Learning Outcomes Based Curriculum Framework (LOCF) for Geography

I. B.A./B.Sc. (Hons.)
II. B.A./B.Sc. (Programme)

Undergraduate Programme
2019
Foreword

UGC has been taking several initiatives for quality improvement in higher education system in the country. Curriculum revision is one of the focus areas of these initiatives. Curriculum development is defined as planned, a purposeful, progressive, and systematic process to create positive improvements in the higher educational system. The ever evolving and fast changing educational technology have posed various challenges as far as curriculum in the Higher Educational Institutions (HEIs) is concerned. The curriculum requires to be updated more often keeping in view the latest developments in the society and to address the society's needs from time to time.

The Quality Mandate notified by UGC was discussed in the Conference of Vice-Chancellors and Directors of HEIs during 26-28th July, 2018; wherein it was inter-alia resolved to revise the curriculum based on Learning Outcome Curriculum Framework (LOCF).

Learning Outcome Curriculum Framework (LOCF) aims to equip students with knowledge, skills, values, attitudes, leadership readiness/qualities and lifelong learning. The fundamental premise of LOCF is to specify what graduates completing a particular programme of study are expected to know, understand and be able to do at the end of their programme of study. Besides this, students will attain various 21st century skills like critical thinking, problem solving, analytic reasoning, cognitive skills, self directed learning etc. A note on LOCF for undergraduate education is available on the UGC website www.ugc.ac.in. It can serve as guiding documents for all Universities undertaking the task of curriculum revision and adoption of outcome based approach.

To facilitate the process of curriculum based on LOCF approach, UGC had constituted subject specific Expert Committees to develop model curriculum. I feel happy to present the model curriculum to all the HEIs. Universities may revise the curriculum as per their requirement based on this suggestive model within the overall frame work of Choice Based Credit System (CBCS) and LOCF.

I express my gratitude and appreciation for the efforts put in by the Chairperson/Member/Co-opted members/experts of the committees for developing model curriculum. I also take the opportunity to thank Prof. Bhushan Patwardhan, Vice-Chairman, UGC for providing guidance to carry forward this task. My sincere acknowledgement to Prof. Rajnish Jain, Secretary, UGC for all the Administrative support. I also acknowledge the work done by Dr. (Mrs.) Renu Batra, Additional Secretary, UGC for coordinating this important exercise.

All the esteemed Vice-Chancellors are requested to take necessary steps in consultation with the Statutory Authorities of the Universities to revise and implement the curriculum based on the learning outcome based approach to further improve the quality of higher education.

New Delhi
30th July, 2019

(Prof. D. P. Singh)
Chairman
University Grants Commission
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Preamble

The UGC committee constituted for preparing the Learning Outcomes Based Curriculum Framework for BA/BSc. Hons. Geography/ B.A/B.Sc (PROGRAMME), is pleased to submit this report. The Committee hereby suggests the curriculum for the students considering the global, national, regional, local issues and programs for better learning outcomes. The LOCF is designed to emphasize the teaching-learning process at the undergraduate (B.A./B.Sc) level to sensitize and train the students to develop a sound and systematic approach regarding mechanism and processes of natural and human activities. The focus is to help the students to understand the latest tools and techniques, which would help in giving focused and precise understanding of geographical phenomenon. The purpose is to enhance the capability of the students in perceiving, creating and analyzing sound geographical bases and concepts.

This Learning Outcome based Curriculum Framework is designed to emphasize the teaching and learning process at the undergraduate (B.A./ B.Sc) from teacher centric to student centric by strengthening the quality of teaching and learning in the present day real life scenario of global, regional and local level. It is considered learning as an activity of creativity of innovations and analyzing geographical phenomena. The committee prepared the major learning outcomes, which would help the students to understand and critically analyze various dimensions of the geographical issues.

The following objectives would be achieved:

- To orient the students towards identification and analysis of various facets of geographical features and processes.
- To develop students’ aptitude for acquiring basic skills of carrying out field work.
- To facilitate the students to learn skills of map making.
- To guide students to learn the science and art of collecting, processing and interpreting the data.
- To expose the students to the use of the updated technologies of remote sensing, IRNSS, GNSS, Geographical Information System (GIS) and GIScience.
The Committee suggests that the following remarks may be taken in to consideration by the faculty members, departments/schools, Boards of studies in Geography Institutes/colleges and Universities, while incorporating the recommendations for utilization:

- The learning outcomes are designed in such a way to assist the students to understand the objectives of studying BA/BSc (H)/B.A/B.Sc (PROGRAMME) in Geography, which is to understand, appreciate and critically evaluate and associate with various time and space aspects.

- It is paramount to consider here BA/BSc (H)/B.A/B.Sc (Programme) in Geography under CBCS remains the point of reference for LOCF recommendations. As it is a field-based learning, all stakeholders may make suitable alterations with suitable justifications while preparing the courses, finalization of objectives keeping in view global, national, regional and local issues and challenges.

- To this end, the themes, units in the LOCF documents are confirmative. Similarly the organization of themes/units should consider the spatial dimensions and references.

- The Organization of units/courses are worked in to semesters/years considering the credit loads in a given semester with the ultimate end of outcomes of the courses /programs. However, it is essential to incorporate the courses applied in nature which focus attention of the students especially in the second and third years of the given courses.

- Learning outcomes are modifiable considering the social, cultural and physical heterogeneity of the country and time scales, accordingly, themes and text units are taken into account considering all the stakeholders.

- The understanding of the LOCF Committee of Geography is to have well defined and justifiable course outcomes and their realization at the end of the course and programs.

- The department/institute/college/university is expected to encourage the faculty to inculcate the best teaching skills with innovative ideas and methods to make students to learn subjects based on field knowledge and updated spatial information.
PART 1
INTRODUCTION

Learning Outcomes based Curriculum Framework (LOCF) for Geography under CBCS

1. Introduction
Geography has been broadly accepted as a bridge discipline between human and physical sciences. In the beginning, geography focussed on the physical aspects of the earth but the modern geography is an all-encompassing discipline that seeks to understand the earth and all of its human and natural processes as integrating elements. Geography has emerged through time as a trans-disciplinary subject integrating the regional diversity with the concepts of the timing of space and the spacing of time. It provides broad, human and place-centred perspectives on the transformation of rural ecology to globalized urban landscape at different levels, from the local/regional/national to global. Geography is transformed through:

- Journey from Village Ecology to Urban Regional Studies
- Qualitative Techniques to Spatial Information Technology
- Global to Micro-level Community Perception Approach

It is essential to focus on the current socio-spatial problems, issues and challenges to make the students aware of the application of geography to sort out the societal upcoming problems. It is also essential to rejuvenate the ancestral geographical knowledge to address the current local and global problems. In the light of exponential changes in the field of arts, science and technology, it is to be studied from multifaceted angles.

It is important for the policy makers to consider the geo-spatial aspects with references to the location and in context of the best utilization of public utilities. It is further expected that if the above said spatial aspects are considered, it will certainly develop the lagging regions and people living therein.

2. Learning Outcomes based Approach to Curriculum Planning
Learning Outcomes based Curriculum Framework (LOCF) for geography curriculum revision incorporates dynamic processes including fundamental and modern techniques, contemporary
paradigms such as global initiatives like Sustainable Development Goals (SDGs), Disaster Risk Reduction (DRR), Paris Climate Action and national initiatives like smart cities, Securities of food, water, energy, human health and livelihood, biodiversity, and disaster management. The approaches are to make geography more scientific and societal-need oriented that could be the panacea of India’s developmental challenges. Geography uses scientific knowledge with the current focus that includes spatio-temporal analysis, skill development, GIScience, sustainable development and human security.

2.1 Nature and Extent of the B.A./B.Sc. (Hons.) Programme

Geography curriculum inculcates knowledge of essential concepts of physical and human geography together with appropriate techniques using lectures, tutorials, group discussions, presentations, assignment evaluation, lab work and field visits. Thus, pedagogy process includes:

- Identifying and explaining the physical and cultural characteristics globally and processes at varied spatio-temporal contexts.
- Understanding human-environment and nature-society interactions as well as various global environmental challenges.
- Analysing geographic information by using geo-spatial technologies.
- Responding towards the global and national challenges and initiatives.

