NATIONAL EDUCATION POLICY-2020

Common Minimum Syllabus for all Uttarakhand State Universities and Colleges

Syllabus Proposed

2023-24

Sri Dev Suman Uttarakhand University

Badshahithol, Tehri (Garhwal)

पाठ्यक्रम निर्माण समिति, उत्तराखण्ड
Curriculum Design Committee, Uttarakhand

क्र0 सं0	नाम एवं पद	
1	**प्रो0 एन0 के0 जोशी** कुलपति, श्रीदेव सुमन उत्तराखण्ड विश्वविद्यालय, टिहरी	**अध्यक्ष**
2	कुलपति, कुमाऊँ विश्वविद्यालय, नैनीताल	**सदस्य**
3	**प्रो0 जगत सिंह बिष्ट** कुलपति, सोबन सिंह जीना विश्वविद्यालय, अल्मोड़ा	**सदस्य**
4	**प्रो0 सुरेखा डंगवाल** कुलपति, दून विश्वविद्यालय, देहरादून	**सदस्य**
5	**प्रो0 ओ0 पी0 एस0 नेगी** कुलपति, उत्तराखण्ड मुक्त विश्वविद्यालय, हल्द्वानी	**सदस्य**
6	**प्रो. एम0 एस0 एम0 रावत** सलाहकार–रूसा, रूसा निदेशालय, देहरादून	**सदस्य**
7	**प्रो0 के0 डी0 पुरोहित** सलाहकार–रूसा, रूसा निदेशालय, देहरादून	**सदस्य**

NATIONAL EDUCATION POLICY-2020

Common Minimum Syllabus
for all Uttarakhand State Universities and Colleges for MA/MSc of Higher Education

PROPOSED STRUCTURE OF MA/MSc TWO YEARS
GEOGRAPHY SYLLABUS
2023

Curriculum Design Committee, Uttarakhand

Sr.No.	Name & Designation	
1	Prof. N.K. Joshi Vice-Chancellor , Kumaun University Nainital	Chairman
2	Prof. O.P.S. Negi Vice-Chancellor , Uttarakhand Open University	Member
3	Prof. P. P. Dhyani Vice-Chancellor , Sri Dev Suman Uttarakhand University	Member
4	Prof. N.S. Bhandari Vice-Chancellor, Soban Singh Jeena University Almora	Member
5	Prof. Surekha Dangwal Vice-Chancellor, Doon University, Dehradun	Member
6	Prof. M.S.M. Rawat Advisor, Rashtriya Uchchatar Shiksha Abhiyan, Uttarakhand	Member
7	Prof. K. D. Purohit Advisor, Rashtriya Uchchatar Shiksha Abhiyan, Uttarakhand	Member

Syllabus Preparation Committee

S.N	Name	Designation	Department Affiliation
1	Dr. R.C. Joshi	Professor & Head	Department of Geography D.S.B. Kumaun University, Nainital
2	Dr. D.C. Goswami	Professor, Head & Dean of Arts Faculty	Department of Geography Sri Dev Suman Uttarakhand University, Campus- Rishikesh
3	Dr. Jyoti Joshi	Associate Professor & Head	Department of Geography Soban Singh Jeena Almora University, Almora
4	Dr. Kritika Bora	Guest Faculty	Department of Geography D.S.B. Kumaun University, Nainital

Proposed Syllabus (w.e.f. 2023-24) NEP Post Graduate Programme in Geography
(M.A. Two years PG Programme for those who have completed Three years Graduation Programme)

Year	Sem.	Course/Paper			Credit	Research Project	Credit	Total Credits
First Year	I	GEOG701T Geomorphology			4	GEOG706Pr Project	4	48
		GEOG702T Natural Resource Management			4			
		GEOG703T Climatology			4			
		GEOG704T Soil Geography			4			
		GEOG705P Surveying, Collection and interpretation of Socio-economic Data			4			
	II	GEOG801T Social and Cultural Geography			4	GEOG806Pr Project	4	
		GEOG802T Environmental Management and sustainable Development			4			
		GEOG803T Remote Sensing			4			
		GEOG804T GIS& GPS			4			
		GEOG805P Satellite Data Interpretation and GIS Mapping			4			
Second Year	III	GEOG901T Disaster Management			4	GEOF906Pr Project	4	48
		GEOG902T Integrated Watershed Management			4			
		*Optional-I	Physical Geography Stream	GEOG903T Fluvial Geomorphology	4			
				GEOG904T Hydrology	4			
		*Optional-II	Human Geography Stream	GEOG903T Urban Geography	4			
				GEOG904T Regional Development and Planning: Concepts, Principles and Techniques	4			
		GEOG905P Quantitative Technique			4			
	IV	GEOG1001T Biogeography			4	GEOF1008Pr Project	4	
		GEOG1002T Geography of Uttarakhand			4			
		*Optional-I	Physical Geography Stream	GEOG1003T Glacial and Periglacial Geomorphology	4			
				GEOG1004T Aeolian Geomorphology	4			
		*Optional-II	Human Geography Stream	GEOG1005T Population Geography	4			
				GEOG1006T Agricultural Geography and Agro- Ecosystem Management	4			
		GEOG1007P Map Projection and Preparation of Geological Maps			4			

T=Theory, P= Practical, Pr=Project

***Out of Two Optional streams student has to choose one optional stream of his/her choice. Each stream includes two papers.**

First Year
Semester-I

Programme: Under Graduate in Arts		**Year: I**	**Semester: I** **Paper-I**
		Subject: Geography	
Course Code: GEOG701T		**Course Title: Geomorphology**	
Course Outcome This course will familiarize the students with the need for understanding of geomorphology with reference to certain fundamental concepts, focusing on the unity of geomorphology in the earth materials and the processes with or without an element of time. Process component of geomorphology is segmented into the internal and external processes of landscape evolution. Finally a few selected applications of geomorphology to societal requirements and quality of environment are dealt with.			
Credits: 04		Max. Marks: 25 Internal Assessment 75 Term End Exam.	

Unit	Course Content	No. of Lectures
Unit – I	Conceptual Base: Nature, Scope, Trends and Development of Geomorphology; Classical Landscape Evolution / Development Theories: (W.M. Davis, W. Penck, L.C. King, Hack); Recent Trends in Geomorphology	10
Uni t – II	Processes and Landforms: Tectonic processes and tectonic landforms both large and small scales; Drainage patterns and systems, Periglacial processes and landforms; Glacial processes and landforms, Arid processes and landforms, Fluvial processes and landforms, Karst Topography;	14
Unit – III	Landscape Evolution: Radiocarbon dating, tree-ring dating (Dendrochronology), and Lichenometry. Interruptions in the evolution of landforms: Polycyclic landforms	10
Unit– IV	Theories and Techniques: Theories of Hill-slope Evolution; Erosion Surfaces; Geomorphic Mapping Techniques; Systems and Models in Geomorphology.	12
Unit – V	Applied Geomorphology: Geomorphic Hazards and Mitigation Measures; Geomorphology in Civil Engineering; Geomorphology and Groundwater Studies; Soil and Geomorphology; Application of geomorphology in agriculture and resource Management.	14

Suggested Readings:

Bloom, A.L. (1978) : A Systematic Analysis of late Cenozonic Landforms, Englewe Cliffs, M.J. Prentice Hall.
Condle, K.C. (1989) : Plate Tectonics and Crustal Evolution. Pergamon Press. New York.
Chorley, R.J. (ed.) : Spatial Analysis in Geomorphology, London, Metheun.
Chorley, R.J. , S.A. Schum and D.E. Sugden (1985): Geomorphology, London
Coats, D.R. (1981. edt.). Geomorphology and Engineering, George Allenand Unwin,London.
Cooke, R.U. and J.C. Doornkamp (1974) : Geomorphology in Environmental Management, Oxford University Press.
Embleton, C. and J. Thornes : Processes in Geomorphology, London, Edward Arnold.
Garner, H.F. : The Origin of Landscape – A Synthesis of Geomorphology, Oxford University Press, London, 1974.
Goudie, A. (ed.) (1990): Geomorphological Techniques. London, George Unwin and Hyman.
Hart, M.G. (1986) : Geomorphology : Pure and Applied, George Allen and Unwin, London.
Holmes, A. : Principles of Physical Geology, 3rd Edn. London . Nelson. 1978.
King, C.A. M. : Techniques in Geomorphology : London : Edward Arnold.
Leopold, L.B. : Fluvial Processes in Geomorphology.
Lobeck, A.K. : Geomorphology.
Ollier, C.D. : Weathering, Edinburgh : Oliver and Royd.
– do - : Tectonics and Landforms. London: Methuen.
Pitty, A.F. : Geomorphology and Rural Settlement in India.
Scheidegner, A.E. : Theoretical Geomorphology. Berlin : Springer – Verlag.
Sharma, V.K. : Process in Geomorphology (Mc Graw Hill).
Small, R.J. : A Text Book on the Study of Landforms.
Thorn, C.E. : Introduction to Theoretical Geomorphology.
Thornbury, W.D. : Principles of Geomorphology. New York : Wiley (1969).
Twidale, C.R. : Analysis of Landforms. New York : Wiley.
Worcester, P.G. : A Text Book of Geomorphology.

Programme: Under Graduate in Arts	Year: I	Semester: I Paper-II
Subject: Geography		
Course Code: GEOG702T	**Course Title: Natural Resource Management**	
Course Outcome It will make to understand the concepts and approaches of natural resource management. The outcome of the study will be helpful to examine use and misuse of various resources and to analyse natural resources' scenario through different techniques, especially remote sensing and GIS,		
Credits: 04	Max. Marks: 25 Internal Assessment 75 Term End Exam.	

Unit	Course Content	No. of Lectures
Unit – I	Basic Framework: Concept, Definition, Classification of natural resources, Process of resource development.	10
Uni t – II	Resource Appraisal: Resource Analysis; Resource Mapping; Natural Resources Information System.	12
Unit – III	Ecology and Ecosystem: Meaning, Scope, Types and classification of ecology, functioning of ecosystem, energy and nutrients in ecosystem, productivity of ecosystem Trophic levels, food chain, food web, ecological pyramids, bio-geochemical cycles, Significance of ecosystem approach in natural resource studies.	14
Unit – IV	Management of Natural Resources: Concept and Approaches of natural resource management, People’s participation and shared decision making in natural resource management, Gender issue and livelihood issues in natural resource management; Sustainable Resource Development; Community Based Natural Resource Management.	14
Unit – V	RS & GIS Applications: Remote Sensing and Geographic Information System (GIS) as tools of natural resource analysis and mapping.	10

Suggested Readings:

Hartshorn, T.A. & Alexander, J.W. Economic Geography, 3rd edn., 1994
Boesch, Hans A Geography of World Economy
Fryer, D.W. World Economic Development
Gregor, H.F. Environment and Economic Life: An Economic and Social Geography
Highsmith, R.M.(Jr.) Case Studies in World Geography
Hoffman, L.A. Economic Geography
Zimmerman, E.W. World Resources and Industries, Harper and Row, London,1951
Stringer, A. Davis A Geography of Resources
Zones and Darkenwold Economic Geography
Mccarty & Lindberg An Introduction to Economic Geography
Miller, E.W. A Geography of Manufacturing
Whate, C.L. & Criffin, P.E., Economic Geography
Russel, J. World Population and Food Supplies
Hoover, E.M. The location of Economic Activity
Isard, W. Location and Space Economy
Stuart Mudd The Population Crisis and the Use of the World Resources
Russel Smith Industrial and Commercial Geography
Janaki, V.A. Economic Geography
Guy, Harold Smith Conserving Natural Resources: Principles & Practice
Kates, W. & FireyW,(ed) Man, Mind and Land: A Theory of Resource Use
Zimmerman, E.W. Introduction to World Resources
Singh, K.N. & Singh,J. Arthik Bhoogol Ke Mool Tatwa (in Hindi)
Smith,R.L. Man and his Environment: An Ecosystem Approach, Harper and Row, London, 1972
Strahler, A. Geography and Man's Environment, John Wiley, New York,1977

Programme: Under Graduate in Arts	Year: I	Semester: I Paper : III
Subject: Geography		
Course Code: GEOG703T	**Course Title: Climatology**	
Outcome: The course will provide an understanding of weather phenomena; dynamics of global climates and generation of climatic information and their application.		
Credits: 04	Max. Marks: 25 Internal Assessment 75 Term End Exam.	

