

SYLLABUS

**Sridev Suman Uttarakhand State University
Badshahithaul, Tehri Garhwal**

M.A./ M.Sc. GEOGRAPHY

03 Years Semester System

(Effective from Academic Session : 2018-2019)

-: Syllabus Committee :-

- 1. Dr. Mohan Singh Panwar – Convener**
Department of Geography
HNB Garhwal University (A Central University)
Srinagar (Garhwal)
Uttarakhand, India
- 2. Dr. Bhanu Prasad Naithani – Member**
Department of Geography
HNB Garhwal University (A Central University)
Srinagar (Garhwal)
Uttarakhand, India
- 3. Dr. Kamal Singh Bisht – Member**
Department of Geography
D.B.S. (P.G.) College
Dehradun
Uttarakhand, India

Summary of the Syllabus

Sridev Suman Uttarakhand State University

Badshahithaul, Tehri Garhwal

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03 Years Semester System

(Effective from Academic Session: 2018-2019)

Semester - I

Paper No.	Name of the Paper	M.A.			M.Sc.		
		Theory	Internal Assessment	Paper Total	Theory	Internal Assessment	Paper Total
Paper - I	Advance Geomorphology	80	20	100	80	20	100
Paper - II	Geographical Thought	80	20	100	80	20	100
Paper - III	Geography of Natural Resources	80	20	100	80	20	100
Paper - IV	Practical – I (Cartography)	80	20	100	80	20	100
TOTAL		320	80	400	320	80	400

Semester - II

Paper No.	Name of the Paper	M.A.			M.Sc.		
		Theory	Internal Assessment	Total	Theory	Internal Assessment	Total
Paper - V	Environmental Geography	80	20	100	80	20	100
Paper - VI	Geography of Himalaya	80	20	100	80	20	100
Paper - VII	World and India - Locational Aspects	80	20	100	80	20	100

Paper - VIII	Research Methodology & Techniques	80	20	100	80	20	100
Paper - IX	Practical – II	40	10	50	40	10	50
	• Remote Sensing & GIS	40	10	50	40	10	50
	• Field Study	40	10	50	40	10	50
TOTAL		400	100	500	400	100	500

Semester - III

Paper No.	Name of the Paper	M.A.			M.Sc.		
		Theory	Internal Assessment	Total	Theory	Internal Assessment	Total
Paper - X	Geography of India	80	20	100	80	20	100
Paper - XI	Practical – III (Quantitative Techniques and Mapping)	80	20	100	80	20	100
Paper – XII	Elective : (Student can opt any one of the three papers given below)	80	20	100	80	20	100
Paper XII (a)	Population Geography						
Paper XII(b)	Urban Geography						
Paper XII(c)	Regional Planning and Development						
Paper – XIII	Elective : (Student can opt any one of the three papers given below)	80	20	100	80	20	100
Paper – XIII (a)	Advanced Climatology						
Paper – XIII (b)	Natural Hazards and Disaster Management						
Paper – XIII (c)	Geo – Hydrology						
TOTAL		320	80	400	320	80	400

Semester - IV

Paper No.	Name of the Paper	M.A.			M.Sc.		
		Theory	Internal Assessment	Total	Theory	Internal Assessment	Total
Paper - XIV	Geography of Uttarakhand (A Regional Analysis)	80	20	100	80	20	100
Paper - XV	Practical - IV (Surveying and Weather analysis)	80	20	100	80	20	100
Paper – XVI	Elective : (Student can opt any one of the three papers given below)	80	20	100	80	20	100
Paper – XVI (a)	Agriculture Geography						
Paper – XVI (b)	Cultural Geography						
Paper – XVI (c)	Remote Sensing and GIS						
Paper – XVII	Elective : (Student can opt any one of the three papers given below)	80	20	100	80	20	100
Paper – XVII (a)	Bio Geography						
Paper – XVII (b)	Oceanography						
Paper – XVII (c)	Geography of Tourism & Recreation						
Paper - XVIII	Dissertation (The topic should be selected only from Uttarakhand Himalaya Region)	80	20	100	80	20	100
TOTAL		400	100	500	400	100	500

Semester – I

Paper – I : Advance Geomorphology

Time : 3 Hours

Theory : 80 Marks
Internal Assessment: 20 Marks

Note : The Paper consists of four units. Two questions will be set from each unit. The candidates will be required to answer one question from each unit. The candidate will be required to attempt 04 questions in all. Answer should be precise. All Questions carry equal marks.

UNIT – I

Fundamental concepts of Geomorphology, methods and approaches of Landforms study, theories of Landscape development by Gilbert, Penk and Hack and Morphogenetic regions.

UNIT – II

Theory of Plate tectonics, Mountain building, Isostasy, Tectonic Geomorphology, Theories of slope development by young and king, peneplain and Pedi plains, geological structure and rock.

UNIT – III

Geomorphic process – Rivers, glacier, air, underground water and coastal, mass movement and resultant and forms, morphometry of drainage basin, profile of equilibrium rejuvenation and polycyclic landscape.

UNIT – IV

Applied Geomorphology engineering works, Anthropoenci process and landscape planning, Regional Geomorphology of Malwa pleatue, Ganga Plain, Nepal and Konkan region, Geomorphic Hazards and Mitigation.

Books Recommended :

1. **Bloom, A.L.** : Geomorphology Prentice Hall, New Jersey USA, 1979.
2. **Goudle, A.** : Geomorphologic Techniques, George Allen and Unwin, London, 1981.
3. **Washborn, A.L.** : Periglacial Processes and Environment, Edward Arnold, London, 1973
4. **Young, A.** : Slopes, Oliver and Boyd, London, 1972
5. **King, C.A..M.** : Techniques in Geomorphology, Edward Arnold, London, 1968.
6. **Embleton, C. and Thorries, J.** : Processes in Geomorphology, Arnold Hienmann, London, 1979.
7. **Phodes, D.D. and Williarms, G.P.** : Adjustment of Fluvial Processes, George Allen and Uniwin, Boston, 1982.

8. **Tricart, I. and Callam** : Introduction to Climate Geomorphology, Longmans London, 1972.
9. **Derbyshire, E. Gregory, K.J. and Halls, J.R.** : Geomorphological Processes, Butterworth, London, 1979.
10. **Gregory, K.J. and Walling, D.E.** : Drainage Basin Processes and Forms, Edward Arnold, London, 1973.
11. **Gregory, K.J. and Walling, D.E.** : Man and Environment Processes, Butter Worths, London, 1981.

Paper – II : Geographical Thought

Time : 3 Hours

Theory : 80 Marks
Internal Assessment: 20 Marks

Note : The Paper consists of four units. Two questions will be set from each unit. The candidates will be required to answer one question from each unit. The candidate will be required to attempt 04 questions in all. Answer should be precise. All Questions carry equal marks.

UNIT – I

Contribution of Greeks and Romans with special reference to Ptolemy and Strabo, Geography in Muslim world, Geography as Science of : **(1) Location (2) Distribution (3) Areas differentiation (4) relationships (5) Special organization and (6) Region.**

UNIT – II

German School of Geography – Humboldt, Ritter, Retzel
 French School of Geography – Blache & Brunhes
 American School of Geography – Sauer & Huntington

UNIT – III

Models and paradigms, system theory, phenomenological approach, dualism between : **(1) Physical and Human Geography (2) Regional and Systematic Geography and Quantitative Revolution.**

UNIT – IV

Positivism, Pragmatism, Functionalism, Idealism, Existentialism, Behavioral, Radical and Humanistic Geography, Future of Geography and contribution of Indian Geographer

Books Recommended :

1. **Haggett, P.** : Geography – A Modern Synthesis
2. **Chorley, R.J. and Claval, P.** : Models in Geography

3. **Johnston, R.J. and Claval, P.** : Geography since the Second World War : An International survey, Crown Haim, Sydney, 1984.
4. **Johnston, R.J.** : The Future of Geography, Methuen, London, 1988
5. **Adhkari, S.** : Fundamentals of Geographical Thought, Chaitanya Publishing House, Allahabad, 2006.
6. **Bunkse, V.E.** : Geography and the art of Life, John Hopkins University Press, Baitimore, 2004
7. **Marcus, D.** : **Post** – Structuralism in Geography, The Diabolical Arts of Spatial Sceinces, Edinburgh University Press, Edinburgh, 1999
8. **Gaile, G. and Wilmot, C. (ed)** : Geography in America at the Dawn of the 21st Centrury, Oxford University Press, Oxford & New York 2003.
9. **Hubbard, P.et al** : Thinking Geographically : Space, Theory and Contemporary Human Geography, Continuum, London, 2002
10. **Majid Husain** : Geographic Thought (2007)
11. **Dixit, R.D.** : Geographical Thought : A critical History of ideas, Prentice Hall of India, New Delhi, 2001.
12. **Dixit, R.D.** : Bhaugolic Chintan, Prentice Hall of India, New Delhi, 2001.