2.2 Aims of B.A./B.Sc. (Hons.) Programme

Four distinct and new learning outcomes have been incorporated from each Course such as:

- Appreciate the relevance of geographical knowledge to everyday life.
- Demonstrate the ability to communicate geographic information by utilising both lecture and practical exercises.
- Inculcate the ability to evaluate and solve geographical problems effectively.
- Demonstrate the skills in using geographical research tools including spatial statistics, cartography, remote sensing, GIS, IRNSS and GIScience.
- Based on the field knowledge and advanced technologies, the students should be able to understand the on-going geographical problems in different regions and levels with appropriate pragmatic solutions.
3. Graduate Attributes in Geography

The curriculum uses CBCS framework and organises under Core Course, Skill Enhancement Course, Elective - Discipline Specific and Elective - Generic Courses. The core courses cover key areas of geography about which all students should have basic knowledge. These courses are grouped as follows:

A. Theory – These courses build up the theoretical and conceptual foundations of geography.

B. Practical – Three courses on Statistical Techniques in Spatial Analysis; Remote Sensing and Geographical Information System, GIScience and Research Methods and Fieldwork in Geography will strengthen the methodological and practical foundations of geography.

C. Regional Approach – Such courses focus on World Geography, Geography of India / different states.

D. Application Oriented – This includes disaster management, climate change, tourism geography, health and wellbeing, etc.

Each Course has one objective, three learning outcomes, five uniform contents and reading list incorporating a few Hindi books also wherever possible.

4. Qualification Descriptors for B.A./B.Sc. (Hons.) Programme

The qualification descriptors for the B.A./B.Sc. (Hons.) programme in Geography shall have the learning attributes such as field knowledge, use of advance tools and techniques for better comprehension of space and society etc. It also involves awareness among the students regarding the issues of different regions and socio-cultural aspects. The main qualification descriptors for the geography B.A./B.Sc. (Hons.) students are to develop the critical evaluation and understanding. Each Honour student in Geography should be able to;

- Demonstrate systematically geographical knowledge and understanding the theoretical as well as practical applications with understanding of various aspects.
- Demonstrate the ability to understand the significance of geographical aspects in relation to development of the regions and minimizing regional inequalities.
- Demonstrate the ability and geographical thinking critically regarding rural and urban spaces and their day to day problems with the application of geographical knowledge.
- Students have to demonstrate their geographical knowledge acquired in the class and apply the same in real world.
• Recognise the scope of geography in terms of exploring the career opportunities, employment and life-long engagement in teaching and utilise the knowledge for publication for the future academic endeavors.

The students have to develop the ability through the theoretical and practical means for realising the Sustainable Development Goals (SDG) both in rural and urban spaces to minimize the differentials in developmental aspects.

5. The Programme Learning Outcomes B.A./B.Sc. (Hons.) Programme

The programme learning outcomes relating to B.A./B.Sc. (Hons.) Programme in geography:

• Demonstrating the understanding of basic concepts in geography.
• Demonstrating the coherent and systematic knowledge in the discipline of geography to deal with current issues and their solution.
• Display an ability to read and understand maps and topographic sheets to look at the various aspects on the space.
• Cultivate ability to evaluate critically the wider chain of network of spatial aspects from global to local level on various time scales as well.
• Recognize the skill development in Geographical studies programme as part of career avenues in various fields like teaching, research and administration.

It is also suggested that after the completion of B.A./B.Sc. (Hons.) Programme, students should be able to demonstrate the knowledge obtained in such way so that they can explore the employability options and service to the society.

5.1 Learning Outcomes

Three distinct and new learning outcomes have been incorporated from each course such as to:

1. Understand the relevance of geographical knowledge to everyday life.
2. Getting the ability to communicate geographic information utilizing both lecture and practical exercises.
3. Inculcate the ability to evaluate geographical problems effectively.
4. Exhibit the skill in using geographical research tools including spatial statistics, cartography, remote sensing, GIS, IRNSS and GIScience.
5.2 Course Level Learning Outcomes

The course level learning outcomes includes:

3. **Basic Concept:** The fundamental concepts and philosophical foundation of each course need to be discussed.

4. **Understanding Landscape:** An understanding of landscape at different levels needs to be discussed and understood for a thorough knowledge of spatial dimensions.

5. **Understanding Ecosystem Structure and Potential:** To comprehend the dynamic dimensions of human and ecosystem relationships.

5. **Human Perception and Behaviour:** Learning human perception and behaviour to acquire the geographical knowledge evolved over time, is essential to improve decision making process.

6. **Identification of Critical Problems and Issues:** Detection and identification of the critical problems and spatial issues are essential for sustainable development.

7. **Field Based Knowledge:** Field based knowledge is essential to understand the ground reality, spatial patterns and processes.

8. **Spatial Tools and Techniques:** The basics and applications of spatial tools and techniques are essential to make the studies more scientific and applicable.

9. **Statistical Techniques:** Use of statistical tools and techniques is essential for precise and objective geographic analysis and interpretation of complex phenomena.

10. **Applied Dimensions:** Identification of the critical problems and spatial issues form the core of the modern geography for various applications and decision making, including Resources, Environment & Disaster Management, Land Use Planning, and Urban and Regional Development together with Climate Change Mitigation and Adaptation, etc.

11. **Case Study based Analysis:** There is a need to understand the specificities of the problems in specific areas for their in depth comprehension and solution. The case studies are essential, especially to find out the solutions to the lagging regions for their solutions based on first hand information.
### 6. Course-Level Learning Outcomes Matrix

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**11. Public Policy and Management:** Spatial aspects and dimensions are the integral parts in the policy making for sustainable regional development. Geographical knowledge needs to be inculcated for application and solutions of the various local, regional and national problems.

**12. Communication Skills:** Communication through models, maps, images and other geographical tools form the sound base for the dissemination of geographical information.
7. GEOGRAPHY COURSE OUTCOMES AND SDGs

The global community has adopted the Sustainable Development Goals to ensure holistic and multifaceted development of human societies across the world. These goals adopted in 2015 were an ambitious upgradation of millennium development goals. The Indian Geographical community aims to harness the trans-disciplinary nature of the subject and link it with sustainable development goals through a range of multi-dimensional core and elective papers

7.1. B.A. (HONS) GEOGRAPHY- CORE PAPERS: CONTRIBUTION TOWARDS SDGs

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Note: X indicates the relevance of the course to the SDG.
7.2. B.A. (HONS) GEOGRAPHY- ELECTIVE PAPERS: CONTRIBUTION TOWARDS SDGs.

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8. (a) Teaching Learning Processes

Learning Outcomes based Curriculum Framework (LOCF) for geography incorporates dynamic processes including fundamental and modern techniques, contemporary paradigms such as global initiatives like Sustainable Development Goals (SDGs), Disaster Risk Reduction (DRR), Paris Climate Action and national initiatives like smart cities, food security, water security, energy security, biodiversity, disaster management, human health and wellbeing and livelihood security. The approaches are to make geography more scientific and societal-need oriented that could be the panacea of India’s development. Geography uses scientific knowledge with the present focus that includes spatio-temporal analysis, skill development, GIScience, sustainable development and human security.

Learning is a challenging, engaging, and enjoyable activity. Learners should be encouraged to engage in a rigorous process of learning and self-discovery by adopting a highly focused and yet flexible approach to education. Each day learners should be encouraged to focus on key areas of the course and spend time on learning the course fundamentals and their application in life and
society. In teaching and learning pedagogy, there should be a shift from domain or conclusions based approach to the experiential or process based approach.

Geography curriculum inculcates knowledge of essential concepts of physical and human geography together with appropriate techniques using lectures, tutorials, group discussion, presentation, assignment evaluation, lab work and field visits. Thus, pedagogy process includes:

- Identifying and explaining the physical and cultural characteristics globally and processes at varied spatio-temporal contexts.
- Understanding human-environment and nature-society interactions as well as various global environmental challenges.
- Analysing geographic information by using geo-spatial technologies.
- Responding towards the global and national initiatives.

Broad framework for teaching in the class includes:

1. Theory courses should have 6 hours per week for courses carrying 6 credits.
2. Tutorial group of each theory course should have a group size of 15 students.
3. Practical courses should have 12 hours per week for a group of 15 students.
4. Practical courses will not have tutorials.
5. There is no practical paper in B.A./BSc. Programme

The faculty should promote learning on a proportionate scale of 20:30:50 principle, where lectures (listening/hearing) constitute 20 per cent of the delivery; visuals (seeing) 30 per cent of the learning methods; and experience (doing/participating) 50 per cent. This ratio is subject to change as per institutional needs.

In order to achieve its objective of focused process based learning and holistic development, the Institution/University may use a variety of knowledge delivery methods:

1. Lectures
   Lectures should be designed to provide the learners with interesting and fresh perspectives on the subject matter. Lectures should be interactive in a way that students work with their teachers to get new insights in the subject area, on which they can build their own bridges to higher learning.

