Department of Geography

School of Earth Science

Course Contents & Syllabus

Fourth year (7th & 8th Semesters)

Four Year Under Graduate Programme (FYUP)
Under NEP 2020

(for Students enrolled 2022-23; 2023-2024; 2024-25 Academic Sessions)

Hemvati Nandan Bahuguna Garhwal University

(A Central University)

Srinagar Garhwal-246174 (Uttarakhand)

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Srinagar (Uttarakhand)

Four Year Under Graduate Programme (FYUP)
Under NEP 2020
(for Students enrolled 2022-23; 2023-2024; 2024-25 Academic Sessions)

The following course descriptions, course structure, and other relevant information will apply exclusively to students enrolling in undergraduate programmes for the first time in the academic session 2025–26.

Fourth year (7th & 8th Semesters)

Fourth Year – NHEQF Level- 6

In the fourth Year of Four-Year Undergraduate Program (FYUP) two types of programs are offered:

1. U.G. with Honours

2. U.G. Honours with Research

Candidates with a minimum CGPA of 7.5 will be eligible to continue their studies into the fourth year of the undergraduate program, leading to a four-year Bachelor's degree (Honours with Research).

Fourth Year- (U.G. with Honours)

The following course structure under FYUP for Multidisciplinary Programmes is designed for subjects which have practical based courses or have relatively larger emphasis on practical course-based learning.

(For practical based subjects)

Entry requirement	(After completing requirements of a 3-year bachelor's degree (120 credits) and 2 additional credits under SSD, will be allowed to continue studies in the fourth year of the undergraduate programme leading to the four years bachelor's degree (with Honours).							
Course Type	**Semester-VII**				**Semester-VIII**			
	Subject/Title	**No. of paper**	**Credits**		**Subject /Title**	**No. of paper**	**Credits**	
			T	**P**			**T**	**P**
Major Subject (One)	**Core Major -I** Geomorphology	**1**	**5**	**-**	**Core Major -I** Climatology	**1**	**5**	**-**
	Core Major –II Resource Geography	**1**	**5**	**-**	**Core Major –II** Regional Planning & Development	**1**	**5**	**-**
	Core Major –III Introduction to Remote Sensing	**1**	**5**		**Core Major –III** Introduction to GIS	**1**	**5**	**-**
	Core Major Elective –I* Geo-Environmental Studies	**1**	**4**	**-**	**Core Major Elective –II*** Hazards and Disaster Management	**1**	**4**	**-**
	Major Practical Remote Sensing	**1**	**-**	**5**	**Major Practical** Introduction to GIS	**1**	**-**	**5**
Minor (One)	**Minor–I** # Population Geography Practical- Quantitative Techniques	**1**	**2**	**2**	**Minor–II** # Social Geography Practical- Cartography	**1**	**2**	**2**
Total		**6**	**21**	**7**		**6**	**21**	**7**
NHEQF Level- 6	***Student on exit after successfully completing four years (i.e., securing minimum required 176 credits along with securing additional 2 credits under SSD course work) will be awarded "Four years Bachelor's Degree (Honours)", in related field/discipline***							

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Note: * In case of Core Major Elective course, if the department want to introduce practical component, the department may bifurcate the total 4 credits between theory and practical. ***Note: # If the minor course is offered without a practical component, the department must allocate 4 credits to the theory component. Electives may be offered by the departments under the Minor.***
Minor–I* Each department will have to prepare Minor course (One in each semester), which enriches the learner's knowledge beyond the Major discipline (Core Major). The minor courses opted by any learner should be different from the Core Major offered by the Department. If a student selects a minor course from a particular subject or department, they are required to study the courses offered by that same subject/department in both the 7th and 8th semesters. ***Important Note:*** *The student may select Minor course either from his/her second core, studied up to 6th semester, or may select from the I.D/M.D subject(s) they have pursued in the first and second year of their U.G. Programme.* **For Example:** If a student has passed U.G. 3 years with two core subjects i.e. Zoology and Botany, and the student have opted for Zoology as his/her Major subject in the 4th year, then the student may opt Minor courses (To be studied in 7th and 8th semester) from any one subject, which could be either Botany or ID/M.D subject (s) studied by him/her in first two years of FYUP.

Fourth Year- (U.G. Honours with Research)

The following course structure under FYUP is designed for subjects which have practical based courses or have relatively larger emphasis on practical course-based learning.

(For practical based subjects)

Entry requirement	(After completing requirements of a 3-year bachelor's degree (120 credits) and 2 additional credits under SSD, candidates who meet a minimum CGPA of 7.5 will be allowed to continue studies in the fourth year of the undergraduate programme leading to the four years bachelor's degree (Honours with Research).							
Course Type	**Semester-VII**				**Semester-VIII**			
	Subject/Title	**No. of paper**	**Credits**		**Subject /Title**	**No. of paper**	**Credits**	
			T	**P**			**T**	**P**
Core Subject (One)	**Core Major -I** Geomorphology	**1**	**5**	**-**	**Core Major-I** Climatology	**1**	**5**	**-**
	Core Major –II Resource Geography	**1**	**5**	**-**				
	Core Major Elective-I* Remote Sensing & GIS	**1**	**4**	**-**	**Core Major Elective -II*** Hazards and Disaster Management	**1**	**4**	**-**
	Major Practical Remote Sensing & GIS	**1**	**-**	**5**	**Major Practical** Surveying	**1**		**3**
	Research Methodology	**1**	**5**		**Dissertation**	**1**		**12**
Minor (One)	**Minor–I #** Population Geography Practical- Quantitative Techniques	**1**	**2**	**2**	**Minor–II #** Social Geography Practical- Cartography	**1**	**2**	**2**
Total		**6**	**21**	**7**		**5**	**11**	**17**
NHEQF Level- 6	***Student on exit after successfully completing four years (i.e., securing minimum required 176 credits along with securing additional 2 credits under SSD course work) will be awarded "Four years Bachelor's Degree (Honours with Research)", in related field/discipline***							

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Note: * In case of Core Major Elective course, if the department want to introduce practical component, the department may bifurcate the total 4 credits between theory and practical.
Note: # If the minor course is offered without a practical component, the department must allocate 4 credits to the theory component. Electives may be offered by the departments under the Minor courses.

Minor–I* Each department will have to prepare Minor course (One in each semester), which enriches the learner's knowledge beyond the Major discipline (Core Major). The minor courses opted by any learner should be different from the Core Major offered by the Department.

If a student selects a minor course from a particular subject or department, they are required to study the courses offered by that same subject/department in both the 7th and 8th semesters.

Important Note: *The student may select Minor course either from his/her second core, studied up to 6th semester, or may select from the I.D/M.D subject they have pursued in the first and second year of their U.G. Programme.*

For Example: If a student has passed U.G. 3 years with two core subjects i.e. Zoology and Botany, and the student have opted for Zoology as his/her Major subject in the 4th year, then the student may opt Minor courses (To be studied in 7th and 8th semester) from any one subject, which could be either Botany or ID/MD subject studied by him/her in first two years of FYUP.

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Syllabus of B.A./B.Sc. in Geography as per Four Year Under Graduate Programme (FYUP) Under NEP 2020 for Students enrolled in 2022-23, 2023-24, 2024-25 Academic Sessions

Applicable to B.A/B.Sc. VII Semester and VIII Semester Session 2025-26 only

Fourth Year- (U.G. with Honours)

Semester VII	Major Subject	Course Name	Credit
Core Subject (One)	Core Major -I	Geomorphology	5
	Core Major -II	Resource Geography	5
	Core Major -III	Introduction to Remote Sensing	5
	Core Major Elective-I*	Geo-Environmental Studies	4
	Major Practical	Remote Sensing	5
Minor (One)	Minor–I #	Population Geography with Practical-Quantitative Techniques	2+2
	Total		28
Semester VIII	**Major Subject**	**Course Name**	**Credit**
Core Subject (One)	Core Major -I	Climatology	5
	Core Major -II	Regional Planning & Development	5
	Core Major -III	Introduction to GIS	5
	Core Major Elective-II*	Hazards and Disaster Management	4
	Major Practical	Introduction to GIS	5
Minor (One)	Minor–II #	Social Geography with Practical- Cartography	2+2
	Total		28

Fourth Year- (U.G. Honours with Research)

Semester VII	Major Subject	Course Name	Credit
Core Subject (One)	Core Major -I	Geomorphology	5
	Core Major -II	Resource Geography	5
	Core Major -III	Research Methodology	5
	Core Major Elective-I*	Remote Sensing & GIS	4
	Major Practical	Remote Sensing & GIS	5
Minor (One)	Minor–I #	Population Geography with Practical-Quantitative Techniques	2+2
	Total		28
Semester VIII	**Major Subject**	**Course Name**	**Credit**
Core Subject (One)	Core Major -I	Climatology	5
	Core Major -II	Dissertation	12
	Core Major Elective-II*	Hazards and Disaster Management	4
	Major Practical	Surveying	5
Minor (One)	Minor–II #	Social Geography with Practical- Cartography	2+2
	Total		28

