. (2010): Population Geography, Ashish Publishing House, Ladakh.

GEO- 104 (ii)
Political Geography

End Sem. Max. Marks: 80
Time: 3 Hrs.

Note: **There will be nine questions in all. Question No. 1 is compulsory and consists of 8 subparts (short notes not exceeding 50 words each). Short notes shall cover entire syllabus. There will be 8 long questions, two from each unit. The candidate shall attempt FOUR long questions, selecting one from each unit. All questions carry 16 marks each.**

Objectives: The objective is to acquaint the students with conceptual framework of geo-political issues and assessment of Indian position in the emerging geo-political situation.

Outcome: The students shall be groomed to grasp the conceptual framework of geo-political issues and role and status India in contemporary geo-political situation.

UNIT-I

Nature and scope of political geography, its approaches and recent developments. School of thoughts: political economy, world system, globalization.

UNIT-II

Themes in Political Geography: State, Nation, Nation-State and Nation-building, Colonialism, Neocolonialism, Federalism and other forms of governance.

UNIT-III

Global strategic views: Mahan and Sea power; Mackinder and Heartland; Spykman and Rimland Servasky and Air power. Geo-politics in the post cold war world- S.B. Cohen's model of geo-politics.

UNIT-IV

Emergence of India as regional power: Geo-political significance of Indian and Pacific Ocean. Geo-political issues in India with special reference to water disputes and riparian claims. Kashmir problem and Indo-Pak relations.

Suggested Readings:

1. Adhikari, S. (2017): Political Geography, Rawat Books, Jaipur.
2. Fisher C. A. (2016): Essays in Political Geography, Routledge, London.
3. Flint, C. and Taylor, P. (2011): Political Geography: World Economy, Nation-State and Locality, Printice Hall Publications, New Delhi.
4. Alexander, L. M. (1963): World Political Patterns, Ran Mc Nally, Chicago.
5. De Blij, H. J. and Glassner, Martin. (1968): Systematic Political Geography, John Wiley, New York.
6. Dikshit, R. D. (1996): Political Geography: A Contemporary perspective, Tata McGraw Hill, New Delhi.
7. Dikshit, R. D. (1999): Political geography: A Century of Progress, Sage Publications, New Delhi.
8. Sukhwal, B. L. (1968): Modern Political Geography of India, Sterling Publishers, New Delhi.

9. Pounds N.J.G. (1972): Political Geography. McGraw Hill, New York
10. John R. Short. (1982): An introduction to Political Geography Routledge, London.
11. Deshpande C.D. (1992): India-A Regional Interpretation Northern Book Centre, New Delhi.
12. Richard M (1997): Political Geography, Macmillan Education, UK

GEO- 104 (iii)
Soil Geography

End Sem. Max. Marks: 80
Time: 3 Hrs.

Note: **There will be nine questions in all. Question No. 1 is compulsory and consists of 8 subparts (short notes not exceeding 50 words each). Short notes shall cover entire syllabus. There will be 8 long questions, two from each unit. The candidate shall attempt FOUR long questions, selecting one from each unit. All questions carry 16 marks each.**

Objective: The main aim of this course is to appraise the students about soil formation processes and geographical distribution of soils in the world. The course shall cover the fundamental processes, development, classification and mapping of this resource.

Outcome: Study of Soil Geography shall make the students understand the significance of soil resources in the development of the society. It should also make the students to internalize the relationship between soils and other natural resources.

UNIT-I

Nature and scope of Soil Geography. Soil formation factors (Parent material, flora and fauna, climatic and topographic) and Processes of soil formation and soil development (physical, biotic and chemical). Pedogenic Regimes, Soil profile and its characteristics (zonal, azonal and intra zonal soils).

UNIT-II

Physical properties of soils: texture, structure, colour, porosity and permeability. Chemical properties of soils: soils reaction and controlling factors, organic matter and humus. Biological properties of soils (Soil organisms).

UNIT-III

Soil classification: genetic, taxonomic and 7th Approximation, their characteristics and world patterns. Soil erosion and degradation processes

UNIT-IV

Conservation methods to improve the qualities of soils. Methods and mechanism of soil survey. Soil reclamation and management, integrated soil management.

Suggested Readings:

1. Birkland P. W. (1999): Soil and Geomorphology, Oxford University Press, New York.
2. Brady Nyle C. and Weil R. C. (2012): The nature and Properties of Soils, Pearson Publishing, Prentice Hall Pvt. Ltd. New Delhi.
3. Brickland, P. W. (1984): Soils and Geomorphology. Oxford University Press, London.
4. Bunting, B. T. (1973): The Geography of Soils, Hutchinson, London.
5. Clark, G. R. (1957): Study of Soil in the Field, Oxford University Press, Oxford.
6. Daji, J. A. (1980): A Text Book of Soil Science, Asia Publishing House, New Delhi.
7. Fenwick I.M and Knapp B. J. (1982): Soils – Processes and Response, Unurin Brothers Ltd.; The Greshman Press, Surrey.
8. Foth H. D. and Turk L. M. (1972): Fundamentals of Soil Science, John Wiley, New York.
9. Govinda R. S. V. and Gopala Rao, H.G. (1978): Studies on Soils of India, Vikas Publications, New Delhi.
10. Sehgal, J. (2000): Pedology-concepts and Applications. Kalyani Publications, New Delhi.

GEO-105
Representation of Physical Data

End Sem. Max. Marks: 40
Time: 3 Hrs.

Distribution of Marks

Lab Exercises:	20 marks
Practical Record book:	12 marks
Viva-Voce:	08 marks

Note: **The examiner shall set six questions in all, three from each section. The candidate shall attempt four questions in all, selecting at two questions from each section. All questions carry 05 marks each.**

Objective: The objective of this course is to make the students familiar with the analysis and representation of physical data in geography.

Outcome: The course shall provide the students an opportunity to practice, learn and enhance their analytical skills on geographical data.

Climatology

1. Graphical Representation of Climatic Data
   a. Climograph (Taylor and Foster's)
   b. Rainfall deviation diagrams
   c. Thiessen Polygon Method
   d. Isopleths
2. Construction of water budget diagram using precipitation and potential evapotranspiration data
3. Delimitation of climatic type on map of India using Koppen's classification scheme.

Geomorphology

1. Profile analysis: Transverse and Longitudinal
   a) Serial profiles
   b) Superimposed profiles
   c) Composite profiles
   d) Projected profiles
   e) Longitudinal or valley Thalweg profile
2. Areal Aspects
   a. Drainage Density
   b. Drainage Frequency
3. Relief Aspects
   a. Area Height Curve
   b. Altimetric Frequency Curve
   c. Hypsographic Curve
   d. Hypsometric Integral Curves
4. Absolute and Relative Relief Map (Smith's Method)

Suggested Reading

1. Monkhouse F. J. and Wilkinson H. R. (1971): Maps and Diagram, Routledge Publication.

GEO-106
Computer Based Data Management and Statistical Diagrams

End Sem. Max. Marks: 40
Time: 3 Hrs.

Distribution of Marks

Lab Exercises:	20 marks
Practical Record book:	12 marks
Viva-Voce:	08 marks

Note: **The examiner shall set six questions in all. The candidate shall attempt four questions in all. All questions carry 05 marks each.**

Objective: The objective of this course is to make the students familiar with the basics of computer and provide them hands on training on MS Office and SPSS.

Outcome: The course shall provide the students an opportunity to practice, learn and enhance their skill on computer systems.

1. Introduction to Computer System and M S Office
2. Entering and Managing data using Spreadsheets
3. Representation of Geospatial Data
    a. Line graph (Single and Polygraph)
    b. Bar graph (Simple, Compound and Multiple)
    c. Pie Charts
    d. X, Y scatter plots
    e. Trend Line
4. Introduction to SPSS program
5. Entering and Managing data in SPSS
6. Analysis of data using different statistical methods in SPSS
7. Preparation and interpretation of Simple and Multiple correlation and regression matrix in SPSS

GEO-201
Geographical Thought

End Sem. Max. Marks: 80
Time: 3 Hrs.

Note: **There will be nine questions in all. Question No. 1 is compulsory and consists of 8 subparts (short notes not exceeding 50 words each). Short notes shall cover entire syllabus. There will be 8 long questions, two from each unit. The candidate shall attempt FOUR long questions, selecting one from each unit. All questions carry 16 marks each.**

Objective: The objective of this course is to introduce the students to the history, philosophy and methodology of geography. The postgraduate students of geography must have an idea about the course of development of the discipline in terms of changes in its philosophy and methodological innovations.