2. Discussions
   Discussions are critical components of learning, and can be used as a platform for students to be creative and critical with old and new ideas. Besides developing critiquing skills, arriving at consensus on various real life issues and discussion groups lead to innovative problem solving and, ultimately to success.
3. Life Skills:
Life skills provide students opportunities to understand real life situations and scenarios (i.e. coping with disaster), and solve challenges in a controlled environment or make use of them in simulating cultural experiences by locating/transposing them in new (local, regional, national and international) situations.

4. Case Studies:
Case studies, wherever possible, should be encouraged in order to challenge students to find creative solutions to complex problems of individual, community, society and various aspects of knowledge domain concerned.

5. Role Playing
Assuming various roles, as in real life, is the key to understanding and learning. Students are challenged to make strategic decisions through role-plays, and to analyze the impact of these decisions. For this purpose, incidents from literary texts may also be used.

6. Team Work
Positive collaboration in the form of teamwork is critical in the classroom environment, for which it is necessary to transcend one’s prejudices and predilections so as to achieve the desired outcomes. In the process of teamwork, leaners will acquire the skills of managing knowledge acquisition and other collaborative learners, thereby understanding how to incorporate and balance personalities.

7. Study Tours/Field Visits:
Study Tours/ Field trips provide opportunities to the learners to test their in-class learning in real life situations as well as to understand the functional diversity in the learning spaces. These may include visits to sites of knowledge creation, preservation, dissemination and application. Institutions may devise their own methods to substitute/modify this aspect.

8. Academics-Industries Interface:
The course curriculum of B.A/BSc. (Hons.) should encourage students for closer interaction with industries/corporate/research institutes, etc. for at least one week internship and training.
8 (b) Assessment Methods:

The assessment of students’ achievement in geography will be aligned with course/program learning outcomes and the academic and geographical skills that the program is designed to be developed. Different assessment methods that are appropriate within the discipline of geography will be used. Learning outcomes will be assessed through continuous evaluation using the oral and written examinations, cartographic and computer based exercises (GIS), practical assignments, observations of practical skills, project and field work reports, seminar presentations, viva voce, output from collaborative work activities and attendances, etc.
PART II: STRUCTURE OF B.A/B.COM/B.SC GEOGRAPHY

9. Introduction

The curriculum uses CBCS framework and organise under Core Courses, Skill Enhancement Course, Elective Discipline Specific and Elective Generic Courses. The core courses cover key areas of geography about which all students should have basic knowledge. These courses are grouped as follows:

- **Theory** – These courses build up the theoretical and conceptual foundations of geography.
- **Practical** – Three courses on Statistical Techniques in Spatial Analysis; Remote Sensing and Geographical Information System, GIScience and Research Methods and Fieldwork in Geography will strengthen the methodological and practical foundations of geography.
- **Regional Approach** – Such courses focus on Geography of India / different states.
- **Application Oriented** – This includes disaster management, climate change, tourism geography, health and wellbeing etc.

Each Course has three learning outcomes, five uniform contents and references incorporating a few Hindi books wherever possible.
10.1. STRUCTURE OF BA (HONS) IN GEOGRAPHY

Note: For the structure of BA Hons. Geography, the Committee has followed the number of credits per course as suggested in the CBCS document, that is, six credits per course.

A. Core Courses: 14 papers (14x6= 84 credits)
B. Discipline Specific Electives: 4 papers (4x6= 24 credits)
C. Generic Electives: 4 papers (4x6= 24 credits)
D. Ability Enhancement Compulsory Courses: 2 papers (2x4=8 credits)
E. Skill Enhancement Courses: 2 papers (2x4=8 credits)

GRAND TOTAL (A+B+C+D): 148 (84+24+24+8+8) credits

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<thead>
<tr>
<th>Serial No</th>
<th>Title of the Course</th>
<th>Credits: 6 credits each</th>
<th>Credit Hours Distribution</th>
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[Note: There can be different options depending on the pedagogical and assessment weightage distribution] L and T

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<tr>
<th>Serial No</th>
<th>Title of the Course</th>
<th>Credits: 6 credits each</th>
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<td>1.</td>
<td>Geomorphology</td>
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<td>2.</td>
<td>Cartographic Techniques (Practical)</td>
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<td>3.</td>
<td>Geography of Human and Cultural Landscape</td>
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<td>4.</td>
<td>Statistical Methods in Geography (Practical)</td>
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<td>5.</td>
<td>Climatology and Oceanography</td>
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<td>6.</td>
<td>Fundamentals of Remote Sensing (Practical)</td>
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<td>Geography of India</td>
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<td>Introduction to Global Economic System</td>
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<td>Environment and Natural Resource Management</td>
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<td>Digital Remote Sensing (Practical)</td>
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<td>Regional Planning and Sustainable Development</td>
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<td>12.</td>
<td>Field Techniques, Surveying and Research Methods (Practical)</td>
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<td>13.</td>
<td>Evolution of Geographical Thought</td>
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<td>14.</td>
<td>Disaster Management Project Work (Practical)</td>
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**B. DISCIPLINE CENTRIC ELECTIVES (ANY FOUR)**

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<td>1</td>
<td>Demography and Population Studies</td>
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<td>2</td>
<td>Hydrology and Soil Studies</td>
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<td>Urbanization and Urban System</td>
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<td>Agriculture and Food Security</td>
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<td>Geography of Health</td>
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<td>Political Geography</td>
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<td>Biogeography</td>
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<td>8</td>
<td>Geography of Social Wellbeing</td>
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### C. GENERIC ELECTIVES (ANY FOUR)

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<tr>
<td>Disaster Management</td>
<td>6</td>
<td>5+1</td>
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<td>Geography of Tourism and Pilgrimage</td>
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<td>Geospatial Information Technology</td>
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<td>Coupled Human and Environment System</td>
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<td>Climate Change Vulnerability and Adaptation</td>
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<td>Rural Development</td>
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<td>Industrial Development</td>
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<td>Sustainable Resource Development</td>
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### D. ABILITY ENHANCEMENT COURSES (COMPULSORY)

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<tr>
<td>Geographic Information System (Practical)</td>
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<td>Spatial Statistical Techniques</td>
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<td>3+1</td>
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### E. SKILL ENHANCEMENT COURSES

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<tr>
<td>Introduction to GIScience (Practical)</td>
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<tr>
<td>Thematic Atlas</td>
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**Note:**

1. Universities/Institutions/Departments may wish to add more courses against categories marked C, D and E, depending on the availability of specialists and other required resources.
2. Any major deviation from category A is likely to impact the very philosophy of LOCF in Geography.
10.2. Choice Based Credit System (CBCS)

SYLLABUS OF COURSES TO BE OFFERED

B.A. / B. Sc (Honours) Geography

Core Courses (All courses are compulsory)

Semester I
1. Geomorphology
2. Cartographic Techniques (Practical)

Semester II
3. Geography of Human and Cultural Landscape
4. Statistical Methods in Geography (Practical)

Semester III
5. Climatology and Oceanography
6. Fundamentals of Remote Sensing (Practical)
7. Geography of India

Semester IV
8. Introduction to Global Economic System
9. Environment and Natural Resource Management
10. Digital Remote Sensing (Practical)

Semester V
11. Regional Planning and Sustainable Development
12. Field Techniques, Surveying and Research Methods (Practical)

Semester VI
13. Evolution of Geographical Thought
14. Disaster Management Project Work (Practical)
Skill Enhancement Course (1 per semester)

Semester III (any one of the following)
1. Geographic Information System (Practical)
2. Spatial Statistical Techniques

Semester IV (any one of the following)
3. Introduction to GIScience (Practical)
4. Thematic Atlas

Elective Discipline Specific (Any Four)

Semester V
DSE-1
1. Demography and Population Studies
2. Hydrology and Soil Studies

DSE-2
3. Urbanization and Urban System
4. Agriculture and Food Security

Semester VI
DSE-3
5. Geography of Health
6. Political Geography

DSE-4
7. Biogeography
8. Geography of Social Wellbeing
Elective Generic Papers (any four)

Semester I (any one)
1. Disaster Management
2. Geography of Tourism and Pilgrimage

Semester II (any one)
3. Geospatial Information Technology
4. Coupled Human and Environment System

Semester III (any one)
5. Climate Change Vulnerability and Adaptation
6. Rural Development

Semester IV (any one)
7. Industrial Development
8. Sustainable Resource Development
Core Courses

1. Geomorphology

Learning Outcomes:

After the completion of course, the students will have ability to:
1. Understand the functioning of Earth systems in real time and analyze how the natural and anthropogenic operating factors affects the development of landforms
2. Distinguish between the mechanisms that control these processes
3. Assess the roles of structure, stage and time in shaping the landforms, interpret geomorphological maps and apply the knowledge in geographical research.