Paper – III : Geography of Natural Resources

Time : 3 Hours

Theory : 80 Marks
Internal Assessment: 20 Marks

Note : The Paper consists of four units. Two questions will be set from each unit. The candidates will be required to answer one question from each unit. The candidate will be required to attempt 04 questions in all. Answer should be precise. All Questions carry equal marks.

UNIT – I

Concept of Natural Resources, Classification: Dynamic theory of Resources, Resources Scarcity and adequacy, Resource regionalization, Economic development and resources.

UNIT – II

Land, water, mineral, energy and biotic resources – distribution, use – misuse and conservation – Global and Indian Scenario

UNIT – III

Resource appraisal, resource depletion and emerging issues like desertification, deforestation, loss of Bio-Diversity, Energy crises, water scarcity and conflicts. Locational aspect of Resources in the world.

UNIT – IV

Natural Resource Data management system, sustainable development and conservation of resources, integrated resource development, Globalization and resources, community Participation and governance and contemporary issues, Locational aspect of resources in India.

Books Recommended:

1. **Holechek, J.L. et al** : Natural Resources : Ecology Economics and Policy, Prentice Hall, New Jersey, 2000
2. **Kates, R.W. and Burton, I. (ed)** : Geography Resources and Environment, Vol. II, University of Chicago Press, Chicago, 1986.
3. **Mc Laren, D.J. and Skinnet, B.J. (ed)** : Resources and World Development, John Wiley & Sons, New York, 1986.
4. **Newson, M.D.** : Land, Water and Development, River Basin Systems and Management, Rutledge London, 1991.
5. **Qwen, S. and Qwens, P.L.** : Environment, Resources and Conservation, Cambridge University Press, New York, 1991.
6. **Rees, J.** : **Natural Resources** : Allocation, Economics and Policy, Methuen, London, 1988
7. **Redclift, M.** : Sustainable Development :Exploring the Contraction , Methuen London, 1987.
8. **Simmons, I.G.** : Earth, Air and Water Resources and Environment in Late 20th Century, Edward Arnold, 1991.
9. **Thomas, Alan et al** : Environmental Policies & NGO Influence, Rutledge, London, 1995.
10. **Mather, A.S. and Chapman, K.** : Environmental Resources, Longman Scientific and Technical, London, 1995.
11. **Harper, C.L.** : Environment and Society Human Perspectives on Environment Issues, Prentice Hall New Jersey.
12. **Burton, I. and Kates, R.W. (ed)** : Readings in Resource Management and Conservation, 1965
13. **Allen, S.W. and Leonard, J.W.** : Conserving Natural Resources, Mc Graw Hill, New York.
14. **Smith, G.H. (ed)** : Conservation of Natural Resources, John Wiley, New York.

Paper – IV : Practical – I (Cartography)

Time : 3 Hours

Theory : 80 Marks
Internal Assessment: 20 Marks

Note : The syllabi for practical is related to laboratory work on cartographic mapping. The practical exam will be of three hours duration. The division of Marks in Practical shall be as given below :

Laboratory Work (Cartography)	– 60
Session Record Work	– 10
Viva Voce	- 10
Internal Assessment	- 20

The Laboratory work is divided into four units, Two Exercises are to be set from each unit with internal choice and candidates will be required to attempt four exercises in all. The cartographic mapping work examination will be of three hours duration in which exercises will be given on Cartography. All Questions carry equal marks

UNIT – I

Polyconic, International, Gnomonic (Equational, Aspect), Gall's Stereographic, Interrupted Mollweide's and Sinusoidal

UNIT – II

Slope analysis by wenthworth's Smith's, Henry – Raiz's, Analysis of Relief Characteristics from contours, Profiles Transverse, Longitudinal, Serial, Superimposed, Projected and Composite.

UNIT – III

Morphometric analysis – Area height, Altimetric frequency and Hypsometric curve, Drainage density, stream order and bifurcation ratio

UNIT – IV

Interpretation of Topographical Maps – Land use and settlements. Topographical mapping Geological Cross Section Drawing

Book Recommended :

1. **Barrett, E.C. & Courts, L.F.** : Introduction to Environmental Remote Sensing
2. **Dickinson, G.O.** : Maps and Aerial Photographs
3. **Smith, H.T.V.** : Aerial Photographs and their Applications
4. **Deekshatula, B.L. & Rajani, Y.S.** : Remote Sensing
5. **Davis, P.** : Data, Description and Presentation

6. **Garnett, A.** : Geographical Interpretation of Topographical Maps
7. **Mishra, R.P. & Ramesh A.** : Fundamentals of Cartography
8. **Raja, Moonis** : Source of Socio – Economic Data
9. **Sharma, J.P.** : Practical Geography (Hindi)
10. **Singh, R.L.** : Practical Geography (English/ Hindi)
11. **Steers, J.A.** : An Introduction the Study of Map Projections, U.L.P., London
12. **Sabins, F.F.** : **Remote Sensing** : Principals and Interpretations, John Wiley and Sons, New York, 1987

Semester – II

Paper - V : Environmental Geography

Time : 3 Hours

Theory : 80 Marks
Internal Assessment: 20 Marks

Note : The Paper consists of four units. Two questions will be set from each unit. The candidates will be required to answer one question from each unit. The candidate will be required to attempt 04 questions in all. Answer should be precise. All Questions carry equal marks.

UNIT – I

Meaning and Scope of Environment Geography, Basic Principles of Environmental Geography : Composition and types of Environment, Ecological Principles, Man – Environment relationship, Restoration of Ecology.

UNIT – II

Ecosystem : Concept and components, Trophic levels, Food chains and food webs, Energy flow in the ecosystem, Ecosystem stability, High land – low land interactive system, human ecological adaptation.

UNIT – III

Environmental Degradation, Environmental Pollution (Air, Water and Solid Waste), Ganga Pollution & Ganga action Plan, Environmental Problems – Global Warming, Ozone Depletion and Green house effects, transformation of nature by man, global ecological imbalances.

UNIT – IV

Environmental Management : Concept and approaches : Ecosystem Management Strategies, Environmental Dimension in Planning – Sustainable Development, Eco- Development, Limits to growth , Environmental Consciousness, National Environmental Policies and Programms, Environmental Impact assessment, Rio Summit, Kyoto Protocol & Carbon Trading.

Books Recommended:

1. **Singh, L.R. et al** : Environmental Management, Allahabad Geographical Society, Allahabad.
2. **National Academy of Sciences** : Understanding Climate Changes, Washington D.C.
3. **Furley, P.A. and Neway, W.W.** : Man and the Biosphere, Butterworth, London
4. **Arvil, R.** : Man and Environment, Penguin
5. **Bennet, R.J. and Chorley, R.J.** : Environmental System – Philosophy, Analysis and Control, Methuen, London.
6. **Singh, Savindra** : Environmental Geography, Prayag Pustak Bhawan, Allahabad
7. **Detwiler, T.R.** : Man's impact on the Environment, McGraw Hill, New York
8. **Detwiler, T.R. and Marcus, M.G.** : Urbanization and Environment, Duxbury Press, California.
9. **Singh, Savindra** : Paryavaran Bhoogol, Prayag Pustak Bhawan, Allahabad
10. **Panwar, Mohan Singh (2007)** - *Environmental Changes and Sustainable Development in the New Millennium*, Research India Press, New Delhi.
11. **Adans, W.M.** : **Green Development : Environment and Sustainability in the Third World**, Routledge, London, 2001
12. **Odum, E.P.** : Fundamentals of Ecology, W.B. Saunders Co. Philadelphia, 1971
13. **Mather, A.S. and Chapman, K.** : Environmental Resources, Longman Group Ltd. U.K. 1995
14. **Hobbs, J.B.** : Applied Climatology, Butherworth, London
15. **Park, C.C.** : Ecology & Environmental Management, Botheworth, London
16. **Bhatt, H.P. & Bhatt Sangita (ed)** : **Environment** – Yesterday, Today and Tomorrow 1992, Galgotia Publication, New Delhi

Paper – VI : Geography of Himalaya

Time : 3 Hours

Theory : 80 Marks

Internal Assessment: 20 Marks

Note : The Paper consists of four units. Two questions will be set from each unit. The candidates will be required to answer one question from each unit. The candidate will be required to attempt 04 questions in all. Answer should be precise. All Questions carry equal marks.