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Detailed Syllabus

Geography-B.A./B.Sc.
Fourth Year- (U.G. with Honours)
Semester-VII
CORE-Major

Paper - I: GEOMORPHOLOGY			
Paper Code: SOES/GEOG/C001			
Credit: 05			
Total Marks: 100	Internal Assessment: 40	End Semester: 60	Contact Hour per Week: 05
Course Objectives:			
1. The purpose of the course is to introduce students the evolution, structure and configuration, landforms and, land forming process.			
Course Outcomes: After the completion of the course, the students will have the ability to: I. Understand the components of the earth system – atmosphere, lithosphere and hydrosphere; II. Appreciate and understand various features of the spheres with local, regional and global examples; III. Understand the Earth Movements and development of landforms.			
Note: The paper consists of four units. Two questions will be set from each unit. The candidate will be required to attempt four 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, Davis, Penk and Hack and morphogenetic region.			
UNIT II			
Plate tectonics; Mountain building; Isostasy; Tectonic Geomorphology; Theories of slope development by Young and King; Peneplain and Pedi plains; Geological structure and rocks.			
UNIT III			
Geomorphic process – River, glacier, underground water: Mass movement and resultant landforms; Morphometry of drainage basin; Profile of equilibrium rejuvenation and polycyclic landscape. (With special reference to Uttarakhand Himalaya)			
UNIT IV			
Applied Geomorphology engineering works; Anthropogenic process and landscape planning; Regional Geomorphology of Uttarakhand -Great, Lesser and Siwalik Himalaya.			

Books Recommended:

1. Bloom, A.L.: Geomorphology, Prentice Hall, New Jersey USA, 1979.
2. Goudie, A.: Geomorphological Techniques, George Allen and Unwin, London, 1981.
3. Washborn, A.L.: Periglacial Process 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 Theories, J.: Processes in Geomorphology, Arnold Hienman, London, 1979.
7. Phodes, D.D. and William, G.P.: Adjustment of Fluvial Process, George Allen and Unwin, Boston, 1982.
8. Tricart, L. and Callam: Introduction to climate Geomorpholgy, Longman, London, 1972.
9. Derbyshrine, E. Gregory K.J. and Halls, J.R.: Geomorphological Processes, Butterworths, London, 1979.
10. Gregory, K.J. and Willing, D.E.: Drainage Basin Processes and Forms, Edward Arnold, London,
11. Gregory, K.J. and Willing, D.E.: Man and Environment Processes, Butter Worths, London, 1981.
12. Singh Savindra: Bhu- Akriti vigyan in Hindi

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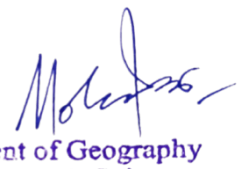
Paper – II: GEOGRAPHY OF RESOURCES			
Paper Code: SOES/GEOG/C002			
Credit: 05			
Total Marks: 100	Internal Assessment: 40	End Semester: 60	Contact Hour per Week: 05
Course Objectives:			
1. Awareness about resource availability, accessibility, utilization, its use and misuse. 2. Spatial distribution of natural resources. 3. Resource management and governance.			
Course Outcomes: After end of this course student will be able to understand and comprehends types, classification, distribution of resources and path of sustainable resource management.			
Note: The paper consists of four units. Two questions will be set from each unit. The candidate will be required to attempt four questions in all. Answer should be precise. All questions carry equal marks.			
UNIT I			
Definition and concept of Resources, Classification of Resources; Nature and Scope of Resources Geography; Theories of Resource use and Management.			
UNIT II			
Land, Water, Energy, Biotic Resources, and Human Resource - distribution, use-misuse and conservation Global and Indian scenario.			
UNIT III			
Resources depletion and emerging issues -Deforestation, loss of bio-diversity, acid rain, energy crises, environmental problems			
UNIT IV			
Over Exploitation and Conservation of resources; Global initiatives (Agenda 21, SDGs) and national resource policies, Community base Natural Resource Management (CBNRM), Resource management practices in Uttarakhand.			

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 Sklnnet, B.J. (ed): Resources and World Development, Jogn Wiley and Sons, New York, 1986.
4. Newson, M.D.: Land, Water and Development, River Basin System and Management, Routledge, London, 1991.
5. Owen, S. and Owen, P.L.: Environment Resources and Conservation, Cambdridge University Press, New York, 1991.
6. Rees, J.: Natural Resources, Allocation, Economics and Policy, Methuen, London, 1988.
7. Simmons, I.G.: Earth, Air and Water Resources and Environment in Late 20th Century, Edward, Arnold, 1991.



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Paper - III: INTRODUCTION TO REMOTE SENSING			
Paper Code: SOES/GEOG/C003			
Credit: 05			
Total Marks: 100	Internal Assessment: 40	End Semester: 60	Contact Hour per Week: 05
Course Objectives:			
1. To introduce to the students about the basic principles of Remote Sensing, to indicate the methods of visual and digital interpretations of satellite imageries and to outline the application of remote sensing.			
Course Outcomes: After the completion of the course, the students will have the ability to: 1. Appreciate the basic principles and components of Remote sensing; 2. comprehend the basics of aerial photogrammetry and image processing for spatial analysis; 3. Analyze the basic spatial resources for land use and Land Cover for meaningful interpretation.			
Note: The paper consists of four units. Two questions will be set from each unit. The candidate will be required to attempt four questions in all. Answer should be precise. All questions carry equal marks.			
UNIT I			
Definition, types, and components of remote sensing, types of platforms; Relevance of remote sensing, Development of Remote sensing in the world and India.			
UNIT II			
Principles, EMR Interaction with Atmosphere and Earth Surface; Satellites (Landsat and IRS) and Sensors			
UNIT III			
Elements of image Interpretation, Application of remote Sensing: Land use/ Land Cover studies.			
UNIT IV			
Types of aerial photographs, marginal information on aerial photographs; scale, Simple geometry of conventional vertical aerial photographs.			

Books Recommended:

1. Sabine, F.F.: Remote Sensing- Principles & Interpretation.
2. Lillesand, R.M.: Remote Sensing and Image Interpretation Kiefer R.W.
3. Chauniyal, D.D.: Remote Sensing and GIS (Hindi).
4. Jensen, J.R.: Introductory Digital Image Processing- A Remote Sensing Perspective.
5. Jones, C.: Geographical Information System & Computer Cartography.
6. Ayery, T.E.: Introduction to Aerial Photographs.
7. Pratt, W.K.: Digital Image Processing, John Wiley & Sons Now York (1995).

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Paper - IV: GEO-ENVIRONMENTAL STUDIES			
Paper Code: SOES/GEOG/E001			
Credit: 04			
Total Marks: 100	Internal Assessment: 40	End Semester: 60	Contact Hour per Week: 04
Course Objectives:			

1. To introduce students to the fundamental concepts and scope of Environmental Geography and the dynamic relationship between humans and the environment.
2. To provide an in-depth understanding of ecosystems and to enable students to comprehend ecological processes and dynamics.
3. To explore the complexities of environmental degradation, and global environmental issues, and environmental management, policy frameworks, and sustainable development initiatives.

Course Outcomes:

1. Students will be able to articulate the key concepts and principles of Environmental Geography and the dynamics of the man-environment relationship.
2. Students will develop the analytical skills necessary to evaluate ecosystem structures and functions and apply this knowledge to assess ecosystem health and resilience.
3. Students will gain the ability to critically analyze environmental degradation, and propose effective environmental management strategies and policies to address these issues.

Note: The paper consists of four units. Two questions will be set from each unit. The candidate will be required to attempt four questions in all. Answer should be precise. All questions carry equal marks.

UNIT I

Meaning and scope of Environmental Geography; Basic concept of Environmental Geography; Component and types of environments; Ecology; Principles, types and ecological secession; Man-environment relationship.

UNIT II

Ecosystem - Concept and components; Trophic levels; Food Chain and Food Webs; Energy flow in the ecosystem; Ecosystem stability, and productivity.

UNIT III

Environmental degradation; Environmental Pollution (Air, Water and Solid Waste); Environmental Problems- Global Warming, Ozone depletion and Green House effect; Acid rain and climate change.

UNIT IV

Environmental Management: Concepts, approaches and management strategies; Environmental dimension in planning and sustainable development; Limits to growth - Rio Summit, Kyoto Protocol; Environment impact assessment; National environment policy and programs.

Books Recommended:

1. Sing. 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 Pushtak Bhawan, Allahabad.
7. Detwler, T.R.: Man's impact on the Environment, McGraw Hill, New York.
8. Sing, Savindra: Paryavaran Bhoogal, Prayag Pushtak Bhawan, Allahabad.
9. Odum, E.P.: Fundamentals of Ecology, W.B. Sounders Co. Philadelphia, 1971.
10. Mather, A.S. and Chapman, K.: Environmental Resources, Longman Group Ltd. U.K., 1995.