Unit	Course Content	No. of Lectures
Unit – I	Nature and Scope of Climatology: Weather and climate, Elements of Climate-Controlling Factors: Composition and Structure of Atmosphere; Insolation; Heating and Cooling of the Atmosphere. Heat Budget and Latitudinal Heat Balance. Adiabatic Processes, Stability and Instability.	10
Uni t – II	Atmospheric Temperature; Factors controlling the temperature; horizontal and vertical distribution of temperature. Inversion of Temperature. Atmospheric Pressure: Vertical and Horizontal Distribution of Pressure: Atmospheric Moisture - forms of Precipitation and types of Rainfall.	14
Unit – III	Winds: Planetary, periodic and local winds (Loo, Mistral, Fohn, and Chinook), factors affecting the winds; General circulation of winds. Origin of the Monsoon and its relation with Jet streams.	12
Unit – IV	Air Masses and Fronts: concepts, classification and properties. Tropical and Temperate cyclones (Polar front theory); Anti-cyclone. Basis of Koppen's classification; Types and characteristics.	14
Unit – V	Climatic changes : Evidences, possible causes; global warming, environmental impacts and society's response	10

Suggested Readings:

Barry R. G. and Carleton A. M., 2001: *Synoptic and Dynamic Climatology*, Routledge, UK.
Barry R. G. and Corley R. J., 1998: *Atmosphere, Weather and Climate*, Routledge, New York.
Critchfield H. J., 1987: *General Climatology*, Prentice-Hall of India, New Delhi.
Lutgens F. K., Tarbuck E. J. and Tasa D., 2009: *The Atmosphere: An Introduction to Meteorology*,Prentice-Hall, Englewood Cliffs, New Jersey.
Oliver J. E. and Hidore J. J., 2002: *Climatology: An Atmospheric Science*, Pearson Education, New Delhi.
Trewartha G. T. and Horne L. H., 1980: *An Introduction to Climate*, McGraw-Hill.
Gupta L S (2000): Jalvayu Vigyan, Hindi MadhyamKaryanvayNidishalya, Delhi Vishwa Vidhyalaya, Delhi.
Lal, D S (2006): Jalvayu Vigyan, Prayag Pustak Bhavan, Allahabad.
Vatal, M (1986): Bhautik Bhugol, Central Book Depot, Allahabad.
Singh, S (2009): Jalvayu Vigyan, PrayagPustak Bhawan, Allahabad

Programme: Under Graduate in Arts	Year: I	Semester: I Paper: IV
Subject: Geography		
Course Code: GEOG704T	**Course Title: SOIL GEOGRAPHY**	
Outcome This course will introduce the students to soil which is one of the important elements of the earth which supports the life system. The overuse and misuse of soil in recent years have resulted in degradation of soil. It will also help the students to appreciate the inherent limitations of soil to a particular managing the soil.		
Credits: 04	Max. Marks: 25 Internal Assessment 75 Term End Exam.	

Unit	Course Contents	No. of Lectures
Unit – I	Conceptual Base: Concept, scope, approaches and significance Soil Geography and its relationship with Pedology; Soil forming factors and profile.	14
Unit – II	Soil Properties & Morphology: Physical, Chemical and biological properties of soils	12
Unit – III	Formation & Capability: Soil Forming Processes; Soil Catena, Land Capability and Land Suitability Classifications.	10
Unit – IV	Soil Classification and Mapping: Genetic Classification of soils; Soil taxonomy: Soils orders and sub-order level; Soil Landscape Mapping.	14
Unit – V	Soil Degradation & Management: Methods of Assessing Soil Erosion; Natural and Anthropogenic Factors of Soil Degradation; Soil Conservation and Management	10

Suggested Readings

Backman, H.O and Brady, N.C.: The Nature and Properties of Soils, Mc Millan New York, 1960.
Bennet, Hugh H.: Soil Conservation, McGraw Hill, New York .
Bunting, B.T.: The Geography of Soils, Hutchinson, London, 1973.
Clarke G.R.: Study of the Soil in the Field, Oxford University Press, Oxford, 1957.
Foth H.D. and Turk, L.M.: Fundamentals of Soil science, John Wiley, New York,1972.
Govinda Rajan, S.V. and Gopala Rao, H.G.: Studies on Soils of India Vikas, New Delhi,1978.
Mc. Bride, M.B.: Environmental Chemistry of Soils, Oxford University Press, New York 1999.
Nye, P.H. and Greene, D.J.: The Soil under Shifting Cultivation Commonwealth Bureau of Soil Science, Technical Communication, No. 51; Harpender, England,1960.
Raychoudhuri, S.P.: Soils of India, ICAR, New Delhi,1958.
Russell, Sir Edward J.: Soil Conditions and Plant Growth, Wiley, New York, 1961.

Programme: Under Graduate in Arts	Year: I	Semester: I Practical
Subject: Geography		
Course Code: GEOG705P	**Course Title: Surveying and Research Methodology**	

Outcome
It will enhance the skill of the students in the field of survey for the understanding of the map making using Dumpy Level and Theodolite. It will also make familiar with the research methodology.

Credits: 04	Max. Marks: 100 (Evaluation will be made by both Internal and external Examiners) Internal Assessment : 25 (10-Viva Voce + 10-Record Book + 5-Attendance) Term End Exam : 75 (Theory and Practical)

Unit	Course Contents	No. of Lectures
Part A: Surveying		
Unit – I	Dumpy level: Rise and Fall Method	09
Unit – II	Theodolite – horizontal and vertical (height) measurement	09
Part B: Research Methodology		
Unit – III	Preparation of research design: Definition and Types of Research. Statement of the Problem, literature review (at least ten nos.), formulation of objectives, hypotheses, methodology, design and references.	12
Unit – IV	Tools and techniques of data collection, construction of survey schedule, types of sampling, secondary sources of data; Final report writing	10
Unit-V	Formulation of research proposal for at least five different research problems covering: i) physical, ii) resource assessment / appraisal / management, iii) socio – economic, iv) cultural v) environmental, vi) demographical, vii) regional development, viii) settlement, ix) agricultural, x) watershed management, xi) any other related problems.	10

Suggested Readings

Clendinning , J. Principles and use of Surveying Instruments. 2nd edition, Blockie.A 1958.
Hotine, Major M. The re-triangulation of Great Britain. Empire survey review 1935.
Mitra,R.P. and Ramesh A : Fundamentals of Cartography Revised Edition, Concept, Publication, New Delhi.
Monkhouse Maps and diagrams Methuen 1971.
Negi, Balbir Singh. Practical Geography Third revised Ed. Kedar Nath and Ram Nath, Meerut &Delhi, 1994-95.
Sandover,J.A. Plane Surveying. Arnold 1961.
Singh & Karanjta Map work and Practical Geography Central Book Dept Allahabad,1972.
Singh, R.L.and Dutt, P.K. Elements of Practical Geography, Students Friends, Allahabad, 1968.

Research Project

Programme: Under Graduate in Arts	Year: I	Semester: I Research Project
Subject: Geography		
Course Code: GEOG706Pr	**Course Title: Research Project**	
Outcome To learn how to select a Research Proposal based on research gap found during the literature survey or field observations made. Preparation of synopsis/outline will be also learned. Finally will learn how to collect data and write a report based on the data analysis		
Credits: 04	Max. Marks: 100 (Evaluation by External & Internal Examiner) Dissertation: 75 Internal Assessment: Viva Voce + Attendance: 25 (20+5)	
The students will be required to select a topic and area of interest with the help of their respective supervisors allotted to them by the Department. Research Project dissertation must be submitted to the Department one week before the commencement of the Theory Examinations. The size of the Dissertation normally ranges between 60 and 70 pages. The Research Project Dissertation will be evaluated by the external and internal examiners.		

Programme: Under Graduate in Arts	Year: I	Semester: I / II
Subject: Geography		
Course Code (Minor): GEOG707T	**Course Title: Climate Change and Adaptation**	

Outcome
This course will introduce the students to climate which is one of the important elements and supports the life system. Over a time period there is change in the climatic conditions for which human has to learn to adapt with new situation. This course will highlight the characteristics of climate change and adaptation.

Credits: 04	Max. Marks: 25 Internal Assessment 75 Term End Exam.