UNIT – I

Geo- physical identity: Origin of Himalaya and its structure: Himalaya as regional entity, geo- political issues, cultural appraisal, Himalayan people, Geo- sensitivity of Himalaya, future of Himalaya

UNIT – II

Physiography, Landforms, drainage (Volume) and Himalaya as water tower, glaciers, lakes, passes, climate, natural vegetation, natural hazards, Geo- Ecological problems of Himalaya created by anthropogenic activities

UNIT – III

Demography and Economy – Distribution, density and growth of population, Migrations, Urbanization, Rural and Urban Population, Agriculture, Industry, Animal Husbandry, Horticulture, Tourism and Power Projects.

UNIT – IV

Geographical account of Western, Central and eastern Himalaya, Regional analysis of Kashmir, Laddak, Kangra and Lahul, Doon, Kathmandu Valley, Tista Valley Mountain Development Planning and Policy.

Books Recommended:

1. **Lal, J.S. & Moddie** : The Himalaya – Aspect of Change A.D. (ed)
2. **Bose, S.C.** : Land and People of the Himalaya
3. **Kayastha, S.** : The Himalayan Beas Basin
4. **Valdin, K.S. (ed)** : Kumaun- Land and People
5. **Singh, T.V. (ed)** : Mountain and Development.
6. **Singh, O.P. (ed)** : The Himalaya – Nature, Man & Culture
7. **Joshi, S.C. and others** : Kumaun Himalaya
8. **Nityanand & Kumar, K.** : The Holy Himalaya – Geographical Interpretation of Garhwal Himalaya
9. **Kharkwal, S.C.** : Uttarakhand- Physico –Culture Complex
10. **Maithani, D.D.** : Central Himalaya : Ecology, Environmental Resources & Development
11. **Rawat, M.S.S. (ed)** : Central Himalaya – Environment Development Vol. I & II
12. **Vaidiya, K.S. (ed) Kumaon** : Land and People (1988)
13. **Bhatt H.P. & Bhatt Sangita** : Environmental Dimensions of Rural Settlements in the Himalaya in 1993

Paper – VII : World and India Locational Aspects

Time : 3 Hours

Theory : 80 Marks

Internal Assessment: 20 Marks

Objective : The Paper is designed to acquaint the students with the importance of location as one of the important aspects of geographical studies. The aim to promote awareness among students about Atlas

There will be two parts of this course:

- A.** An outline map of India will be provided to the students and they will have to mark locations on it. 15 Locations will be given and 01 mark for each correct location.
- B.** An outline map of the World with indicated location of features of the numerals will be provided to the Students and they will identify the location feature. 15 locations features will be given for identification and 01 mark to each correct identification

Students will provide write up **(for both A and B Part)** on the significant geographical relevance and importance of the locations (Marked and identified), whether physical, economic, cultural, ecological, environmental and commercial etc. in 30 words on each. 01 Mark is allotted for each write- up.

Distribution of Marks :

A. Locations	20 Marks
Write up in 30 Words	20 Marks
B. Identification of Locations	20 Marks
Write up in 30 Words	20 Marks

Course Contents:

Physical – Mountain and Ranges, Rivers, Forest, Soil, Lakes and Natural Regions, Drainage, Region Ocean and Seas, Climate and Change, major currents, major land forms

Cultural – State and Capitals, Important Cities, Population, Rural – Urban, Tribal Areas, Planning Regions, Population, Agglomeration, Poverty, Metropolitan

Economic – Human Ecological regions, Industrial regions and Major industrial, Agricultural regions/ belts, industrial regions and complexes, Power Plants, Hydro Power Projects, Important Industries, Important ports and transport routes, important resources.

Others – Bio Diversity, Natural Parks, Environment, Ecology and Contemporary Issues

Note : Examiner (Paper Setter) should select location and identified locations from all aspects of course and covering the entire map distributed all across. Repetition of Location of same nature and character should be avoided.

Examiner will provide key of **both A and B part**. Map provided to the students should be of same scale/ size on which key is prepared. For **part A** a blank map should be attached with the question paper. For **part B** numerically identified map to be enclosed with question paper. For evaluation of this paper, key is of utmost importance prepared by the paper setter.

Books Recommended:

1. India & the world – NATMO, School Atlas, Oxford – Atlas & time UK Print World Atlas AND Uttarakhand Atlas.
2. Britanica World Atlas, Environmental Map, Sweden Print, Natural Region of the World.

Paper – VIII : Research Methodology & Techniques

Time : 3 Hours

Theory : 80 Marks

Internal Assessment: 20 Marks

Note : The Paper consists of four units. Two questions will be set from each unit. The candidates will be required to answer one question from each unit. The candidate will be required to attempt 04 questions in all. Answer should be precise. All Questions carry equal marks.

UNIT – I

Concept & Significance of Research in Geography, Nature, objective and basis of Research, types of research, approaches & methods, Research problem selection, techniques and Research process.

UNIT – II

Research Design : Meaning Need, Features and types

Sampling : Methods and steps, design of spatial sampling, Survey and Experiments, Data collection methods – Primary and secondary data, schedule and questionnaire and observation

UNIT – III

Hypothesis, meaning, characteristic importance and formulation, testing of Hypothesis – parametric (Standard) and non parametric, Review of literature, Bibliography and case study

UNIT – IV

Application of Remote Sensing and GIS in Research, Arrangements and Analysis of Data and map, Quantitative and qualitative interpretations, Writing of Research report/ paper and dissertation, Framing of Pilot and Research project

Books Recommended:

1. **Bhatt, H.P. and Bansal S.C. (2012)** : Research Methodology (in Hindi), Meenakshi Prakashan, Meerut.
2. **Ahuja, R. (2001)**: Research Methods, Rawat Publication, Jaipur and New Delhi
3. **Bhattacharya, D.K. (2005)**: Research Methodology, Excel Books, New Delhi
4. **Blackburn, J. and Holland, J. (eds) (1998)** : Who changes ? Institutionalizing Participation in Development IT Publication, London
5. **Blaxter, L., Hughes, C. and Tight, M. (1996)**: How to Research. Open University Press, Buckingham.
6. **Crang, Mike 1999** : Cultural Geography, Rutledge, London
7. **Daniels, P., Bradshaw, M. et al. (2000)** : Human Geography : Issues for the 21st Century, Prentice Hall, London and Pearson Publishers, Singapore, Indian reprint, 2003.
8. **Denzin, N.K. and Lincoln, Y.S. (eds) 2000** : Handbook of Qualitative Research Thousand Oaks CA Sage Publications.
9. **Dikshit, R.D. (2003)** : The Art and Science of Geography : Intergrated Readings, Prentice – Hall of India, New Delhi
10. **Dorling, D. and Simpson, L. (eds) (1991)** : Statistics in Society, Edward Arnold, London
11. **Fisher, P. and Unwin, D. (eds) (2002)**: Virtual Reality in Geography, Taylor and Francis, London
12. **Flowerdew, R. and Martin, D. (eds) (1997)** : Methods in Human Geography, A Guide for Students Doing a Research Project, Longman, Harlow
13. **Hay, I. (ed), (2002)** : Qualitative Research Methods in Human Geography, Oxford University Press, New York
14. **Henn, M. Mark W. and Nick F. (2006)** : A Short introduction to Social Research, Vistaar Publications, New Delhi
15. **Eyles, J. and Smth, D.M. (1988)** : Qualitative Methods in Human Geography, Polity Press, Dales Brewerling Cambridge.
16. **Kitchin, R. and Tate, N. (2001)** : Conducting Research into Human Geography, Theory, Methodology and Practice, Prentice- Hall, London
17. **Har Prasad** : Research Methodology and Techniques in Geography, Rawat Publicaiton, Jaipur

Paper – IX : Practical II (Remote Sensing, GIS & Field Study)

Time : 3 Hours

Theory : 80 Marks

Internal Assessment: 20 Marks

The syllabus for Practical is divided into two sections, Section 'A' is related to Laboratory Work, and Section 'B' is related to field work (Geographical Tour). The Laboratory work is divided into four units, Eight questions will be selected at least two questions from each unit, Candidate will have to attempt four questions selecting at least one question from each unit. The division of marks in Practical is given below -

Lab Work	-	M.M. 40
Sessional Record	-	M.M. 05
Viva – Voce	-	M.M. 05

Section A – Laboratory Work

Unit I

Basic of Computer, Concept of Maps, Coordinates, Projection (WGS84 and Everest), Types of Files, Export Import file, Layer Stacking of Multispectral Imagery.

Unit II

Concept of Geo referencing (maps to image, image to image), sub- setting with the help of AOI layer, Mosaicking, Radiometric and Geometric errors and correction, image classification.

