# दिल्लीविश्वविद्यालय
# UNIVERSITY OF DELHI

Bachelor of Arts (Hons) Geography

(Effective from Academic Year 2019-20)

**Revised Syllabus as approved by**

**Academic Council**
Date: No:
**Executive Council**
Date: No:

**Applicable for students registered with Regular Colleges**

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**Learning Outcomes Based Curriculum Framework (LOCF) for B.A. (Hons.) Geography**

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# Preamble

The objective of anyprogramme at Higher Education Institute is to prepare their students for the society at large. The University of Delhi envisions all its programmes in the best interest of their students and in this endeavour it offers a new vision to all its Under-Graduate courses. It imbibes a Learning Outcome-based Curriculum Framework (LOCF) for all its Under Graduate programmes.

The LOCF approach is envisioned to provide a focused, outcome-based syllabus at the undergraduate level with an agenda to structure the teaching-learning experiences in a more student-centric manner. The LOCF approach has been adopted to strengthen students' experiences as they engage themselves in the programme of their choice. The Under-Graduate Programmes will prepare the students for both, academia and employability.

Each programme vividly elaborates its nature and promises the outcomes that are to be accomplished by studying the courses. The programmes also state the attributes that it offers to inculcate at the graduation level. The graduate attributes encompass values related to well-being, emotional stability, critical thinking, social justice and also skills for employability. In short, each programme prepares students for sustainability and life-long learning.

The new curriculum of B.A. (Hons) Geography offer following objectives:

1. To orient the students towards identification and analysis of various facets of geographic and geographical features and processes.
2. To develop students' aptitude for acquiring basic skills of carrying out field work.
3. To facilitate the students to learn skills of map making.
4. To guide students to learn the science and art of collecting, processing and interpreting the data.
5. To expose the students to the use of the updated technologies of remote sensing, GNSS, Geographical Information System (GIS) and GIScience.

## 1. INTRODUCTION

The Choice Based Credit System (CBCS) offers a uniform structure to the undergraduate curriculum. The B.A.Honours programme in Geography offers a choice of varied papers covering theoretical, practical and applied aspects of the discipline. It is designed to cover both traditional and contemporary framework of study, thus giving a wide scope to the learners to apply their knowledge and skills in real scenarios. Teaching-learning methods have also evolved from purely lecture mode to demonstrative techniques of knowledge enabling process.

The main objective is to develop an aptitude towards erudition that is rich in its content as well as it delivers the requirement of the present day society and industry. The curriculum has been carefully designed to include conceptual, practical, experiential and skill building component.

Each Course has three learning outcomes, five uniform contents and references incorporating a few Hindi books wherever possible.

**1.1 Fundamentals:** This curriculum also focuses on the understanding of core and fundamental branches of the discipline. These papers are specially designed to cater to foundation building of the students by imparting knowledge about the pillars of geography. It encompasses the evolution of the subject right from the experiences and understanding of travellers and explorers regarding space, place and people to the progression towards establishment of the discipline geography in social sciences. Care has been taken to cover all basic themes in geography. The classic and contemporary theories / models of the subject are incorporated in most papers. These core branches cover the two broad spectrums of physical and human geography, along with the interface branch of environmental studies.

**1.2 Practical:** To enrich the process of knowledge assimilation varied tools and technique oriented papers have also been incorporated in the curriculum. It includes traditional mapping concepts to digital and space based learning. There has been emphasis on use of sophisticated methods of data collection as well as data processing through exhaustive field work, use of basic statistics and Geographic Information System. The advantage of going for compulsory

fieldwork can train them to undertake research in future which is essential part of social science approach.

**1.3 Application Oriented:** In addition to this, the applied component has also been integrated in the syllabus for skill enhancement and capacity building. Laboratory and project based learning are important constituents of these papers. Hands on learning making use of various tools, equipment and softwares are essential mechanism for knowledge transfer. There has been focus on student centric education that involves an exploratory approach and gaining proficiency by learning both inside and outside their classrooms.

**1.4 Regional Approach**: In most of the papers regional dimensions are added through theoretical case studies and field excursions. Along with the global dimensions of the issues that are covered in syllabus papers like geography of India purely caters to regional and local approach to the understanding.