Unit	Course Contents	No. of Lectures
Unit – I	Atmosphere Composition of Earth's atmosphere, layering of atmosphere, solar and terrestrial radiation, variation with latitudes and seasons, inversion of temperature. Atmospheric pressure and winds, Pressure belts and winds, local winds and Jet streams.	14
Unit – II	Climate and Weather Definition of weather and climate, meteorology and climatology, Koeppen classification system climate change, Geological time scale, ice ages.	12
Unit – III	Greenhouse gases and Global warming Greenhouse gases and its sources, Global warming and Greenhouse gases policy issue, Effects and causes of global warming.	10
Unit – IV	Human ecology of climate change Anthropogenic activities responsible for climate change: Source activities (Burning of fossil fuel, Industrial activity, Urbanization, Agriculture, transportation), Environment and human health risk. Climate change and food security, History of IPCC and climate change convention	14
Unit – V	Climate Change and Adaptation Types of adaptation (Anticipator, reactive, human, natural), Methods of adaptation: Vulnerability and resilience: Concept, definition, methodology Sector –wise adaptation strategy (agriculture, forests, water resources, coastal resources, fisheries, human health), adaptation potential and challenges	10

Suggested Readings

J. Oliver and J. Hidore (2001): Climatology-An Atmospheric Science (second edition).
M. Maslin (2004): Global Warming- A very short introduction, Oxford publication.
L.D. Danny Harvey Climate and Global Environmental Change , Prentice Hall publication
S.K.Das Climate Change- An Indian Perspective , Foundation books
Mark Maslin Global Warming- A very short introduction by, Oxford publication
John Oliver & John Hidore Climatology-An Atmospheric Science (second edition) Indian edition
John Theodore Houghton Global Warming: the complete briefing
Jonathan Cowiea Climate change: Biological and Human aspects. Climate change policy
John T. Hardy Climate change: Causes, Effects and Solutions. Willey publication
Konrad Soyez and Hartmut Grabi, Climate change and technological options: basic facts, evaluation and practical solutions by SpringerWien New York publication
Joel B. Smith, Richard J. T. Klein, SaleemulHuq Climate change, adaptive capacity and development, Potsdam-InstitutfürKlimafolgenforschung
SaleemulHuq, Atiq Rahman Mainstreaming Adaptation to Climate Change in Least Developed Countries (Ldcs), International Institute for Environment and Development
P.R Shukla, Subodh Sharma, N.H. Ravindranath , Amit Garg and Sumana Bhattacharya, Climate Change and India: Vulnerability Assessment and Adaptation
Technologies, policies and measures for mitigating climate change- IPCC Technical paper I
Anil Markandya, Kirsten Halsnaes, Climate change and sustainable development By
Farhana Yamin Climate change and carbon markets - A Handbook of emission reduction mechanisms
Barry R. G. and Carleton A. M., 2001: Synoptic and Dynamic Climatology, Routledge, UK.
Barry R. G. and Corley R. J., 1998: Atmosphere, Weather and Climate, Routledge, New York.
Critchfield H. J., 1987: General Climatology, Prentice-Hall of India, New Delhi.
Lutgens F. K., Tarbuck E. J. and Tasa D., 2009: The Atmosphere: An Introduction to Meteorology,Prentice-Hall, Englewood Cliffs, New Jersey.
Oliver J. E. and Hidore J. J., 2002: Climatology: An Atmospheric Science, Pearson Education, New Delhi.
Trewartha G. T. and Horne L. H., 1980: An Introduction to Climate, McGraw-Hill.
Gupta L S (2000): Jalvayu Vigyan, Hindi MadhyamKaryanvayNidishalya, Delhi Vishwa Vidhyalaya, Delhi.
Lal, D S (2006): Jalvayu Vigyan, Prayag Pustak Bhavan, Allahabad

First Year
Second Semester

Programme: Under Graduate in Arts	**Year: I**	**Semester: II** **Paper-I**
	Subject: Geography	
Course Code: GEOG801T	**Course Title: Social and Cultural Geography**	
Outcome; It will make familiar with the basic concepts and development of Social and Cultural Geography. Student will understand the Social Identities and Social Issues in India and the processes in Cultural Geography		
Credits: 04	Max. Marks: 25 Internal Assessment 75 Term End Exam.	

Unit	Course Content	No. of Lectures
Unit – I	Basic Concept: Definition, scope, and significance , Evolution and Development, Place of Cultural and Social Geography within Geography; Cultural Region; Cultural Landscape and Environment.	10
Uni t – II	PROCESSES: Cultural Landscape Evolution; Cultural Diffusion; Adaptation; Acculturation; Assimilation; and Resistance/ Cultural Resilience.	10
Unit – III	Socio-cultural Diversity: Ethnic/tribal Groups and their Spatial Distribution, Components of social diversity; tribes and their distribution; Tribal region; Cultural regions: elements of cultural regionalization: race, caste, dance, music, cuisine, costumes, dialect, language, religion.	14
Unit – IV	Races and Culture Concept of race. Basis of racial classification and their physical characteristics. Races of India. Griffith Taylor and C.S. Coon's Theories of distribution of races of mankind in the world. Concept of culture, culture areas and culture regions, Cultural hearths and their diffusion, World Culture Realms	14
Unit – V	Socio-cultural Diversity Concept of Dialects and ethnicity. Distribution of Religion, Caste, Tribe, Languages in India. Concept of social areas, North-South Socio-Cultural diversity of India, Processes of Social changes: Modernization, Sanskritization and Globalization	12

Suggested Readings

Ahmad, A. (2012). Social Geography of India. Concept Publishing Company, New Delhi.
Maurya, S. D. (2011). Samajik Bhugol. Sharda Pushtak Bhawan, Allahabad.
Anderson, Jon. (2010). Understanding Cultural Geography Places and Traces. Routledge, London.
Vincent J. Del Casino, (2009). Social Geography- Critical Introduction to Geography. Wiley-Blackwell. Johnston, R. J., Gregory, D., et.al. (eds.). (2005). The Dictionary of Human Geography, Blackwell Publishing. Anderson, K. Domosh, M., Pile, S. & Thrift, N. (eds.). (2003). Handbook of Cultural Geography.,Sage Publications, London.
Ahmed, A. (1999). Social Geography. Rawat publications, Jaipur.
Massey, D. (1994). Space, Place and Gender. Polity Press, Cambridge.
Singh, K.S. (1993). People of India Vol I to **XI**. Oxford University Press, New Delhi.
Raza, M. and Ahmed, A. 1990. An Atlas of Tribal India**.** Concept Publishing Co, Delhi.
Sopher, D. (ed.). (1980). An Exploration of India: Geographical Perspectives on Society and Culture . Cornell Press, New York.
Jones, E. and Eyles, J. (1977). Introduction to Social Geography. Oxford University Press.
Knox, P.L. (1975). Social Well –being: A Spatial Perspective. Oxford, London.
Panikkar, K.M. (1959). Geographical Factors in Indian History. Bharatiya Vidya Bhavan, Bombay.
Subba Rao, B. (1958). Personality of India. MS University Press, Baroda.

Programme: Under Graduate in Arts	Year:I	Semester: II Paper-II
Subject: Geography		
Course Code: GEOG802T	**Course Title: Environmental Management and Sustainable Development**	
Outcome This course will make to understand the physical and social environment of an area. It will also create the awareness about the sustainable management of deteriorating environment particularly with reference the Uttarakhand Himalaya.		
Credits: 04	Max. Marks: 25 Internal Assessment 75 Term End Exam.	

Unit	Course Content	No. of Lectures
Unit – I	Conceptual Base: Environment: Concepts and Types; Environmental Perception; Environment and Society; Meaning, Scope and Significance of Environmental Geography; Approaches to the Study of Environmental Geography.	12
Uni t – II	Environmental Problems: Types of environmental problems; causes and consequences of environmental problems at global regional and local levels; Global environmental change; Natural disasters; Environmental Impact Assessment (EIA).	14
Unit – III	Sustainable Development: Concepts of Sustainable Development; Need of Sustainable Development; Sustainable Mountain Agriculture and Livelihood.	10
Unit – IV	Environmental Management: Concept of Environmental Management; Approaches to Environmental Management; Integrated Watershed Management; Disaster Management	12
Unit – V	Environmental Management in Uttarakhand Himalaya: Environmental Changes – Causes & Consequences; Environmental Planning & Sustainable Development; Disaster Management; Climate, Change and Adaptation	12

Suggested Readings:

Ahmad,Y.J., G.K. Sammy (1985): Guidelines to EIA in Developing Countries.Hordder & Stoughton, London.

Brundland, G. (1988) Our Common Future, Report of the World Commission on Environment and Development, UN.

Carpenter R A (ed) (1983): Natural Systems for Development: what planners need to known Mc. Millan London.

Cheremisinoff, P.N. & A.C. Morresi (1977): Environment Assessment and Impact studies Handbook. An Arbor, Mich: Anarbor Science.

Wathern, Peter (1986): Enviromental Impact Assessment: Theory and Practice. Unwin & Hyman, London.

Pande G.C. & D.C. Pandey (1999) : Environmental Development and Management: Strategies and Policies (ed.), New Delhi.

Programme: Under Graduate in Arts	Year:I	Semester: II Paper-III
Subject: Geography		
Course Code: GEOG803T	**Course Title: Remote Sensing**	
Outcome It will provide an introduction to the basic principles of Remote Sensing. Students will acquire the methods of visual and digital interpretations of satellite data. Finally, it will make familiar with the application of remote sensing technique in resource mapping.		
Credits: 04	Max. Marks: 25 Internal Assessment 75 Term End Exam.	

Unit	Course Content	No. of Lectures
Unit – I	Bases of Remote Sensing: Definition, interaction of Electro-Magnetic Radiation (EMR) with Atmosphere and Earth surface. Sensors and remote sensing data products.	14
Uni t – II	Aerial Photographs and Photogrammetry: Types of aerial photos, fundamentals of air photographs interpretation. Geometry of aerial photographs: tilt and relief displacement.	10
Unit – III	Thermal and Microwave Remote Sensing: Types; Characteristics; utilization in Geographical studies	10
Unit – IV	Digital Image Processing: Restoration; Enhancement and Classification: supervised and unsupervised	14
Unit – V	Remote Sensing Applications: Application of Remote Sensing in terrain evaluation, land use and forest resource inventory.	12

Suggested Readings

Lillesand, T.M. & Kiefer,R.W. Remote Sensing and Image interpretation, Jhon Wiley & Sons, New York,1987.
Wolf, P.R. Elements of Photogrammetry, McGraw Hill, New York, 1983.
Smith,H.T.V. Aerial Photographs and their Applications, Appleton Century Crafts, New York,1943.

Lindren, D.T 1980. Landuse Planning and Remote Sensing, Niyheff, Dordrecht, 1985
Siogal,B.S. and A.R.Gsllespio (eds.) Remote Sensing in Geology, Wiley, New York,
Sprurr, S.H. Photogrammetry and Photo-Interpretation,Ronald Press, New York,1960
Avery, T.E.&Berlon,G.L. Interpretation of Aerial Photographs Burgess Minneapolies, 1985
Moffott.F.H. & Mikhail Photogrammetry, Harpor & Row, New York,1980
Stimson,A. Photometry and Radiometry for Engineers,Wiley, New York, 1974
Sabins, F.F.Jr. Remote Sensing Principles and Interpretation, Freeman, New York,1986
Basces, G.A. Digital Image Processing for Remote Sensing, Prentice Hall, 1984
Ekstrom, M.I. Digital Image Processing Techniques, Academic Press, New York,1984
Tomar, M.S. & M.R.Moslekar Aerial Photographs in Landuse and Forest Surveys, Jugal Kishor & Co.,Dehradun,1974
Curran, Paul J. Principle of Remote Sensing ,Longman Group,1985
Barrett,E.C. and L.F.Curties Photo Interpretation ,Mcmillan, New York,1982
Compbell, J. Introdution to Remote Sensing, Guilford, New York,1989
Hord. R.M. Digital Image Processing of Remotely Sensed Data Academic, New York
Luder, D. Aerial Photography Interpretation:Principles and Application, Mcgraw Hill, New York,1959
Pratt,W.K. Digital Image Processing Wiley, New York,1978
Rao,D.P.(eds.) Remote Sensing for Earth Resources, Association of Exploration Geophysicist, Hyderabad,1998

Programme: Under Graduate in Arts	Year: I	Semester: II Paper- IV
Subject: Geography		
Course Code: GEOG804T	**Course Title: GIS AND GPS Applications**	
Outcome It will introduce Geographic Information System (GIS) and Global Positioning System (GPS) as a tool of spatial science and will make understand the basic elements of GIS and GPS. Finally, with some examples the application of these tools will be known.		
Credits: 04	Max. Marks: 25 Internal Assessment 75 Term End Exam.	