Unit III

Spatial Data integration, Digitization (Point, line, Polygon), Non Spatial Data integration, Editing of Spatial and Non Spatial Data, Building Topology

Unit IV

Basics of GPS and Computer Cartography and Mapping

Section B – Field Work (Geographical Tour)

The field study is compulsory for all students, those who will not take will not given any mark for this. The field study/ work are designed to acquaint the students that '**Geography is an observational Science**' and field work is one of the important methodologies in Geographical studies.

The students are to be sensitized about pre filed work preparation, conduct field work, post field work exercises and report writing.

Field study tour to provide traverses across and macro regions of the country specially problem areas, new Geographical Regions, it should be arranged of about two week duration. Student will be trained in field work collection of data, mapping data/ information etc. in which minimum 5 maps (Location map, Route Map, Physical, Socio – economic and Cultural Map) and diagrams and **40 pages** of write up is necessary.

Field Study Guide (Teacher) – Will submit a precise report (*at least 5 pages*) of field study work about the detail plan of field study, Justification of Selection of the Region, day wise field study plan with the list of students present/ attended the field study to the HoD Concern.

Books Recommended:

1. **Jenson, J.R.** : Introduction to Digital image processing , Prentice Hall, Englewood cliffs, N.J.
2. **Pratt, W.K.** : Digital image processing, John Wiley & Sons, New York, 1995
3. **Hord, R.M.** : Digital image processing of Remotely sensed Data, Academic Press, New York, 1989
4. **Nag, P.** : Thematic cartography and Remote Sensing , Concept Publishing House, New Delhi
5. **Black Well, B.** : Statistics in Geography, Basil Black Well Ltd. , 1988
6. **Sinha, P.K. & Sinha, P.** : Computer Fundamentals, 3rd Ed. B.P.B. Publication
7. **Lo, C.P.** : Applied Remote Sensing, Longman Scientific and Technical, Harlow, ESSEX
8. **Peuquet, D.J. & Marble, D.F.** : Introductory Readings in Geographic information Systems Taylor & Francis, Washington, 1990
9. **Spurr, R.** : Photogrammetry and Photo Interpretation, The Rolland Press Co. London, 1960
10. **Cole, J.P. and King, C.A.M.** : Quantitative Geography, John Willey, London, 1968
11. **Panwar, Mohan Singh (2017)** - “**Sookcham Stariya Niyozan Evam PRA Techniques**” Binsar Publication.

Semester – III

Paper – X : Geography of India

Time : 3 Hours

Theory : 80 Marks

Internal Assessment: 20 Marks

Note : The Paper consists of four units. Two questions will be set from each unit. The candidates will be required to answer one question from each unit. The candidate will be required to attempt 04 questions in all. Answer should be precise. All Questions carry equal marks.

UNIT – I

Indian federalism, India unity in diversity (View points from social geography), physiography, Drainage (Volume), Climate Mechanism of Indian Monsoon (Recent Theories), Soil and Natural Vegetation

UNIT – II

Human Development Index and its components, Growth and Distribution and Density of Population, Trends of Urbanization Special Distributional Pattern of Settlements (Rural & Urban)

UNIT – III

Agroclimatic, Region, Rainbow Revolution, Industrial Complex and Industrial Regions, Major River Valley Projects, energy crises and food security

UNIT – IV

Growing importance of ports, fast two five years plans, experience of Rural Planning, Integrated R.D.P., Multi level planning, Community participation & governance and planning contemporary issues and Economic Reforms – Multinationals and liberalization

Books Recommended:

1. **Misra, R.P. et al** : Regional Development Planning in India, Vikas Publishers, New Delhi, 1978
2. **Mishra, R.P. (ed)** : Local level Planning and Development, Sterling Publication, New Delhi
3. **Diamond, D. (ed)** : Regional Disparities and Regional Policies, Pergamon Press, Oxford, 1982
4. **Subrahmayam, K.N. (ed)** : Economic Development and Planning in India, Pub. New Delhi, 1985
5. **Sundaram, K.V., Misra, R.P. and Rao, V.L.S.P.** : Spatial Planning for a Tribal Region, Inst. Of Development Studies, Mysore, 1971
6. **Regional Science Association** : Regional Planning in India , IIT Kharagpur, 1995
7. **Prasad, K.V.** : Planning at the Grass Roots, Sterling Pub. Pvt. Ltd. New Delhi
8. **Chand, Mahesh and Puri, V.K.** : Regional Planning in India, Allied, New Delhi, 1983
9. **Chandna, R.C.** : Regional Planning : A Comprehensive Text, Kalyani Publication, New Delhi
10. **Tiwari, R.C.** : Geography of India, Prayag Pustak Bhawan, Allahabad, 2008
11. **Tiwari, R.C.** : Bharat ka Bhoogol, Prayag Pustak Bhawan, Allahabad, 2008
12. **Maithani, D.D. & Prasad, Gayatri & Nautiyal, Rajesh**: Geography of Uttarakhand, 2010 Sharada Pustak Bhawan Allahabad.
13. **Misra, R.P.** : Regional Planning and National Development, Vikas Publication, New Delhi

Paper - XI : Practical – III (Quantitative Techniques and Mapping)

Time : 3 Hours

Theory : 80 Marks
Internal Assessment: 20 Marks

The syllabi for Practical is related to laboratory work on Quantitative techniques and Mapping Eight questions will be set selecting at least two questions from each Unit. Candidate will have to attempt four questions selecting one question from each Unit. It will be of two hour duration.

Distribution of Marks :

Laboratory Work	-	30
Sessional Record	-	20
Viva Voce	-	10

UNIT I

Types of Spatial Data : Line, Area and Point, Levels of their measurement – Nominal, Ordinal interval and ratio, Diagrammatic representation of Data Circle, Spheres, Block Piling, Erograph (Cropcycle and Activity Pattern) Climatograph.

UNIT II

Nearest Neighbor Analysis (NNA), Gini's Co- efficient, Rank Size Rule, Location quotient, Lorenz, Curve, Compositing- the indices of Nodal Accessibility

UNIT III

Elements of Maps – Generalization, Symbolization and Classification, Techniques of Mapping – Dot, Choropleth and Isopleths, Stiglenbauer's & Sten de Geer's method. Choropleth – Simple and asymmetric stepped statistical surface, class less choopleth, errors and their elimination

UNIT IV

Correlation by spearman's and Karl Person's method, Scatter Diagram, Simple Linear Regression analysis, Construction of Regression Line, Plotting of Residuals of Absolute and Relative location, explanation of Residuals plotted on the maps.

Books Recommended :

1. **Barrett, E.C. & Courtis, L.F.** : Introduction to Environmental Remote Sensing
2. **Dickinson, G.O.** : Maps and Aerial Photographs
3. **Smith, H.T.V.** : Aerial Photographs and their Applications
4. **Dookshatula, B.L. & Rajani, Y.S.** : Remote Sensing
5. **Davis, P.** : Data Description and Presentation
6. **Garnett, A.** : Geographical Interpretation of Topographical Maps
7. **Mishra, R.P. & Ramesh A.** : Fundamentals of Cartography
8. **Raja, Moonis** : Source of Socio – Economic Data

9. **Sharma, J.P.** : Practical Geography (Hindi)
10. **Singh, R.L.** : Practical Geography (English / Hindi)
11. **Lillesand, T.M. and Keifer, R.W.** : Remote Sensing and Image Interpretation, John Wiley and Sons, New York, 1999
12. **Jenson, J.R.** : Introduction to Digital image Processing, Prentice Hall, Englewood Cliffs, NJ.
13. **Hord, R.M.** : Digital Image Processing of Remotely Senses Data, Academic Press, New York, 1989
14. **Pratt, W.K.** : Digital Image Processing, John Wiley & Sons, New York, 1995
15. **Robinson, A.H. et al** : Elements of Cartography, John Wiley and Sons, New York

Paper – XII Elective: (Student can opt any one of the three papers given below)

Paper – XII (a) : Population Geography

Time : 3 Hours

Theory : 80 Marks

Internal Assessment: 20 Marks

Note : The Paper consists of four units. Two questions will be set from each unit. The candidates will be required to answer one question from each unit. The candidate will be required to attempt 04 questions in all. Answer should be precise. All Questions carry equal marks.