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Paper - V: PRACTICAL- REMOTE SENSING			
Paper Code: SOES/GEOG/C004 (P)			
Credit: 05			
Total Marks: 100	Internal Assessment: 40	End Semester: 60	Contact Hour per Week: 05
Course Objectives:			
1. The course aims at to equip students with principles and procedures of conduct field survey based on remote sensing data assisted by GIS.			
Note: The syllabus 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) - 40 Session Record Work - 10 Viva-voce - 10 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. This paper examination will be of three hours' duration in which exercises will be given on cartographic. All questions carry equal marks.			
UNIT I			
Familiarization with different types of remote sensing data, Identification of different platforms and sensors using data sets, Hands-on collection and downloading of open source satellite data.			
UNIT II			
Introduction of EMR interaction through spectral signatures, Hands-on with satellite data- band combinations and their significance, False Colour Composite (FCC) using digital satellite data.			
UNIT III			
Visual Interpretation Techniques: tone, texture, shape, size, pattern, and association, Practical exercise on land use/land cover classification from satellite images.			
UNIT IV			
Basic of GPS and Computer Cartography & Mapping.			

Books Recommended:

1. Jenson, J.R.: Introduction to Digital Image Processing, Prentice Hall, Englewood Cliffs, NJ.
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. Blackwell, B.: Statistics in Geography, Basil Blackwell Ltd., 1988.
6. Sinha, P.K. & Sinha, P.: Computer Fundamentals, 3rd Ed. B.P.B. Publishing.
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 Wiley, London, 1968.

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Paper - VI: POPULATION GEOGRAPHY			
Paper Code: SOES/GEOG/MN001			
Credit: 02			
Total Marks: 100	Internal Assessment: 40	End Semester: 60	Contact Hour per Week: 02

Course Objectives:

1. This course intends to orient the students towards spatial and interdisciplinary perspectives on population issues.
2. It will acquaint the candidate to understand the role of different dynamics of population changes and its impact on the economy, society, environment
3. The Students will acquaint with the different policies, and planning at diverse geographical spheres.

Course Outcomes:

- Students will be able to understand the scope, relevance, and evolving approaches of Population Geography.
- Students will be able to understand population composition, growth, density, and dynamics.
- Students will be able to apply key concepts and measures of fertility, mortality, and migration.
- Students will be able to evaluate population policies, and development indicators like the Human Development Index and National Population Policies.

Note: The paper consists of four units. Two questions will be set from each unit. The candidate will be required to attempt four questions in all. Answer should be precise. All questions carry equal marks.

UNIT I

Nature, scope and significance of Population Geography and its relationship with demography, Relevance of Population Geography; Recent approaches and methods to study population geography.

UNIT II

Population composition; Population growth, density, distribution patterns and their determinants; Concepts of under, over and optimum Population.

UNIT III

Concepts and measurements of fertility, mortality and migrations; major theories of fertility, mortality and migration, demographic transition theory, demographic dividend.

UNIT IV

Concept of Human Resource and Management; Population resource regions; Population planning and policies in under-developed and developed countries, Human development index; National Population Policies in India.

Books Recommended:

1. Asha A. Bhende and Tata Kanitkar (2024). Principles of Population Studies, 19th Edition, Himalaya Publishing House Pvt. Ltd., India
2. Chandna, R.C. (2000). A Geography of Population; Concept, Determinants and Patterns, Kalyani Pub. New Delhi
3. Beaujeu-Garnier, Jacqueline (1978). Geography of Population, Longman, London 1970.
4. Srinivasan, K. (1997). Basic Demographic Techniques and Applications, Sage Pub. New Delhi,
5. Clarke, J.I. (1972). Population Geography, Pergamon. Oxford
6. Bhagat, R. B. and Rajan, S. I. (2023). Researching Internal Migration, Routledge, London
7. Bhagat, R. B. (2008). Assessing the measurement of internal migration in India , Asian and Pacific Migration Journal, 17(1), 91-102
8. Md Izhaar Hassan (2020): Population Geography-A Systematic Exposition, Routledge, London
9. United Nations Demographic Manuals: https://www.unpopulation.org/en/development/desa/population/publications/manual/index.html
10. ORGI, UNFPA (2014), Training Manual on Demographic Techniques, https://india.unfpa.org/en/publications/training-manual-demographic-techniques

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Paper - VII: PRACTICAL-QUANTITATIVE TECHNIQUES			
Paper Code: SOES/GEOG/MN01 (P)			
Credit: 02			
Total Marks: 100	Internal Assessment: 40	End Semester: 60	Contact Hour per Week: 02

Course Objectives:

1. This course studies the concept of statistics and its geographical applications.
2. It lays the foundation of quantitative techniques to the students for spatial analysis.
3. It will enhance the ability to interpret data statistically.

Course Outcomes:

1. Students will be able to understand and differentiate various types of data and their levels of measurement with appropriate diagrammatic techniques.
2. Students will be able to apply methods to measure spatial distribution and analyze spatial inequality using statistical tools.
3. Students will be able to interpret and construct thematic and topographical maps, including weather maps.
4. Students will be able to understand and analyze the data patterns using scatter plots, measures of central tendency, and correlation techniques such as Spearman's Rank and Pearson's method.

The syllabus 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 three-hour duration.

Distribution of Marks:

Laboratory Work	-40
Sessional Record	-10
Viva Voce	-10

UNIT I

Types of data- spatial and non-spatial data; Levels of their measurement- Nominal, ordinal, interval and ratio; Diagrammatic representation of data, proportional circles, dot-spheres, cubes.

UNIT II

Measures of spatial inequality, Location quotient; Lorenz curve, Gini's Co-efficient; Concept of Spatial Distribution-Nearest Neighbour Analysis (NNA); Rank Size Rule;

UNIT III

Elements of Maps: Generalization, Symbolization and classification; choropleth and isopleths, Basics of topographical map and OSM, Elements of Weather map.

UNIT IV

Scatter plots and its types; Measures of central tendencies and dispersion, Correlation: Spearman's Rank and Karl Pearson's method, Simple linear regression: basic concepts and construction of regression line.

Books Recommended:

1. Thomas Lillesand, Ralph W. Kiefer, Jonathan Chipman (2015). Remote Sensing and Image Interpretation, 7th Edition, Wiley, New York
2. Partha Basu (2023). Advanced Practical Geography, 4th Edition, Books and Allied Private Limited, India
3. Aslam Mahmood (2020). Statistical Methods in Geographical Studies, Rajesh Publications, India
4. S. P. Gupta (2021). Statistica Methods, 46th Edition, Sultan Chand and Sons, New Delhi
5. D. N. Gujrati, D.C. Porter and S. Gunasekar (2017), Basic Econometrics, 5th Edition, McGraw Hill Education
6. Ashis Sarkar (2015). Practical Geography: A Systematic Approach, 3rd Edition, Orient BlackSwan,
7. Mishra, R.P. & Ramesh A (1989). Fundamentals of Cartography, 2nd Edition, South Aisa Books,
8. Singh, R. L. and R. P. B. Singh (2015). Elements of Practical Geography (English/Hindi), Kalyani Publishers
9. eGyanKosh, IGNOU Self Learning Material (SLM), Master of Science in Geography (MSCGG), https://egyankosh.ac.in/handle/123456789/98159
10. Kali Charan Sahu (2024), Textbook Of Remote Sensing and Geographical Information Systems, Atlantic Publishers & Distributors (P) Ltd, India.

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Srinagar (Uttarakhand)

Geography-B.A./B.Sc.
Fourth Year- (U.G. with Honours)
Semester-VIII
CORE-Major

Paper - VIII: CLIMATOLOGY			
Paper Code: SOES/GEOG/C005			
Credit: 05			
Total Marks: 100	Internal Assessment: 40	End Semester: 60	Contact Hour per Week: 05
Course Objectives:			
1. The objective of the course is to provide understanding of weather phenomena, 2. Dynamics of global climates and generation of climatic information and their application.			
Course Objectives: Students will learn the atmosphere, climate, weather, ocean and related processes which affect human day to day life. Additionally, student will learn regarding the emerging environmental problems such as global warming and climate change.			
Note: The paper consists of four units. Two questions will be set from each unit. The candidate will be required to attempt four 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; Precipitation and Humidity.			
UNIT II			
Air Masses - Origin, growth, classification and distribution; Horizontal and vertical motion of winds; Fronts and Fronts Genesis; Cyclones and Anti- cyclones; Temperate and Tropical Cyclones			
UNIT III			
Climate Classification of Koppen and Thornthwaite; Major climate types; Weather analysis - weather forecasting- methods, types and accuracy; Weather and human behavior; Weather modification; Atmospheric hazards - Cloud Bursts.			
UNIT IV			
Climatic Changes – Definition and detection; Tree rings; Solar variability; Human impact on global climate; Global Warming; Artificial climate and acid precipitation.			