Outcome: The course would appraise the students about the development of geography as a scientific discipline. It would help them in assessing the positive aspects and shortcomings of the discipline.

UNIT-I

Classification of knowledge, Nature of geography and its place among sciences. Geographic knowledge during ancient (Greek and Roman) and medieval (Arab) periods. Contribution of Ancient Indian scholars in geographical development. Foundation of Modern Geography: contributions of Varenius, Kant, Humboldt and Ritter.

UNIT-II

Geography as a study of: Physical features, chorology, landscape science. Concepts in Geography: Environmental determinism, Possibilism, Neo-determinism, Probabilism, aerial differentiation. Dualism in geography: Physical vs Human geography, systematic vs regional geography.

UNIT-III

Quantitative Revolution: Emergence of geography as spatial science. Positivist Explanations in Geography: Laws, theories, hypotheses, models. Scientific explanations: routes to scientific explanations (Inductive and Deductive approach), cause and effect analysis.

UNIT-IV

Modern approaches in geography: Behavioral and Humanistic Perspectives in Geography, Welfare approach, Radical approach, Structuralism and postmodernism.

Suggested Readings:

1. Dickinson, R. E. (1969): The Makers of Modern Geography, Routledge, London.
2. Dikshit, R. D. (2018): Geographical Thought- A Contextual History of Ideas, Prentice Hall of India, New Delhi.
3. Harvey D. (1989): Explanation in Geography, Edward Arnold, London.
4. Hartshorne, R. (2000): Perspectives on the Nature of Geography, Rand MacNelly, Chicago.
5. James PE and Martin J Geoffrey (1993): All possible Worlds, John Wiley and Sons, New York.
6. Johnston, R. J. (2017): Geography and Geographers, Edward Heinemann, London
7. Peet, R.(2011): Modern Geographical Thought, Oxford, Blackwell Publishers.

GEO-202
Geomorphology

End Sem. Max. Marks: 80
Time: 3 Hrs.

Note: **There will be nine questions in all. Question No. 1 is compulsory and consists of 8 subparts (short notes not exceeding 50 words each). Short notes shall cover entire syllabus. There will be 8 long questions, two from each unit. The candidate shall attempt FOUR long questions, selecting one from each unit. All questions carry 16 marks each.**

Objective: Geomorphological knowledge helps in identifying the problems faced by human society, arising due to the interaction of human being with landscape and natural environment. The present course is aimed at providing the knowledge to students about the processes and patterns involved in shaping the features on land surface.

Outcome: Through the study of geomorphology, students shall get to know about formation of the earth's surface features, the role played by the humans in changing the landscape and the significance of landforms in shaping the physical environment in an area

UNIT-I

Introduction to geomorphology as a science: definition, nature, scope and recent developments. Fundamental concepts: Geological structure and landforms, Uniformitarianism, Multi-cycle and polygenetic evolution of landscape, Frequency concept of geomorphic processes, Peneplain and Pediplain.

UNIT-II

Origin of Continents and Oceans: Tetrahedral hypotheses, Continental drift theory, Sea floor spreading, Plate tectonics: Concept, plate motion and cycle, major tectonic activities along plate boundaries. Hill Slope: elements, classification and theories of its development-parallel retreat and slope replacement model.

UNIT-III

Impacts of climatic conditions on: Types and classification of weathering and mass movement activities; Dynamics of fluvial, glacial, peri-glacial and aeolian processes and resultant landforms.

UNIT-IV

Applied geomorphology: Meaning and concept, role of geomorphology in environmental management of the following: (i) Accelerated erosion and sedimentation, (ii) Construction of large dams (iii) Urban floods and Geomorphology

Suggested Readings:

1. Bloom, A. L. (2011): Geomorphology : A systematic Analysis of late Canozic landforms, Prentice – Hall Private Limited, New Delhi.
2. Kale V. S. and Gupta A. (2018): Introduction to Geomorphology, Orient –Longman, Hyderabad.
3. Sharma H. S. and Kale V. S. (2009): Geomorphology in India, Prayag pustak Bhawan, Allahabad.
4. Sharma, V. K. (2010): Introduction to process Geomorphology. Tayler and Francis's, London.

5. Sharma, V. K. (2010): Process Geomorphology, CRC Press, London, New York.
6. Singh S. (2015): Geomorphology, Prayag pustak Bhawan, Allahabad.
7. Strahler A. H. (2013): Introducing physical geography, Wiley and sons, New York.
8. Tasbuck, E. J. and Lutgers, F. K. (2009): Earth science, Prentice hall, New Jersey.
9. Thornburry, W. D. (2004): Principles of Geomorphology, John Wileys Sons, New York.

GEO- 203
Biogeography

End Sem. Max. Marks: 80
Time: 3 Hrs.

Note: **There will be nine questions in all. Question No. 1 is compulsory and consists of 8 subparts (short notes not exceeding 50 words each). Short notes shall cover entire syllabus. There will be 8 long questions, two from each unit. The candidate shall attempt FOUR long questions, selecting one from each unit. All questions carry 16 marks each.**

Objective: The objective is to introduce the concept of biogeography, evolution and dispersal of flora and fauna, interaction between living and non living organisms with physical environment, conservation of resources and human adaptation and adjustment to diverse environment.

Outcome: Students shall learn the significance of bio-geography, origin and evolution of flora and fauna, their dispersal over space and environmental hazard and laws to protect biodiversity and clean and safe environment.

UNIT-I

Nature and scope of biogeography. Development of biogeography as branch of physical geography. Biological classification of flora and fauna.

UNIT-II

Evolutionary biogeography: origin of species, process and types of speciation, diversity and extinction of spices, adaptation and natural selection, The Theory of Territorial Evolution in animals.
Ecological biogeography: structure and selection of habitat, concept of niche.

UNIT-III

Distribution of plant life on the earth and its relation to soil, climate, topography. Geographical distribution of animal life on the earth and its relation to climate and topography. Biodiversity: elements and types of biodiversity, biodiversity hotspots.

UNIT-IV

Biodiversity: its relation with climate change, conservation, protected areas, biosphere reserve, Zoning of biosphere reserve, tiger reserve and project elephant in India. National forest and wild life policy of India.

Suggested Readings:

1. Bradshaw, M. J. (1981): Earth, The Living Plant, Journal of Eastern African Research & Devlopment.
2. Cox, C.D. and Moore, P.D. (2010): Biogeography: An Ecological and Evolutionary Approach, Willey, London.
3. Gaur, R. (1987): Environment and Ecology of Early Man in Northern India: Geological and Paleontological Evidences, R.B. Publication Corporation, Chandigarh.
4. Hoyt, J. B. (1992): Man and the Earth, Prentice Hall, U.S.A.
5. Huggett, R. J. (2004): Fundamentals of Biogeography. Routeldge, U.S.A.
6. Lllies, J. (1974): Introduction of Zoogeography, McMillan. London.

7. Khushoo, T. N. and Sharma, M.(eds.) (1991): Indian Geosphere-Biosphere, Har-Anand Publication, Delhi.
8. Mathur, H. S. (1998): Essentials of Biogeography, Anuj Printers, Jaipur.
9. Pears, N. (1985): Basic Biogeography 2nd edn. Longman, London.
10. Simmons, I. G. (1979): Biogeography: Natural and Cultural, Longman, London.
11. Tivy, J. (1992): Biogeography: A study of Plants in Ecosphere 3rd edn. Oliver and Boyd, U.S.A.

GEO-204 (i)
Regional Development and Planning (Indian reference)

End Sem. Max. Marks: 80
Time: 3 Hrs.

Note: **There will be nine questions in all. Question No. 1 is compulsory and consists of 8 subparts (short notes not exceeding 50 words each). Short notes shall cover entire syllabus. There will be 8 long questions, two from each unit. The candidate shall attempt FOUR long questions, selecting one from each unit. All questions carry 16 marks each.**

Objective: The objective of the course is to develop an understanding of the processes, pattern and practice of regional development in India. This will expose students to development theories and strategies and planning concepts and broaden their perspective regarding regional disparities in India and the need of regional planning to overcome it.