UNIT – I

Nature, Scope and Significance of Population Geography, its relation with demography, Relevance of Population Studies in Geography: Nature and Sources of Population data and maps, Methods and Approaches to Population Study, Recent Development in Population Geography, Population and Development Planning

UNIT – II

Population growth distribution and density, World Patterns and their determinants, concepts of 'Under', over and optimum population, Population composition – age, sex, literacy, occupational structure and gender issues. Population growth in the context of Manpower and employment

UNIT – III

Population Dynamics – Measurement of Fertility and mortality, **Migration – Causes**, types, national and international Pattern, Push and Pull Factors, Mobility Transition, Rural and Urban Dimensions, Globalization and Labour mobility, **Demographic regions of India** : Attributes, Structure and Characteristics

UNIT – IV

Concept of Human Resource and Management, Population Resource Regions, Population Planning and Policies in Under – Development and developed countries with special reference to Japan and India, Population as Social Capital, Human Development Index, National Population Policy

Books Recommended:

1. **Chandna, R.C.** : A Geography of Population, Concept, Determinants and Patterns, Kalyani Publication, New Delhi, 2000
2. **Clarke, John I.** : Population Ecology, Pergamon Press, Oxford 1973
3. **Crook, Nigael** : Principles of Population and Development, Pergamon Press New York, 1997
4. **Garnle, R.B.J.** : Geography of Population, Longman, London, 1970
5. **Srinivasan, K. & Vlassoff M.** : Population Development Nexus in India : Challenges for the Millennium, Tata Mc Graw Hill, New Delhi, 2001
6. **Srinivasan, K.** : Demographic Techniques and Applications, Sage Publication, New Delhi, 1998
7. **Sundaram, K.V. and Nangla, Sudesh (ed)** : Population Geography, Heritage Publication, Delhi 1986
8. **Woods, R.** : Population Analysis in Geography, London, 1979
9. **Zelinsky, Wilbur** : A Prologue to Population Geography, Prentice Hall, 1966
10. **Clarke, J.I.** : Population Geography, Pergamon, Oxford, 1972

Paper – XII (b) : Urban Geography

Time : 3 Hours

Theory : 80 Marks

Internal Assessment: 20 Marks

Note : The Paper consists of four units. Two questions will be set from each unit. The candidates will be required to answer one question from each unit. The candidate will be required to attempt 04 questions in all. Answer should be precise. All Questions carry equal marks.

UNIT – I

Meaning, Scope and approaches of Urban Geography: Changing Paradigms of Urban Geography, Development of Urban Geography in India, **Theories of Urban Origin** : Urbanization Cycle, Trends of Urbanization – World and India, Historical and Spatial Perspective

UNIT – II

Urban Morphology, land use models and city growth – concentric zone, Urban Economic Base, multiple nuclei models, Structure and Characteristics of Central Business District, Classification, Nelson – Steigenga webb and double index method, Rank size rule applicability

UNIT – III

Centrality and Hierarchy of Towns, Central place theory of Christaller, Concept of City Region - Rural Urban fringe and its delimitation, satellite town, suburbs, conurbation, urban problems, poverty, slums urban renewal and sprawl, solid waste

UNIT – IV

National Urban Policy and Urban land use Planning: Concept of garden city and New Town, Major Plans : A case study of Nainital and Dehradun, Planned and Smart Cities : Chandigarh and New Tehri town, urban development, planning in India – Policies, programme and implication, Delhi and NCR Globalization and Urban Planning

Books Recommended:

1. **Singh, L.S. and Goledge, R.G.** : **Cities, Space and Behaviour** : Elements of Urban Geography, Prentice Hall, New Delhi
2. **Mishra, H.N. (ed)** : Urban Geography, Heritage
3. **Ortham, R.M.** : Urban Geography, John Wiley, New York
4. **Short, R.J.** : An introduction to Urban Geography, Rutledge and Kegan Paul, London, 1984
5. **Johnston, R.J.** : City and Society, Hutchinson, London
6. **Herbert, D.T.** : Urban Geography : As Social Perspective, David and Charles, Newton Abbot, 1977
7. **Johnson, J.H.** : Urban Geography : An Introductory Analysis, Pergamon Press, London, 1972
8. **Singh, R.L.** : Urban Geography in Developing Countries, National Geographical Society India, Varanasi
9. **Berry, B.J.L. and Horton, F.F.** : Geographic Perspectives on Urban Systems, Prentice, Englewood Cliffs, New Jersey, 1970
10. **Ramachandran, R.** : Urbanization and Urban Systems of India, Oxford, New Delhi, 1993
11. **Knox, P.L. and Taylor. P.J.** : World Cities in a World System, Cambridge University U.K. 1995
12. **Harvey, D.** : Social Justice and the City, Arnold, 1973

Paper – XII (c) : Regional Planning and Development

Time : 3 Hours

Theory : 80 Marks
Internal Assessment: 20 Marks

Note : The Paper consists of four units. Two questions will be set from each unit. The candidates will be required to answer one question from each unit. The candidate will be required to attempt 04 questions in all. Answer should be precise. All Questions carry equal marks.

UNIT – I

Concept, Scope and Typology of Planning, Regional Planning- its Philosophy and purpose, Theoretical and operational frame work of Regional Planning, Approaches to regional planning, Historical Development of Regional Planning, Geography and its role in regional planning and development

UNIT – II

Methodology and techniques of regional planning, Analytical techniques and procedural techniques, Principles of Regionalization, Planning Processes – sectoral and spatial planning, short – term and long term perspective planning, Multi Regional, Multi – level and Decentralize Planning

UNIT – III

Regional Development Strategies : Identification of planning regions , Regional Planning strategies for backward area – Hill area, tribal area case studies of planning program, achievements, problems and prospects from Japan and China

UNIT – IV

Spatial inequalities and regional imbalances in India : Problems of Regional planning, indicators and level of regional development, Dilemma of Development of Problem areas, Regional Planning & Development in India, Region Planning and Development strategies in the 21st Century NITI Ayog of India.

Books Recommended:

1. **Johnosn, E.A.J.** : The Organization of Space in Development Countries, Harward University Press Cambridge, 1970
2. **Kuhilnski, A.R. (ed):** Growth Poles and Growth Centers in Regional Planning, Mouton, The Hague, 1972
3. **Misra, R.P. et al** : Regional Planning : Concepts, Techniques and Policies, University of Mysore, Mysore, 1969
4. **Misra, R.P. et al** : Multi Level Planning, Heritage Publishers, Delhi, 1930
5. **Hall, Peter** : Urban and Regional Planning, Penguin Books Ins, New York
6. **Shorts, J.G.M. Hill** : Regional Planning, University Press, Rotterdam

7. **Glasson John** : Regional Planning, Hutchison, London
8. **Mishra, R.P.** : Development Issues of our time, Concept Pub. Co. New Delhi
9. **Alden, J. and Morgan, R.** : Regional Planning : A Comprehensive View, Leonard, Hill Bed Beds, 1974
10. **Glassen, J.** : An Introduction to Regional Planning, Hutchison Educational, London
11. **Hall, Peter** : Cities of Tomorrow, Updated Edition, Blackwell Publishers Ltd. Oxford 1996

Paper – XIII : Elective : (Student can opt any one of the three papers given below)

Paper – XIII (a) : Advanced Climatology

Time : 3 Hours

Theory : 80 Marks

Internal Assessment: 20 Marks

Note : The Paper consists of four units. Two questions will be set from each unit. The candidates will be required to answer one question from each unit. The candidate will be required to attempt 04 questions in all. Answer should be precise. All Questions carry equal marks.

UNIT – I

Meaning, Scope and Development of Climatology, Atmospheric equilibrium, Adiabatic temperature change, Jet stream, El – Nino, La- Nina, Walker Circulation, Southern Oscillation, Precipitation & Humidity

UNIT – II

Air masses – origin, growth, classification and distribution, Horizontal and Vertical motion of winds, Fronts and front genesis, cyclones and anticyclones, temperate and tropical cyclones

UNIT – III

Climate Classification of Koppen and Thornthwalte, Major Climate types, Weather analysis data acquisition and dissemination and weather forecasting – methods, types and accuracy weather and human behavior, Weather modification, atmospheric hazards – cloud bursts

UNIT – IV

Climate Changes – Definition & detection : Tree rings, Glacial ice & Oxygen Isotope analysis causes, Plate tectonics, volcanic activity, orbital variations, solar variability, Human impact global climate, Global Warming, Artificial climate and acid precipitation.