Books Recommended:

1. Chorley, R.J. and Barry, R.G.: Atmosphere, Weather and Climate Methuen & Co. Ltd. London, 1995.
2. Critchfield, H.J.: General Climatology, Prentice Hall of India, New Delhi, 2002.
3. Hidoore, J.J.: Global Environment Change, Prentice Hall, New Jersey, 1996.
4. Lockwood, J.G.: World Climatology, Elbs and Edward Arnold (Pub.) Ltd., 1979.
5. Miller, A. et al: Elements of Meteorology, Merrill and Columbus.
6. Oliver, J.E. & Hiddore J.J.: Climatology: An Atmosphere Science, Pearson Education, India, 2003.
7. Thomson, R.D. and Perry, A.: Applied Climatology, Routledge, London and New York, 1997.
8. Trewartha, G.T.: An introduction to climate, McGraw Hill Series in Geography, 1954.
9. Lal, D.S.: Climatology, Sharda Pushtak Bhawan, Allahabad.
10. Singh, Savindra: Climatology, Prayag Pushtak Bhawan, Allahabad, 2005.
11. Lal, D.S.: Jalvayu Vigyan, Sharda Pushtak Bhawan, Allahabad.
12. Singh, Savindra: Jalvayu Vigyan, Prayag Pushtak Bhawan, Allahabad.

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Paper – IX: REGIONAL PLANNING AND DEVELOPMENT			
Paper Code: SOES/GEOG/C006			
Credit: 05			
Total Marks: 100	Internal Assessment: 40	End Semester: 60	Contact Hour per Week: 05
Course Objectives:			

1. To comprehend the concept, scope, and various types of planning, with a focus on Regional Planning and its significance.
2. To examine the historical development of Regional Planning globally and within the context of India, tracing its evolution and key milestones.
3. To analyze the planning regions of India, understanding their characteristics, needs, and challenges in the process of regional development.

Course Outcomes:

1. Demonstrate an understanding of the diverse types of planning, including Regional Planning, and their roles in addressing spatial challenges and fostering balanced development.
2. Evaluate the historical evolution of Regional Planning, recognizing its adaptation to changing socio-economic contexts and its implications for contemporary regional development strategies.

Note: The paper consists of four units. Two questions will be set from each unit. The candidate will be required to attempt four questions in all. Answer should be precise. All questions carry equal marks.

UNIT I

Concept, scope and types of Planning, Regional Planning-its meaning and needs; Approaches to Regional Planning; Historical development of Regional Planning, Planning Regions of the India

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 region; Delineation and regions; Regional Planning strategies for backward areas, hill areas, tribal areas; Case studies of planning regions; Problems and prospects of Himalayan region.

UNIT IV

Spatial inequalities and regional imbalances in India; Problems of planning regions, indicators and level of regional development; Dilemma of development of problem areas, Regional Planning & development in India; Regional Planning and development strategies in the 21st century; NITI Aayog

Books Recommended:

1. Kuhlinski A.R. (ed.): Growth Poles and Growth Centers in Regional Planning, Mouton, The Hague, 1972.
2. Misra, R.P. et al: Regional Planning Concepts, Techniques and Policies, University of Mysore, Mysore, 1969.
3. Misra, R.P. et. At: Multi Level Planning, Heritage Publishers, Delhi, 1930.
4. Hall, Peter: Urban and Regional Planning, Penguin Books ins. New York.
5. Glasson John: Regional Planning, Hutchison, London.
6. Misra, R.P.: Development Issues of Our Time, Concepts Pub. Co., New Delhi.

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Paper - X: INTRODUCTION TO GIS			
Paper Code: SOES/GEOG/C007			
Credit: 05			
Total Marks: 100	Internal Assessment: 40	End Semester: 60	Contact Hour per Week: 05
Course Objectives:			
1. To introduce to the students about the basic principles of Remote Sensing, to indicate the methods of visual and digital interpretations of satellite imageries and to outline the application of remote sensing.			
Course Outcomes: After the completion of the course, the students will have the ability to: 1. Appreciate the basic principles and components of Remote sensing; 2. comprehend the basics of aerial photogrammetry and image processing for spatial analysis; 3. Analyze the basic spatial resources for land use and Land Cover for meaningful interpretation.			
Note: The paper consists of four units. Two questions will be set from each unit. The candidate will be required to attempt four questions in all. Answer should be precise. All questions carry equal marks.			
UNIT I			
Geographical Information System (GIS): Definition, scope and specific characteristics; development in the world and in India, Relation of GIS with other collateral subjects like Cartography, Remote Sensing, Computer Science and Geography.			
UNIT II			
Basic concepts and essential elements of GIS-Map concepts; Data types involved in GIS; types of data structures, their characteristics, and merits-demerits, Components of GIS. Methods of inputting data in GIS.			
UNIT III			
GIS softwares: paid and open. Integration of remote sensing data with GIS; Digital terrain modeling and its application in GIS; Spatial analysis in GIS.			
UNIT IV			
Generation Date Base Management System (DBMS), shapefile; point, line, polygon. Geo-referencing and preparation of maps, Components of GPS; Data Extraction from GPS to GIS and mapping.			

Books Recommended:

1. Lillesand, Thomas M. *Remote Sensing and Image Interpreation*. Wiley India, New Delhi. 2016. Michael, N. Demers. *Fundamentals of Geographic Information System*, Wiley India. New Delhi. 2015.
2. Nag, P., *Introduction to GIS,* Concept India, New Delhi, 2008.
3. Lo C.P. & Yeung A.K.W., *An Introduction to GIS*, P.H.I/Pearson Edu., Asia, 2002
4. Haywood I., Cornelius I. & Carver S., *An introduction to GIS*, Longman/Pearson Education Asia, 1998/2000.
5. Martin D. *GIS and their Socio-economic Applications,* Routledge, 2nd ed., 1997.
6. Goutam, N.C., *Fundamentals of GIS*, Pink Pubs. 1993.
7. Heywoods, I., Cornelius, S and Carver, S., *An Introduction to Geographical Infromation system*. Prentice Hall,2006.
8. Kraak M.J. & Ormeling F., *Cartography: visualization of Geo-spatial Data,* Pearson Education Asia., 2nd Ed., 2004.
9. Burrough P.A. & McDonnell R.A., *Principles of GIS for Land Resource Assessment,* OUP, 2nd ed. 1998.
10. Chrisman N., *Exploring Geographic Information Systems*, Wiley, 1997.

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Paper - XI: PRACTICAL- INTRODUCTION TO GIS			
Paper Code: SOES/GEOG/C008 (P)			
Credit: 05			
Total Marks: 100	Internal Assessment: 40	End Semester: 60	Contact Hour per Week: 05
Course Objectives:			
1. The course aims at to equip students with principles and procedures of conduct field survey based on remote sensing data assisted by GIS.			
Note: The syllabus 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) - 40 Session Record Work - 10 Viva-voce - 10 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. This paper examination will be of three hours' duration in which exercises will be given on cartographic. All questions carry equal marks.			
UNIT I			
Basic of Computer; Concept of maps; Coordinates System; 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			
Preparation of land use/land cover map of a selected area and final project report.			

Books Recommended:

1. Pratt, W.K.: Digital Image Processing, John Wiley & Sons, New York, 1995.
2. Hord, R.M.: Digital Image Processing of Remotely sensed data, Academic Press, New York, 1989.
3. Nag, P.: Thematic cartography and Remote Sensing Concept, Publishing House, New Delhi.
4. Blackwell, B.: Statistics in Geography, Basil Blackwell Ltd., 1988.
5. Sinha, P.K. & Sinha, P.: Computer Fundamentals, 3rd Ed. B.P.B. Publishing.
6. Lo, C.P.: Applied Remote Sensing, Longman Scientific and Technical, Harlow, ESSEX.
7. PEUQUET, D.J. & Marble, D.F.: Introductory Readings in Geographic Information Systems, Taylor & Francis, Washington, 1990.
8. Spurr, R.: Photogrammetry and Photo Interpretation, The Rolland Press, Co. London, 1960.
9. Cole, J.P. and King, C.A.M.: Quantitative Geography, John Wiley, London, 1968.