Outcome: Students shall develop understanding about regional development processes, models adopted for development, regional disparities, challenges and strategies to overcome the disparities.

UNIT-I

Concept of Regions, Types of Regions and their Delineation. Types of Planning; Principles and Objectives of Regional Planning. Characteristics and Delineation of Planning Region, Economic and Planning regions.

UNIT-II

Theories of Regional Development (albert O. Hirschman, Gunnar Myrdal, John Friedman, Rostow's) Methods and Techniques of Regionalization. Measurement of Development by Kendall's Methods and Regional Disparity by Sopher's Index. Indicators of Development: Economic, Social, Environmental and Human.

UNIT-III

Development Thoughts Development Idea of Gandhi, Deen Dayal Upadhyay and Western Scholars. Critical Evaluation of the Five Year Plans; A review of NITI Aayog.

UNIT-IV

Regional Planning Programmes in India: A Case Study of–National Capital Region. An Innovative Extension Model for Integrated Rural Development: A Case Study of Nana Ji Deshmukh Rural Development Model. Constitutional Framework of Planning and Multi-Level Planning in India.

Suggested Readings:

1. Singh, S. and Saroha, J. (2020): Human and Economic Geography, Pearson India Education, Noida.
2. Chandna, R. C. (2016): Regional Planning and Development, Kalyani Publishers, New Delhi.
3. Chaudhuri, J. R. (2001): An Introduction to Development and Regional Planning with special reference to India, Orient Longman, Hyderabad.
4. Friedman, J. and Alonso, W. (ed.) (1973) : Regional Development and Planning, the MIT Press, Cambridge.

5. Kuklinski, A. R. (1972): Growth Poles and Growth Centers in Regional Planning Mouton and Co., Paris.
6. Leys, C. (1996): The Rise and fall of Development Theory, Bloomington and James Curry, Oxford.
7. Mahapatra, A. C. and Pathak, C. R. (eds.) (2003): Economic liberalization and Regional Disparities in india, Special Focus on the North Eastern Region. Star Publishing House, Shillong.
8. Mahesh Chand and V. K. Puri (2000): Regional Planning in India, Allied Publishers, New Delhi.
9. Misra, R. P. (ed.) (1992): Regional Planning: Concepts, Techniques, Policies and Case Studies, 2nd edition. Concept Publishing Company, New Delhi.
10. Misra, R. P. and Natraj, V.K. (1978): Regional Planning and National Development. Vikas Publishing House, New Delhi.
11. Planning Commission of India: Eighth Five Year Plan (1992-97) Vol. I, Govt. of India, New Delhi.
12. Raza Moonis (ed) (1988): Regional Development Vol. 10, Contribution to Indian Geography, Heritage Publishers, New Delhi.
12. Kundu and Moonis Raza (1988): Indian Economy: The Regional Dimension, CSRD/SSS, JNU, New Delhi.
13. Patnaik, C. S. (1981): Economics of Regional Development and Planning in Third World Countries, Associate Publishing House, New Delhi.

GEO- 204 (ii)
Disaster Management and Geography

End Sem. Max. Marks: 80
Time: 3 Hrs.

Note: **There will be nine questions in all. Question No. 1 is compulsory and consists of 8 subparts (short notes not exceeding 50 words each). Short notes shall cover entire syllabus. There will be 8 long questions, two from each unit. The candidate shall attempt FOUR long questions, selecting one from each unit. All questions carry 16 marks each.**

Objective: The objective of this course to develop among the students an understanding about the geographical dimensions of different types of disasters. It also introduces the students to concepts and practices of disaster mitigation and recovery, impacts of disasters and role of RS and GIS in disaster prevention.

Outcome: The course shall make the students aware about the risk of occurrence of different types of disasters in various parts of world. It will also appraise them about the mitigation and recovery mechanisms of disasters.

UNIT-I

Disasters and Hazards: Definition, nature and classification. Geography and disasters: major disasters of world, disaster profile of India; Tectonic Disasters: Volcanoes, Earthquakes, Tsunamis, Landslides.

UNIT-II

Hydrological Disasters: Floods and Droughts; Climatic Disasters: Cyclones and Heavy Precipitation events. Human Induced Disasters: Epidemics, Industrial and Transport Disasters.

UNIT-III

Disaster Management in India: Policy and Organizational Structure setup. Disaster Vulnerability and Affecting Factors. Planning for Disaster Mitigation Measures and Preparedness.

UNIT-IV

Post Disaster Recovery and Rehabilitation. Impacts of Disaster on Society and Economy
Remote Sensing and GIS Applications in Disaster Prevention and Monitoring.

Suggested Readings:

1. Singh J. (2014): Climate Change Adaptation and Disaster Mitigation, I. K. International Pvt. Ltd. S-25, New Delhi, India
2. Singh J. (2009): Tsunamis: Threats and Management, I. K. International Pvt. Ltd. S-25, New Delhi, India.
3. Singh J. (2007): Disaster Management: Future Challenges and Opportunities, I. K. International Pvt. Ltd. S-25, New Delhi, India.
4. Nlaikie, P et. al. (1994): At Risk: Natural Hazards, People's Vulnerability and Disasters, Routledge, London.
5. Carter, N. W. (1991): Disaster Management: A Disaster Manager's Handbook, ADB, Manila.
6. Cuny, F. C. (1983): Disasters and Development, Oxford University Press, London.
7. National Policy on Disaster Management. (2009): Ministry of Home Affairs, Govt. of India, New Delhi.

GEO- 204 (iii)
Cultural Geography

End Sem. Max. Marks: 80
Time: 3 Hrs.

Note: **There will be nine questions in all. Question No. 1 is compulsory and consists of 8 subparts (short notes not exceeding 50 words each). Short notes shall cover entire syllabus. There will be 8 long questions, two from each unit. The candidate shall attempt FOUR long questions, selecting one from each unit. All questions carry 16 marks each.**

Objective: The objective of this course is to introduce the students to concepts of cultural geography, sites of evolution of human civilizations, cultural diversity, distribution of races and languages and socio-cultural diversity in India.

Outcome: The study of cultural geography shall make the students understand and appreciate the ethnic-cultural diversity in the world and India.

UNIT-I

Definition, nature and scope of Cultural Geography; Cultural Geography: Elements & Components; The evolutionary approach in cultural geography and contribution of Otto Schluter and Carl Sauer; Cultural landscape and cultural ecology.

UNIT-II

Primates and evolution of homosapians concept of Race, criteria of racial classification. Classification of Races: Major races of the world: Nordics, Mongoloids, Negroids and Caucasoids. Racial Classification in India: Risley, B.S. Guha. Racial Elements in world Population.

UNIT-III

Concept of cultural areas, cultural adaption and environmental perception; cultural regions or cultural realsms: Indic Cultural Realm. Man as modifier of the earth.

UNIT-IV

Habitat economy and Society of tribal groups. Tribes of World (Eskimo, Pigmy, Bushman. Tribes of India with main emphasis on Naga, Khasis, Todas, Bhils and Santhals.

Suggested Readings:

1. Singh, S. and Saroha, J. (2020) Human and Economic Geography, Pearson India Education, Noida.
2. Aitken, S. C. and Valentine, G. (2015) Approaches to Human Geography. Philosophies, Theories, People and Practices, Sage Publications, London.
3. Agnew, J. A. and Duncan, J. S. (2016): The Wiley Companion to Human Geography, Wiley, U. K.
4. Cloke, P., Crang, P. and Goodwin, M. (eds.), (2014): Introducing Human Geographies, Routledge, London and New York.
5. Doherty, G. And Waldheim, C. (eds) (2016): Is Landscape...? Essays on the Identity of Landscape, Routledge: London and New York.
6. Valentine, G. (2014): Social geographies: space and society, Routledge, London.