Course Content:


References:

2. Cartographic Techniques (Practical)

Learning Outcome:
After the completion of course, the students will have ability to:

1. Read and prepare maps.
2. Comprehend locational and spatial aspects of the earth surface.
3. Use and importance of maps for regional development and decision making.

Course Content:

1. Cartography – Nature and Scope; Scales – Concept and application; Graphical Construction of Plain, Comparative and Diagonal Scales.
2. Map Projections – Classification, Properties and Uses; Merits and Demerits of Polar Zenithal, Stereographic, Bonne’s and Mercator’s Projections.
4. Topographical Maps- Interpretation (one each- hilly/plain area) and Slope Analysis (Wentworth’s method).
5. Interpretation of Weather Maps (at least one of summer, winter and monsoon seasons)

Practical Record:
A Project File in pencil comprising one exercise each, on scale, map projection, profile, interpretation of topographic sheet and weather maps.

References:

3. Geography of Human and Cultural Landscape

Learning Outcomes:
After the completion of course, the students will have ability to:
1. Know the changing human and cultural landscape at different levels.
2. Understand patterns and processes of population growth and its implications.
3. Appreciate the nature and quality of human landscapes.

Course Content:
1. Human Geography: Definition, Scope and Principles; Contemporary Relevance.
2. Population: Population Growth and Distribution; Population Composition; Malthusian and Demographic Transition Theories.
3. Space and Society: Cultural Regions; Race; Tribes, Religion and Language.
4. Settlements: Types of Rural Settlements; Classification of Urban Settlements; Trends and Patterns of World Urbanization.
5. Population-Resource Relationships and Regional Resource Development

References:
4. **Statistical Methods in Geography (Practical)**

**Learning Outcomes:**
After the completion of course, the students will have ability to:

1. Understand the basics of data collection and processing for the meaningful outcomes.
2. Comprehend the representation and interpretation of the results.
3. Put into practice results obtained in representation as well as day-to-day life.

**Course Content:**

1. Use of Data in Geography: Significance of Statistical Methods in Geography; Sources of Data, Scales of Measurement (Nominal, Ordinal, Interval and Ratio).
2. Tabulation and Descriptive Statistics: Frequencies (Deciles, Quartiles), Cross Tabulation, Central Tendency (Mean, Median and Mode, Centro-graphic Techniques, Dispersion (Standard Deviation, Variance and Coefficient of Variation).
5. Association and Correlation: Rank Correlation, Product Moment Correlation, and Simple Regression.

**Class Record:**
Each student will submit a record containing five exercises:

1. Construct a data matrix (of about 10 x 10) with each row representing an areal unit (districts or villages or towns) and about 10 columns of relevant attributes of the areal units.
2. Based on the above table, a frequency table, measures of central tendency and dispersion would be computed and interpreted for any two attributes.
3. Histograms and frequency curve would be prepared for the entire data set and attempt to fit a normal curve and interpreted for one or two variables.
4. From the data matrix a sample set (20 per cent) would be drawn using random-systematic and/or stratified methods of sampling and locate the samples on a map with a short note on method used.
5. Based on the sample set and using two relevant attributes, a scatter and regression line would be plotted and residual from regression would be mapped with a short interpretation.

References:

2. Berry, B. J. L. and Marble, D. F. (eds.): *Spatial Analysis–A Reader in Geography*.
5. Climatology and Oceanography

Learning Outcomes:
After the completion of course, the students will have ability to:

1. Understand the elements of weather and climate and its impacts at different scales.
2. Comprehend the climatic aspects and its bearing on planet earth.
3. Understand the oceanic process and availability of resources.

Course Content:

1. Atmospheric Composition and Structure: Variation with Altitude, Latitude and Season; Insolation and Temperature: Factors and Distribution, Heat Budget, Temperature Inversion.
5. Ocean Salinity and Temperature: Distribution and Determinants; Coral Reefs and Marine Deposits and Ocean Resources.

References:

6. Fundamentals of Remote Sensing (Practical)

Learning Outcomes:
After the completion of course, the students will have ability to:

1. Appreciate the strength and application of remote sensing
2. Map the resources, their location and availability
3. Apply this knowledge for sustainable development

Course Content:

1. Remote Sensing: Definition, Development, Platforms and Types
2. Aerial Photography and Satellite Remote Sensing: Principles, Types and Geometry of Aerial Photograph; EMR Interaction with Atmosphere and Earth Surface; Satellites – geostationary and remote sensing (Landsat and IRS) and Sensors, Resolution (spatial and temporal).
3. Introduction to Image Processing and Data Analysis: Geo-Referencing; Editing and Output.

Practical Record:
A project file consisting of two exercises will be done from aerial photos and satellite images (scale, orientation and interpretation) and 3 exercises on using any Software on above mentioned themes.

References:


7. Geography of India

Learning outcomes:
After the completion of course, the students will have ability to:

1. Understand the physical profile of the country
2. Study the resource endowment and its spatial distribution and utilization for sustainable development
3. Synthesise and develop the idea of regional dimensions.

Course Content:
1. Physical: Location, Physiographic Divisions, Climate: characteristics and classification; Soil and Natural vegetation
3. Regionalisation of India: Physiographic (R. L. Singh), Socio-Cultural (Sopher), Economic (Sengupta)
5. Spatial Patterns of Industrial Development: Automobile and Information Technology

References:


8. Introduction to Global Economic System

Learning Outcome:
After the completion of course, the students will have ability to:

1. Distinguish different types of economic activities and their utilities.
2. Appreciate the factors responsible for the location and distribution of activities.
3. Examine the significance and relevance of theories in relation to the location of different economic activities.

Course Content:
1. Introduction to Global Economic System: Concept and Classification of Economic Activities.
2. Theories: Agriculture (Von Thunen); Industry (Weber’s theory).
3. Primary Activities: Agriculture, Precision agriculture, Forestry, Fishing and Mining.
4. Secondary Activities: Manufacturing (Cotton Textile, Iron and Steel), Concept of Manufacturing Regions, Special Economic Zones and Technology Parks.

References:


9. Environment and Natural Resource Management

Learning Outcome:

After the completion of course, the students will have ability to:

1. Understand the dynamic interactive relationship between man and environment.
2. Have sound understanding on distribution, utilization and proper management of natural resources at global level.
3. Make assessment and review of planning and policies related to environment and natural resources.

Course Content:

1. Environment and Natural Resource Management: Concept, Human-Environment Relationships;
2. Ecosystem: Concept, Structure and Functions.
5. Appraisal and Conservation of Environment and Natural Resources and Sustainable Resource Development.
6. Environmental Programmes and Policies – Global, National and Local levels

References:


10. Digital Remote Sensing (Practical)

Learning Outcomes:
After the completion of course, the students will have ability to:
1. Develop the skill so as to use digital satellite data using software
2. Prepare the maps based with satellite data to compare with the ground realities.
3. Classify digital data for the land use/land cover and urban studies

Course Content:
1. Image Processing (Digital and Manual): Pre-processing (Radiometric and Geometric Correction); Enhancement (Filtering); Classification (Supervised and Un-supervised)
2. Digital Image Processing and Interpretation.
5. Application of Remote Sensing in weather (cyclones) studies and natural hazards (e.g. floods)

Practical Record: A project file consisting of 5 exercises on using any method on above mentioned themes.

References:


11. Regional Planning and Sustainable Development

Learning Outcomes:
After the completion of course, the students will have ability to:

1. Identify notable lagging regions and solutions for their overall development
2. Have comprehensive understanding regarding the different regions and application of different models and theories for integrated regional development.
3. Select appropriate indicators for the measurement of socio-economic regional development.

Course Content:

1. Definition of Region, Evolution and Types of Regional planning: Formal, Functional, and Planning Regions and Regional Planning; Need and types of Regional Planning.
2. Choice of a Region for Planning: Characteristics of an Ideal Planning Region; Delineation of Planning Region; Regionalization of India for Planning (Agro-Ecological Zones)
3. Theories and Models for Regional Planning: Growth Pole Model of Perroux; Growth Centre Model in Indian Context; Myrdal, Hirschman, Rostow and Friedmann; Village Cluster.
5. Sustainable Development Policies and Programmes: Rio+20; Goal-Based Development; Financing for Sustainable Development; Principles of Good Governance.

References:


12. Field Techniques, Surveying and Research Methods (Practical)

Learning Outcome:
After the completion of course, the students will have ability to:

1. Conduct proper field work for the collection of primary data to bring out grassroots realities.
2. Make use of proper tools and surveying methods for measurement in context of collection and processing of data.
3. Prepare a report based on field data.