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Paper - XII: HAZARD AND DISASTER MANAGEMENT			
Paper Code: SOES/GEOG/E002			
Credit: 04			
Total Marks: 100	Internal Assessment: 40	End Semester: 60	Contact Hour per Week: 04
Course Objectives:			
1. The course begins with a discussion on alternative concepts of disasters, calamity, risk and hazard. 2. The course then proceeds to aggregate the models used to benchmark disasters 3. In the final its de-myths that disasters are natural and lays bare the role of vulnerability in creating disasters and what needs to be managed.			
Course Outcomes: After end of this lesson, it is expected that students will prepare project on given topic varying from natural calamities to disaster impact region.			
Note: The paper consists of four units. Two questions will be set from each unit. The candidate will be required to attempt four 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; Magnitude determinants and scale.			
UNIT II			
Natural Hazards – Typology; Regional dimension of Hazards; Occurrence and trends; Methods of identifying hazard prone regions; Major terrestrial disaster- seismic disasters, volcanic disaster, landslides and tsunamic disasters; Reasons of increasing frequency of disasters.			
UNIT III			
Disaster Management: Concept, stage of disaster management; Pre-disaster stage-disaster preparedness, disaster research, disaster prediction and disaster warning; Methods and levels of preparedness; Disaster mitigation and disaster prevention; post-disaster stage-rescue and relief work; Remedial measures; Long term disaster planning.			
UNIT IV			
Different types of disaster and hazard prone areas in India; Disaster management policies and approaches; Major disasters in India and their management; Response to disasters, government, non-government; Community and individual; Mitigation and Management; Appraisal of government programs/institution of Disaster Management; Significance of Remote Sensing and GIS in planning to the context of Disaster Management.			

Books Recommended:

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

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Paper – XII: SOCIAL GEOGRAPHY			
Paper Code: SOES/GEOG/MN02			
Credit: 02			
Total Marks: 100	Internal Assessment: 40	End Semester: 60	Contact Hour per Week: 02
Course Objectives:			

The course is designed to acquaint the students to

1. The basics of social geography, its key concepts, approaches and methods in national and international perspective.
2. The roles of different factors of regionalization, social identity, and its spatial patterns.
3. The dynamics of social transformation in India and various related issues.

Course Outcomes: After successful completion of this course students will be capable-

- To understand the definition, nature, scope, and key concepts of Social Geography, including approaches and social indicators.
- To understand the spatial distribution and diversity of social groups in India, and its dynamics.
- To examine the processes of social transformation and social mobility.
- To understand different inclusion and exclusion, social justice, policies and planning with special reference to Uttarakhand.

Note: The paper consists of four units. Two questions will be set from each unit. The candidate will be required to attempt four questions in all. Answer should be precise. All questions carry equal marks.

UNIT I

Definition, nature and scope of social geography; concept of place, space and society and relevance of social geography; approaches and methods.

UNIT II

Key concepts in social geography- social stratification and differences, social hierarchy, culture, social structure, power structure and space; social ecology and space, mobility and space, social pluralism and diversity, race and ethnicity, religion.

UNIT III

Components of social space in India, process of social transformation- Sanskritization, westernization, modernization: post-modern approaches to understand social change and transformation, social bases of identity; social groups, distribution of castes, tribes and language in India, social factors in region formation; socio-cultural regionalism in India.

UNIT IV

Segregation and assimilation; social and spatial justice; inclusion and exclusion, indicators of social well-being and social pathology (crime, conflicts, other forms of social disorganization), problems and processes of socio-economic and political-inequality, social security and protective discrimination, policies and planning with special reference to India and Uttarakhand.

Books Recommended:

1. Ahmed, A. (1999). Social Geography, Rawat Publication, Jaipur.
2. Kath Browne, Dhiren Borisa, Mary Gilmartin, Niharika Banerjea (2024). Social Geographies-the Basics, Routledge, London
3. Social Geography, IGNOU Self Learning Material, Block-1 to Block-4, https://egyankosh.ac.in/handle/123456789/109916
4. Jones, E. and John Eyles (1979). Social Geography. Oxford University Press, London
5. Harvey, D. (1989). The Condition of Postmodernity: An Enquiry into the Origins of Cultural Change. Oxford: Blackwell.
6. Smith, David M. (1977). Human Geography: A Welfare Approach, Edward Arnold, London
7. Soja, E. W. (2009). The city and spatial justice. http://www.jssj.org.

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8. Pirie, G. H. (1983). On Spatial Justice. Environment and Planning A: Economy and Space. 15(4) https://doi.org/10.1068/a150465.
9. Crane, R.I. (1973), Regions and regionalism in South Asia Studies: An Exploratory Study, Durham, Duke University.
10. Dube, S.C. (1991), Indian Societies, National Book Trust of India, New Delhi.
11. Kaufmann V. (2005). Re-thinking Mobility. Contemporary Sociology, Hampshire: Ashgate
12. Rawat, P.S. (1993): Migration and structural change a study of rural society in Garhwal Himalaya, Sarita Book House, Delhi, India
13. Indian Institute of Public Administration. (2020). Caste-Based Segregation in Public Spaces. New Delhi: IIPA.
14. Lefebvre, H. (1991). The Production of Space. Blackwell.
15. Pahl, R. E. (1965). 'Trends in Social Geography.', In Chorley, R. J. & Haggett, P. (Eds.). Frontiers in Geographical Teaching., London: Routledge.
16. Mukherjee, R. (1979). The construction of social indicators, The Use of Socio-Economic Indicators in Development Planning. Paris: UNESCO, United Nations Educational, Scientific and Cultural Organization, pp. 33 59.
17. Sheldon, Eleanor B., and Wilbert E. Moore (Eds.) (1968). Indicators of Social Change: Concepts and Measurements. New York: Russell Sage Foundation.
18. Laitinen, A., & Särkelä, A. (2018). Four conceptions of social pathology. *European Journal of Social Theory*, *22*(1), 80-102. https://doi.org/10.1177/1368431018769593 (Original work published 2019)
19. Bhagat, R. B. (2023). Population and Political Imagination: Census, Register and Citizenship in India, Routledge, London

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Paper - XIII: PRACTICAL IV - CARTOGRAPHY			
Paper Code: SOES/GEOG/MN02 (P)			
Credit: 02			
Total Marks: 100	Internal Assessment: 40	End Semester: 60	Contact Hour per Week: 02
Course Objectives:			

1. Larger objective of this course is to develop the cartographic skill of students to depict and represent the geographic information on the map.
2. The course will create the ability of students to adapt various methods of relief, slope, projection and climatic analysis as well as thematic mapping.

Note: The syllabus 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) - 40
Session Record Work - 10
Viva-voce - 10

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 cartographic. All questions carry equal marks.

UNIT I

Map Projection: Mercator's, Polyconic, Stereographic, Interrupted Mollweide's and Interrupted Sinusoidal.

UNIT II

Slope analysis by Wentworth's, Smith's, Henry-Raiz's and Robinson's Methods; Analysis of relief characteristics from contour; Profile - Transverse, Longitudinal, Serial, Superimposed, Projected and Composite.

UNIT III

Morphometric analysis-Area-height, Altimetric frequency and Hypsometric curve; Drainage density; Stream order, Elongation; Circularity and Bifurcation ratio; Geomorphic Mapping.

UNIT IV

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

Note: Examination - Departmental Committee appointed by HoD for University Campuses. External Examiners will be Appointed by the University for Affiliated Colleges.

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. 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 Social-Economic Data.
9. Sharma, J.P.: Practical Geography (Hindi).

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Detailed Syllabus

Geography-B.A./B.Sc.
Fourth Year- (U.G. Honours with Research)
Semester-VII
CORE-Major

Paper - I: GEOMORPHOLOGY			
Paper Code: SOES/GEOG/C001			
Credit: 05			
Total Marks: 100	Internal Assessment: 40	End Semester: 60	Contact Hour per Week: 05
Course Objectives:			
2. The purpose of the course is to introduce students the evolution, structure and configuration, landforms and, land forming process.			
Course Outcomes: After the completion of the course, the students will have the ability to: V. Understand the components of the earth system – atmosphere, lithosphere and hydrosphere; V. Appreciate and understand various features of the spheres with local, regional and global examples; VI. Understand the Earth Movements and development of landforms.			
Note: The paper consists of four units. Two questions will be set from each unit. The candidate will be required to attempt four 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, Davis, Penk and Hack and morphogenetic region.			
UNIT II			
Plate tectonics; Mountain building; Isostasy; Tectonic Geomorphology; Theories of slope development by Young and King; Peneplain and Pedi plains; Geological structure and rocks.			
UNIT III			
Geomorphic process – River, glacier, underground water: Mass movement and resultant landforms; Morphometry of drainage basin; Profile of equilibrium rejuvenation and polycyclic landscape. (With special reference to Uttarakhand Himalaya)			
UNIT IV			
Applied Geomorphology engineering works; Anthropogenic process and landscape planning; Regional Geomorphology of Uttarakhand -Great, Lesser and Siwalik Himalaya.			