7. Anderson, K., Domosh, M., Pile, S., & Thrift, N. (eds.). (2002): Handbook of cultural geography, Sage Publications, London.
8. Cavallaro, D. (2001): Critical and Cultural Theory: Thematic Variations, Athlone Press, London and New Brunswick.
9. Hirsch, E and Hanlon, M. (2003): The Anthropology of Landscape: perspectives on space and Place, Oxford University Press, London.
10. Whatmore, S. (2006): Materialist returns: practicing cultural geography in and for a more-than-human world, Cultural geographies, 13(4), 600-609.
11. Lorimer, H. (2005): Cultural geography: the busyness of being more-than-representational'. Progress in human geography, 29(1), 83-94.
12. Spencer, J.E. and Thomas, W.L. (1973): Introducing Cultural Geography, John Wiley and Sons, New York.
13. Dickens, S.N. (1970): Introduction to Cultural Geography, Xerox College Publishing House, Waltham, Massachusatts.
14. De Blij, Harm J. (1977): Human Geography, Cultural Society and Space, John Wiley and Sons, New York.
15. Magunder, D.N. (1973): Races and Culture of India, Asia Publishing House, New Delhi.
16. Mukerjee, A.B. and Aijazuddin A. (1985): India: Culture, Society and Economy, Inter-India Publications, New Delhi.
17. Craig, Mike (1998): Cultural Geography, Routledge Publications, London.

GEO-205
Representation of Socio-Economic Data

End Sem. Max. Marks: 40
Time: 3 Hrs.

Distribution of Marks

Lab Exercises:	20 marks
Practical Record book:	12 marks
Viva-Voce:	08 marks

Note: **The examiner shall set six questions in all. The candidate shall attempt four questions in all. All questions carry 05 marks each.**

Objective: The objective of this course is to give the students assignments for making maps, graphs and diagrams to represent socio-economic data.

Outcome: The students will learn the art of cartography and methods of interpretation of maps and diagrams.

1. Diagrams: Types and properties of diagrams representing socio-economic data:
   - One dimensional diagrams-Bar diagram:
     Simple bar(1), multiple bar(1), comparative bar (1)
   - Two dimensional diagrams- pie diagram/proportional circle (1).
   - Three dimensional diagrams- Sphere (1)
2. Distribution maps
   - Dot method (1)
   - Choropleth : monovariate (2) and bivariate (2)
3. Miscellaneous diagrams and graphs
   - Trend graph (1)
   - Age and Sex pyramid (1), Snail Diagram (1).
   - Flow diagram, cartogram and accessibility maps (2).

Note: figures in parentheses represent number of exercises.

GEO-206
Field Survey Based Report

End Sem. Max. Marks: 40
Time: 3 Hrs.

Distribution of Marks
Survey Report: 25 marks
Viva-Voce: 15 marks

Note: **The students will have to write a project report based on field survey which shall be duly supervised by the teachers.**

Objective: The objective of the course is to teach the techniques and tools used in the collection and analysis of field data collected through field survey and drawing inferences and interpretations.

Outcome: The writing of the project report shall train the students in analysis and interpretation of socio-economic/physical data obtained from the field.

Scheme of Practical Examination:

1. Report: 25 marks
   (The students under the supervision of department teachers shall conduct a field survey of an area for at least 7 days and write report on different topics, accordingly)
2. Viva voce: 15 marks

GEO-207 (Open Elective)
General Geography of India

End Sem. Max. Marks: 80
Time: 3Hrs.

Note: **There will be nine questions in all. Question No. 1 is compulsory and consists of 8 subparts (short notes not exceeding 50 words each). Short notes shall cover entire syllabus. There will be 8 long questions, two from each unit. The candidate shall attempt FOUR long questions, selecting one from each unit. All questions carry 16 marks each.**

Objective: The objective of the course is to appraise the students about India as a geographical entity. It is aimed at making the students to understand geographical diversities of India.

Outcome: The course shall educate the students about the concept of unity in diversity in India. It shall make him/her to appreciate the regional, cultural and social diversities found in the country.

UNIT-I

India: Locational Setting and Geographical Expansion. Relief and Drainage Systems.

UNIT-II

Climate of India, Soil: types and their distribution in India. Natural Vegetation: types, characteristics and distribution in India.

UNIT-III

Population: Distribution, Density and Growth. Ethnic and Socio-cultural attributes (caste and tribes) of the population of India.

UNIT-IV

Contemporary issues in India: Sir Creek Line, Geographical perspective of Doklam and Galwan valley intrusion by China, Inter-state water disputes: SYL and Cauvery.

Suggested Readings:

1. Singh, S. and Saroha, J. (2019): Geography of India, G. K. Publications, New Delhi.
2. Singh, S. and Saroha, J. (2019): Bharat ka Bhugol, G. K. Publications, New Delhi.
3. Khullar, D. R. (2018): Geography of India, Mc Graw Hills Education Pvt. Ltd. Delhi
4. Tiwari, R. C. (2016): Geography of India, Prayag Pustak Bhawan, Allahabad.
5. Hussain Majid, (2015): Geography of India, Mc Graw Hill Education

GEO-301
Research Methodology

End Sem. Max. Marks: 80
Time: 3Hrs.

Note: **There will be nine questions in all. Question No. 1 is compulsory and consists of 8 subparts (short notes not exceeding 50 words each). Short notes shall cover entire syllabus. There will be 8 long questions, two from each unit. The candidate shall attempt FOUR long questions, selecting one from each unit. All questions carry 16 marks each.**

Objective: This paper aims to familiarize the students with basics of research and its significance. It provides them the training to various aspects of research, analysis techniques, report writing etc.

Outcomes: This course educated the students to make understand the ways data are collected, classified, tabulated and analyzed and presented in the forms of report.

UNIT-I

Research: Meaning, Objectives, Motivation. Research Approaches: Applied and Fundamental Conceptual and Empirical, Descriptive and Analytical, Quantitative and Qualitative. Observation, Generalization. Hypotheses formulation, Law, Theory and their Implications in Geographical Research.

UNIT-II

Research Design: meaning, need and characteristics of a good design. Measurements scales in research; techniques of developing measurement tools; Selection of the Topic – Statement of the Problem – Formulation of Hypotheses, Testing of Hypotheses.

Data Acquisition editing and Analysis: Sources of Data: Primary and Secondary, structuring the data; Data Transformation, interpretation and analysis.

UNIT-III

Methods of Qualitative Research: Type of Approaches- Narrative, Phenomenological, Grounded Theory, Ethnographic Case Study, The Recent trends in research: E-research, Analysis of variance: ANOVA, Chi-Square. Using of SPSS and MS Excel for data handling and analysis.

UNIT-IV

Ethical Issues in Social Research; Criteria of Good Research; Problems Encountered by Researchers. Methods of writing Notes, Style of Referencing, Bibliography and Appendices, Abstract and Synopsis Writing. Writing research report.

Suggested Readings:

1. Galderisi, P. (2015): Understanding Political Science Statistics: Observations and Expectations in Political Analysis. Routledge, New York and London.
2. Kothari, C.R., (2014): Research Methodology: Methods and Techniques, New Age International Publsher, New Delhi.
3. Creswell, John W. (2011): Research Design: Qualitative, Quantitative and Mixed Methods Approaches. Sage Publications, London.
4. Audi, R. (2002): Epistemology: A Contemporary Introduction to the Theory of Knowledge, Routledge, London.
5. De Vaus, D. A. (2002): Surveys in Social Research (5th edn.), Routledge, London.
6. Kuhn, T. (1996): The Structure of Scientific Revolutions. University of Chicago Press, Chicago.
7. Norcliffe, G. B. (1982): Inferential Statistics for Geographers: An Introduction, Hutchinson, London.

8. Yeats, M. H., (1974): An Introduction to Quantitative Analysis in Human Geography, Mc Graw Hill, New York.
9. Goode, W. J and Hatt, P.K. (1952): Methods in Social Research, McGraw-Hill, New York

GEO-302
Economic Geography

End Sem. Max. Marks: 80
Time: 3 Hrs.

Note: **There will be nine questions in all. Question No. 1 is compulsory and consists of 8 subparts (short notes not exceeding 50 words each). Short notes shall cover entire syllabus. There will be 8 long questions, two from each unit. The candidate shall attempt FOUR long questions, selecting one from each unit. All questions carry 16 marks each.**

Objectives: The economy of the world has been changing fast in recent times. This has also led to drastic change in the spatial structure of economies world over. Therefore the objective of this course is to integrate the various factors of economic development to acquaint the students about dynamic aspects of economic geography.

Outcome: After completion of the course the students will be able to understand the spatial organization of economies in the world in relation to human activities, location theories of various activities, transport functions, trends of trade and processes of globalization.

UNIT-I

Definition, Nature, Scope, Importance, Recent Trends and Approaches in Economic Geography. Relationship of Economic Geography with Other Social Sciences. Spatial Organization of Economic Activities and their Classification.