Course Content:

1. Meaning, Significance, Types and Approaches to Research in Geography; Literature review; Field Work in Geographical Studies –Defining the Field and Identifying the Case Study.
2. Research Design: Identification of Research Problem; Research questions. Data Collection: Type and Sources of Data; Methods of Collection; Data Analysis, Data Representation Techniques.
3. Field Techniques – Merits, Demerits and Selection of the Appropriate Technique; Observation (Participant / Non-Participant), Questionnaires (Open/ Closed / Structured / Non-Structured); Interview with Special Focus Group Discussions.
4. Surveying Use of Field Tools: Plain Table survey, Prismatic Compass, Theodolite.
5. Designing the Field Report – Aims and Objectives, Methodology, Analysis, Interpretation and Writing the Report.
Practical Record:

1. Each student will prepare an individual report based on primary and secondary data collected during fieldwork.
2. The duration of the fieldwork should not exceed 10 days.
3. The word count of the report should be about 8000 to 12,000 excluding figures, tables, photographs, maps, references and appendices.
4. One copy of the report on A4 size paper should be submitted in soft binding.

References:

13. Evolution of Geographical Thought

Learning Outcome:
After the completion of course, the students will have ability to:
1. Distinguish the paradigms in geography discipline through time
2. Understand the geographical thinking in different regions of world
3. Appreciate the past and future trends of world geography in general and Indian geography in particular

Course Content:
1. Paradigms in Geography

References:


14. Disaster Management Project Work (Practical)

Learning Outcomes:
After the completion of course, the students will have ability to:

1. Understand processes and impact of disaster
2. Understand both the natural and man-made disaster and human negligence in context of environment
3. Write a field work based report on Disaster Management to minimize the disaster risk/Risk from Disaster.

Course Content:
The Project Report based on any two fields based case studies among following disasters and one disaster preparedness plan of respective college/locality and district:

1. Flood
2. Drought
3. Cyclone and Hailstorms
4. Earthquake and Volcanoes
5. Landslides
6. Human Induced Disasters: Fire Hazards, Chemical, Industrial accidents

References:


Skill Enhancement Course (Any 2)

15. Geographical Information System (Practical)

Learning Outcome:
After the completion of course, the students will have ability to:

1. Understand various components and principles of GIS
2. Construct the thematic maps using different digital layers
3. Apply GIS in various geographical studies

Course Content:
3. GIS Data Structures: Types (spatial and non-spatial), Raster and Vector Data Structure.
4. GIS Data Analysis: Input; Geo-Referencing; Editing, Output and Query; Overlays.

Practical Record:
A project file consisting of 5 exercises on using any GIS Software on above mentioned themes.

References:

16. **Spatial Statistical Techniques**

**Learning Outcomes:**
After the completion of course, the students will have ability to:

1. Understand the basics of data collection and, processing for the meaningful outcomes
2. Understand the selection of proper sampling techniques for the collection of data
3. Put into practice the results obtained for spatial analysis of results and to apply various statistical softwares for the study

**Course Content:**

1. Statistics and Statistical Data: Spatial and non-spatial;
2. Probability theory, probability density functions with respect to Normal, Binomial and Poisson distributions and their geographical applications.
3. Sampling plans for spatial and non-spatial data, sampling distributions; sampling estimates for large and small samples tests involving means and proportions.
4. Correlation and Regression Analysis: Rank order correlation and product moment correlation; linear regression, residuals from regression, and simple curvilinear regression; Introduction to multi-variate regression and correlation analysis.
5. Time Series Analysis: Time Series processes; Smoothing time series; Time series components.

Note: Any Statistical Software Package (SPSS, MS Excel, R, etc.) may be used for practice.

**References:**


17. Introduction to GIScience (Practical)

Learning Outcome:
After the completion of course, the students will have ability to:
1. Have comprehensive understand of GIS for the construction of maps and their use 
   the development planning.
2. Have knowledge of using GPS & DGPS for the accurate location
3. Apply the GIScience platform for the monitoring and forecasting analysis

Course Contents:
1. Evolution of GIScience, Institutions and GI data sharing, GIS: Definition and Components
2. Global Positioning System (GPS) – Principles and Uses
3. GIS Data Structures: Types (spatial and Non-spatial), Raster and Vector Data Structure.
4. GIS Data Analysis: Input; Geo-Referencing; Editing, Query
5. Application of GIS: Land Use Mapping; Urban Sprawl Analysis; Forests Monitoring, Natural disasters

Practical Record: A project file consisting of 5 exercises on using any GIS Software on abovementioned themes.

References:


18. Thematic Atlas

Learning Outcomes:

After the completion of course, the students will have ability to:

1. Have sound knowledge regarding the classification and elements of maps.
2. Have proper utilization of maps for the development.
3. Appreciate the preparation of various thematic maps with the application of various techniques.

Course Content:

1. Maps – Classification and Types; Principles of Map Design.
3. Thematic Mapping Techniques – Properties, Uses and Limitations; Areal Data -- Choropleth, Dot, Proportional Circles; Point Data – Isopleths.
5. Thematic Maps – Preparation and Interpretation.

Practical Record: A Thematic Atlas should be prepared on a specific theme with at least five plates for any state in India.

References:

2. Cuff, J. D. and Mattson, M. T., (1982): Thematic Maps: Their Design and Production, Methuen Young Books
Elective Discipline Specific (any four)

19. Demography and Population Studies

Learning Outcome:

After the completion of course, the students will have ability to:

1. Learn the role of demography and population studies as a distinct fields of human geography
2. Have sound knowledge of key concept, different components of population along with its drivers
3. Examine population dynamics and characteristic with contemporary issues

Course Contents:

1. Defining the Field – Nature and Scope; Sources of Data with special reference to India (Census, Vital Statistics and NSS).
4. Population Composition and Characteristics – Age-Sex Composition; Rural and Urban Composition; Literacy.
5. Contemporary Issues – Ageing of Population; Declining Sex Ratio; HIV/AIDS.

References:


20. **Hydrology and Soil Studies**

**Learning Outcome**

After the completion of course, the students will have ability to:

1. Understand the basic components of hydrological cycle and comprehend practices of integrated watershed management.
2. Evaluate the water balancing and river basin and water disputes.
3. Study the soil as a basic resource, focusing its distribution, problems and management.

**Course Content:**

1. Hydrological Cycle: Systems approach in hydrology, human impact on the hydrological cycle; Precipitation, interception, evaporation, evapotranspiration, infiltration, groundwater, runoff and overland flow;
2. Water Balance: input and output; water balance; floods and droughts; Integrated water resource management.
3. River Basin: Characteristics and problems of river basins, basin surface run-off, and measurement of river discharge. Watershed management
4. River Water Dispute; River linkages; Case studies

**References:**


21. **Urbanization and Urban System**

**Learning Outcome:**
After the completion of course, the students will have ability to:
1. Understand the fundamentals and patterns of urbanization process
2. Learn the functional classification of cities and Central Place Theory
3. Know contemporary problems of Delhi, Mumbai, Kolkata and Chennai

**Course Content:**
2. Patterns of Urbanisation in developed and developing countries
3. Functional classification of cities: Quantitative and Qualitative Methods
4. Cities and Central Place Theory: Christaller and Losch
5. Urban Issues: problems of housing, slums, civic amenities (water and transport); Case studies of Delhi, Mumbai, Kolkata, Chennai.

**References:**


14. Sharma, Poonam and Rajput, Swati (Eds.) (2017) Sustainable Smart Cities in India; Challenges and Future Perspectives, Springer.

22. **Agriculture and Food Security**

**Learning Outcome:**
After the completion of course, the students will have ability to:

1. Conceptualise the agriculture and its determinants.
2. Get the overview of Indian and World agriculture regions and systems.
3. Have sound knowledge of agriculture revolutions and food security

**Course Content:**

1. Defining the field: Introduction, nature and scope; Land use/land cover definition and classification.
2. Determinants of Agriculture: Physical, Technological and Institutional
3. Agricultural Regions of India: Agro-climatic, Agro-ecological & Crop Combination Regions.
4. Agricultural Systems of the World (Whittlesey’s classification) and Agricultural Land use model (Von Thunen, modification and relevance).
5. Food Security: Concept, approaches, pattern, Indian revolution and government policies.

**References:**


23. **Geography of Health**

**Learning Outcome:**
After the completion of course, the students will have ability to:

1. Understand the key concepts related to health and its driving forces
2. Identify the linkages between the health, environment, exposure and risk.
3. Explain the relationships among health and disease pattern in environmental context with reference to climate change

**Course Content:**

1. Perspectives on Health: Definition; linkages with environment, development and health; driving forces in health and environmental trends - population dynamics, urbanization, poverty and inequality.
2. Pressure on Environmental Quality and Health: Human activities and environmental pressure land use and agricultural development; industrialisation; transport and energy.
3. Exposure and Health Risks: Air and water pollution; household wastes; housing; workplace.
4. Health and Disease Pattern in Environmental Context with special reference to India, Types of Diseases and their regional pattern (Communicable and Lifestyle related diseases).
5. Climate Change and Human Health: Changes in climate system – heat and cold; Biological disease agents; food production and nutrition.