Unit	Course Content	No. of Lectures
Unit – I	Geography and Geographical Information System: Geography as a spatial science; Basic concepts of GIS; Components & Elements of GIS. Map Characteristics: Geo-referencing, Scale, Map Resolution; Map Projections, Data Automation; Types of Information in a Digital Map; Attribute Information; Display Information; Layering.	14
Uni t – II	Geographical Data Sets: Geographic Data Types; Spatial and Non-spatial data; Linkages and Matching, Principal Functions of GIS; Data Capture; Geographic Analysis; Scanning System; Data Conversion; Data Base and Spatial Data Management; Geo-Relational Data Model; Topological Data Structure; Attribute Data Management; Relational Database - Concepts & Model.	12
Unit – III	Global Positioning System: Basic Concepts; GPS - Components and Basic Facts; Components of a GPS; GPS Positioning Types; Accuracy of GPS; Reference station; GPS Applications.	14
Unit – IV	GPS Applications: Application of GPS in resource mapping, Map Updating, Cadastral Mapping, Micro Level Surveying etc.	10
Unit – V	GIS Applications: Application of GIS in Geographical studies with special reference Natural Resource Management, Urban Management, Environmental Management, Agricultural Planning, Emergency Response System and Decision Support System.	10

Suggested Readings

Aroneff, S. Geographic Information System: A Management Perspective, DDL Publication, Otawa, 1989

Burrough,P.A. Principles of Geographic Information System for Land Resources Assessment, Oxford University Press, New York, 1986

Fraser Taylor, D.R. Geographic Information System, Pergamon Press Oxford, 1991

Maquire, D.J.M.F. Goodchild Geographic information Systems: Principles and Application, Taylor & Francis, Washngton,1991

Mark S. Monmonier Computer-assisted Cartography- prentice Hall, Englewood Cliff, New Jersey

Peuquet D.J. & D.F.Marble Introductory Reading in Geographic Information System, Taylor & Francies, Washngton, 1990

Star J. and J.E. Estes Geographic Information Sytems : An Introduction: Prentice Hall, Engleweed Cliff, New Jersey,1994

Programme: Under Graduate in Arts	Year: I	Semester: II Practical

Subject: Geography

Course Code: GEOG805P	Course Title: Satellite Data Interpretation and GIS Mapping

Outcome
After completing this course, student is expected:
To understand aerial photographs & Satellite Data and elements of image interpretation.
To known about various sources of remote sensing data acquisition.
To learn a few techniques of digital data interpretation.
To have some exposure of GIS technique

Credits: 04	Max. Marks: 100 (Evaluation will be made by both Internal and external Examiners) Internal Assessment : 25 (10-Viva Voce + 10-Record Book + 5-Attendance) Term End Exam : 75 (Theory and Practical).

Unit	Course Content	No. of Lectures
Unit – I	Base Map Preparation	10
Uni t – II	Visual interpretation of Aerial Photograph and Satellite Data	12
Unit – III	Satellite Data and False Colour composite (FCC). Image Enhancement: Linear Contrast Stretch and Non-Linear Contrast Stretch, Spatial Filtering, Digital Image Classification: Supervised and Unsupervised Classification	14
Unit – IV	Delineation of drainage basin, Map layout Preparation	12
Unit – V	Map Overlay analysis and buffer zone delineation	12

Suggested Readings:

Kumar, D.; Singh, R.B. and Kaur, R. (2019). Spatial Information Technology for Sustainable Development Goals. Springer Nature, Switzerland.

Peter, J.G.,Teunissen and Oliver, M. (Eds.) (2019). Springer Handbook of Global NavigationSatellite Systems. Springer Nature, Switzerland:

Gupta, R.P. (2018). Remote Sensing Geology (3rd Edition). Springer Nature, Switzerland.

Kron, G. (2017). Global Navigation Satellite Systems: Signal, Theory & Applications. Wilmington: Scitus Academics.

Chuveico, E. (2016). Fundamentals of Satellite Remote Sensing — An Environmental Approach (2 nd Edition). CRC Press, Roca Raton.

Chaunial, D.D. (2016). Principles of Remote Sensing and Geographical Information System (In Hindi), Sharda Pustak Bhawan, Allahabad.

Scott, M. (2015). Global Navigation Satellite Systems and Their Applications. Springer, New York.

Heywood, I.; Cornelius, S. and Carver, S. (2011). An Introduction to Geographic Information Systems (4 th Edition). Pearson Education, New Delhi.

Longley, P.A.; Goodchild, M.; Maguire, D.J. and Rhind, D.W. (2010). Geographic Information Systems and Science (3rd Edition). John Wiley, New Jersey:

DeMers, M. (2009). Fundamentals of Geographic Information Systems (4th Edition). John Wiley,New Jersey.

Sabins, F.F. (2007). Remote Sensing: Principles and Interpretation (3rd Edition). Waveland Press, Long Grove.

Chang, K-t. (2006). Introduction to Geographic Information Systems. Tata McGraw Hills, New Delhi.

Lillesand, T.M.; Kiefer, R.W. and Chipman, J.W. (2004). Remote Sensing and Image Interpretation (5th Edition). John Wiley India, New Delhi.

Joseph, George (2003). Fundamental of Remote Sensing, University's Press (India) Pvt. Ltd.,Hyderabad.

Burrough, P.A. and McDonnell, R.A. (1998). Principles of Geographic Information Systems.Oxford University Press, Oxford

Research Project

Programme: Under Graduate in Arts	Year: I	Semester: II Research Project
Subject: Geography		
Course Code: GEOG806Pr	**Course Title: Research Project**	
Outcome To learn how to select a Research Proposal based on research gap found during the literature survey or field observations made. Preparation of synopsis/outline will be also learned. Finally will learn how to collect data and write a report based on the data analysis		
Credits: 04	Max. Marks: 100 (Evaluation by External & Internal Examiners) Dissertation: 75 Internal Assessment: Viva Voce + Attendance: 25 (20+5)	
The students will be required to select a topic and area of interest with the help of their respective supervisors allotted to them by the Department. Research Project dissertation must be submitted to the Department one week before the commencement of the Theory Examinations. The size of the Dissertation normally ranges between 60 and 70 pages. The Research Project Dissertation will be evaluated by the external and internal examiners.		

Second Year
Third Semester

Programme: Post Graduate in Arts/Science	**Year: II**	**Semester: III** **Paper-I**
Subject: Geography		
Course Code: GEOG901T	**Course Title: Disaster Management**	
Course Outcome This course will develop the skill of understanding about natural calamities and disaster and, also realize the consequences as well as preparedness. It will also give an exposure about the natural and manmade disasters of Uttarakhand		
Credits: 04	Max. Marks: 25 Internal Assessment 75 Term End Exam.	

Unit	Course Content	No. of Lectures
Unit – I	Fundamentals of Disaster Management: The significance of disaster, Disaster threat, National disaster management policy, Major requirements for coping with disaster, Disaster and disaster management cycle,	12
Uni t – II	Long term Measures: Prevention, Mitigation, Preparedness, Disaster and development, Disaster legislature, Counter disaster resources, Disaster management plans, Utilization of resources.	12
Unit – III	Response to Disaster Impact: Response; Search, Rescue and Evacuation, Logistic; Incident command system.	10
Unit – IV	Major Post impact Factors: Recovery, Post disaster review and damage assessment, Relief, Rehabilitation and Restructuring	12
Unit – V	Regional Pattern of Disaster Management: International disaster assistance, Leadership in disaster, Organization, Disaster scenario of Uttarakhand, Disaster management system in Uttarakhand.	14

Suggested Reading

Bhargava, Gopal (1992): Environmental Challenges and Ecological Disaster, Mittal Publication, New Delhi

Kapur, A. (2010) Vulnerable India: A Geographical Study of Disasters, Sage Pub. New Delhi,

Muhammad Z Mamun and A T M Nurul Amin, Densification: A Strategic Plan to Mitigate River bank Erosion Disaster in Bangladesh, The University Press Limited (UPL), 1999 .

Sahni, Pardeep et.al. (eds.) 2002, Disaster Mitigation Experiences and Reflections, Prentice Hall of India, New Delhi.

Modh, S. (2010) Managing Natural Disaster: Hydrological, Marine and Geological Disasters, Macmillan, Delhi.

Singh, R.B. (2005) Risk Assessment and Vulnerability Analysis, IGNOU, New Delhi.

Singh, R. B. (ed.), (2006) Natural Hazards and Disaster Management: Vulnerability and Mitigation, Rawat Publications, New Delhi

Government of India. (1997) Vulnerability Atlas of India. New Delhi, Building Materials & Technology Promotion Council, Ministry of Urban Development, Government of India

Feilden, B. 1987, "Between Two Earthquakes; Cultural Property in Seismic Zones", ICCROM and Getty Conservation Institute, Online Bibliography for Museum Emergency Programme; http://gcibibs.getty.edu/asp/ accessed on 25 August 2008

Stovel, H. 1998, "Risk Preparedness: A Management Manual for World Cultural Heritage", Rome, ICCROM

Jigyasu, R. & Masuda, K. 2005, "Proceedings; Cultural Heritage Risk Management", World Conference on Disaster Reduction Kyoto; Research Center for Disaster Mitigation of Urban Cultural Heritage, Ritsumeikan; Kyoto, Japan

Menegazzi, C. 2004, "Cultural Heritage Disaster Preparedness and Response", Proceedings of the International Symposium held at Salar Jung Museum, Hyderabad, India, 23-27 November 2003, ICOM Paris http://icom.museum/disaster_preparedness_book/copyright.pdf accessed on 15 August 2008

Spenneman, D. & Look, D. (eds.) 1998, "Disaster Management Programs for Historic Sites", US National Park Service, Western Chapter of the Association of Preservation Technology, California and the Johnstone Centre, Charles Sturt University, Albery, Proceedings of a Symposium organized by the U.S. National Park Service, Western Regional Office, San Francisco, in collaboration with the Western Chapter of the Association for Preservation Technology, and held on 27-29 June, 1997 in San Francisco

UNESCO-WHC 1983, "Desirability of adopting an international instrument on the Protection of the cultural heritage against natural disasters and their consequences", Report of the Director General; http://unesdoc.unesco.org/images/0005/000560/056088eo.pdf accessed on 15 August 2008

UNESCO-WHC 2008, "Policy Document on the Impacts of Climate Change on World Heritage Properties", UNESCO Paris document/ "Case Studies on Climate Change and World Heritage", 2007, UNESCO: Paris http://unesdoc.unesco.org/images/0015/001506/150600e.pdf

Michalski S. 2004, "Care and Preservation of Collections", in Running a Museum, A Practical Handbook (ed. P. Boylan), ICOM, Paris. p. 51 - 91

Waller R. 2003, Canadian Museum of Nature", Gutenberg Studies in Conservation 13, Gutenberg Act Universitatis Gothoburgensis.