UNIT-II

Measures of Network Structure and Economic Activities, Impact of Transport on Economic Activities. Geographic Fixity and Mobility- Typology of Distance-Spatial Interaction: Edward Ullman's Spatial Interaction Model and M.E. Hurst's diffusion model. Application of Industrial Location Theories: Weber, Losch, Isard, Hoover, A. Pred and D.M. Smith.

UNIT-III

World Economies: Bases of Classification, Patterns and Characteristics of Developed and Developing Economies of the World. Dynamics of World Economy and Time Space, Matrix of World Economy. World Energy Resources: Coal, Petroleum and Nuclear; their characteristic, Distribution and Utilization.

UNIT-IV

Globalization and Recent Trends in Pattern of International Trade. Geo-Economy of E-Commerce with Special Reference to India. Major Regional Trade Blocks of The World, Free Trade Initiatives (GATT, UNCTAD, WTO).

Suggested Readings:

1. Singh, S. and Saroha, J. (2020): Human and Economic Geography, Pearson India Education, Noida.
2. Gautam, A. (2015): Advanced Economic Geography. Sharda Pustak Bhawan, Allhabad.
3. Hartshorne, T. A. and Alexander, J. W. (2011): Economic Geography, Prentice Hall of India, New Delhi.

4. Hudson, R. (2005): Economic Geography, Sage Publication, New Delhi.
5. Jones, C. F. and Darkenwarld, G.G. (1968): Economic Geography, the Macmillan and Company, New York.
6. Knowles, R. and Wareing, J. (1992): Economic and Social Geography, Rupa and Company, Calcutta.
7. Knox, P. (2003): The Geography of World Economy, Arnold, London.
8. Saxena, H. M. (2013): Economic Geography, Rawat Publications, Jaipur.
9. Wheeler, J. O. and Muller, P. O. (1998): Economic Geography, John Wiley and Sons, New York.

GEO-303
Fundamentals of Remote Sensing

End Sem. Max. Marks: 80
Time: 3 Hrs.

Note: **There will be nine questions in all. Question No. 1 is compulsory and consists of 8 subparts (short notes not exceeding 50 words each). Short notes shall cover entire syllabus. There will be 8 long questions, two from each unit. The candidate shall attempt FOUR long questions, selecting one from each unit. All questions carry 16 marks each.**

Objective: The objective is to provide exposure to students regarding use of new techniques in obtaining geographical data. It shall introduce the students to the processes of satellite remote sensing data acquisition and the application of digital information in real time mapping.

Outcome: The course will equip the students with state of art concepts and methodologies of remote sensing technology.

UNIT-I

Basics of Aerial Photography: History, definition, advantages and limitations. Taking Aerial Photographs: Pre, during and post flight planning. Types of aerial photographs. Photogrammetric methods: Calculating the scale of aerial photograph, measurement of relief displacement and stereoscopic parallax and their application. Elements of aerial photo interpretation.

UNIT-II

Remote Sensing: evolution, definition and scope. Interaction of energy with atmosphere and earth surface features. Electromagnetic radiation and spectrum, various bands of remote sensing and atmospheric window.

UNIT-III

Remote Sensing platforms: Geostationary and sun synchronous or polar orbiting satellites. Types of Sensors: active and passive, whiskbroom and push broom sensors; characteristics of sensors-spatial, spectral, radiometric and temporal resolutions.
Indian Space program and characteristics of resource, weather, communication and navigation satellites.

UNIT-IV

Digital Image processing: image restoration and correction, image classification- supervised and unsupervised, calculation and application of various indices (NDVI, NDWI). Applications of remote sensing data in resource mapping and monitoring.

Suggested Readings:

1. Jensen, J. R. (2018): Remote Sensing of the Environment: An earth Resource Perspectives, Pearson Education Inc. India.
2. Lillesand, Thomas M. and R. Kiffer (2015): Remote Sensing and Image Interpretation, 3rd edition, John Willy & sons, Inc New York, USA.
3. Sabins, F. (2013): Remote Sensing Principles and Application, Freemass and Compare, New York, USA.
4. Reddy, A (2012): Textbook of Remote Sensing and Geographical Information System (An Introduction), B S Publications, Hyderabad.
5. Campbell, J.B. (2011): Introduction to Remote Sensing, 3rd ed., Taylor & Francis, New York, USA.

GEO- 304 (i)

Environmental Geography

End Sem. Max. Marks: 80
Time: 3 Hrs.

Note: **There will be nine questions in all. Question No. 1 is compulsory and consists of 8 subparts (short notes not exceeding 50 words each). Short notes shall cover entire syllabus. There will be 8 long questions, two from each unit. The candidate shall attempt FOUR long questions, selecting one from each unit. All questions carry 16 marks each.**

Objective: The objective of the course is to acquaint the students with the various aspects of environment governance, its evolution, dynamics and ecological interrelationship.

Outcome: The students shall learn about the evolution of environment, source of its degradation and human interference in the environment and mitigating measures.

UNIT-I

Environmental Geography: Nature and scope of Environmental Geography. Evolution of biophysical environment. Concept of ecology and ecosystem, trophic structure and energy flow, biogeochemical cycle.

UNIT-II

Biological classification of fauna and flora. Theory of Evolution, natural selection and variance, Ecosystem Processes; Community Dynamics: Competition, Predation, Mutualism, Succession process)

UNIT-III

Agents of Biogeographically Pattern: Climate, Soil and Terrain. Ecological controls - Physical limiting factors and Habitat; Niche and life forms; Relationships: Niche and geographic range, and distribution and abundance. Concepts, Significance and Types of Biodiversity

UNIT-IV

Environmental pollution-meaning, types, sources, causes and its impact on human health. Nature, process, types and causes of environmental degradation; Green house effect, Global warming, Ozone depletion and Desertification, The mitigating efforts at the Stockholm conference, the earth summit, Kyoto protocol and Copenhagen conference.

Suggested Readings:

1. Cox, B., Moore, P.D., Ladle, R. (2016): Biogeography: An Ecological and Evolutionary Approach, 9th ed, Wiley-Blackwell.
2. Sharma, P. D. (2011): Ecology and Environment, Rastogi Publications
3. Chandna R. C. (2002):Environmental Geography, Kalyani Publisher, Ludhiana.
4. Lomolino, M.V., Riddle, B.R., Whittaker, R.J. (2016): Biogeography, 5th ed, Oxford University Press.
5. Chapman, J.L. and Reiss, M.J. (1992): Ecology Principles and Applications, Cambridge University Press, Cambridge.
6. Dash, M. C. (2001): Fundamental of Ecology, 2nd edition, Tata Mc Graw Hill, New Delhi.
8. Gilpin, A. (1994): Environmental Impact Assessment: Cutting Edge for the 21st Century, Cambridge University Press,
9. Hugget, R. J. (2004): Fundamentals of Biogeography, Routledge, London

10. Kormondy, E. J. (1991): Concepts of Ecology, Prentice Hall India, New Delhi
11. Miller G. T. (2004): Environmental Science: Working with the Earth, Thomson Brooks Cole, Singapore.
12. Odum, E. P. (2017): Fundamentals of Ecology, Ceng age Learning India.
13. Simmons, I.G. (1980): Bio-geographical Processes, George Allen and Unwin, London
14. Singh S. (1997): Environmental Geography, Prayag Pustak Bhawan, Allahabad.

GEO-304 (ii)
Geography of Rural Settlements

End Sem. Max. Marks: 80
Time: 3 Hrs.

Note: **There will be nine questions in all. Question No. 1 is compulsory and consists of 8 subparts (short notes not exceeding 50 words each). Short notes shall cover entire syllabus. There will be 8 long questions, two from each unit. The candidate shall attempt FOUR long questions, selecting one from each unit. All questions carry 16 marks each.**

Objective: The objective of the paper is to give to the students the basic ideas about the rural settlements, environment, social issues and development plans in the rural areas. It also throws light on the social and economic deprivation and inequalities in the rural areas.

Outcome: The present paper shall enhance the knowledge of studcnts about the pattern, type and functional systems of rural settlements.

UNIT-I

Nature, scope, significance and development of settlement geography. Approaches in rural settlement geography.
Histogenesis of rural settlements: historical development, definition and characteristics of rural settlement, distribution of rural settlements, size and spacing of rural settlements in India.