**References:**


24. **Political Geography**

**Course Learning Outcomes:**
After the completion of course, the students will have ability to:

1. Learn the concept of nation and state and geopolitical theories
2. Understand the different dimensions of electoral geography and resource conflicts
3. Have sound knowledge of politics of displacement, focusing on dams and SEZ

**Course Content:**

1. **Introduction:** Concepts, Nature and Scope.
2. **State, Nation and Nation State** – Concept of Nation and State, Attributes of State – Frontiers, Boundaries, Shape, Size, Territory and Sovereignty, Concept of Nation State; Geopolitics; Theories (Heartland and Rimland)
3. **Electoral Geography** – Geography of Voting, Geographic Influences on Voting pattern, Geography of Representation, Gerrymandering.
5. **Politics of Displacement:** Issues of relief, compensation and rehabilitation: with reference to Dams, Highways and Special Economic Zones

**References:**


25. Biogeography

Learning Outcome:
After the completion of course, the students will have ability to:

1. Familiarise the dynamics of climate and related theories.
2. Understand of Vegetation as an index of climate.
3. Assess of different aspects of floral and faunal provinces.

Course Content:
1. Introduction to Biogeography: Nature, scope, and components.
2. World Climatic Patterns (Koppen) vis-à-vis biogeographical regions
3. Evolution of major groups of floral and faunal provinces.
5. Biodiversity; bio-diversity hotspots, biodiversity conservation.

References:
10. Mountain and Tree cover in Mountain Regions Report - 2002, UNEP-WCMC.
26. Geography of Social Wellbeing

Learning Outcomes:
After the completion of course, the students will have ability to:

1. Understand the nature, scope and relationships of geography and human wellbeing;
2. Acquire knowledge on spatial dimensions of social diversity components;
3. Appreciate the social welfare programs related to inclusive and exclusive policies in India.

Course Content:

2. Social Diversity: Caste, Class, Religion, Race and Gender and their Spatial distribution
3. Social Wellbeing and Inclusive Development: Concept and Components – Healthcare, Housing and Education.
4. Social Geographies of Inclusion and Exclusion, Slums, Gated Communities, Communal Conflicts and Crime.
5. Social welfare program and policies.

References:

Elective Generic Papers

27. Disaster Management

Learning Outcome:
After the completion of course, the students will have ability to:
1. Gain a perspective of disasters and various dimensions of disaster management
2. Have comprehensive knowledge of various natural and manmade disasters in India
3. Examine the response and mitigation measures of disasters

Course Content:
1. Disasters: Definition and Concepts; Risk and Vulnerability; Classification
2. Disasters in India: (a) Flood: Causes, Impact, Distribution and Mapping; Landslide: Causes, Impact, Distribution and Mapping; Drought: Causes, Impact, Distribution and Mapping
3. Disasters in India: (b) Earthquake and Tsunami: Causes, Impact, Distribution and Mapping; (c) Cyclone: Causes, Impact, Distribution and Mapping.
4. Manmade disasters: Causes, Impact, Distribution and Mapping
5. Response and Mitigation to Disasters: Mitigation and Preparedness, NDMA and NIDM; Indigenous Knowledge and Community-Based Disaster Management; Do’s and Don’ts During and Post-disasters.

References:


28. Geography of Tourism and Pilgrimage

**Learning Outcome:**

After the completion of course, the students will have ability to:

1. Equip with a basic understanding of nature and scope, trends and patterns of various types of tourism.
2. Have sound knowledge on geographical, environmental and socio-cultural aspects of tourism in India.
3. Apply the principles of Geo-tourism and analyse the prospects and problems associated with pilgrimage tourism.

**Course Content:**

1. Scope and Nature: Concepts and Issues, Tourism, Recreation and Leisure Inter-Relations; Geographical Parameters of Tourism by Robinson.
2. Trends and Patterns: Nature Tourism, Cultural Tourism, Medical Tourism, Pilgrimage, Geo-tourism.
3. Recent Trends of Tourism: International and Regional; Domestic (India); Eco-Tourism, Sustainable Tourism, Meetings Incentives Conventions and Exhibitions.
4. Impact of Tourism: Economy; Environment; Society.
5. Tourism in India: Tourism Infrastructure; Case Studies of Himalaya, Desert and Coastal Areas; India’s World Heritage Sites and National Geological Monuments National Tourism Policy.

**References:**


29. Geospatial Information Technology

Learning Outcomes:
After the completion of course, the students will have ability to:

1. Appreciate the basic concepts and historical development of geographical information technology
2. Acquire knowledge on data structure, interpolation, modelling, functions and working of geographical information technology
3. Apply the geographical information technology for sustainable development of the nation

Course Content:
1. Introduction: Definitions, Concept and Historical Development of geospatial technology.
2. Geospatial Data: Web data sources; Registration and projection; Data structures; Data interpolation and modelling
3. Working on spatial information system
4. Functions of Geospatial Information System: Information retrieval; Topological modelling; Networks; Overlay; Data output
5. Application of Geospatial Information Technology for sustainable development

References:
30. Coupled Human and Environment System

Course Learning Outcome:
After the completion of course, the students will have ability to:

1. Understand the fundamental concepts of coupled human-environment system.
2. Assess the vulnerability, risk and resilience issues associated with the human-environment system.
3. Develop possible solutions for addressing the contemporary sustainability challenges.

Course Content:

2. Biogeochemical cycles: Interactions and impact between human and natural systems.
3. Global and regional case studies: Himalaya-Ganga system; Atmosphere-water system; Surface and ground water and Coastal-water interaction.
4. Integrated Assessment of Vulnerability Risk; Resilience and Sustainability.

References:

31. Climate Change Vulnerability and Adaptation

Learning Outcome:
After the completion of course, the students will have ability to:

1. Understand the foundational concepts of climate change and its impacts.
2. Assess the human and environmental vulnerability to climate change.
3. Learn the various adaptation and mitigation for reducing the impacts of climate change and national action plan.

Course Content:

1. Climate Change: Understanding Climate Change; Greenhouse Gases and Global Warming; Global Climatic Assessment- IPCC
2. Climate Change and Vulnerability: Physical Vulnerability; Economic Vulnerability; Social Vulnerability
3. Impact of Climate Change: Agriculture and Water; Flora and Fauna; Human Health
5. National Action Plan on Climate Change; Local Institutions (Urban Local Bodies, Panchayats)

References:


32. Rural Development

Learning Outcomes:
After the completion of course, the students will have ability to:

1. Appreciate the concepts, needs and various approaches to rural development;
2. Understand the strong economic bases of rural areas of India;
3. Appreciate the area based and target group based approaches and provision of services to rural development.

Course Content:

2. Rural Economic Base: Panchayati Raj System, Agriculture and Allied Sectors, Seasonality and Need for Expanding Non-Farm Activities, Co-operatives, PURA.
3. Area Based Approach to Rural Development: Drought Prone Area Programmes, PMGSY.
4. Target Group Approach to Rural Development: SJSY, MNREGA, Jan Dhan Yojana and Rural Connectivity.
5. Provision of Services – Physical and Socio-Economic Access to Elementary Education and Primary Health Care and Micro credit

References:

1. Anand, Subhash.,(2013): Dynamics of Rural Development, Research India Press, Delhi
33. **Industrial Development**

**Learning Outcomes:**

After the completion of course, the students will have ability to:

1. Understand the factors responsible for location of an industry.
2. Differentiate various types of industries and industrial regions and policies of India.
3. Evaluate the socio, economic and environmental implications of various types of industries.

**Course Contents:**

1. Nature and Scope of Industrial Geography.
2. Types, Geographical Characteristics and Location of Industries (Weber’s Theory):
   - Small and Medium
4. Mega Industrial Complexes: National Capital Region, Mumbai-Pune Industrial Region, Bengaluru-Chennai Industrial Region and Chota Nagpur Industrial Region
5. Impact of Industrialisation in India: Environmental; Social and Economic
6. Industrial Policy of India

**References:**


34. Sustainable Resource Development

Learning Outcomes:
After the completion of course, the students will have ability to:

1. Understand difficulties in defining the components of sustainable development;
2. Distinguish the patterns of regional development of the world and the need for sustainable development plan;
3. Appreciate the efforts and initiatives of the Governments in reducing the levels of poverty and inequality among the people of various countries.