Programme: Post Graduate in Arts/Science	Year: II	Semester: III Paper-II
Subject: Geography		
Course Code: GEOG902T	**Course Title: Integrated Watershed Management**	
Course Outcome It will impart the knowledge about the significance of the watershed as an important unit for the planning and implementation of the developmental programme.		
Credits: 04	Max. Marks: 25 Internal Assessment 75 Term End Exam.	

Unit	Course Content	No. of Lectures
Unit – I	Conceptual Base: Concept, Scope and Significance: Approaches of Watershed Management, Drainage of Watershed Management.	10
Uni t – II	Ecosystem and Energy Environment: Land Use Pattern, Natural Resource appraisal and Development, Ecological Processes and Ecosystem: Agro-Ecosystem, forest Ecosystem, River Ecosystem and Hydrological Cycle; Energy Analysis and Energy Budget of the Watershed.	14
Unit – III	Environmental Status and Hazards: Environmental Health Status: Physical properties (Viz, Temperature, Rainfall, Soil etc.) and Human Habitat of the Watershed; Impact of Environmental and Anthropogenic Interferences on the Status and Quality of the Watershed; Major Natural Hazards: Landslides, Erosion, Floods, Droughts, Sedimentation, Disruption of Hydrological Cycle etc.	14
Unit – IV	Functioning of Ecosystem: Impact of Agriculture, Mining and Quarrying, Deforestation, Livestock, Frequent Construction of Roads on Ecosystems Functioning of Watershed with particular reference to Uttarakhand Himalaya; Environmental Impact Assessment (EIA).	12
Unit – V	Watershed Management: Watershed Management: Techniques and Methods, Land and Soil Conservation, Run-off Control, Sustainable Environment Management Plan for Local Resources.	10

Suggested Readings

C.S.E.; The State of India's Environment-Citizens Report, Centre for Science and Environment. (CSF), New Delhi, 1982

Valdiya, K.S.; Environmental Geology: Indian Cntext, T.M.H.,New Delhi, 1987.

Dassman, R.F.; Environmental Conservation, John Wiley & Sons, New York,1976 Edington, J.M. & Edington.M.A.; Ecology and environmental Planning, Chapman and Hall, London, 1977

Harvey, B. and Hallet, J.D.; Introductory Analysis, Macmillan, London,1977

Thomas, W.L.(ed.); Man's role in changing the Face of the Earth, University of Chicago Press, Chicago, 1956

Simmons, I.G.,The Ecology of Natural Resources, Edward Arnold, London, 1974

Whittaker, R.H.;Communities and Ecosystems ,2nd Edn. Collier-Macmillan, London, 1975

Singh, L.R. et.al.(eds.); Environmental Management, Allahabad Geographical Society, Dept. of Geography, University of Allahabad, 1983

Singh, Savindra; Environmental Geography, Allahabad, 1991(both in English & Hindi) latest edn.

Optional - I Physical Geography Stream

(Out of Two Optional streams student has to choose one optional stream of his/her choice. Each stream includes two papers)

Programme: Post Graduate in Arts/Science	**Year: II**	**Semester: III** **Paper III (Physical Geography Stream)**
Subject: Geography		
Course Code: GEOG903T (Physical Geography Stream)	**Course Title Fluvial Geomorphology**	
It will provide an understanding of the fluvial forms and processes. This course also will make familiar with the evolution of drainage pattern hydraulic geometry and sediment load of river.		
Credits: 04	Max. Marks: 25 Internal Assessment 75 Term End Exam.	

Unit	Course Content	No. of Lectures
Unit – I	Fluvial Geomorphology and Geography; hydrological cycle and subcycle; drainage pattern evolution; limits of drainage development; channel changes with time.	10
Unit – II	Fundamentals of river mechanics: - types of flow and flow discrimination; forces acting in channels; Low regimes; sediment load of streams. sediment transport; competent velocity; lift force; critical tractive force	12
Unit – III	Hydraulic geometry of streams at a station and down-stream; channel thalweg; causes of concavity; channel patterns, equilibrium profile - straight, meandering and braided.	12
Unit – IV	Drainage basin as a fundamental geomorphic unit. Drainage basin - form and process; drainage basin morphometry; morphometric interrelations.	12
Unit – V	Applied fluvial geomorphology; human adjustment to flood plain, alluvial fans and deltaic environments (case studies). Effects of reservoirs on fluvial systems. Remote sensing and GIS application to fluvial environments.	14

Suggested Readings

Chorley R.J. (ed) Introduction of Fluvial Processes Methuen & Co., London, 1973.

Coates D.R. and Vitek J.I. Thresholds in Geomorphology. George Allen Unwin, London 1980.

Gregory K.J. River Channel Changes' John Wiley & Sons, New York, 1977.

Gregory K.J. and Walling, D.E.: Drainage Basin: Forms and Process- A Geomorphological Approach. John Wiley & Sons, New York, 1985.

Kingston D. Fluvial Forms and Processes Edward Arnold, London, 1984.

Leopold C.B. et.al.: Fluvial Processes in Geomorphology; Freeman, London 1964.

Morisawa M.(ed.) Fluvial Geomorphology. George Allen & Unwin, 1981.

Gleick, P.H. (ed.): Water in Crisis Oxford University Press, New York 1993.

Morisawa M: Streams - Their Dynamics and Morphology' McGraw Hill, New York,1968.

Programme: Post Graduate in Arts/Science	Year: II	Semester: III Paper IV (Physical Geography Stream)
Subject: Geography		
Course Code: GEOG904T (Physical Geography Stream)		**Course Title: Hydrology**
Outcome Water is an integral part of all living things in the world. Hence it is necessary to make the students to understand the significance of a systematic study on fresh water resources and occurrence, flow, storage and utilization.		
Credits: 04		Max. Marks: 25 Internal Assessment 75 Term End Exam.

Unit	Course Content	No. of Lectures
Unit – I	**Conceptual Base:** Concepts and scope of hydrology, Elements of hydrological cycle: precipitation - intensity and duration; evaporation; infiltration, surface runoff, Man's interference on hydrological cycle	10
Unit – II	**Underground Hydrosphere:** Hydrological properties of rocks. Structure of the underground hydrosphere - Vadose and phreatic Zones, Types of aquifer, Underground water classification, Recharge and discharge of ground water.	12
Unit – III	**Ground Water Movements and Drainage Basin Characteristics** Hydraulic conductivity, Darcy's law, Porosity, Permeability, Transmissibility, Drainage basin characteristics : human impact on hydrological system , morphometric analysis	12
Unit – IV	**Flow Measurements and Hydrograph:** Channel flow measurement, Hydrograph analysis; Water quality , Surface water resources of India.	12
Unit – V	**Application of Remote Sensing and Water Management:** Principles of water balance and their application - its relevance in crop geography; water pollution, need for water management; Application of remote sensing in hydrological studies.	14

Suggested Readings

Chorley, R.J. (ed.) (1969): Water Earth and Man, Methuen, London.

Dakshinamurthy, et.al. (1973) : Water, Resources of India and Their Utilization in Agriculture, IARI, New Delhi.

Govt. of India, Ministry of Agriculture (1972), Report of the Irrigation Commission,Vol. 1 to IV, New Delhi.

Govt. of India, Ministry of Agriculture (1974), Report of National Commission on Agriculture, Parts IV &V, New Delhi.

Govt. of India, Ministry of Energy and Irrigation (Dept. of Irrigation, 91980),Rashtriya Barh Ayog, Report- National Commission on Floods, Vol. I & II.

Gregory, K.J. and Walling De (1973)) : Drainage Basin Form and Processes,Edward Arnold, London.

Jackson, P.J. (1977) : Climate, Water and Agriculture in the Tropics, London.

Law, B.C. (ed.) (1968) : Mountains and Rivers of India, 21, G.C. National Committee for Geography, Calcutta.

Linslay, R.K. et.al. (1958) : Hydrology for Engineers, Mc Graw Hill.

Rao, K.L. : India's Water Wealth, Orient Longman.

David Knighton (1984) : Fluvial Forms and Processes, Edward Arnold, London

Jones, J.A.A : Global Hydrology: Processes, Resources and Environmental Management, Longman, London,1997.

Matter , J.R., Water Resources. Distribution, Use and Management, John Wiley, Marylane,1984.

Singh, R.A. and Singh, S.R.: Water Management: Principles and Practices. Tara Publication, Varanasi, 1972.

Todd, D.K.: Ground Water Hydrology, John Wiley, New York,1959.

Optional - II Human Geography Stream

(Out of Two Optional streams student has to choose one optional stream of his/her choice. Each stream includes two papers)

Programme: Post Graduate in Arts/Science	**Year: II**	**Semester: III** **Paper-III**
Subject: Geography		
Course Code: GEOG905T (Human Geography Stream)		**Course Title: URBAN GEOGRAPHY**
Outcome Students will understand the process of urbanization, origin, growth and classification of Urban Settlements with relevant theories and models. Finally will have an exposure to examine the contemporary urban issues and suggest new urban planning and urban policy.		
Credits: 04		Max. Marks: 25 Internal Assessment 75 Term End Exam.

Unit	Course Content	No. of Lectures
Unit – I	Nature and scope of urban geography, different approaches and recent trends in urban geography; attributes of urban places during ancient, medieval and modern period; origin and growth of urban settlements: bases and process of urbanization and development; classification of urban settlements on the basis of size and function; urban systems: Urban growth and theories. Central Place Theory of Christaller and Losch; contributions of Indian scholars to the studies of urban settlements	14
Uni t – II	Urban economic base: Basic and non-basic functions, input-output models, concept of dualism; colonial and postcolonial structure, metropolitan city and changing urban function; role of informal sector in urban economy.	10
Unit – III	Organization of urban space: urban morphology and landuse structure: city core, commercial, industrial and residential areas; cores-country variations; city-region relations, modern urban landscape;. morphology of urban settlements and its comparison with western urban settlements; urban expansion, umland and periphery	12
Unit – IV	Contemporary urban issues: urban poverty, urban renewal, urban sprawl, slums; transportation, housing, urban infrastructure; urban finance; environmental pollution: air, water, noise, solid waste, urban crime, issues of environmental health.	12
Unit – V	Urban policy and planning: development of small and medium sized towns, planning for new wards, city planning, green belts, garden cities, urban policy; contemporary issues in urban planning; globalization and urban planning in the Third World, urban landuse planning, Concept of Smart cities.	12