Books Recommended:

1. **Chorley, R.G. and Barry, R.G.** : Atmosphere, Weather and Climate Methuen & Ltd., London, 1995
2. **Critchfield, H.J.** : General Climatology, Prentice Hall of India, New Delhi 2002
3. **Aguado, E. and Burt J.E.** : Understanding Weather and Climate Prentice Hall, 2001

4. **Brasseur, B.P. et al** : Atmospheric Climatology and Global, Oxford University Press, New Delhi ,1999
5. **Hiddore, J.E.** : Global Environment Change, Prentice Hall, New Jersey, 1996
6. **Hidoore,J.J.** : Global Environment Change, Prentice Hall, New Jersey , 1996
7. **Lockwood, J.G.** : World Climatology, Eibs and Edward Arnold (Pub.) Ltd. 1979
8. **Miller, A.et al** : Elements of Meteorology, Merrill and Columbus
9. **Morgon, M.D. and Moran, J.M.** : Weather and People, Prentice Hall, New Jers 1997
10. **Oliver, J.E. and Hiddore J.J.** : Climatology An Atmosphere Scinece, Pears Education, India 2003
11. **Thompson, R.D. and Perry, A.** : Applied Climatology, Routledge, London and New York, 1997
12. **Trewartha, G.T.** : An Introduction to Climate McGraw Hill Series in Geogrpahy, 195
13. **Trewartha, G.T.** : The Earth's Problem Climates, Univeristy of Wisconsin Pres 1981
14. **Lal, D.S.** : Climatology, Sharda Pustak Bhawan, Allahabad
15. **Singh, Savindra** : Climatology, Prayag Pustak Bhawan, Allahabad, 2005
16. **Lal, D.S.** : Jalvayu Vigyan, Sharda Pustak Bhawan, Allahabad,
17. **Singh, Savindra** : Jalvayu Vigyan, Prayag Pustak Bhawan, Allahabad

Paper – XIII (b) : Natural Hazards and Disaster Management

Time : 3 Hours

Theory : 80 Marks

Internal Assessment: 20 Marks

Note : The Paper consists of four units. Two questions will be set from each unit. The candidates will be required to answer one question from each unit. The candidate will be required to attempt 04 questions in all. Answer should be precise. All Questions carry equal marks.

UNIT – I

Meaning and concept of Hazards and Disaster, Type of Natural and Manmade Hazards, Elements of Disasters: Hazard analysis, Vulnerability and risk analysis, Disaster Management – Determinants of Scale

UNIT – II

Natural Hazards : Typology, Regional Dimension of Hazards, Occurrence and trends, Methods of Identifying Hazards Prone regions, Major terrestrial Disasters : Seismic Disasters, Volcanic Disaster, Landslides and Tsunamic Disaster, Reasons of increasing frequency of Disasters

UNIT – III

Disaster Management : Concept, stages of Disaster Management, Pre- Disaster stage – Disaster Preparedness (Disaster research, Disaster Predication and Disaster warning), Methods and levels of preparedness, Disaster mitigation and Disaster prevention, Post – Disaster stage – Rescue and relief work, Disaster Management Act

UNIT – IV

Different type of Disaster and Hazards prone areas in India, Disaster Management Policies and Approaches, Major Disaster in India and their management, Resource to Disaster, Government, Non Government Programmes/ Institution of Disaster Management

Books Recommended:

1. **Tianch, L.** : Landslide Hazard Mapping and Management in China, ICIMOD, Nepal, 1996
2. **Valdiay, K.S.** : Environmental Gology, Tata McGraw Hill Co. Ltd., New Delhi 1987
3. **Zareba, Q. and Mance V.** : Landslides and their Control, Elsevier Amsterdam, 1969
4. **White, G.F. (ed):** Natural Hazards : Local, National, Global, Oxford University Press, London 1974
5. **Gupta, H.K.** : Dams and Earthquakes, Elsevier, Amsterdam, 1976
6. **I. et al** : The Environment as Hazards, O.P.U. , New York, 1978
7. **B.A. et ai (ed)** : Geological Hazards, Springer Varlay, New York, 1950
8. **C.** : Natural Hazards and Global Change I.T.C. Journal, 1989
9. : Environmental Geography (English /Hindi)
10. **Petak, W.J. & Atkinson, A.D.** : Natural Hazards Risk Assessment and Public Policy, Springer – Verlay, New York, 1982

Paper – XIII (c) : Geo – Hydrology

Time : 3 Hours

Theory : 80 Marks
Internal Assessment: 20 Marks

Note : The Paper consists of four units. Two questions will be set from each unit. The candidates will be required to answer one question from each unit. The candidate will be required to attempt 04 questions in all. Answer should be precise. All Questions carry equal marks.

UNIT – I

Definition, concept, importance and scope of Geohydrology, Water resource, The Hydrological cycle, concept of water shed management in Hydrology, Mountain Hydrological system

UNIT – II

Precipitation and Measurement, runoff process and factors, surface runoff, compilation of runoff, Discharge and Measurement, Hydrograph, stream gauging and stream flow, constraint - examples from India

UNIT – III

Infiltration - capacity, rate, factors and methods of compilation of infiltration, evaporation factors, estimation and its control, transition ratio,

Management planning : Ground Water Hydrology origin, occurrence, movement, recharge and discharge

UNIT – IV

Water Surplus and water deficit - areas, over and under utilization of water resource, water balance, **Water conservation** – present, future perspective, planning and programme, **Water Harvesting** – Traditional and modern methods

Books Recommended:

1. **Bouwer, H.** : Ground Water Hydrology, McGraw Hill Book Co., New York, 1978
2. **Karanth, K.r.** : Groundwater Assessment : Development and Management, Tata McGraw Hill New Delhi, 1987
3. **Rao, K.L.** : India's Water Wealth, Orient Longman, New Delhi, 1979
4. **Murthy, J.V.S.** : Watershed Management in India : Wiley Eastern Ltd., New Delhi , 1995
5. **Reddy, R.J.** : The Textbook of Hydrology, Laxmi Publicaiton, New Delhi,1999
6. **Charlu, T.G.K. and Dutt. D.K.** : Ground Water Development in India, Rural Electrification Corporation, New Delhi, 1982
7. **Singh, R.A. and Singh, S.R.** : Water Management Principles and Practices, Tara Publishers Varanasi
8. **Tideman, E.M.** : Watershed Management Guidelines for India Conditions, Omega, New Delhi
9. **Sain, S.K.** : The Flood Problem in India, Birla Institute of Scieintific Research, Economic Reserarch Divison, New Delhi
10. **Sokolar, A.A. and Chapman, T.B. (ed)** : Methods for Water Balance Computations : An International Guide for Research & Practice : The UNESCO Press, Paris, 1974
11. **Chorley, R.J.** : Introduction to Physical Hydrology, Methuen, London, 1967
12. **Jones, J.A.** : Global Hydrology : Processes, Resources and Water Management, London, 1997

Semester – IV

Paper - XIV : Geography of Uttarakhand (A Regional Analysis)

Time : 3 Hours

Theory : 80 Marks
Internal Assessment: 20 Marks

Note : The Paper consists of four units. Two questions will be set from each unit. The candidates will be required to answer one question from each unit. The candidate will be required to attempt 04 questions in all. Answer should be precise. All Questions carry equal marks.

UNIT – I

Geo Political setting, Historical Outline, Geo Physical Setting, Geological structure, Geomorphic Characteristics, Processes and features and physiographic region Drainage – River system and basin, Characteristics and water volume, Climate, Natural Vegetation, Soil, Glaciers and Lakes

UNIT – II

Population, growth and distribution, density, age, sex structures , Literacy and Educaiton, Cultural Appraisal, rural out migration, rural settlement, Type, Patterns and urbanization, occupational structure Harsh Nature of Environment and its influence on Socio – Economic aspects of Life, Tribes

UNIT – III

Land use, Agriculture, Constraints of Agrarian Economy, Money order economy and Role of Women in Hill economy, Important crops, animal husbandary, forestry, Horticulture mixed farming system, poverty, Transport, Tourism and Pilgrimage, Important Natural Resources, Industries, Hydropower projects – Tehri Dam, Vishnuprayag and AHPP Srinagar

UNIT – IV

Environmental Constraints in the Framework of Man- Nature interaction, Disaster, Regional Disparities in Development, Hill Development planning, problems and limitation of Development, Movement of Environment conservation, Environment V/S Economic Development, Waste Land Expansion after the creation of Uttarakhand State, Contemporary issues.