Books Recommended:

1. Bloom, A.L.: Geomorphology, Prentice Hall, New Jersey USA, 1979.
2. Goudie, A.: Geomorphological Techniques, George Allen and Unwin, London, 1981.
3. Washborn, A.L.: Periglacial Process 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 Theories, J.: Processes in Geomorphology, Arnold Hienman, London, 1979.
7. Phodes, D.D. and William, G.P.: Adjustment of Fluvial Process, George Allen and Unwin, Boston, 1982.
8. Tricart, L. and Callam: Introduction to climate Geomorpholgy, Longman, London, 1972.
9. Derbyshrine, E. Gregory K.J. and Halls, J.R.: Geomorphological Processes, Butterworths, London, 1979.
10. Gregory, K.J. and Willing, D.E.: Drainage Basin Processes and Forms, Edward Arnold, London,
11. Gregory, K.J. and Willing, D.E.: Man and Environment Processes, Butter Worths, London, 1981.
12. Singh Savindra: Bhu- Akriti vigyan in Hindi

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Paper – II: GEOGRAPHY OF RESOURCES			
Paper Code: SOES/GEOG/C002			
Credit: 05			
Total Marks: 100	Internal Assessment: 40	End Semester: 60	Contact Hour per Week: 05
Course Objectives:			
1. Awareness about resource availability, accessibility, utilization, its use and misuse. 2. Spatial distribution of natural resources. 3. Resource management and governance.			
Course Outcomes: After end of this course student will be able to understand and comprehends types, classification, distribution of resources and path of sustainable resource management.			
Note: The paper consists of four units. Two questions will be set from each unit. The candidate will be required to attempt four questions in all. Answer should be precise. All questions carry equal marks.			
UNIT I			
Definition and concept of Resources, Classification of Resources; Nature and Scope of Resources Geography; Theories of Resource use and Management.			
UNIT II			
Land, Water, Energy, Biotic Resources, and Human Resource - distribution, use-misuse and conservation Global and Indian scenario.			
UNIT III			
Resources depletion and emerging issues -Deforestation, loss of bio-diversity, acid rain, energy crises, environmental problems			
UNIT IV			
Over Exploitation and Conservation of resources; Global initiatives (Agenda 21, SDGs) and national resource policies, Community base Natural Resource Management (CBNRM), Resource management practices in Uttarakhand.			

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 Sklnnet, B.J. (ed): Resources and World Development, Jogn Wiley and Sons, New York, 1986.
4. Newson, M.D.: Land, Water and Development, River Basin System and Management, Routledge, London, 1991.
5. Owen, S. and Owen, P.L.: Environment Resources and Conservation, Cambdridge University Press, New York, 1991.
6. Rees, J.: Natural Resources, Allocation, Economics and Policy, Methuen, London, 1988.
7. Simmons, I.G.: Earth, Air and Water Resources and Environment in Late 20th Century, Edward, Arnold, 1991.

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Paper - III: RESEARCH METHODOLOGY			
Paper Code: SOES/GEOG/C009			
Credit: 05			
Total Marks: 100	Internal Assessment: 40	End Semester: 60	Contact Hour per Week: 05
Course Objectives:			
1. To develop, enable and familiarize the students with different research approaches and aptitudes of geography. 2. To explain and understand the research design, database, methodology, sampling framework, hypotheses testing with relevant tools and techniques.			
Note: The paper consists of four units. Two questions will be set from each unit. The candidate will be required to attempt four 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 and 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, questionnaire and observation. Introduction to advance open sources statistical software (hands on training)			
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; Farming of pilot and projects.			

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 methodology, Excel Books, New Delhi.
3. Bhattacharya, D.K. (2005): Research Methodology, Excel Books, New Delhi.
4. Blaxter, L.; Hughes, C. and Tight, M. (1996): How to Research. Open University Press, Buckingham.
5. Denzin, N.K. and Lincoln, Y.S., (eds.) (2000): handbook of Qualitative Research thousand Oaks C.A. Sage Publications.
6. Dorling, D. And Simpson, L.(eds.) (1999): Statistics in Society. Edward Arnold, London.
7. Flowerdew, R. and Martin, D. (eds.) (1997): Methods in Human Geography. A Guide for Students Doing a Research Project. Longman, Harlow.
8. Hay, I. (ed.) (2000): Qualitative research Methods in Human Geography. Oxford University Press, New York.
9. Henn, M., Mark W., and Nick F. (2006): A short introduction to Social Research, Vistaar Publications, New Delhi.
10. Eyles J. And Smith D.M. (1988): Qualitative Methods in Human Geography, Polity Press, Dales Brewering Cambridge.
11. Kitchin, R. And Tate, N., (2001): Conducting Research into Human geography, Theory, Methodology and Practice. Prentice-hall, London.
12. Har Prasad: Research Methodology and Techniques in Geography, Rawat Publications, Jaipur.

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Paper - IV: REMOTE SENSING & GIS			
Paper Code: SOES/GEOG/E003			
Credit: 04			
Total Marks: 100	Internal Assessment: 40	End Semester: 60	Contact Hour per Week: 04
Course Objectives:			
1. To introduce to the students about the basic principles of Remote Sensing, to indicate the methods of visual and digital interpretations of satellite imageries and to outline the application of remote sensing.			
Course Outcomes: After the completion of the course, the students will have the ability to: 1. Appreciate the basic principles and components of Remote sensing; 2. comprehend the basics of aerial photogrammetry and image processing for spatial analysis; 3. Analyze the basic spatial resources for land use and Land Cover for meaningful interpretation.			
Note: The paper consists of four units. Two questions will be set from each unit. The candidate will be required to attempt four 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 principles of micro wave Remote Sensing. Types of R.S. Platforms; Satellites and sensor; 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 Photogrammetry, Orientation, relief displacement, stereoscopic, 3D viewing, Uses of A.P. in landforms mapping and urban planning.			
UNIT III			
Definition, concept, scope and components of GIS; Data and Information; Geo-referencing and rectification; Data imputing methods and GPS. Data base, type of data; Data models in GIS; Data integration; Geospatial data analysis.			
UNIT IV			
Computer Cartography and mapping in digital image; 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:

8. Sabine, F.F.: Remote Sensing- Principles & Interpretation.
9. Lillesand, R.M.: Remote Sensing and Image Interpretation Kiefer R.W.
10. Chauniyal, D.D.: Remote Sensing and GIS (Hindi).
11. Jensen, J.R.: Introductory Digital Image Processing- A Remote Sensing Perspective.
12. Demer, M.N.: Fundamentals of Geographic Information System.
13. Martin, D.S.: Geographic Information System- Socio-Economic Applications.
14. Aronoff, S.: Principles of Geographical Information Systems for Land Resource Assessment.
15. Aronoff, S.: Geographic Information System- A Management Perspective.
16. Bontham Carter, G.F.: Geographic Information System for Geoscientists.
17. Jones, C.: Geographical Information System & Computer Cartography.
18. Ayery, T.E.: Introduction to Aerial Photographs.
19. Pratt, W.K.: Digital Image Processing, John Wiley & Sons Now York (1995).

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Paper - V: PRACTICAL- REMOTE SENSING & GIS			
Paper Code: SOES/GEOG/C010 (P)			
Credit: 05			
Total Marks: 100	Internal Assessment: 40	End Semester: 60	Contact Hour per Week: 05
Course Objectives:			
2. The course aims at to equip students with principles and procedures of conduct field survey based on remote sensing data assisted by GIS.			
Note: The Laboratory work is divided into four units. Eight questions will be set selecting at least two questions from each unit. The division of marks in practical is given below: Note: Examination Departmental Committee Appointed by HoD for University Campuses. External Examiners will be Appointed by the University for Affiliated Colleges. Laboratory Work: M.M. 20 Field Work: M.M. 30 Sessional Records: M.M. 05 Viva-voce: M.M. 05			
UNIT I			
Basic of Computer; Concept of maps; Coordinates System; 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 and Web GIS.			
UNIT IV			
Basic of GPS and Computer Cartography & Mapping, Advanced Cartography techniques, Design of research project on physical and human studies.			

Books Recommended:

1. Jenson, J.R.: Introduction to Digital Image Processing, Prentice Hall, Englewood Cliffs, NJ.
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. Blackwell, B.: Statistics in Geography, Basil Blackwell Ltd., 1988.
6. Sinha, P.K. & Sinha, P.: Computer Fundamentals, 3rd Ed. B.P.B. Publishing.
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 Wiley, London, 1968.

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Paper - VI: POPULATION GEOGRAPHY			
Paper Code: SOES/GEOG/MN01			
Credit: 02			
Total Marks: 100	Internal Assessment: 40	End Semester: 60	Contact Hour per Week: 02
Course Objectives:			
4. This course intends to orient the students towards interdisciplinary perspectives on population issues at different geographical scales. 5. It will acquaint the candidate to appreciate the role of spatial perspectives towards showcasing population changes and its impact on the economy, society, environment and politics at diverse geographical spheres.			
Course Outcomes: At the end of this course, it is expected that students will enable to describe and evaluate spatial dimension of population dynamics			
Note: The paper consists of four units. Two questions will be set from each unit. The candidate will be required to attempt four questions in all. Answer should be precise. All questions carry equal marks.			
UNIT I			
Nature, scope and significance of Population Geography and 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-developed and developed countries with special reference to Japan and India, Human development index; National Population Policy.			

Books Recommended:

1. Chandna, R.C.: A Geography of Population; Concept, Determinants and Patterns, Kalyani Pub. 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 Pub. New Delhi, 1998.
7. Sundaram, K.V. and Nangia, Sudesh (ed.): Population Geography, Heritage Pub. Delhi, 1986.
8. Woods, R.; Population Analysis in Geography, London 1979.
9. Zelinsky, Wilbur: A Prologue to Population Geography, Prentice Hall, 16966.
10. Clarke, J.I.; Population Geograhy, Pergamon. Oxford, 1972.