Suggested Readings

Alam, S.M.: Hyderabad - Secunderabad Twin Cities Asia Publishing House, Bombay, 1964.
Berry, B.J.L. and Horton F.F. Geographic Perspectives on Urban Systems, Prentice Hall, Englewood Cliffs, New Jersey, 1970.
Carter: The Study of Urban Geography, Edward Arnold Publishers, London, 1972.
Chorley, R.J.O., Haggett P. (ed.) : Models in Geography, Methuen, London, 1966.
Dickinson, R.E.: City and Region, Routledge, London, 1964
Dwyer, D.J. (ed.) The City as a Centre of Change in Asia, University of Hong Kong Press, Hongkong, 1971.
Gibbs J.P.: Urban Research Methods D. Van Nostrand Co. Inc. Princeton, New Jersey, 1961.
Hall P. : Urban and Regional Planning, Routledge, London, 1992.
Hauser, Philip M. and Schnore Leo F. (ed.) : The Study of Urbanisation, Wiley, New York, 1965.
James, P.E. and Jones C.F. (eds.) : American Geography, Inventory and Prospect, Syracuse University Press, Syracuse, 1954.
Kundu, A. : Urban Development and Urban Research in India, Khanna Publication, 1992.
Meyor, H.M. Kohn C.F. (eds.) : Readings in Urban Geography, University of Chicago Press, Chicago, 1955.
Mumford, L : Culture of Cities, McMillan & Co., London, 1958.
Nangia, Sudesh Delhi Metropolitan Region: A study in settlement geography, Rajesh Publication, 1976.
Rao V.L.S.P. : Urbanisation in India: Spaial Dimensions. Concept Publishing Co. New Delhi Concept, New Delhi.
Rao VL.S.P.: The Structure of an Indian Metropolis: A study of Bangalore Allied Publishers Bangalore,1979.
Singh K and Steinberg F. (eds.) : Urban India in Crisis, New Age Interns, New Delhi, 1998.
Smailes A.E.: The Geography of Towns, Hutchinnson, London, 1953.
Tewari, Vinod K, Jay A. Weinstein, VLS Prakasa Rao (editors) Indian Cities:Ecological Perspectives Concept 1986.
Singh O P Nagriya Bhugol

Programme: Post Graduate in Arts/Science	Year: II	Semester: III Paper-IV
Subject: Geography		
Course Code: GEOG906T (Human Geography Stream)	**Course Title: Regional Development and Planning: Concepts, Principles and Techniques**	
Course Outcome It will be helpful to understand and evaluate the concept of region in geography and its role and relevance in regional planning. Students will identify the issues relating to the development of the region through the process of spatial organization of various attributes and their inter relationship.		
Credits: 04	Max. Marks: 25 Internal Assessment 75 Term End Exam.	

Unit	Course Content	No. of Lectures
Unit – I	Geography and its role in regional development and planning: Concept, Scope & purpose of Regional planning, Types of regions: formal and functional; growth and development.	10
Uni t – II	Regional Planning: Planning process - sectoral, temporal and spatial dimensions; short-term and long-term perspective planning, Indicators of development and their data sources	14
Unit – III	Regional development theories: Economic growth doctrines and their impact on regional growth theories: F. Perroux, W. Isard, A. Losch; Western concerns: Paradigm shift from regional resource development to spatial planning of economic development for the third world; G. Myrdal, A.O. Hisrchman	10
Unit – IV	Regional Planning Strategies: Urban industrial growth strategies and diffusion of modernization; Regional planning in Five Year Plans; Spatial aspects of sectoral development: agriculture, industry and infrastructure.	12
Unit – V	Schemes of regionalization for planning: V. Nath, L.S. Bhat, P. Sengupta and Galina Sdyasuk; territorial production and complexes. Regional development planning; the state and regional development in India.	14

Book recommended:

Bernstein, H. (1979) : Sociology of Development versus Sociology of Underdevelopment in D. Lehmann (ed.), Development Theory : Four Critical Studies, Cass, London.

Berry, B.J.L. (1972) : Hierarchical Diffusion : The Basis of Development Filtering and Spread in a System of Growth Centres in N.N. Hansen (ed.), Growth in Regional Economic Development, Macmilan, London Bhat, L.S. (1972) Regional Planning in India, Indian Statistical Institute, Calcutta.

Bhat, L.S. (2003) Micro Planning: A Case Study of Karnal Area, KB Publications, New Delhi.

Brookfield, H.C. (1975) :Interdependent Development, Methuen, London.

Carney, J. Hudson, R. and Lewis, J. (eds.) (1980) : Regions in Crisis, Croom Helm, London.

Dewar, D. et. Al. (eds.) (1986): Regional Development and Settlement Policy, Allen and Unwin, Boston.

Dube, K.K. and Singh, M.B. (1986): *Pradeshik Niyojan*. Tara Book Agency, Varanasi.

Forbes, D.K. (1984) : The Geography of Underdevelopment : A Critical Survey, Croom Helm, London.

Friedmann, J. (1966): Regional Development Policy : A Case Study of Venezuela, MIT Press, Cambridge, Mass.

Friedmann, J. and Weaver, C. (1979) : Territory and Function : The Evolution of Regional Planning , London, Arnold.

Gore, Charles (1984) : Regions in Question, Methuen, London and New York.

Hall, P. (1981) : Urban and Regional Planning, Allan and Unwin, Boston.

Hansen, N.N. (1972) : Growth Centres in Regional Economic Development, Macmillan, London.

Kitching, G. (1982) : Development and underdevelopment in Historical Perspective : Population, Nationalism and Industrialization, Methuen, New York.

Kuklinski, A. (ed. (1975): Regional Development and planning, Sythoff, London.

Mabogunje, A.L. (1980): The Development Process: A Spatial Perspective, Hutchinson, London.

Mishra, R.P., K.V. Sundaram and V.L.S.P. Rao (1974): Regional Development Planning in India , Viking, Delhi. 17.

Mishra, R.P. (1969) Regional Planning. University of Mysore, Mysore.

Mishra, R.P. (2002) Regional Planning, Concepts, Techniques, Policies and Case Studies, Concept Publishing Company, New Delhi.

Chandana, R. C. (2005) Regional Development and Planning. Kalyani Publishers, New Delhi.

Stohr, W.B. and Taylor, D.R.F. (1981): Development from above or Development from Below, John Wiley, Chichester.

Programme: Post Graduate in Arts/Science	Year: II	Semester: III Practical
Subject: Geography		
Course Code: GEOG907P	**Course Title: Quantitative Technique**	
Outcome: Students will identify the basic statistical procedures to be applied to various themes in geography. It will also train the students to handle these statistical techniques towards analysing the geographical problems		
Credits: 04	(Max. Marks: 100 (Evaluation will be made by both Internal and external Examiners) Internal Assessment : 25 (10-Viva Voce + 10-Record Book + 5 -Attendance) Term End Exam : 75 (Theory and Practical)	

Unit	Course Content	No. of Lectures
Unit – I	Basics of Statistics Definitions of statistics, Importance and use of statistical techniques in geography, Types and sources of statistical data in geography, Formation of frequency distribution table, Graphical representation of frequency distribution using Histogram, O give curve, Cumulative percentage curve	10
Uni t – II	Measures of Statistics Measures of central tendency: Mean, Median and Mode. Measures of position: Estimation of quartiles, deciles and percentiles; Measures of dispersion: Absolute measurements- Mean deviation, Quartile deviation, and Standard deviation; Relative measurements: Coefficient of mean deviation, Coefficient of quartile deviation, Coefficient of variations, Index variability and Relative variability	10
Unit – III	Analysis of Statistical Relationship Skewness: Karl Pearson's and Bowley's methods; Kurtosis; Correlation analysis: Spearman's rank order correlation and Pearson product moment correlation, Kendall rank correlation coefficient; Regression analysis: Simple and Multiple Regression; Least square method	10
Unit – IV	Probability Distribution Probability: Theory of probabilities-law of addition and multiplication-probabilities of distribution: normal, binomial, Poisson-sampling: basic concepts, sample units and design, sampling frame and procedures, standard error and sample size, testing the adequacy of samples	10
Unit – V	Hypothesis Testing: Needs and types of hypotheses-goodness of fit and significance and confidence levels-parametric and non-parametric procedures: contingency tables, Chi-square test, binomial test, t-test.	10

Suggested Reading

Alvi, Z. (1995): Statistical Geography: Methods and Applications, Rawat Publications, Jaipur

Cole, J.P. & King, C.A.M. (1968): Quantitative Techniques in Geography. John Wiley & sons Inc.New York.

Elhance, D.N. (1972): Fundamentals of statistics, Kitab Mahal, Allahabad.

Gregory, S. (1968): Statistical methods and the geographer. Longman, London.

Gupta, C.B. (1978); An introduction to statistical Methods, Vikas Pub.House,New Delhi.

Hemawati: Statistical Methods for Geographers.

Hoel P.G.: Elementary Statistics, Wiley, New York.

King, L.J. (1991): Statistical Analysis in geography. Prentice Hall, Englewood Cliff N.J.

David Unwin, Introductory Spatial Analysis, Methuen, London, 1981.

Gregory, S. Statistical Methods and the Geographer, Longman, London, 1978.

Hammond R and P.S. McCullagh Quantitative Techniques in Geography: An Introduction, Clarendan Press, Oxford, 1974.

John P.Cole and Cuchlaine A. M. King, Quantitative Geography, John Wiley, London, 1968.

Johnston R. J., Multivariate Statistical Analysis in Geography, Longman, London. 1973.

Koutsoyiannis, Theory of Econometrics, Mcmillan, London, 1973.

Maurice Yeats, An Introduction to Quantitative Analysis in Human Geography, McGraw Hill, New York, 1974.

Peter Haggett, Andrew D. Cliff, & Allan Frey, Location Methods Vol. I and II, Edward Arnold, London, 1977.

Research Project

Programme: Post Graduate in Arts/Science	Year: II	Semester: III Research Project
Subject: Geography		
Course Code: GEOG908Pr	**Course Title: Research Project**	
Outcome To learn how to select a Research Proposal based on research gap found during the literature survey or field observations mdae. Preparation of synopsis/outline will be also learned. Finally will learn how to collect data and write a report based on the data analysis		
Credits: 04	Max. Marks: 100 (Evaluation by External & Internal Examiner) Dissertation: 75 Internal Assessment: Viva Voce + Attendance : 25 (20+5)	
The students will be required to select a topic and area of their interest with the help of their respective supervisors allotted to them by the Department. Research Project dissertation must be submitted to the Department one week before the commencement of the Theory Examinations. The size of the Dissertation normally ranges between 60 and 70 pages. The Research Project Dissertation will be evaluated by the external and internal examiners.		

Second Year
Fourth Semester

Programme: Post Graduate in Arts/Science	**Year: II**	**Semester: IV** **Paper-I**
Subject: Geography		
Course Code: GEOG1001T	**Course Title: BIOGEOGRAPHY**	
Outcome Student will understand the interrelationships among the living organisms within the environment and the importance of conservation of biosphere and biodiversity.		
Credits: 04	Max. Marks: 25 Internal Assessment 75 Term End Exam.	