Books Recommended:

1. **Lal, J.S. & Moddie** : The Himalaya Aspect of Change A.D. (ed)
2. **Bhatt, H.P. & Bhatt Sangeeta** : Environmental Dimensions of Rural Settlements in the Himalaya in 1993
3. **Bhatt, H.P. & Bhatt Sangeeta (1992)** : Environment – Yesterday, Today and Tomorrow, Galgotia Publication, New Delhi
4. **Bose, S.C.** : Land and People of the Himalaya

5. **Kayastha, S.** : The Himalayan Beas Basin
6. **Valdin, K.S. (ed)** : Kumaun – Land and People
7. **Singh, T.V. (ed)** : Mountain and Development
8. **Singh O.P. (ed)** : The Himalaya Nature, Man & Culture
9. **Joshi, S.C. and others** : Kumaun Himalaya
10. **Nitynnand & Kumar, K.** : The Holy Himalaya – Geographical Interpretation of Garhwal Himalaya
11. **Kharkwel, S.C.** : Uttarakhand – Physico – Culture Complex
12. **Mathani, D.D.** : Central Himalaya : Ecology, Environmental Resources and Development
13. **Rawat, M.S.S. (ed)** : Central Himalaya – Environment Development Vol. I & II

Paper - XV : Practical – IV (Surveying and Weather analysis)

Time : 3 Hours

Theory : 80 Marks
Internal Assessment: 20 Marks

The syllabi for Practical is divided into two sections: Section A and B

A is related to field work. Candidate will have to attempt two exercises of Surveying form section A of 02 Hours Duration and two exercises of Section B of 01 Hour duration

Section A : Field Work

1. **Plane Table Survey:** Two Point and three point problem. Triangulation and determination of heights and contouring with clinometers
2. **Prismatic Compass Survey:** Closes Traverse error adjustment by Bowditch method and trigonometry.
3. **Dumpty level survey** : Contouring and Profile drawing

Section B : Laboratory Work

1. GPS : Handling usages, GPS based data acquisition, GPS System and application
2. Altimeter (Hi – teach with precision) : Handling and use
3. Interpretation of Indian daily weather maps through the study of thermal and cloud conditions and pressure system, Weather forecasting method

Distribution of Marks :

Surveying (Two Exercises)	– 30
Lab Work (Two Exercise)	– 10
Survey Camp	– 20
Sessional Record (min)	– 10
Viva – Voce	- 10

Note :

1. In all 20 exercises form both the parts A and B shall constitute the sessional record covering all sub sections
2. Candidate shall attend (Compulsory) field training (Survey camp) of at least seven days duration in a suitable area handling different survey instruments. They shall prepare minimum 5 exercises (Survey camp) belonging to the original field survey.
3. Survey camp work will be evaluated at the time of the end semester Practical exam.

Paper – XVI : Elective: (Student can opt any one of the three papers given below)

Paper – XVI (a) : Agriculture Geography

Time : 3 Hours

Theory : 80 Marks

Internal Assessment: 20 Marks

Note : The Paper consists of four units. Two questions will be set from each unit. The candidates will be required to answer one question from each unit. The candidate will be required to attempt 04 questions in all. Answer should be precise. All Questions carry equal marks.

UNIT – I

Nature, Scope, significance and development of Agricultural geogprahy, Origin and Dispersal of Agriculture – major agriculture hearths, Diffusion of Agriculture innovation, Recent trends in Agriculture

UNIT – II

Determinants of agriculture – Physical, economic, Political, Technological, Socio – cultural, Land reforms, cropping Patter, Cropping intensity, diversification and specialization, efficiency and Productivity, crop combination regions

UNIT – III

Theories of agriculture location: Von Thunen’s Model and its modification – Sinclair’s approach, concept of agriculture region, whittlesey’s classification of agriculture regions, Agricultural typology Mix Cropping, Crop – rotation and eco farming

UNIT – IV

Agriculture in India: Land use and shifting cropping Pattern, New trends in India Agriculture – Green revolution, White revolution, Nutritional Index, Problems of India Agriculture, Agriculture Policy in India, Food Security.

Books Recommended:

1. **Symons, L.** : Agricultural Geography, G. Bells, London, 1967
2. **Grigg, D.** : An introduction to Agricultural Geography, Hutchinson Publication, London
3. **Gigg, D.B.** : The Agricultural System of the World, Cambridge University Press, New York, 1974
4. **Mannion, A.M.** : Agriculture and Environment Change, John Wile, London, 1995
5. **Sauer, Carl** : Agricultural Origin and Dispersals American Geographical Society, New York, 1952
6. **Brown, L.R.** : The Changing World Food Prospects : The Nineties and Beyond, World Institute, Washington DC, 1990
7. **Dyson, T.** : Population and Food – Global Trends and Future Prospects, Routledge, London, 1997
8. **Morgan, W.B.** : Agriculture in the Third World – A Spatial Analysis, West Press, 1978
9. **Singh, B.B.** : Krishi Bhoogol, Gyanoday Prakashan, Gorakhpur
10. **Kumar, Pramila evm Sharma, S.K.** : Krishi Bhoogol, Hindi Granth Academy, Bhopal
11. **Tiwari, R.C. and Singh, B.N.** : Krishi Bhoogol, Prayag Pustak Bhawan, Allahabad

Paper – XVI (b) : Cultural Geography

Time : 3 Hours

Theory : 80 Marks

Internal Assessment: 20 Marks

Note : The Paper consists of four units. Two questions will be set from each unit. The candidates will be required to answer one question from each unit. The candidate will be required to attempt 04 questions in all. Answer should be precise. All Questions carry equal marks.

UNIT – I

Concept of Culture and Culture as an indicator of Regional identity. The Study of culture in Geography, Nature, Scope concept and significations of Culture Geography, Development of Cultural Geography, Cultural Landscape, Cultural Process, Cultural Diffusion

UNIT – II

Origin and dispersal of man, Brief cultural history of Man

Migration processes and cultural development – Prehistoric, Primitive agrarian, Industrial revolution, Role of Technological changes in Cultural Development, Cultural Hearths, Cultural Ecology

UNIT – III

Human Races – origin and dispersal and related theories, type and distribution, Major ethnic, Racial Groups and Linguistic groups

Resource and Culture – Resource extraction and conversion

Processes and elements of Cultural Transformation

Cultural Segregation and Assimilation, Cultural unity and Diversification

UNIT – IV

Cultural Realms – Monsoon Asian, Meso – African, Mediterranean, Western European, Anglo – American , Latin American

Cultural Regions - Indo – Aryan, Dravidian, Chinese, Arabian Islamic, Angolo – American Atlent Coastal, Brazilian, Maxican, English – European

Books Recommended:

1. **Spencer, J.&E. Thomsas W.I.** : Introducing cultural Geography
2. **Rostlund, F.** : Outline of Cultural Geography
3. **Wagner, P.J. & Mikesell, M.W. (eds)** : Reading Cultural Geography
4. **Sultar, C.I.** : The Cultural Landscape
5. **Frazier, D.E.** : Race and Cultural Contacts in the modern world
6. **Spher, D.F.** : Geography of Religions
7. **Carter, G.F.** : Man and the land a cultural Geography
8. **Dohra, F.E. & Sommers, L.M. (eds)** : Cultural Geography Selected Readings
9. **Coul, B.R.** : The Orign of Civilized Society
10. **Brood, J.M.** : Geography of Mankind
11. **Jain, J.K. & Vohra, D.M.** : Sanskrit Bhoogol (Hindi)
12. **Prasad, Gayatri** : Sanskritik Bhoogol (Hindi)

Paper – XVI (c) : Remote Sensing and GIS

Time : 3 Hours

Theory : 80 Marks

Internal Assessment: 20 Marks

Note : The Paper consists of four units. Two questions will be set from each unit. The candidates will be required to answer one question from each unit. The candidate will be required to attempt 04 questions in all. Answer should be precise. All Questions carry equal marks.

UNIT – I

Definition, Process and stages of Remote Sensing, Energy Sources and radiation, EMR, Energy Interaction with atmosphere and earth surface, Principle of Micro wave Remote Sensing

Types of R.S., Platforms, Satellites and sensor, Resolution, Digital Image and satellite imagery, elements of Visual image Interpretation, Digital image processing techniques.

UNIT – II

Definition, History Types, Classification and planning mission of A.P. : Basic Geometric Characteristics – Scale, height, overlap, mosaic, resolution, Stereoscopic coverage
Fundamental concept of Photogrammetric, Orientation, Relief Displacement, Stereoscopic, 3 D viewing, uses of A.P. in landform mapping and urban planning

UNIT – III

Definition, concept, scope and components of GIS, data and information, geo referencing and rectification, Data inputting methods and GPS

Data base, types of Data, Data models in GIS, Data integration, Geospatial Data analysis

UNIT – IV

Computer Cartography and mapping in Digital age, Internal GIS, Web GIS, DTM, Recent Trends of GIS, emerging branches of GIS Science.