UNIT-II

Rural Settlement: types, forms and patterns. Rural settlement as service centers: Concept, identification with reference to Central Place Theory of Christaller.

UNIT-III

Regionalization of rural settlements with special reference to India. Social issues in rural settlements: Poverty, housing, health care and inequality in India.

UNIT-IV

Environmental issues in rural settlements. Cultural landscape elements in rural settlements: House type and field pattern. Rural development planning in India.

Suggested Readings:

1. Alam, S.M. et. al. (1982): Settlement System of India, Oxford and IBH Publication Co, New Delhi.
2. Brock, J. O. M and Welb, J. W. (1978): Geography of Mankind. McGraw Hill, London.
3. Chisholm, M. (1967): Rural settlements and Land Use, John Wiley, New York.
4. Daniel, P. and Hopkinson, M. (1986): The Geography of Settlement. Oliver & Byod, Edinburgh.
5. Grover, N. (1985): Rural Settlements – A Cultural Geographical analysis, Inter-India Publication, Delhi.
6. Hudson, R. S. (1976): A Geography of Settlements, MacDonald & Evans., New York.
7. Ramchandran, H. (1985): Village Clusters and Rural Development, Concept Publication, New Delhi.
8. Rao, E.N. (1986): Strategy for Integrated Rural Development, B.R. Publication Cor., Delhi.

9. Mayer, I and Hagget, R. J. (1979): Settlements: Theory and Practice. Harper & Row, London.
10. Singh, R. L. (ed) (1978): Transformation of Rural Habitat in Indian Perspectives: A Geographic Dimension, NGSI Research Publication, No. 19, Varanasi.

GEO- 304 (iii)
Geography of Water Resources

End Sem. Max. Marks: 80
Time: 3 Hrs.

Note: **There will be nine questions in all. Question No. 1 is compulsory and consists of 8 subparts (short notes not exceeding 50 words each). Short notes shall cover entire syllabus. There will be 8 long questions, two from each unit. The candidate shall attempt FOUR long questions, selecting one from each unit. All questions carry 16 marks each.**

Objectives: The objective of the course is to introduce the students to the concepts of development of earth's finite water resources, its dynamic nature, availability, and management and conservation practices.

Outcome: The course shall make the students understand the issues related to spatial and temporal dimensions of availability, utilization, conservation, management and challenges of water resources.

UNIT-I

Definition, nature, scope and importance of Water Resources Geography. Distribution and changing trends in use of water in the world.Status of water resources in India.

UNIT-II

Factors affecting demand of water, kor water demand, delta and duty of water. Estimation of water demand and use in agricultural sector. Groundwater assessment, development and management. Water pricing and its marketing.

UNIT-III

Irrigation induced waterlogging and salinity with reference to Indira Gandhi Canal project. Sources, monitoring and management of water pollution. Interstate water disputes-history, constitutional provisions, treaties and financial constraints with reference to India.

UNIT-IV

Water harvesting techniques. Watershed management. Issues and challenges of inter basin transfer of water. Environmental flows. Resettlement issues pertaining to water resource projects.

Suggested Readings:

1. Aggarwal, A. and Narain, S. (1997): Dying Wisdom: Rise, Fall and Potential of India's Traditional Water Harvesting System, Centre of Science and Environment, New Delhi.
2. Gurjar R. K. and Jat B. C. (2008): Geography of Water Resources, Rawat Publications, Jaipur.
3. Jones, J. A. (1997): Global Hydrology-Processes, Resources and Environmental Management. Longman.
4. Mather, J. R. (1984): Water Resources Distribution, Use and Management, John Wiley, Marylane.
5. Newson, M. (1992): Land, Water and Development River Basin Systems and their Sustainable Management. Routledge, London.
6. Rao, K.L. (1979): India's Water Wealth. Orient Longman, New Delhi.
7. Tideman, E.M. (1996): Watershed Management; Guidelines for Indian Conditions, Omega, New Delhi.

GEO-305
Dissertation/Project work

End Sem. Max. Marks: 100

Distribution of Marks

Dissertation	:	40 marks
Presentation	:	20 marks
Viva-Voce	:	20 marks
Internal Assessment by Supervisor:		20 marks

Objective: The objective of this course is to train the students on research works in geography and writing dissertation.

Outcome: The course shall provide the students an opportunity to enhance their skill of research and applied aspects of geography.

Note: **The students shall write a dissertation on the topics (not from the syllabus) chosen by self or in consultation with concerned teachers of the department. The submitted dissertation after approval of chairperson will be evaluated by outside expert through presentation and viva-voce. Depending on the number of dissertations, more than one outside experts could be called.**

GEO- 306 (Open Elective)

General Geography of World

End Sem. Max Marks: 80
Time: 3 Hrs.

Note: **There will be nine questions in all. Question No. 1 is compulsory and consists of 8 subparts (short notes not exceeding 50 words each). Short notes shall cover entire syllabus. There will be 8 long questions, two from each unit. The candidate shall attempt FOUR long questions, selecting one from each unit. All questions carry 16 marks each.**

Objective: The objective of the course is to provide understanding about World Geography. It aims at developing understanding about physiographic structure, continents, location of countries and demographic-ethnic characteristics of people and world economy.

Outcome: The course shall make the student to understand the distribution and characteristics of continent, oceans and physiographic landscape of the world. It will also introduce the students to the ethnic-cultural diversity and economies of the world.

UNIT-I

Continents and Oceans: Their location, expansion and geographical characteristics. World Major Physiographic Units: Mountain, Plains and Plateaus.

UNIT-II

World Climates and Major Climatic Regions by Koppen. Major Soil Types and Natural Regions of the world.

UNIT-III

Human Biological Diversity, Ethnicity and Distribution of Races. Major Religions of World and their Distribution.

UNIT-IV

Population: Distribution, Density and Growth. World Economy: Characteristics of Developed and developing Economics

Suggested Readings:

1. Hussain, Majid. (2014): World Geography, Rawat Publishers, New Delhi.
2. Pounds and Taylor. (1974): World Geography, South Western Publishing Co., Ohio.
3. Brown, 1. (ed) (1994): State of the World, WW Norton and Co. New Delhi.
4. Mcdougal, Holt. (2010): World Geography, HMH Publishing Co.

GEO- 401
Hydrology and Oceanography

End Sem. Max. Marks: 80
Time: 3 Hrs.

Note: **There will be nine questions in all. Question No. 1 is compulsory and consists of 8 subparts (short notes not exceeding 50 words each). Short notes shall cover entire syllabus. There will be 8 long questions, two from each unit. The candidate shall attempt FOUR long questions, selecting one from each unit. All questions carry 16 marks each.**

Objectives: The objective is to introduce the students the basic concepts of hydrology and oceanography such as hydrologic cycle, water balance and movement of oceanic water, salinity distribution etc.

Outcome: It will acquaint the students with the basic concepts of hydrology and oceanography.

UNIT-I

Hydrology: Definition, nature, scope and development of Hydrology. Hydrological cycle. Estimation of global water budget. Impact of anthropogenic activities on hydrological cycle.
Rainfall: Measurement of rainfall, determination of average rainfall (Arithmetic mean, Isohytel method and Theisson polygon), world distribution of rainfall.

UNIT-II

Groundwater hydrology: Darcy's law and elementary groundwater flow equation, geological formations of aquifer, types of aquifer and properties.
Sources and measurement of stream flow, hydrograph and its components, analysis of hydrograph, factors affecting the hydrograph shape, methods of hydrograph separation.

UNIT-III

Oceanography: introduction, nature, scope and relation with other sciences.
Corals-origin, types and conditions for development, theories of the origin of coral reefs (Subsidence and standstill).

UNIT-IV

Tides: types, causes and theories explaining the origin of tides. Oceanic temperature: distribution and causes of variation; Oceanic movement: Waves, Stream and Currents; Currents of Atlantic, Pacific and Indian oceans. Global warming and sea level changes.