Unit	Course Content	No. of Lectures
Unit – I	Fundamental Concepts: Concept, Scope, Significance and Development of Biogeography;Environment, Habitats and Plant-animal Association.	10
Uni t – II	Plant Geography & Plant Succession: Elements of Plant Geography, Distribution of Forests and Major Plant Communities. Plant successions in newly formed landforms. Examples from flood plains and glacial fore fields.	12
Unit – III	Zoogeography & Biodiversity: Zoogeography and its environmental relationship; Physical factors influencing world distribution of animals and their actual world distribution; classification & distribution of animals; faunal regions; biomes and their types; Bio-diversity and its depletion through natural and man-induced causes.	14
Unit – IV	Climate Change: Temporal Perspectives: Paleo botanical and Paleo climatological records of environmental Changes. Impact of Climate Change on Flora and Fauna with special reference to Uttarakhand Himalaya.	12
Unit – V	Biotic Resource Management: National Forest and Wildlife Policy of India. Conservation of biotic resources. Bioinformatics, Protected Areas and their management with special reference to National Parks, Wildlife Sanctuaries and Biosphere Reserves of Uttarakhand.	12

Suggested Reading

Agarwal, D.P. (1992) : Man and Environment in India Through Ages, Books and Books.

Bradshaw, M.J. (1979): Earth and Living Planet, ELBS, London

Cox, C.D. and Moore, P.D. (1993): Biogeography: An Ecological and Evolutionary, 5th Edn., Blackwell.

Gaur, R. (1987): Environment and Ecology of Early Man in Northern India, R.B. Publication, Corporation.

Hoyt, J.B. (1992): Man and the Earth, Prentice Hall, U.S.A.

Hugget, R.J. (1998): Fundamentals of Biogeography, Routledge, U.S.A.

Illies, J. (1974): Introductory to Zoogeography, Mcmillan, London.

Khoshoo, T.N. and Sharma, M. (eds.) (1991): Indian Geosphere – Biosphere Har – Anand Publication, Delhi.

Lapedes, D.N. (ed.) (1974) : Encyclopedia of Environmental Science, McGraw Hill.

Mathur, H.S. (1998) : Essentials of Biogeography, Anuj Printers, Jaipur.

Pears, N. (1985) : Basic Biogeography, 2nd Edn. Longman, London.

Simmon, I.G. (1974) : Biogeography, Natural and Cultural, Longman, London.

Tivy, J. (1992) : Biogeography : A Study of Plants in Ecosphere, 3rd Edn., Oliver and Boyd, U.S.A

Tiwari, P.C. and Bhagwati Joshi (1997): Wildlife in the Himalayan Foothills of Uttar Pradesh: Conservation and Management, New Delhi

Programme: Post Graduate in Arts/Science	Year: II	Semester: IV Paper-II

Subject: Geography

Course Code: GEOG1002T	Course Title: Geography of Uttarakhand

Outcome
Students will identify the basic physical and socio-economic background of Uttarakhand for the planning and utilization of its resources for sustainable development.

Credits: 04	Max. Marks: 25 Internal Assessment 75 Term End Exam.

Unit	Course Content	No. of Lectures
Unit – I	Physical Background: Geo-environmental background: Geology, Physiography, climate,drainage, Soils, flora and fauna, Natural and Bio-geographic Regions.	10
Uni t – II	Population and Settlements: Population and Human Resource Development; Spatial Patterns, Structure, Composition and Dynamics of Population; Tribal Groups and their Spatial Distribution, Fairs Festivals and Languages and Dialects, Settlements: Types and Patterns	12
Unit – III	Agricultural Development: Agricultural Characteristics and Trends; land holdings; Land Reforms; Cropping Pattern; Irrigation; Farm Technology; Agricultural Productivity and Agricultural Regions; Impact of Green Revolution; Horticultural and Floriculture Development including medicinal, aromatic plants and Organic farming.	12
Unit – IV	Mineral and Energy Resources and Industries: Major Mineral Deposits: Distribution and Production, Energy Resources: Development of Hydro-electricity, Industries: Localization and Spatial Distribution, Principal Industries of the region, Industrial Regions, Trade,Transport, Tourism and forestry, Potentials and Prospects,	12
Unit – V	Future Prospects and Development Plans: Prospects of Tourism, Sustainable Development Plan for Uttarakhand Himalaya, Environmental Hazards and Management in Uttarakhand Himalaya.	14

Suggested Reading

Valdiya, K.S. : Land and People, 1988
Bose, S.C.: Land and People of the Himalaya, Calcutta,1968
Singh O.P.(ed.) : The Himalaya: Nature, Man and Culture, 1983
Joshi, S.C. et.al : Kumaun Himalaya, Nainital, 1983
Singh,O.P. & Pande,R.K.: Human Habitat in the Mountain (1998)
Joshi, S.C.: Uttaranchal: Environment & Development, 2001
Saklani,P.S.(ed.): Tectonic Geology of the Himalaya, 1978
Singh, R.L.: India: A Regional Geography, 1971
Nityanand & K.Kumar : The Holy Himalaya

Optional - I Physical Geography Stream

(Out of Two Optional streams student has to choose one optional stream of his/her choice. Each stream includes two papers)

Programme: Post Graduate in Arts/Science	**Year: II**	**Semester: IV** **Paper: III**
Subject: Geography		
Course Code: GEOG1003T(Physical Geography Stream)	**Course Title: Glacial and Periglacial Geomorphology**	
Outcome It will make familiar with the geomorphic processes and resultant landforms of the glacial and periglacial area. It will also make understand about the sensitiveness of the periglacial environment to heat budget		
Credits: 04	Max. Marks: 25 Internal Assessment 75 Term End Exam.	

Unit	Course Content	No. of Lectures
Unit – I	Theoretical Base: Definition of Glacial Geomorphology; Ice Age; Causes of ice ages; Pleistocene Glaciation; onset and retreat.	12
Unit – II	Erosional Proceeses and Landforms: Erosional process; glacial erosion, development of erosional landforms; superglacial, englacial and basal .	10
Unit – III	Depositional Proceeses and Landforms: Deposional processes: processes-stratified and non stratified; forms of Moraines; glaciofluvial and glacio-lacustrine environment.	12
Unit – IV	Periglacial Processes: Periglacial process: frozen ground phenomenon – identifical ,depth variations, classification and distribution; mechanism of frost action.	12
Unit – V	Periglacial Landforms and Human adaptation: Periglacial landforms;frost action and landforms-mass wasting and landforms, adaptation of human beings to periglacial environment.	14

Suggested Readings

Brown, R.J.E.: Permafrost in Canada. University of Toronto Press, Toronto, 1970.
Carson MA. and Kirkby M.J., Hillslope Form and Process, Cambridge University Press, 1972.
Coates, D.R.(ed.), Glacial Geomorphology, State University of New York,1974, New York, 1974.
Dixon, J.C. and Abrahams, A.D. (eds.), :Periglacial Geomorphology. John Wiley, New York, 1992.
Drewry, D., Glacial Geological Processes, Edward Arnold, London, 1986.
Embleton, C. and King, C.A.M., Glacial and Periglacial Geomorphology, Edward Arnold, London, 1968.
Embleton, C. and Thormes, J. (eds.), Process in Geopmorphology, Arnold - Hesnemann, New Delhi, 1980.
Hails, J.R. (ed.): Applied Geomorphology Elsevier Sci. Amsterdam, 1977.
Pewe, T.L.(ed.):. The Periglacial Environment. Mc. Gill- Queen's University Press, Montreal1969
Peterson, W.S.B., The Physics of Glaciers. Pergamon Press, Oxford 1969.
Price, L.W., The Periglacial Environment, Permafrost and Man., Commission on College Geography, Resource Paper No. 14, Washington, D.C,1972.
Ritter, D.F. Craig, R. and Miller, J.P., Process of Geomorphology. , W.C. Brown Dubuque, 1995.
Slymaker, O. (ed.), Steepland Geomorphology., John Wiley, London, 1995.
Sugden, D.E. and John, B.S. Glaciers and Landscape. Edward Arnold, London, 1976.
Vander Veen, C.J., Fundamentals of Glacier Dynamics., A.A. Balkemma, Rotterdam, 1999.
Wright, A.E and Mosley, P.(eds), Ice Ages: Ancient and Modern., Seel House Press, Liverpool,1975. Suggested Readings

Programme: Post Graduate in Arts/Science	Year: II	Semester: IV Paper: IV

Subject: Geography

Course Code: GEOG1004T (Physical Geography Stream)	Course Title: Aeolian Geomorphology

Outcome

It will make aware about the environments which is sensitive to aridity, bio-mass and human interferences. This course will also make familiar with the aeolian processes and their resulting landforms.

Credits: 04	Max. Marks: 25 Internal Assessment 75 Term End Exam.

Unit	Course Content	No. of Lectures
Unit – I	Wind Environments: Introduction; desert wind systems; directional variability and resultant drift potential; scope of aeolian geomorphology. Grain in motion: fluid flows - flow types; interaction of the wind and the bed - wind shear; entrainment – lift and drag; Thresholds of movement: static and dynamic ; modes of transport: saltation, creep, reptation and suspension; transport rates.	12
Unit – II	Wind erosion and landforms: Processes: abrasion, deflation and aerodynamic erosion; Landforms: ventifacts, yardangs, pans, stone pavements, deflation hollows; desert varnish; processes and significance. Dusts-Sources; - contemporary and proximal, mineral composition; Dust-generating and dust yielding systems, gross spatial patterns of production and removal; deposition: loess, types, palaeo - environmental significance.	12
Unit – III	Forms of wind deposition: sand ripples, obstacle dunes; dune- classification schemes; morphodynamics of the crescentic, longitudinal and complex dunes	10
Unit – IV	Plaeo—environments : Introduction; sediment movement in the past; relic and active dunes; dating aeolion deposits; pre-leistocene sand dunes; Pleistocene and Holocene dunes; Aeolinites - composition and distribution.	12
Unit – V	Applied Aeolian Geomorphology : Introduction; wind erosion on agricultural fields; controls of dust; Management of coastal dunes and dunes in semi -arid areas; desertification and its controls with special reference to India. Remote sensing and GIS applications in aeolian settings.	14

Suggested Readings

Abrahams, A.D. and Parsons, A.J. (eds.), Geomorphology of Desert Environments Chapman & Hall, London, 1994.
Goudie,A and Hegde : Palaeo-geography and Pre-history of Indian Desert, Academic Press, London,1980..
Baumont, P.: Drylands-Environment, Management and Development, Routledge, New York,1993.
Bagnold, R.A. The Physics of Blown Sand and Desert Dunes, Methuen, London, 1941.
Cook, R.U., Waren, A. and Goudie, A.S. Desert Geomorphology, London, UCL Press, London, 1993.
Embleton, C. and Thornes, J. (eds.), Process in Geomorphology, Arnold -Heinemann, New Delhi, 1980.
Greeley, R and Iversen, J.D., Wind as a Geological Process. Cambridge University Press, Cambridge, 1985.
Lancaster, N: Geomorphology of Desert Dunes Routledge, New York,1995.
Livingstone I. and Warren, A. Aeolian Geomorphology ,Adison Wesley, Longman, Essex, 1996.
Mckee, E.D. (ed.) A Study of Global Sand Seas, Castel House, Kent, 1980.
Nickling, W.G. (ed.) Aeolian Geomorphology. Allen & Unwin, Boston, 1986.
Singhvi, A.K. and Derbyshire, E.(eds.) Palaeo—environmental Reconstruction in Arid Lands, Oxford & IBH, New Delhi, 1999.
Tchakerian, V.P. (ed.) Desert Aeolian Process ,Chapman & Hall, London, 1995.