Course Content:

1. Sustainable Resource Development: Definition, Components and Limitations
2. The Millennium Development Goals: National Strategies and International Experiences
3. Sustainable Regional Development: Need and examples from different Ecosystems.
4. Inclusive Development: Poverty and Inequality; Education, Health; Climate Change: The role of higher education in sustainable resource development; The Challenges of Universal Health Coverage,
5. Sustainable Development Policies and Programmes: The proposal for SDGs at Rio+20; SDGs; Goal-Based Development; Financing for Sustainable Development; Principles of Good Governance; National Environmental Policy, CDM.

References:


PART III
Learning Outcomes based Curriculum Framework (LOCF) for Geography B.A. /B.Sc. (Programme)

11. Introduction

The aim of Learning Outcome based Curriculum Framework Committee (LOCF) constituted by the University Grants Commission (UGC) is to introduce the students of geography not only to the conventional and innovative courses but also to provide them an understanding of the basic principles of technology based practical courses such as Geographical Mapping, Remote Sensing, Spatial Information Technology, Satellite System, etc. It also intents to expose the learners the technical skills required to analyse and interpret the results by applying such techniques. The LOCF is designed to emphasize the teaching-learning process at the undergraduate (B.A./B.Sc) level to sensitise and train the students to develop a sound and systematic approach regarding mechanism and processes of natural and human made hazards and disasters. The focus is to help the students to understand the latest tools and techniques, which would help in giving focused and precise understanding of geographical phenomenon.

The purpose is to enhance the capability of the students in perceiving, creating and analyzing sound geographical bases and concepts. This Learning Outcome based Curriculum Framework is designed to emphasize the teaching and learning process at the undergraduate (B.A./B.Sc) from teacher centric to student centric by strengthening the quality of teaching and learning in the present day real life scenario of global, regional and local level. It is considered learning as an activity of creativity of innovations and analysing geographical phenomena.

The committee prepared the major objectives and learning outcomes, which would help the students to understand and critically analyse various dimensions of the geographical issues. The following objectives would be achieved:

- To orient the students towards identification and analysis of various facets of geographic and geographical features and processes.
- To develop students’ aptitude for acquiring basic skills of carrying out field work.
- To facilitate the students to learn skills of map making.
- To guide students to learn the science and art of collecting, processing and interpreting the data.
- To expose the students to the use of the updated technologies of remote sensing and Geographical Information System (GIS).
12.1. B.A/B.SC (PROGRAMME) Geography Course Outcomes and SDGs

The global community has adopted the Sustainable Development Goals to ensure holistic and multi-faceted development of human societies across the world. These goals adopted in 2015 were an ambitious upgradation of millennium development goals. The Indian Geographical community aims to harness the trans-disciplinary nature of the subject and link it with sustainable development goals through a range of multi-dimensional core and elective papers.

**B.A. (Programme) GEOGRAPHY: CONTRIBUTION TOWARDS SDGs**

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<td>Geography of Tourism</td>
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<tr>
<td>Climate Change Vulnerability and Mitigation</td>
<td>X</td>
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93
12.2. STRUCTURE OF B.A. & B.Sc (Programme) IN GEOGRAPHY

**Note:** For the structure of B.A. & B.Sc (Programme) in Geography, the Committee has followed the number of credits per course as suggested in the CBCS document, that is, six credits per Core Course.

A. Core Courses: (4) (4x6= 24 Credits)

B. Elective courses (EC) (any two) (2x6= 12 Credits)

C. Ability Enhancement Compulsory Course (AECC) (As per UGC CBCS guidelines) (08 Credits)

D. Skill Enhancement Course (SEC) (4x4=16 Credits)

GRAND TOTAL (A+B+C+D+E): Total Courses: 10
Total Credits: (24+12+16+8=60)

### A. CORE COURSE (4)

<table>
<thead>
<tr>
<th>Serial No</th>
<th>Title of the Course</th>
<th>Credits: 6 credits per course. Total 24 (credits distribution to be decided by institutions as per UGC/CBCS guidelines).</th>
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<tbody>
<tr>
<td>1.</td>
<td>Physical Geography</td>
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<td>4.</td>
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### B. Elective Courses (any two) EC

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<tr>
<td>Course Title</td>
<td>Credits</td>
<td>Distribution</td>
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**C. Ability Enhancement Compulsory Course (AECC)**

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<tr>
<td>Distribution of Credit Hours</td>
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<tr>
<td>L Lectures: 4 /[5]/[4]</td>
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<tr>
<td>T Tutorials: 1 /[1]/(0)</td>
<td></td>
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<tr>
<td>O Others: 1 /[0]/[2]2</td>
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<tr>
<td>[Note: There can be different options depending upon the pedagogical and assessment weightage distribution]</td>
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**D. Skill Enhancement Course (SEC)**

<table>
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<td>O Others: 1 /[0]/[2]2</td>
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<tr>
<td>Regional Planning and Sustainable Development</td>
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Note:
1. Universities/Institutions/Departments may wish to add more courses against categories marked B and C, depending upon the availability of specialists and other required resources.
2. Any major deviation from category A is likely to impact the very philosophy of LOCF in Geography.

9.2 Choice Based Credit System B.A. / B. Sc (Programme) Geography

<table>
<thead>
<tr>
<th>Core Course (12) (4 credits per course)</th>
<th>Ability Enhancement Compulsory Course (AECC) (2)</th>
<th>Skill Enhancement Course (SEC)(2)</th>
<th>Discipline Specific Elective (DSE) (2)</th>
<th>Generic Elective (GE) (2)</th>
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<tr>
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<tr>
<td>I</td>
<td>Physical Geography</td>
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<td>II</td>
<td>Cartographic Techniques</td>
<td>DSC-2 C</td>
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<td>II</td>
<td>Fundamentals of Remote Sensing and GPS</td>
<td>DSC-2 D</td>
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<tr>
<td>III</td>
<td>Field Techniques and Surveying Methods</td>
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<td>Systematic Geography of India or World Economic Geography</td>
<td>DSE-2 A</td>
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<tr>
<td>IV</td>
<td>Introduction to Geographic Information System</td>
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<td>IV</td>
<td>Disaster Risk Reduction or Geography of Tourism</td>
<td>DSE-2 B</td>
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<td>V</td>
<td>Disaster Management</td>
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**B.A./B.Sc (Programme) Geography**

**Core Course (4 Compulsory courses)**

**Semester I**
1. Physical Geography

**Semester II**
2. Human Geography

**Semester III**
3. Cartographic Techniques

**Semester IV**
4. Environmental Geography
Skill Enhancement Course (2 Compulsory courses)

**Semester III**
1. Regional Planning and Sustainable Development

**Semester IV**
2. Fundamentals of Remote Sensing and GPS

**Semester V**
3. Field Techniques and Surveying Methods

**Semester VI**
4. Introduction to Geographic Information System

Discipline Specific Elective Papers (2 Compulsory courses)

**Semester V**
1. Systematic Geography of India
2. World Economic Geography

**Semester VI**
3. Disaster Risk Reduction
4. Geography of Tourism

Generic Elective (2)

**Semester V**
1. Disaster Management

**Semester VI**
2. Climate Change Vulnerability and Mitigation
Core Courses

1. Physical Geography

Learning Outcomes:

After the completion of the course, the students will have the ability to:

1. Understand the components of the earth system – atmosphere, lithosphere and hydrosphere;
2. Appreciate and understand various features of the spheres with local, regional and global examples;
3. Associate and bring out the relationships of the features of one sphere with other spheres.

Course Content:

3. Lithosphere – Internal Structure of Earth based on Seismic Evidence, Plate Tectonics and its Associated Features.
5. Hydrosphere – Hydrological Cycle, Ocean Bottom Relief Features, Tides and Ocean Currents.

References:

2. Human Geography

Learning Outcomes:

After the completion of the course, the students will have the ability to:

1. Understand the basic concepts in various sub-fields of human geography;
2. Appreciate the growth, distribution and composition of population in different parts of the world;
3. Analyse the types and patterns of rural and urban settlements, urbanisation and related issues in India and other regions of the world.

Course Content:

2. Space and Society: Cultural Regions; Race; Religion and Language.
4. World Population Distribution and Composition (Age, Gender and Literacy).
5. Settlements: Types and Patterns of Rural Settlements; Classification of Urban Settlements; Trends and Patterns of World Urbanisation.

References:

3. Cartographic Techniques

Learning Outcomes:

After the completion of the course, the students will have the ability to:

1. Distinguish between various types of maps and also appreciate the elements of map;
2. Appreciate how projections are applied to prepare maps from the globe;
3. Acquire knowledge to prepare maps from geographic data and also the ability to interpret them.