Suggested Readings:

1. Singh J. (2014): Coral Ecology and its Conservation: A Case Study of the Great Barrier Reef. 2014, Publisher- I.K. International Pvt. Ltd. New Delhi.
2. Patra K. C. (2010): Hydrology and Water Resource Engineering, Norsa Publishing House, New Delhi.
3. Reddy, P. J. (1992): A Text Book of Hydrology, Laxmi Publications, New Delhi.
4. Singh. S. (2008): Oceanography. Prayag Pustak Bhawan, Allahabad
5. Lal, D S. (2007): Oceanography. Sharda Pustak Bhawan, Allahabad.
6. Sharma RC and Vatal M. (1993): Oceanography for Geographers, Chaitanya Publishing House, Allahabad.
7. Ward, R. C. (1967): Principles of Hydrology, McGraw Hill, New York.
8. Todd, D. K. (1980): Groundwater hydrology, John Wiley, New York.
9. Rai, S. C. (2017): Hydrology and Water Resource; A Geographical Perspective , Ane Book Pvt. Ltd., New Delhi

GEO-402
Urban Geography

End Sem. Max. Marks: 80
Time: 3 Hrs.

Note: **There will be nine questions in all. Question No. 1 is compulsory and consists of 8 subparts (short notes not exceeding 50 words each). Short notes shall cover entire syllabus. There will be 8 long questions, two from each unit. The candidate shall attempt FOUR long questions, selecting one from each unit. All questions carry 16 marks each.**

Objectives: The objective is to enlighten the students about the basics of urban geography, world urbanization pattern, morphology and land use of cities, social- economic, functional and spatial dimensions of urban centers and their various theoretical conjectures.

Outcome: The students shall be acquainted with various urban concepts, urban economic base, urban functions, urban core- periphery interaction and various theories and models.

UNIT-I

Urban Geography: definition, nature, scope, different approaches and urban settlement concept (town, cities, and metropolitan). Origin and growth of urban places, factors and stages of urban growth and change. Urbanization: definition, concept, trends and pattern of urbanization in the world with special reference of India.

UNIT-II

Aspects of Urban space: urban morphology: concentric zone model, sector model, multiple nuclei model and Social area analysis, City Region Relations- Sphere of influence or umland and Urban Sprawl. Rural Urban Fringe: structural characteristics and its development.

UNIT-III

Urban Economic base of cities: basic and non-basic functions and Functional classification of towns: by C. D Harris and H.J Nelson and Ashok Mitra. Central place theory of Christaller and Losch. Rank Size rule and Law of Primate City concept.

UNIT-IV

Contemporary Urban issues and challenges: Slums, Crime, renewal, and Environmental Pollution. Urban development Policies and programs in India. The concept of sustainable development of cities.

Suggested Readings:

1. Bansal, S. C. (2010): Urban geography, Meenakshi Prakashan, Meerut.
2. Pacione, M. (2010): Urban Geography: A Global perspective, Routedge, London.
3. Stephan Ward (2004): Planning and urban change, Sage publications, New Delhi.
4. Mayer H. M. and Kohn, C. F. (1959): Readings in Urban Geography, The University of Chicago Press, Chicago.
5. Cater, H. (1972): The study of Urban Geography, Edward Arnold, London.
6. Clark, D. (1982): Urban Geography, Croom Halm, London and Cambridge.
7. Northern, R. M. (1979): Urban Geography, john Wiley, Toronto.
8. Michanel Pacione. (2004): Urban Geography: a global Perspective, Routledge, USA.

9. Ramachandra, R. (1997): Urbanization and Urban System in India, Oxford University Press, India.
10. Murphy R. (1960): The American cities: An urban geography, McGraw hills, New York.
11. Sinha, S. P. (1984): Processes and Pattern of Urban Development in India: A.C. study of Haryana, The associated Publishers, Ambala Cantt.

GEO-403
Fundamentals of Geographical Information Systems (Theory)

End Sem. Max. Marks: 80
Time: 3 Hrs.

Note: **There will be nine questions in all. Question No. 1 is compulsory and consists of 8 subparts (short notes not exceeding 50 words each). Short notes shall cover entire syllabus. There will be 8 long questions, two from each unit. The candidate shall attempt FOUR long questions, selecting one from each unit. All questions carry 16 marks each.**

Objectives: The objective of the course is to provide exposure to students to the field of GIS and modern techniques of making maps, handing spatial and non spatial data electronically and the concepts of data acquisition using GPS.

Outcome: The students shall acquire the skills in managing spatial and non spatial data electronically and get acquaintance to concepts related to GPS

UNIT-I

GIS: Definition and scope; Development of GIS, Computer requirements of GIS. Functions of GIS. Components of GIS: Hardware, Software, User, Organizational context and Methods and Procedures. Graphic user interface of Arc GIS and Q-GIS.

UNIT-II

Geographic Data: Spatial and Non-Spatial, their sources. Spatial Data Structure: Raster and Vector; Non spatial data: file system and DBMS.
Definition and need of coordinate projection system: types, characteristics and relevance of projection system. Understanding spheroid/ellipsoids, understanding datum.

UNIT-III

Data input in GIS: scanning and digitization of maps and images, Errors in GIS, editing and cleaning. Spatial Analysis in GIS: Overlay, Neighborhood and Proximity; Integration of raster and vector data. Queries in GIS: Spatial and Non-spatial queries.

UNIT-IV

Understanding GPS; GPS satellite constellation; space segment-control segment and user segment; GPS signals and codes; Errors in GPS observations; Introduction to DGPS; GPR.
GPS system: NAVSTAR, GALILIO and IRNSS. Applications of GPS

Suggested Readings:

1. Burrough, P.A. and McDonnell, R. (2016): Principles of Geographic Information Systems. Oxford University Press, Oxford.
2. Chang, K. T. (2017): Introduction to Geographic Information Systems. Tata McGraw Hill Publications Company, New Delhi.
3. Demers, M. N. (2008): Fundamentals of Geographic Information Systems. John Wiley and Sons, Singapore.
4. Rahman A., (2017): Global Positioning System: Concept, Technique and Application, New Age International Pvt. Ltd, New Delhi.
5. Grewal M. S., (2013): Global Navigation Satellite Systems, Inertial Navigation and Integration, Willey-Blackwell.

GEO- 404 (i)

Agricultural Geography

End Sem. Max. Marks: 80
Time: 3 Hrs.

Note: **There will be nine questions in all. Question No. 1 is compulsory and consists of 8 subparts (short notes not exceeding 50 words each). Short notes shall cover entire syllabus. There will be 8 long questions, two from each unit. The candidate shall attempt FOUR long questions, selecting one from each unit. All questions carry 16 marks each.**

Objective: The objective of this course is to acquaint the students with the spatial organization of agriculture and processes determining the agricultural pattern and processes. The students will develop an in-depth knowledge about the dynamics of land use, cropping pattern and the factors involved in change of agricultural landscape.

Outcome: The students shall get to know about the spatial organization of agricultural activities in world and India. Their knowledge about the origin, location, distribution of the agricultural activities shall be enriched. They would also get the knowledge about the modern agriculture, its dynamics and impact of climate change and economic liberalization on agricultural pattern and processes.

UNIT-I

Nature, Scope and Significance of Agricultural Geography. Origin, dispersal and development of agriculture in the world. Approaches to the Study of Agriculture Geography.

UNIT-II

Concepts and Historical Development of Land Capability Survey, Concept of Land Use and Cropping pattern. Agricultural Concepts: (I) Intensity of Cropping (II) Degree of Commercialization (III) Cropping Diversification and Concentration (IV) Crop Combination Methods (V) Contract Framing (VI) Agri-Business (VII) Co-Operative Farming.

Agricultural location theory of Von Thunen and T. Hagerstrand's Model of Spatial Diffusion of Innovation.

UNIT-III

Bases of Identification of Agricultural Systems by Whitllesey. Measurements of Agricultural Efficiency and Productivity of India. Agriculture Development in India: Agro-Tourism, Horticulture, Dairy Farming, Poultry farming.

UNIT-IV

Critical Analysis on Food Security in India. A review of the scheme of Govt. of India: Co-Operative Societies, Kisan Credit Cards, Crop Insurance. Agriculture and Climate Change: Impacts and Adaptation.

Suggested Readings:

1. Safi, M. (2007): Agricultural Geography, Pearson Education, India.
2. Husain, M. (2004): Systemic Agricultural Geography Rawat Publications, Jaipur.
3. Bowler, T. R. (1992): The Geography of Agriculture in Developed Market Economics, Longman, New York.
4. Geoffrey, H. F. (1970): Geography of Agriculture: Themes in Research, Practice Hall, N.J.
5. Grigg, D. (1995): Introduction to Agricultural Geography, Routledge, London.
6. Morgon, W. B. and Munton, R. J. C. (1971): Agricultural Geography Methuen, London.