## 2. LEARNING OUTCOME – BASED APPROACH TO CURRICULUM PLANNING

The learning outcome is to prepare the students of BA/BSc Honours degree in Geography, to understand the development of the subject and delve around issues suited to the needs of the contemporary world. It covers a wide range of papers covering various themes and also maintains uniformity of structure across universities in the country. Geography being interdisciplinary in nature integrates learning derived from all basic and applied sciences/social sciences.

### 2.1 **Nature and Extent of Programme**

The Learning Outcomes-based Curriculum Framework (LOCF) for the B.A. (Honours) degree in Geography is intended to develop as per the requirements of the subject with emerging new domains of Geography. The framework allows for flexibility in programme design and course content along with maintaining a basic uniformity in structure in comparison with other universities across the country. The B.A. (Honours) Geography programme covers a wide range of fundamental and applied courses as well as courses of interdisciplinary nature. The core courses are designed to develop strong subject knowledge base in the student and apprise them with the applied aspects of this dynamic global

discipline. The programme offers a wide range of elective courses to the student to choose from. The syllabi include skill enhancement courses that prepare the student for a career in academia or industry.

2.2 **Aims of Bachelor degree programme in Geography**

The student is equipped to pursue higher studies in an institution of her/his choice, and to apply the skills learnt in the programme to solving practical societal problems. The student will also be ready to join the industry as trained workforce.

## 3. GRADUATE ATTRIBUTES

Some of the characteristic attributes of an Honors graduate in Geography include:

3.1 **Disciplinary Knowledge**: Students gains in-depth knowledge of basic and applied areas of geography. Core and discipline courses train them in fundamental branches of the subject. Technical and skill courses help them to learn tools and technics. Geography student gets a unique opportunity to experiment and observe on the field.

3.2 **Communication Skills**: Students develops effective communication skills through oral presentations, and group discussions on the subject content. Besides interviewing people, field surveys and public dealing with different cadre of people makes him/her confident in communication. The compiling, processing and analyzingthe information from the field;and presenting in the form of reports enhances written communication skills.

3.3 **Critical Thinking**: Geography subject creates scientific logic aptitude and approaches a problem through critical reasoning. The course content is enabled to stimulate the questioning capacity for what, where, who, when and how. The papers like Environmental Geography, Disaster Management, Global Economic System, Resource Management to name a few.

3.4 **Problem Solving**: The understanding about surroundings, the issues that concerns life, climate or to that matter water crisis etc makes students yearn to look for solutions. Geography discipline has the flair which connects to everyday living and survival thus generates problem solving aptitude.

3.5 **Analytical Reasoning**: The geography course teaches variety of tools, techniques and data handling which develop analytical reasoning to solve the issues. In fact the training in all these courses is meant to develop the analytical reasoning, mining the data from satellite images, aerial photographs and observations to arrive at interpretations and inferences.

3.6 **Research Related Skills**: The course content trains students to learn basic research design, data collection process, and ethics to conduct research work through field work. The specially developed course on research methodology and field work acquaint them to prepare questionnaires, selecting sample plans, identifying right kind of objectives,data collections methods, field exposure, mental mapping, reproducing the observations, analysis and finally to prepare reports.

3.7 **Cooperation/ Teamwork**: The course enables to develop skill to work with students ofdiverse backgrounds and cooperation on same topic will increase better understanding. The group assignments and presentations are essential elements in the course design that will inculcate the team spirits. The field excursions help develop great bonding; working and executing the plans on ground .They also learn to work as team in case any emergency with group member away from institution/home/or city.

3.8 **Scientific Reasoning**: Course will develop critical analysis of theories and models, raising critical questions about the theories and models, developing hypothesis and learning their testing. Many of the courses in geography are truly scientific in nature which will generate scientific reasoning aptitude and also skills to look towards new approaches.

3.9 **Reflective Thinking:** A graduate who successfully completes his/her course should be able to reflect on the assimilated knowledge so as to apply these skills at different levels. Whether they go for masters in pure or applied disciplines, it will inculcate a sense of understanding of the world to manage real world problems. Any teaching learning process is incomplete without clear refection of the theoretical, practical and applied knowledge of the subject. A degree in geography has ample scope in other field of studies too as the subject with its interdisciplinary approach helps the learners to think in a more comprehensive manner.