Course Content:

1. Maps: Types, Elements and Uses
2. Map Scales: Types and Application, Reading Distances on a Map.

References:

4. Environmental Geography

Learning Outcomes:

After the completion of the course, the students will have the ability to:

1. Appreciate the structure and functions of ecosystems with examples;
2. Understand the environmental problems and relevant management strategies;
3. Acquire knowledge about the new environmental policies and the need to revise policies to tackle the environmental issues of India, in particular.

Course Content:

1. Environmental Geography: Concepts and Approaches; Ecosystem – Concept and Structure; Ecosystem Functions.
2. Human-Environment Relationship in Equatorial, Desert, Mountain and Coastal Regions.
3. Environmental Problems and Management: Air Pollution; Solid and Liquid Waste; Biodiversity Loss
4. Environmental Programmes and Policies: Developed Countries; Developing Countries.
5. New Environmental Policy of India; Government Initiatives.

References:


Skill Enhancement Courses (2 Compulsory Courses)

1. Regional Planning and Sustainable Development

Learning Outcomes:

After the completion of the course, the students will have the ability to:

1. Appreciate the basics of regional planning methodology and the need for adopting newer models in the planning process;
2. Understand the history of adopting various planning strategies for balanced national development;
3. Capable of diagnosing the regional issues and the necessity to adopt suitable SDGs in India.

Course Content:

1. Regional Planning: Concepts, Need and Types; Delineation of Planning Regions.
2. Models for Regional Planning: Growth Pole Theory; Core Periphery Model and Growth Foci Concept in Indian Context.
3. Backward Regions and Regional Plans - Special Area Development Plans in India; DVC-The Success Story and the Failures; NITI Aayog.

Sustainable Development Goals (SDGs): History, Global Challenges, Blueprint, Target by 2030, Partnerships.

References:

Methuen, London.


2. Fundamentals of Remote Sensing and GPS

Learning Outcomes:

After the completion of the course, the students will have the ability to:

1. Appreciate the development and uses of aerial and satellite remote sensing system and navigation satellite systems in India and other nations;
2. Understand the basics of EMR and energy interaction in atmosphere and on earth surface features;
3. Analyse and interpret the aerial and satellite data products and GNSS/GPS survey results.

Course Content:


Practical Record: A project consisting of five exercises will be done from satellite images and navigation satellite positioning (scale, orientation and interpretation).

References:

3. Field Techniques and Surveying Methods

Learning Outcomes:

After the completion of the course, the students will have the ability to:

1. Conduct field work in physical and human geography, besides investigating socio-economic and environmental issues;
2. Develop tools to collect primary data from the field and interpret them meaningfully;
3. Prepare field report with suitable tables, maps and diagrams based on the data collected from the field and secondary sources.

Course Content:

1. Field work in Geographical Studies – Definition, Concept, Role, Value and Ethics of Field work.
2. Defining the Field and Identifying the Case Study – Rural / Urban / Physical / Human / Environmental, Types of data.Field Techniques – Merits, Demerits and Selection of the Appropriate Technique; Observation and navigation satellite positioning (Participant / Non Participant).Surveying methods: Questionnaires (Open/ Closed / Structured / Non-Structured); Interview with Special Focus on Focused Group Discussions; Participatory Rural Appraisal (PRA).
3. Designing the Field Report – Aims and Objectives, Methodology, Analysis, Interpretation and Writing the Report.

Practical Record

1. Each student will prepare an individual report based on primary and secondary data collected during field work.
2. The duration of the field work should not exceed 10 days.
3. The word count of the report should be about 6,000 to 10,000 excluding figures, tables, photographs, maps, references and appendices.
4. Students are advised to make use of navigation satellite positioning (GNSS/GPS) during observation and it report.
5. One copy of the report on A4 size paper should be submitted in soft binding.
References:

4. Introduction to Geographic Information System

Learning Outcomes:

After the completion of the course, the students will have the ability to:

1. Appreciate the basic principles and components of GIS;
2. Apply raster and vector data structure for GIS analysis;
3. Analyse the basic resources, land use and urban related data using GIS software for meaningful interpretation.

Course Content:

2. GIS Data Structures: Types (Spatial and Non-spatial), Raster and Vector Data Structure.
3. GIS Data Analysis: Input; Geo-Referencing; Editing and Output; Overlays.
5. Application of GIS in Urban Sprawl, Land use/Land-cover.

Practical Record: A project file consisting of 5 exercises on using any GIS Software (free software like QGIS, AGIS etc.) on above mentioned themes.

References:


Discipline Specific Elective Courses (2 Compulsory Courses)

1. Systematic Geography of India

Learning Outcome:

After the completion of the course, the students will have the ability to:

1. Learn the differences in terms of varied physiography of India;
2. Understand the demographic component and settlement structure in India;
3. Study the economy and various types of resources in India.

Course Content:

1. Physical Setting – Location, Structure and Relief, Drainage, Climate.
3. Settlement System - Rural Settlement Types and Patterns, Urban Patterns.
4. Resource Base – Livestock (Cattle and Fisheries), Power (Coal, and Hydro-electricity), Minerals (Iron Ore and Bauxite).
5. Economy – Agriculture (Rice, Wheat, Sugarcane, Groundnut, Cotton); Industries (Cotton Textile, Iron-Steel, Automobile), Transportation Modes (Road and Rail).

References:


2. World Economic Geography

Learning Outcome:

After the completion of the course, the students will have the ability to:

1. Appreciate the basic concepts and approaches of economic geography;
2. Examine the significance and relevance of theories in relation to the location of different economic activities;
3. Distinguish different types of human activities and their inter and intra relationships.

Course Content:

1. Economic Geography: Definition, Approaches and Fundamental Concepts; Patterns of Development.
2. Locational Theories: Agriculture (Von Thunen), Industrial (Weber) and Services (Christaller).
5. Tertiary and Quaternary Activities: Modes of Transportation, Patterns of International Trade, and Information and Communication Technology Industry.

References:

3. Disaster Risk Reduction

Learning Outcome:

After the completion of the course, the students will have the ability to:

1. Acquire knowledge on concepts, types, distribution and mapping of disasters in India;
2. Understand the man-made disasters and human negligence in the context of environment;

Course Content:

5. Disaster Risk Reduction: Mitigation and Preparedness, NDMA and NIDM; Community-Based Disaster Management; Do’s and Don’ts during Disasters.

References:

4. Geography of Tourism

Learning Outcomes:

After the completion of the course, the students will have the ability to:

1. Appreciate the basic concepts and geographical parameters of tourism;
2. Acquire knowledge on the recent trends and patterns of tourism development in India and other countries;
3. Understand the impacts of tourism on national, regional and local economy, environment and society.

Course Content:

2. Geographical Parameters of Tourism by Robinson; Type of Tourism: Nature Tourism, Cultural Tourism, Medical Tourism, Pilgrimage, Geo-tourism
3. Recent Trends of Tourism: International and Regional; Domestic (India); Eco-Tourism, Sustainable Tourism, Meetings, Incentives, Conventions and Exhibitions (MICE); Trends of Pilgrimage Tourism.
4. Impacts of Tourism: Economy; Environment; Society.
5. Tourism in India: World heritage sites Tourism Infrastructure; Case Studies of Himalaya, Desert and Coastal and Heritage; National Tourism Policy.

References:


Generic Elective Courses (2)

1. Disaster Management

Learning Outcomes:

After the completion of the course, the students will have the ability to:

1. Understand the basic concepts and the classification method of disasters;
2. Acquire knowledge on the causes, impacts, distribution and mapping of disasters of India;
3. Appreciate the responses and mitigation measures of disasters in India.

Course Content:

5. Response and Mitigation to Disasters: Mitigation and Preparedness, NDMA and NIDM; Indigenous Knowledge and Community-Based Disaster Management; Do’s and Don’ts During Disasters.

References:

2. Climate Change Vulnerability and Mitigation

Learning Outcomes:

After the completion of the course, the students will have the ability to:

1. Understand the climate change and its physical, economic and social vulnerabilities;
2. Diagnose the impacts of climate change on various spheres of the earth;
3. Appreciate the global, national and local adaptation and mitigation efforts and plans of the Governments.

Course Content:

1. Science of Climate Change: Understanding Climate Change; Green House Gases and Global Warming; Global Climatic Assessment - IPCC
2. Climate Change and Vulnerability: Physical Vulnerability; Economic Vulnerability; Social Vulnerability
3. Impacts of Climate Change: Agriculture and Water; Flora and Fauna; Human Health
5. National Action Plan on Climate Change; Local Institutions (Urban Local Bodies, Panchayats)

References:

13. **Keywords**

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<th>Atmosphere and Climate</th>
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<th>Spatio-temporal analysis</th>
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Expert Committee Members of Learning Outcomes based Curriculum Framework (LOCF) Geography

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