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Paper - VII: PRACTICAL-QUANTITATIVE TECHNIQUES			
Paper Code: SOES/GEOG/MN01 (P)			
Credit: 02			
Total Marks: 100	Internal Assessment: 40	End Semester: 60	Contact Hour per Week: 02
Course Objectives:			

4. This course studies the concept of statistics and its geographical applications.
5. It lays the foundation of quantitative techniques to the students for spatial analysis.
6. It will enhance the ability to interpret data statistically.

Course Outcomes:

5. Students will be able to understand and differentiate various types of data and their levels of measurement with appropriate diagrammatic techniques.
6. Students will be able to apply methods to measure spatial distribution and analyze spatial inequality using statistical tools.
7. Students will be able to interpret and construct thematic and topographical maps, including weather maps.
8. Students will be able to understand and analyze the data patterns using scatter plots, measures of central tendency, and correlation techniques such as Spearman's Rank and Pearson's method.

The syllabus 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 three-hour duration.

Distribution of Marks:

Laboratory Work	-40
Sessional Record	-10
Viva Voce	-10

UNIT I

Types of data- spatial and non-spatial data; Levels of their measurement- Nominal, ordinal, interval and ratio; Diagrammatic representation of data, proportional circles, dot-spheres, cubes.

UNIT II

Measures of spatial inequality, Location quotient; Lorenz curve, Gini's Co-efficient; Concept of Spatial Distribution-Nearest Neighbour Analysis (NNA); Rank Size Rule;

UNIT III

Elements of Maps: Generalization, Symbolization and classification; choropleth and isopleths, Basics of topographical map and OSM, Elements of Weather map.

UNIT IV

Scatter plots and its types; Measures of central tendencies and dispersion, Correlation: Spearman's Rank and Karl Pearson's method, Simple linear regression: basic concepts and construction of regression line.

Books Recommended:

1. Thomas Lillesand, Ralph W. Kiefer, Jonathan Chipman (2015). Remote Sensing and Image Interpretation, 7th Edition, Wiley, New York
2. Partha Basu (2023). Advanced Practical Geography, 4th Edition, Books and Allied Private Limited, India
3. Aslam Mahmood (2020). Statistical Methods in Geographical Studies, Rajesh Publications, India
4. S. P. Gupta (2021). Statistica Methods, 46th Edition, Sultan Chand and Sons, New Delhi
5. D. N. Gujrati, D.C. Porter and S. Gunasekar (2017), Basic Econometrics, 5th Edition, McGraw Hill Education
6. Ashis Sarkar (2015). Practical Geography: A Systematic Approach, 3rd Edition, Orient BlackSwan,
7. Mishra, R.P. & Ramesh A (1989). Fundamentals of Cartography, 2nd Edition, South Aisa Books,
8. Singh, R. L. and R. P. B. Singh (2015). Elements of Practical Geography (English/Hindi), Kalyani Publishers
9. eGyanKosh, IGNOU Self Learning Material (SLM), Master of Science in Geography (MSCGG), https://egyankosh.ac.in/handle/123456789/98159
10. Kali Charan Sahu (2024), Textbook of Remote Sensing and Geographical Information Systems, Atlantic Publishers & Distributors (P) Ltd, India.

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Geography-B.A./B.Sc.
Fourth Year- (U.G. Honours with Research)
Semester-VIII
CORE-Major

Paper - VIII: CLIMATOLOGY			
Paper Code: SOES/GEOG/C008			
Credit: 05			
Total Marks: 100	Internal Assessment: 40	End Semester: 60	Contact Hour per Week: 05
Course Objectives:			
3. The objective of the course is to provide understanding of weather phenomena, 4. Dynamics of global climates and generation of climatic information and their application.			
Course Objectives: Students will learn the atmosphere, climate, weather, ocean and related processes which affect human day to day life. Additionally, student will learn regarding the emerging environmental problems such as global warming and climate change.			
Note: The paper consists of four units. Two questions will be set from each unit. The candidate will be required to attempt four 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; Precipitation and Humidity.			
UNIT II			
Air Masses - Origin, growth, classification and distribution; Horizontal and vertical motion of winds; Fronts and Fronts Genesis; Cyclones and Anti- cyclones; Temperate and Tropical Cyclones			
UNIT III			
Climate Classification of Koppen and Thornthwaite; Major climate types; Weather analysis - weather forecasting- methods, types and accuracy; Weather and human behavior; Weather modification; Atmospheric hazards - Cloud Bursts.			
UNIT IV			
Climatic Changes – Definition and detection; Tree rings; Solar variability; Human impact on global climate; Global Warming; Artificial climate and acid precipitation.			

Books Recommended:

1. Chorley, R.J. and Barry, R.G.: Atmosphere, Weather and Climate Methuen & Co. Ltd. London, 1995.
2. Critchfield, H.J.: General Climatology, Prentice Hall of India, New Delhi, 2002.
3. Hidoore, J.J.: Global Environment Change, Prentice Hall, New Jersey, 1996.
4. Lockwood, J.G.: World Climatology, Elbs and Edward Arnold (Pub.) Ltd., 1979.
5. Miller, A. et al: Elements of Meteorology, Merrill and Columbus.
6. Oliver, J.E. & Hiddore J.J.: Climatology: An Atmosphere Science, Pearson Education, India, 2003.
7. Thomson, R.D. and Perry, A.: Applied Climatology, Routledge, London and New York, 1997.
8. Trewartha, G.T.: An introduction to climate, McGraw Hill Series in Geography, 1954.
9. Lal, D.S.: Climatology, Sharda Pushtak Bhawan, Allahabad.
10. Singh, Savindra: Climatology, Prayag Pushtak Bhawan, Allahabad, 2005.
11. Lal, D.S.: Jalvayu Vigyan, Sharda Pushtak Bhawan, Allahabad.
12. Singh, Savindra: Jalvayu Vigyan, Prayag Pushtak Bhawan, Allahabad.

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Paper - IX: DISSERTATION			
Paper Code: SOES/GEOG/C011			
Credit: 12			
Total Marks: 100	Internal Assessment: 40	End Semester: 60	Contact Hour per Week: 05
Course Objectives:			

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 students are to be sensitized about field work and data/information collection and writing of report.

Note:

Topic of dissertation will be assigned by HOD or Supervisor of the Dept. concerned. HOD will ensure no repetition of topic and area. Dissertation topic will be selected from any core/elective paper offered by the student in semester only. Area of study shall be the Himalaya region preferably.

Distribution of marks

Periodical presentation (Internal Assessment) by Supervisor - 20 Marks
Dissertation (evaluation by external examiner and supervisor jointly) - 60 Marks
Power Point/ Viva-voce - 20 Marks

The project report will involve statement of objectives and scope of field investigation, methods of field work for studies of different scales (Macro, Meso and Micro), Preparation of a questionnaire/schedule, sampling techniques, collection, processing, presentation, analysis and interpretation of data/information. The candidates are required to write a project report on assigned problem involving field investigations.

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.
3. Power point presentation is must, Separate external examiner will be appointed by the University, Supervisor of dissertation will act as an Internal examiner. In the absence of Supervisor, HOD will act as internal examiner.

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Paper - X: HAZARD AND DISASTER MANAGEMENT			
Paper Code: SOES/GEOG/E004			
Credit: 04			
Total Marks: 100	Internal Assessment: 40	End Semester: 60	Contact Hour per Week: 04
Course Objectives:			
1. The course begins with a discussion on alternative concepts of disasters, calamity, risk and hazard. 2. The course then proceeds to aggregate the models used to benchmark disasters 3. In the final its de-myths that disasters are natural and lays bare the role of vulnerability in creating disasters and what needs to be managed.			
Course Outcomes: After end of this lesson, it is expected that students will prepare project on given topic varying from natural calamities to disaster impact region.			
Note: The paper consists of four units. Two questions will be set from each unit. The candidate will be required to attempt four 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; Magnitude determinants and scale.			
UNIT II			
Natural Hazards – Typology; Regional dimension of Hazards; Occurrence and trends; Methods of identifying hazard prone regions; Major terrestrial disaster- seismic disasters, volcanic disaster, landslides and tsunamic disasters; Reasons of increasing frequency of disasters.			
UNIT III			
Disaster Management: Concept, stage of disaster management; Pre-disaster stage-disaster preparedness, disaster research, disaster prediction and disaster warning; Methods and levels of preparedness; Disaster mitigation and disaster prevention; post-disaster stage-rescue and relief work; Remedial measures; Long term disaster planning.			
UNIT IV			
Different types of disaster and hazard prone areas in India; Disaster management policies and approaches; Major disasters in India and their management; Response to disasters, government, non-government; Community and individual; Mitigation and Management; Appraisal of government programs/institution of Disaster Management; Significance of Remote Sensing and GIS in planning to the context of Disaster Management.			