3.10 **Information and Digital Library:** The student of geography is always encouraged to explore beyond the basic textbooks. Besides availability of all types of reading material, a student needs to invest in learning and consulting from various open source library to expand the vista of their knowledge acquiring capability. Since it is a subject that does not completely rely on traditional text book oriented studies but has to delve deeper and research enough to keep pace with the ever-changing world. Thus the World Wide Web has proved to be very useful in keeping oneself apprised and continuously update ones knowledge base. The usage of open source software, tools and open access reading material are part of the curriculum which will train them for digital world.

3.11 **Self Directed Learning:** A graduate in the discipline of geography has to engage continuously in a learning process that can give a sense of direction to him/her. Different types of project work and field oriented papers encourages the pupil to take up self-directed task so as to widen their research horizon and ultimately look beyond the basic course book. Anyone with a mindset to move beyond the curriculum has to go for self-learning as the teaching content is fixed and defined. Under the supervision of the teacher one can easily involve themselves in fruitful learning. This will enable the students to take up task that is well understood and adapting themselves to the changing curriculum needs.

3.12 **Multicultural Competence:** Geography is a discipline which is not limited to any specific place or space. Its identity is based on multi-plural, multi-cultural and multi sited-ethnography. As a subject it emphasizes on regional and cultural studies which involves detailed understanding of places and perceptions. Also as a disciplinarian, it allows the learner to learn about both their own culture as well as those of their distant counterparts. This diversified knowledge also helps them to respect all fellows following varied community norms, traditions and practices. Field studies have been much helpful in introducing multicultural competencies to students of geography.

3.13 **Moral and ethical awareness**: In the age of fast technological changes and in the attempt to obtain an increased level of comforts. Today is the age in which the social order of the national state, class, ethnicity and traditional family needs more attention. In this scenario, Geography curriculum attempts to explain rights and duties not only towards working and fellow citizens but also towards nature and resources. The student will appreciate the balanced interactions, personal space, and common/community space. Geography will play its part in nurturing values and ethics in future citizens of the world.

3.14 **Leadership Readiness/ Quality**: A good leader needs to have the knowledge, rational thinking and ready to act at the time of need. Geography encourages to have descriptive and explanatory knowledge of one's surroundings and the globe as a whole, it develops rational thinking and prepares the students to think about alternative social, economic and environmental futures. So a geography student will be a good leader and will contribute in different capacities.

**Lifelong learning**: Lifelong learning is a seamless process of learning from primary education to higher levels and even during one's profession through formal or informal modes. The core of the Geography is the man-environment interaction, which remains

relevant for all at all stages of human life. So the basic knowledge and the tools Geographer learns help them in their future life and the process of learning will continue throughout life.

## 4. QUALIFICATION DESCRIPTION

The qualification description for B.Sc. (Honours) programme in Geography includes:

- Demonstration of exhaustive understanding of the basic concepts of Geography and an awareness of the emerging areas of the field.
- Acquisition of in-depth understanding of the applied aspects of Geographyas well as interdisciplinary subjects in everyday life.
- Improvement of critical thinking and skills facilitating.
- The application of knowledge gained in the field of Geography in the classroom to the practical solving of societal problems.
- Development of intellectual capabilities to get into further research in the discipline.
- Acquirement of practical laboratory skills, systematic research design and collection of experimental data.
- Exhibition of ability to quantitatively analyse the experimental data and writing project reports.
- Development of strong oral and written communication skills promoting the ability to present ideas and also team work spirits.

## 5. PROGRAMME LEARNING OUTCOMES IN COURSE

- The learning outcome is to prepare the students of BA/BSc Honours degree in Geography, to understand the development of the subject and delve around issues suited to the needs of the contemporary world. It covers a wide range of papers covering various themes and also maintains uniformity of structure across universities in the country.Geography being interdisciplinary in nature integrates learning derived from all basic and applied sciences/social sciences.
- Students of the BA/BSc Honours degree in Geography will learn to use geographic understanding of various sub fields such as physiography, resources, global economic systems, socio- cultural aspects, rural and urban milieu, environmental and disaster studies and mapping methods.
- They are trained to read and interpret maps, prepare transect charts and thematic atlas.
- They are also able to read and analyse weather phenomenon through weather maps and charts.
- Students will acquire scientific methodology of data handling, hypothesis generation, testing and analysis.
- After the completion of the course, students will also gain knowledge of various technological applications through study of Remote Sensing and Geographic Information Science.
- The curriculum also provides an opportunity to digitally produce maps and modelling applications.