7. Singh Jasbir and Dhillon S. S. (1994): Agricultural Geography, Tata Mc Graw Hill, New Delhi.
8. Symons, L. (1967): Agricultural Geography, G. Bell and Sons, London.
9. Tarrant, J.R. (1974): Agricultural Geography, Willey, New York.

GEO-404 (ii)
Geography of Health

End Sem. Max. Marks: 80
Time: 3 Hrs.

Note: **There will be nine questions in all. Question No. 1 is compulsory and consists of 8 subparts (short notes not exceeding 50 words each). Short notes shall cover entire syllabus. There will be 8 long questions, two from each unit. The candidate shall attempt FOUR long questions, selecting one from each unit. All questions carry 16 marks each.**

Objective: Students will be familiarized with different factors such as physical, social, economic, environmental and their impacts on diseases; to create awareness about ecology and health care planning also.

Outcome: At the end of this course, students will demonstrate the ability to analyze, interpret, and draw conclusion about role of geography in origin and spread of major disease and also can assess the role of health care planning.

UNIT-I

Introducing health geography and its fundamental concepts. Approaches in health geography: ecological, social, and spatial perspectives.

UNIT-II

Classification of Diseases: Communicable, Non-Communicable and Occupational and deficiency diseases. Concept of disease ecology: zoonotic and vector borne disease, Diffusion of diseases.

UNIT-II

Geographical Factors Affecting Human Health and Diseases: Physical Factors –relief, climate, water, Socio-economic Factors –population density, social customs, poverty and nutrition, occupation & standard of living. Modeling through GIS in Medical Geography.

UNIT-IV

Health care systems and inequalities in health care services in India. Emerging Health Challenges: Urbanization and urban health problems; unhealthy lifestyle and chronic diseases; climate change and infectious disease.

Suggested Readings

1. Banerjee, b and Hazra J. (1980): Geo-Ecology of Cholera in West Bengal, University of Calcutta.
2. Brown, T., McLafferty, S. and Moon, G. (eds.) (2010): A Companion to Health and Medical Geography, Wiley-Blackwell, Oxford.
3. Burton, L. M., Kemp, S. P., Leung, M., Matthews, S. A., and Takeuchi, T. A. (2011): Communities, Neighborhoods, and Health: Expanding the Boundaries of Place, Springer, New York.
4. Curtis, S. (2004): Health and Inequality: Geographical Perspectives, Sage Publications, London.
5. Freudenberg, N., Klitzman, S. and Saegert, S. (eds.) (2009): Urban Health and Society: Interdisciplinary Approaches to Health and Practice, San Francisco, CA: Jossey-Bass.
6. Gaimard, M. (2014): Population and Health in Developing Countries, Springer, New York.

7. Gatrell, A. C. and Elliott, S. J. (2015): Geographies of Health: An Introduction, 3rd edition, Wiley- Blackwell, Oxford.
8. Kawachi, I. and Berkman, L.F. (eds.) (2003): Neighbourhoods and Health, Oxford University Press, Oxford.
9. Luginaah, I. and Kerr, R. B. (eds.) (2015): Geographies of Health and Development, urlington, VT: Ashgate.
10. May, J. M., (1959): Ecology and Human Diseases, M.D. Publications, New York,
11. May, J. M. (1961): Studies in Disease Ecology, Hafner Publications, New York.
12. Misra, R. P. (2007): Geography of Health: A Treatise on Geography of Life and Health in India, Concept Publishing Company, New Delhi.
13. Meade, M. S. and Emch, M. (2010): Medical Geography. 3rd edition, Guilford Press, New York.
14. Sen, G., and Ostlin, P. (eds.) (2010): Gender Equity in Health: The Shifting Frontiers of Evidence and Action, Routledge, New York.

GEO-404 (iii)
Geography of Haryana

End Sem. Max. Marks: 80
Time: 3Hrs.

Note: **There will be nine questions in all. Question No. 1 is compulsory and consists of 8 subparts (short notes not exceeding 50 words each). Short notes shall cover entire syllabus. There will be 8 long questions, two from each unit. The candidate shall attempt FOUR long questions, selecting one from each unit. All questions carry 16 marks each.**

Objective: Haryana is a state with diversity in landscape, vegetation, soils, drainage network, economy, population characteristics and culture. It is rich in agriculture and has got many crops, which are the main assets of the state and are also exported. Therefore it becomes immense important to make the students know about their state.

Outcome: After studying Geography of Haryana, students will become aware about the states physiography and natural resources. They will acquire knowledge about the economy and its importance. This would also sharpen their understanding about the social and cultural diversity of Haryana.

UNIT-I

Geographical location and agro-ecological regions of Haryana, Geology Structure and Relief, Drainage System, Climatic characteristics of Haryana.

UNIT-II

Agriculture in Haryana: Major Irrigation Projects, Spatial Distribution and Development of Horticulture and Farming. Green Revolution and its Socio-Economic and Ecological Implications.

UNIT-III

Industrial development in Haryana: Location and distribution of agro-based industries, automobile Industries, cotton and IT industries. Transportation: major transportation networks and impacts of transportation development on regional development.

UNIT-IV

Demographic Characteristics of Haryana: Population Growth, Density, Age and Sex Composition, Literacy.

Suggested Readings:

1. Bhupal, D. S. (2012): Agricultural Profile of Haryana Agricultural Economics Research Centre, University of Delhi.
2. Duggla, S. L. (1977): Geographical Zone of Haryana. Haryana Cooperative Press, Chandigarh.
3. Government of Haryana (2020): Economic Survey of Haryana 2019-20, Department of Economics and Statistical Analysis, Haryana Yojana Bhawan, Sector 4, Panchkula.
4. Haryana State Gazetteer (2005): Haryana State Gazetteer. Vol. I & II, Haryana Gazetteer Organization, Revenue Department, Chandigarh (India).
5. Haryana Vision Document 2030 (2017): Department of Economic and Statistical Analysis, Yojana Bhawan, 21-28, Sector 4, Panchkula, Haryana.
6. Khandelwal, K. K. et al (eds.) (2010): Haryana Encyclopaedia, Bhugol Khand , Vol. I & II, Vani Prakashan, New Delhi.

7. Sangwan R. S. and Sangwan Sneh (2015): Geography of Haryana, Concept Publishing Company Private Limited, New Delhi.
8. Singh J. (1976): An Agriculture Geography of Haryana, Vishal Publication, Kurukshetra.
9. Singh, M. and kaur, H. (2004): Economic Development of Haryana: An Era of Prosperity, Deep and Deep Publication Private Limited, New Delhi.
10. State Industrial Profile of Haryana (2015-16): MSME-Development Institute Government of India, Ministry of MSME 11-A, Industrial Development Colony, Near ITI, Kunjpura Road, Karnal -132001 (Haryana).

GEO-405
Geoinformatics Technology (Practical)

End Sem. Max. Marks: 80
Time: 3 Hrs.

Distribution of Marks

Lab Exercises:	40 marks
Practical Record book:	20 marks
Viva-Voce:	20 marks

Note: **The examiner shall set six questions, three from each unit. The candidate shall attempt four questions in all, selecting two from each unit. All questions carry 10 marks each.**

Objectives: The objective is to enable the students to understand and analyze the emerging field of geoinformatics that plays an important role in present day geographical analysis.

Outcome: It shall equip students with handing instruments, tools and techniques of aerial photo interpretation and satellite imageries and the development of point, line polygon and composition of maps in GIS environment.

UNIT I

1. Understanding Digital Image (Digital signature and Digital numbers)
2. Visualizing the DN values (1)
3. Georefrencing of Toposheets (1)
4. Image to Image Registration (1)
5. Preparation NCC and FCC (2)
6. Making Subset and resolution merge (2)
7. Supervised Classification (1)
8. Unsupervised Classification (1)

UNIT II

1. Generation of Geo-database/ Shape files: Vectorisation of data (point, line and polygon),
2. Editing and building topology
3. Joining of Spatial & non-spatial data
4. Symbolization: Chorochromatic, Choropleth and Point proportional.
5. GPS: Introduction to the GPS
6. Different pages in GPS device,
7. Collection of GCP using GPS devices.

Figures in parenthesis represent number of practical exercises