Optional - II Human Geography Stream

(Out of Two Optional streams student has to choose one optional stream of his/her choice. Each stream includes two papers)

Programme: Post Graduate in Arts/Science	**Year: II**	**Semester: IV** **Paper: III**
Subject: Geography		
Course Code: GEOG1005T (Human Geography Stream)		**Course Title POPULATION GEOGRAPHY**
Outcome It will introduce to the students about the complex dimensions of population. Students will also understand and evaluate the association between demographic and socio-economic attributes of population and the resultant levels of social well- being and economic development.		
Credits: 04		Max. Marks: 25 Internal Assessment 75 Term End Exam

Unit	Course Content	No. of Lectures
Unit – I	Population Geography: Scope and Objectives; development of Population Geography as a field of specialization; Population Geography and Demography sources of population data, their level of reliability, and problems of mapping of population data	12
Unit – II	Population distribution: density and growth - theoretical issues; Classical and modern theories in population distribution and growth; World patterns and their determinants; India -: population distribution, density and growth profile, Concepts of under population and over population.	12
Unit – III	Population composition: age and sex; family and households; literacy and education; religion, caste and tribes; rural and urban; urbanisation; occupational structure; gender issues; Population composition of India	12
Unit – IV	Population dynamics: Measurements of fertility and mortality. Migration: national and international patterns; India's population dynamics.	10
Unit – V	Population and development: population- resource regions and levels of population and socio-economic development; population policies in developed and less developed countries; Human Development Index and its components; India's population policies; population and environment; implications for the future.	14

Suggested Readings

Bilasborrow, Richard E and Daniel Hogan, Population and Deforestation in the Humid Tropics, International Union for the Scientific Study of Population, Belgium 1999.

Bogue, D.J. Principles in Demography, John Wiley, New York 1969.

Bose, Ashish et. al. : Population in India's Development (1947-2000); Vikas Publishing House, New Delhi 1974.

Chandna, R.C. Geography of Population; concept, Determinants and Patterns. Kalyani Publishers, New York 2000.

Clarke, John I., Population Geography, Pergamon Press, Oxford 1973.

Crook, Nigel Principles of Population and Development. Pergmon Press, New York 1997.

Daugherty, Helen Gin, Kenneth C.W. Kammeyir, An Introduction to Population (Second Edition), The Guilford Press, New York, London 1998.

Garnier, B.J. Geography of Population Longman, London 1970.

Kochhar, Rajesh, The Vedic People: Their History and Geography Orient Longman Ltd., New Delhi 2000.

Mamoria C.B. India's Population Problem, Kitab Mahal New Delhi 1981.

Mitra, Asok, India's Population: Aspects of Quality and Control. Vol. I & II, Abhinar Publications, New Delhi 1978.

Premi M.K., India's Population: Heading Towards a Billion, B.R. Publishing Corporation,1991.

Srinivasan K. and M.Vlassoff. Population Development Nexus in India: Challenges for the New Millennium. Tata McGraw -Hill, New Delhi 2001.

Srinivasan, K. Basic Demographic Techniques and Applications Sage Publications, New Delhi 1998.

Sundaram K.V. and Sudesh Nangia, (ed.) Population Geography, Heritage, Publications, Delhi 1986.

UNDP: Human Development Report. Oxford University Press, Oxford 2000.

United Nations, Methods for Projections of Urban and Rural Populations, No. VIII, New York 1974.

Woods R. Population Analysis in Geography. Longman, London1979.

Zelinsky Wilbur, A Prologue to Population Geography, Prentice Hall, 1966

Programme: Post Graduate in Arts/Science	Year: II	Semester: IV Paper: IV
Subject: Geography		
Course Code: GEOG1006T (Human Geography Stream)	**Course Title: Agricultural Geography and Agro-Ecosystem Management**	
Outcome Students will have an exposure of the agriculture scenario and different techniques to analyse the various techniques used in agriculture regionalization		
Credits: 04	Max. Marks: 25 Internal Assessment 75 Term End Exam	

Unit	Course Content	No. of Lectures
Unit – I	Concepts: Definition, Nature, scope, Significance of Agricultural Geography, Approaches to the study Agricultural Geography, Agricultural Land Use and Location Theories	12
Unit – II	Agricultural Types: Agricultural types and their world distribution, Subsistence Agriculture, Commercial farming, Plantation agriculture, Mixed agriculture, State, Collective and Cooperative farming, Spatial patterns of major commodities in each type.	12
Unit – III	Techniques of Agricultural Regionalization: Quantitative Techniques and methods in Agricultural Geography for measuring Agricultural Intensity, Agricultural Efficiency, Concentration and Diversification of Crops, Methods of delimitation of crop Combination and Agricultural regions. Whittlesey's classification of Agricultural regions of the world.	12
Unit – IV	Agricultural Ecology and Ecosystem: Agro-ecosystem – connotation, components , types and functioning, agroecosystem degradation with special reference to Himalaya, Agro- ecosystem and agro- energy environment Management.	12
Unit – V	Planning and Management: Regional Perspective: Problems of agriculture and agricultural planning in India, salient features of agricultural development of Uttarakhand Himalaya and their management and planning.	12

Suggested Readings

Bhalla, G.S. and Alagh, Y.K. (1979) performance of India, agriculture: a district wise study, sterling, New Delhi.
Das, M.M. (1982) Peasant Agriculture in Assam, Inter India, New Delhi.
Gobind, N. (1986) Regional perspective in agriculture, concept, New Delhi.
Hussain, M. (1979) Agricultural Geography, Inter India, New Delhi.
Mergra, W.B. & Munton, R.J.C. (1971) Agricultural Geography, methuen, London.
Mitchel, P. (1979) Agro-ecosystem, Inter India Publication,New Delhi
Shafi, M. (1984) Agricultural Productivity and Regional Imbalance, Concept, New Delhi.
Singh J. & Dhillon, S.S. (1985) Agricultural Geography, Tata McGraw Hill, New Delhi.
Singh, J. (1974) Agricultural Atlas of India: A Geographical perspective,Vishal Publications, Kurukshetra.
Morgan, Agricultural Geography.
Alexander, J.W., Economic Geography.
Thomas, R.S., The Geography of Economic Activity.
Gregor, Howard, F., Geography of Agriculture: Themes in Research.
Russel, J.,World Population and World Food Supplies.
Stamp, L.D., Our Developing World.
Sykes, F., Food Farming and Future.
Courtnay, P.P., Plantation Agriculture.
Egher and Heady, Regional Adjustment in Grain Production.
Sauer, Carl O., Agricultural Origins and Dispersals,
Randhawa, M.S., Indian Agriculture.
Page, W.G., Origins of Agriculture
Bireshwar Banergee (ed), Agricultural Geography.
Padam Singh Jhina, Agriculture in the Hill regions of North India.
Singh, B.B., Krishi Bhoogol (in Hindi).
Tiwari, R.C. & Singh,B.N., Krishi Bhoogol, Prayag Pustak Bhawan, Allahabad.
Kumar, Pramila, Krishi Bhoogol, Madhya Pradesh Hindi Granth Academi, Bhopal.
Howard Greor, Geography of Agriculture, P.Hall, 1967.
Singh, J. (1974) Agricultural Atlas of India: A Geographical Perspective Kurukshetra.
Wathern, Peter, Enviromental Impact Assessment: Theory and Practice.Unwin & Hyman, London. 1986.
Brundland, G., Our Common Future, Report of the World Commission on Environment and Development, UN , 1988.

Programme: Post Graduate in Arts/Science	Year: II	Semester: IV Paper: Practical

Subject: Geography

Course Code: GEOG207P	Course Title: Map Projection, Geological Map and Field Study Trip Part A: Map Projection and Preparation of Geological Maps Part B: Field Study Trip and Preparation of Report

Outcome:
Student will understand the significance of the projection in correct map making process with reference to the shape, size and area. Another important output is to learn the preparation of the geological cross-section on the bases of contour and Geological Map

Credits: 04	(Max. Marks: 100 (Evaluation will be made by both Internal and external Examiners) Internal Assessment: 25 (10-Viva Voce + 10-Record Book + 5-Attendance) Term End Exam : 75 (55-Theory and Practical+20- Field Survey)

Unit	Course Content	No. of Lectures
Part A		
Unit – I	Map Projection: Meaning and classification; Principles, merits, demerits.	08
Unit – II	Construction (with emphasis on mathematical methods) and use of the following projections: Gall's, Mercator's, Bonne's,Polyconic, Gnomomic, Stereographic and Orthographic Zenithal Projections.	14
Unit – III	Identification of Rocks and Minerals, Rock Types and their characteristics, Structure (Fold, Fault and Thrust), Unconformity; Dip and strike	10
Unit – IV	Preparation of Geological cross-section of folded and faulted structure	10
Unit – V	Preparation of Geological cross-section of thrusted and unconformity area.	08
Part B		

Part B: Field Study Trip and Preparation of Report

The course is based on supervised field work carried out by the fourth semester students for about one week. One region (if possible, based on the optional paper offered by the department) will be selected every year within Uttarakhand/any part of India. Observations will be made regarding various aspects such as different landforms, drainage, vegetation, agriculture, industries, transport and communication, settlement, environmental problems etc. The information thus collected will be submitted by the students in the form of the field survey diary and field report for evaluation.

Suggested Readings

Bygott, G.L. : Mapworks and Practical Geography.
Derk, C.L. & Brown, U.S. Interpretation of Topographical and Geological Maps
Mishra, R.P. and Ramesh, A. (1969) : Fundamentals of Cartography, Concept Publishing Company, New Delhi
Singh, R.L. and Singh Rana, P.B. (1991) : Elements of Practical Geography, Kalyani Publishers, Ludhiana.
Singh, L.R. and Singh, R. (1991): Mapwork and Practical Geography, Central Book Depot, Allahabad.
Wilkinson, H.R. and Monkhouse, F.J. (1952) : Maps and Diagrams, B.I. Publications Pvt. Ltd., New Delhi.

Research Project

Programme: Post Graduate in Arts/Science	Year: II	Semester: IV Research Project
Subject: Geography		
Course Code: GEOG208Pr	**Course Title: Research Project**	
Outcome To learn how to select a Research Proposal based on research gap found during the literature survey or field observations mdae. Preparation of synopsis/outline will be also learned. Finally will learn how to collect data and write a report based on the data analysis		
Credits: 04	Max. Marks: 100 (Evaluation by External & Internal Examiner) Dissertation: 75 Internal Assessment: Viva Voce + Attendance : 25 (20+5)	
The students will be required to select a topic and area of interest with the help of their respective supervisors allotted to them by the Department. Research Project dissertation must be submitted to the Department one week before the commencement of the Theory Examinations. The size of the Dissertation normally ranges between 60 and 70 pages. The Research Project Dissertation will be evaluated by the external and internal examiners.		