- The students also learn hand on skills to prepare building disaster plans, community disaster preparedness and also awareness creation.
- They will also develop an understanding of global issues from economic, social, environmental and political perspectives, which has relevance in further studies all across the globe.
- They also develop effective communication skills, team work, travel exposure and zeal of investigation and exploration.
- The learners can greatly contribute to the subject through teaching, research and field oriented studies.
- The students will also be able to pursue a career in spatial planning, sustainable practices, environmental and resource management.
- The geography graduates will be well informed citizens who can play immense role in the civil society too. They will be able to pursue wide range of careers as planners, administrators, academicians, and managers.

## 6. CURRICULUM STRUCTURE

The Learning Outcome-based Curriculum framework is designed around CBCS and it is intended to provide greater opportunity and employability along with in-depth knowledge of the discipline. By the end of the completion of the programme the students will be equipped to pursue further their interest in the subject.

**Table 1: Brief CBCS Course Structure for B.A. Honours Geography**

| **S.N.** | **COURSES** | **NO. OF PAPERS** | **CREDITS** | |
|---|---|---|---|---|
| | | | Theory +Tutorial | Total |
| A. | Core Courses<br>(14 Papers of 6 credits each) | 14 | 14x5 = 70<br>14x1 = 14 | 84 |
| B. | Discipline Specific Elective Courses<br>(4 Papers of 6 credits each) | 4 | 4x5= 20<br>4x1= 4 | 24 |
| C. | Skill Enhancement Courses<br>(2 Papers of 4 credits each, no tutorials) | 2 | 2x4=8 | 8 |
| D. | Generic Electives Courses/Interdisciplinary<br>(4 Papers of 6 credits each) | 4 | 4x5= 20<br>4x1= 4 | 24 |
| E. | Ability Enhancement Compulsory Courses<br>(2 Papers of 4 credits each, no tutorials) | 2 | 2x4=8 | 8 |
| **Total (A+B+C+D+E)** | | **26** | | **148** |

NOTE

1. For Theory courses : Theory and Tutorial (5+1/week)
2. For practical core courses 6 credits without tutorials. One credit is equivalent to two continuous hours.
3. For practical SEC courses 4 credits without tutorials. One credit is equivalent to two continuous hours.

**Programme Duration**

The BA/B.Sc. (Honours) programme will be of three years duration. Each year will be called an academic year and will be divided into two semesters. Thus there will be a total of six semesters. Each semester will consists of sixteen weeks.

**Programme Design**

The programme includes Core Courses (CC) and Elective Courses (EC). The core courses are all compulsory courses. There are three kinds of elective courses that includes Discipline-Specific Elective (DSE), Generic Elective (GE) and Skill Enhancement Course (SEC). In addition there are compulsory Ability Enhancement Courses (AEC).

To acquire a degree in Geography a student must study fourteen Core Courses, four Discipline Specific Electives, four Generic Electives, two Skill Enhancement Courses and two compulsory Ability Enhancement Courses. The Core Courses, Discipline-Specific Electives and Generic Electives are six-credit courses. The Skill Enhancement Courses are four-credit courses while the Ability Enhancement Courses are two credit-courses. **A student has to earn a minimum of 148 credits to get a degree in B.Sc. (H) Geography.**

a. The fourteen **Core Courses** are to be spread as, two courses each in I and II semesters; three courses each in semester III and IV; two courses each in semester V

**Table 2: Semester-wise Distribution of Credits**

| **Year** | **Semester** | **Courses** | **Credits** |
|---|---|---|---|
| I | I | 4 | 22 |
| | II | 4 | 22 |
| II | III | 5 | 28 |
| | IV | 5 | 28 |
| III | V | 4 | 24 |
| | VI | 4 | 24 |
| **Total** | | **26** | **148** |

and VI. Each course will be of six credits which will involve theory papers (Lectures) of one hour duration five days a week, and one tutorial per paper per week. While practical papers will have six double periods of two hours duration. For practical papers one credit is equivalent to two hours of teaching. There are no tutorials for practical courses.The size of the practical group will be not more than 15 students.