Books Recommended:

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

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Paper - XI: PRACTICAL- SURVEYING			
Paper Code: SOES/GEOG/C012 (P)			
Credit: 05			
Total Marks: 100	Internal Assessment: 40	End Semester: 60	Contact Hour per Week: 05
Course Objectives:			
1. The course aims to equip the students with principles and procedures of surveying techniques.			

Note: The syllabi for practical are divided into two sections: section A and B. A is related to field work. Candidate will have to attempt two exercises of surveying from section A of 2 hours' duration and two exercises of section B of 1-hour duration.

Distribution of Marks

(i)	Surveying (Two exercises)	30
(ii)	Survey Camp	20
(iii)	Sessional Record (min)	05
(iv)	Viva-voce	05

Section A: Field Work:

UNIT I

Plain Table Survey: Two and Three station Problem, Triangulation and determination of heights and contouring with clinometers.

UNIT II

Dumpy level survey: Contouring and profile drawing (Instrument based: Total station Survey and Theodolite)

UNIT III

Interpretation of Indian daily weather maps through the study of thermal & cloud condition and pressure system, Weather forecasting method.

Section B: Laboratory Work

(i) GPS: Handling usages, GPS based data acquisition, GPS system and application.
(ii) Altimeter (Hi-tech with precision): Handling and use.

Note: Examination: Departmental Committee Appointed by HoD for University Campuses. External Examiners will be Appointed by the University for Affiliated Colleges

Note:

1. In all 20 exercises from both the parts A and B shall constitute the sessional record covering all sub section.
2. Candidate shall attend (compulsory) field training (survey camp) of at least seven days' duration in a suitable area handling different instruments. They shall prepare minimum 05 exercise (survey camp) belonging to the original field survey.
3. Survey camp work will be evaluated at the time of the end semester practical exam.

Book Recommended:

1. Campbell, J., Introductory Cartography, Prentice Hall, Inc., Englewood Cliff, New Jersey, 1984.
2. Cuff, D.J., & Mattson, M.T., Thematic Maps, their Design and Production, Mathuen, New York., 1982.
3. Robinson, A.H. & others., Elements of Cartography, John Willey and Sons, New York (New edition).
4. Archer, J.E., & Dalton, T.H., Fieldwork in Geography, London.
5. National Atlas and Thematic Maps Organization (NATMO): National Atlas of India, Calcutta.
6. Monkhouse, F.J., Maps and Diagrams, Methuen & Co., London,1967

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Paper – XII: SOCIAL GEOGRAPHY			
Paper Code: SOES/GEOG/MN02			
Credit: 02			
Total Marks: 100	Internal Assessment: 40	End Semester: 60	Contact Hour per Week: 02
Course Objectives:			

The course is designed to acquaint the students to

4. The basics of social geography, its key concepts, approaches and methods in national and international perspective.
5. The roles of different factors of regionalization, social identity, and its spatial patterns.
6. The dynamics of social transformation in India and various related issues.

Course Outcomes: After successful completion of this course students will be capable-

- To understand the definition, nature, scope, and key concepts of Social Geography, including approaches and social indicators.
- To understand the spatial distribution and diversity of social groups in India, and its dynamics.
- To examine the processes of social transformation and social mobility.
- To understand different inclusion and exclusion, social justice, policies and planning with special reference to Uttarakhand.

Note: The paper consists of four units. Two questions will be set from each unit. The candidate will be required to attempt four questions in all. Answer should be precise. All questions carry equal marks.

UNIT I

Definition, nature and scope of social geography; concept of place, space and society and relevance of social geography; approaches and methods.

UNIT II

Key concepts in social geography- social stratification and differences, social hierarchy, culture, social structure, power structure and space; social ecology and space, mobility and space, social pluralism and diversity, race and ethnicity, religion.

UNIT III

Components of social space in India, process of social transformation- Sanskritization, westernization, modernization: post-modern approaches to understand social change and transformation, social bases of identity; social groups, distribution of castes, tribes and language in India, social factors in region formation; socio-cultural regionalism in India.

UNIT IV

Segregation and assimilation; social and spatial justice; inclusion and exclusion, indicators of social well-being and social pathology (crime, conflicts, other forms of social disorganization), problems and processes of socio-economic and political-inequality, social security and protective discrimination, policies and planning with special reference to India and Uttarakhand.

Books Recommended:

20. Ahmed, A. (1999). Social Geography, Rawat Publication, Jaipur.
21. Kath Browne, Dhiren Borisa, Mary Gilmartin, Niharika Banerjea (2024). Social Geographies-the Basics, Routledge, London
22. Social Geography, IGNOU Self Learning Material, Block-1 to Block-4, https://egyankosh.ac.in/handle/123456789/109916
23. Jones, E. and John Eyles (1979). Social Geography. Oxford University Press, London
24. Harvey, D. (1989). The Condition of Postmodernity: An Enquiry into the Origins of Cultural Change. Oxford: Blackwell.
25. Smith, David M. (1977). Human Geography: A Welfare Approach, Edward Arnold, London
26. Soja, E. W. (2009). The city and spatial justice. http://www.jssj.org.

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27. Pirie, G. H. (1983). On Spatial Justice. Environment and Planning A: Economy and Space. 15(4) https://doi.org/10.1068/a150465.
28. Crane, R.I. (1973), Regions and regionalism in South Asia Studies: An Exploratory Study, Durham, Duke University.
29. Dube, S.C. (1991), Indian Societies, National Book Trust of India, New Delhi.
30. Kaufmann V. (2005). Re-thinking Mobility. Contemporary Sociology, Hampshire: Ashgate
31. Rawat, P.S. (1993): Migration and structural change a study of rural society in Garhwal Himalaya, Sarita Book House, Delhi, India
32. Indian Institute of Public Administration. (2020). Caste-Based Segregation in Public Spaces. New Delhi: IIPA.
33. Lefebvre, H. (1991). The Production of Space. Blackwell.
34. Pahl, R. E. (1965). 'Trends in Social Geography.', In Chorley, R. J. & Haggett, P. (Eds.). Frontiers in Geographical Teaching., London: Routledge.
35. Mukherjee, R. (1979). The construction of social indicators, The Use of Socio-Economic Indicators in Development Planning. Paris: UNESCO, United Nations Educational, Scientific and Cultural Organization, pp. 33 59.
36. Sheldon, Eleanor B., and Wilbert E. Moore (Eds.) (1968). Indicators of Social Change: Concepts and Measurements. New York: Russell Sage Foundation.
37. Laitinen, A., & Särkelä, A. (2018). Four conceptions of social pathology. *European Journal of Social Theory*, *22*(1), 80-102. https://doi.org/10.1177/1368431018769593 (Original work published 2019)
38. Bhagat, R. B. (2023). Population and Political Imagination: Census, Register and Citizenship in India, Routledge, London

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Paper - XIII: PRACTICAL IV - CARTOGRAPHY			
Paper Code: SOES/GEOG/MN02 (P)			
Credit: 02			
Total Marks: 100	Internal Assessment: 40	End Semester: 60	Contact Hour per Week: 02
Course Objectives:			

3. Larger objective of this course is to develop the cartographic skill of students to depict and represent the geographic information on the map.
4. The course will create the ability of students to adapt various methods of relief, slope, projection and climatic analysis as well as thematic mapping.

Note: The syllabus 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) - 40
Session Record Work - 10
Viva-voce - 10

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 cartographic. All questions carry equal marks.

UNIT I

Map Projection: Mercator's, Polyconic, Stereographic, Interrupted Mollweide's and Interrupted Sinusoidal.

UNIT II

Slope analysis by Wentworth's, Smith's, Henry-Raiz's and Robinson's Methods; Analysis of relief characteristics from contour; Profile - Transverse, Longitudinal, Serial, Superimposed, Projected and Composite.

UNIT III

Morphometric analysis-Area-height, Altimetric frequency and Hypsometric curve; Drainage density; Stream order, Elongation; Circularity and Bifurcation ratio; Geomorphic Mapping.

UNIT IV

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

Note: Examination - Departmental Committee appointed by HoD for University Campuses. External Examiners will be Appointed by the University for Affiliated Colleges.

Books Recommended:

10. Barrett, E.C. & Courtis, L.F.: Introduction to Environmental Remote Sensing.
11. Dickinson, G.O.: Maps and Aerial Photographs.
12. Smith, H.T.V.: Aerial Photographs and their Applications.
13. Deekshatula, B.L. & Rajani, Y.S.: Remote Sensing.
14. Davis, P.: Data Description and Presentation.
15. Garnett, A.: Geographical Interpretation of Topographical Maps.
16. Mishra, R.P. & Ramesh, A.: Fundamentals of Cartography.
17. Raja, Moonis: Source of Social-Economic Data.
18. Sharma, J.P.: Practical Geography (Hindi).

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