Application of Remote sensing and GIS in watershed management, weather information, Disaster Forecast and Geo Information

Books Recommended:

1. **Sabine, F.F. : Remote Sensing – Principles & Interpretation**
2. **Lillesand, R.M. & : Remote Sensing & Image Interpretation Kiefer, R.W.**
3. **Chaunlyal, D.D. : Remote Sensing and G.I.S (Hindi)**
4. **Jensen, J.R. : Introductory Digital Image Processing – A Remote Sensing Perspective**
5. **Demer, M.N. : Fundamentals of Geographic Information System**
6. **Martin, D.S. : Geographic Information System : Socio – Economic Applications**
7. **Aronoff, S. : Principles of Geographical Information systems for Land Resource Assessment**
8. **Aronoff, S. : Geographic information System – A Management Perspective**
9. **Bonham Carter, G.F. : Geographic Information System for Geoscientists**
10. **Jones, C. : Geographical information System & Computer Cartography**
11. **Ayery, T.E. : Introduction to Aerial Photographs**
12. **Praff, W.K. : Digital Image Processing, John Wiley & Sons, New York, 1995**

Paper – XVII : Elective (Student can opt any one of the three papers given below)

Paper – XVII (a) : Bio Geography

Time : 3 Hours

Theory : 80 Marks

Internal Assessment: 20 Marks

Note : The Paper consists of four units. Two questions will be set from each unit. The candidates will be required to answer one question from each unit. The candidate will be required to attempt 04 questions in all. Answer should be precise. All Questions carry equal marks.

UNIT – I

Biogeography : Nature, Scope, Significance, Approaches, History, Recent Development, Succession and Ecological adaptation, Climax concept and ecosystem balance and spatial Dimension in Biogeography

UNIT – II

Historical Evolution of Plants and Animals: Pattern and Causes of Plant and Animal Distribution, Factors influencing the distribution of life, Bio – Geographical regions and realm of the world: Biome and Biomass.

UNIT – III

Biodiversity and the source of novelty in life, Biodiversity: Concept and Significance, Biodiversity and Global Climate Change, Palaeo- Botanical and Palaeo- Climatological records of Environmental change of India, Adaptations of Plants and Animals to the Environment, Biogeography of Uttarakhand Himalaya

UNIT – IV

Bio- Geographical information/ Data, Collection retrieval and application, Conservation of Wildlife and forest, Agro forestry and Reforestry international and National efforts for conserving Biological Resources, Biosphere Reserves, Tropical Forest Action Plan

Books Recommended:

1. **Bradshaw, M.J.** : Earth and Living Planet, ELBS, London, 1979
2. **Cox, C.B. and Moore, P.D.** : Biogeography : An Ecological and Evolutionary Approach, 5th Edition Blackwell, 1993
3. **Hoyt, J.B.** : Man and the Earth, Prentice Hall, USA, 1992
4. **Huggett, R.J.** : Fundamentals of Biogeography, Rutledge, USA, 1998
5. **Bansereau, B.M.** : Biogeography – An Ecological Perspective, Ronald Press, New York, 1957
6. **Joy, T.** : Biogeography : A study of Plants in the Ecosphere, Oliver & Boyd, Edinburgh, 1977
7. **Mani, M.S. (ed)** : Biogeography of India, The Hague, 1975
8. **Martin, C.** : Plant Geography, Methuen, London, 1975
9. **Mathur, H.S.** : Essentials of Biogeography, Any Printers, Jaipur, 1998

Paper – XVII (b) : Oceanography

Time : 3 Hours

Theory : 80 Marks
Internal Assessment: 20 Marks

Note : The Paper consists of four units. Two questions will be set from each unit. The candidates will be required to answer one question from each unit. The candidate will be required to attempt 04 questions in all. Answer should be precise. All Questions carry equal marks.

UNIT – I

Meaning, Objective, Scope and Significance of Oceanography, Submarine topography, Configuration of Pacific, Indian and Atlantic Ocean Floors, sea Floor Spreading

UNIT – II

Ocean Salinity, Temperature, Currents, Tides, Ocean Deposits and Coral Reefs

UNIT – III

Marine Resources, Mineral, Biotic and Energy and their conservation, Marine Pollution and Ocean dumping

UNIT – IV

Ocean Routes and World Economics, laws of the seas, Global Warming and Transgression of seas, Tsunamis and El Niño, Sea level change, Contemporary issues.

Books Recommended:

1. **Davis, R.J.A. : 1986 - *Oceanography*** -An Introduction of the Marine Environment Win.C. Brown, Iowa
2. **Griffiths, J.F. : 1976 - Applied Climatology**, Oxford Press, New York
3. **Huntington, E. and S.S. Visher : 1922 - Climate Change**, Yale University Press
4. **Hussain, T. and Tahir, M. : 2003 - Oceanography**, Jawahar, New Delhi
5. **Kings, C.A.M. : 1963 - An Introduction to Oceanography**, McGraw, New York
6. **Lamb, H.H. : 1972 - Climate - Present, Past and Future**, Methuen London
7. **Biddhartha, K. : 1999 - Oceanography – A Brief Introduction**, Kisalya Publication, New Delhi
8. **Singh, S. : 2002 - Physical Geography**, Prayag Publication, Allahabad
9. **Trewartha, G.T. : 1968 - An Introduction to Climate**, McGraw, New York
10. **Thurnman, H.V. : 1978 - Introduction to Oceanography**, Charles E. Merrill Publication, London
11. **Weyl, P.K. : 1970 - Oceanography – An Introduction of the Marine Environment**, John W. and Sons, London

Paper – XVII (c) : Geography of Tourism & Recreation

Time : 3 Hours

Theory : 80 Marks
Internal Assessment: 20 Marks

Note : The Paper consists of four units. Two questions will be set from each unit. The candidates will be required to answer one question from each unit. The candidate will be required to attempt 04 questions in all. Answer should be precise. All Questions carry equal marks.

UNIT – I

Tourism and Recreation – meaning and Definitions, Development of Geography of Tourism and Recreation, Approaches to the study and models of Tourism, Present Tourism Trends, Its relation with other branches of Geography

UNIT – II

Tourism Types : Cultural, Eco- tourism- coastal and adventure tourism, National and International tourism, Globalization and Tourism, Tourism as an industry structural components and characteristics, International tourism and Political Fallouts

UNIT – III

Development of Tourism in Himalayas: Potentials and Promotion of Tourism – Pilgrimage Tourism as a process of Development and Change in Hill region : Futuristic Tourism Himalayas. Impact of Tourism – Environmental, Economic and Socio- Cultural, Case Study of Mussorie and Nainital

UNIT – IV

Planning of Tourism – conflicting issues of Development, Concept of Green Tourism, Eco Tourism Sustainable tourism: Community participation: Role of Foreign capital and impact of Globalization on Tourism, Contemporary issues

Books Recommended:

1. **Hall, C.M. and Page, S.J.** : The Geography of Tourism and Recreation, Environment, Place and Space, Routledge, London, 1999
2. **Shaw, G. and Williams, A.M.** : Critical issues in Tourism : A Geographical Perspective Blackwell, Oxford, 1994
3. **Kaul, R.K.** : Dynamics of Tourism and Recreation, Inter India, New Delhi, 1985
4. **Pearce, D.** : Tourism Today – A Geographical Analysis, Longman Scientific and Technical, New York, 1987
5. **Bhatia, A.K.** : Tourism Development Principles and Practices, Sterling, Bangalore,
6. **Cris, Ryan** : Recreational Tourism, A Social Science Perspective, Routledge, London
7. **Hall, C.M. and Page, S.J.** : Tourism in South and South East Asia, issues and Cases, Butterworth, Heinemann, Oxford, 2001

8. **Garg, N.K.** : Tourism and Economic Development, Avishkar, Jaipur, 1996
9. **Sinha, P.C.** : International Encyclopedia of Tourism Management, Vols. 1-12, Anmol, New Delhi
10. **Bhardwaj, D.S. and Chaudhary, M.** : Contemporary Issues in Tourism, Himalaya, Mumbai, 1997

Paper – XVIII : Dissertation

(The topic should be selected only from Uttarakhand Himalaya Region)

Time : 3 Hours

Theory : 80 Marks

Internal Assessment: 20 Marks

Note : Concern Teacher will allot relevant Topic to the student. The Topic should be selected only from Uttarakhand Himalayan Region. Topic is only given from the field of Geography. It can cover any branch of Geography.

Distribution of Marks :

Periodical Presentation (Internal Assessment) - 20 Marks

Dissertation - 60 Marks

Power Point / Viva Voce - 20 Marks

Objective :

1. The Paper is designed to acquaint the student with the importance of Field Work as one of The Methodologies in Geography and Especially in Research Work
2. The Student are to be sensitized about Field Work and Data/ information collection and writing of Report.

Field Based (Dissertation)

The Students should be sensitized about the methodology, synopsis preparers, Mapping exercise, data collection. 10 Minutes Power Point presentations on the Dissertation work are compulsory for the students. Students will also submit precise Dissertation Report along with maps, diagrams and at least 100 pages report. Supervisor will be allotted by HoD concern.

1. The Candidates are required to submit their Project Reports one week before the commencement of Examination to the concerned Head of the Department.
2. Assessment of Report will be done by a Board of Examiners, Consisting of external examiner and internal examiner.