b. There are eight **Discipline-Specific Electives Courses (DSEC**), the student must choose any two in each of the Semesters V and VI. These courses will be of six credits each (five theory classes and one tutorial) of one hour duration.
c. The students will undertake two **Skill Enhancement Courses**(SEC) of four credits each in Semesters III and IV,to be selected from the list of SEC courses offered. The SEC courses will be of four credits each comprising of practical papers only. For practical papers one credit is equivalent to two hours of teaching. There are no tutorials for practical courses. The size of the practical group will be not more than 15 students.
d. **Generic Elective** (GE) courses will be offered to the students of the BA/BSc Honours Geography by other departments of the college. The student will have the option to choose oneGE course each in Semesters I, II, III, and IV. The GEs will be of six credits each (five credits for theory and one credit for tutorial). The department of Geography will offer eight GE courses for students of other department.
e. **Ability Enhancement Courses** (AEC)/ will be of two kinds: AE Compulsory Course (AECC) and AE Elective Course (AEEC). "AECC" courses are the courses based upon the content that leads to Knowledge enhancement. They are mandatory for all disciplines with two papers:(i) Environmental Science, (ii) English/MIL Communication). "AEEC" courses are value-based and/or skill-based and are aimed at providing hands-on-training, competencies, skills, etc.

**Table 3: Detailed CBCS Course Structure for B.A. Honours Geography**

**A. CORE COURSES**

(14 Papers of 6 credits each)

| **S.N.** | **Name of the Papers** | **Credits** (14x6=84) | **Credit Hours** | | |
|---|---|---|---|---|---|
| | | | **L** | **T** | **P** |
| 1 | Geomorphology | 6 | 5 | 1 | - |
| 2 | Cartographic Techniques (Practical) | 6 | - | - | 12 |
| 3 | Human Geography | 6 | 5 | 1 | - |
| 4 | Thematic Cartography (Practical) | 6 | - | - | 12 |
| 5 | Climatology | 6 | 5 | 1 | - |
| 6 | Statistical Methods in Geography (Practical) | 6 | - | - | 12 |
| 7. | Geography of India | 6 | 5 | 1 | - |
| 8. | Economic Geography | 6 | 5 | 1 | - |

| | | | | | |
|---|---|---|---|---|---|
| 9 | Environmental Geography | 6 | 5 | 1 | - |
| 10. | Field Work and Research Methodology (Practical) | 6 | - | - | 12 |
| 11. | Regional Planning and Development | 6 | 5 | 1 | - |
| 12. | Remote Sensing and GIS (Practical) | 6 | - | - | 12 |
| 13. | Evolution of Geographical Thought | 6 | 5 | 1 | - |
| 14. | Disaster Management based Project Work (Practical) | 6 | - | - | 12 |

**B. DISCIPLINE SPECIFIC ELECTIVES COURSES (ANY FOUR)**

(4 Papers of 6 credits each)

| S.N. | Name of the Papers | Credits (4x6=24) | Credit Hours | | |
|---|---|---|---|---|---|
| | | | L | T | P |
| 1. | Demography and Population Studies | 6 | 5 | 1 | - |
| 2. | Hydrology and Soil Studies | 6 | 5 | 1 | - |
| 3. | Urbanization and Urban System | 6 | 5 | 1 | - |
| 4. | Agriculture and Food Security | 6 | 5 | 1 | - |
| 5. | Geography of Health | 6 | 5 | 1 | - |
| 6. | Introduction to Political Geography | 6 | 5 | 1 | - |
| 7. | Biogeography and Biodiversity | 6 | 5 | 1 | - |
| 8. | Geography of Social Wellbeing | 6 | 5 | 1 | - |

**C. SKILL ENHANCEMENT COURSES**

(2 Papers of 4 credits each)

| S.N. | Name of the Course | Credits (2x4=8) | Credit Hours | | |
|---|---|---|---|---|---|
| | | | L | T | P |
| 1. | Geographic Information System(Practical) | 4 | - | - | 8 |
| 2. | Advanced Spatial Statistical Techniques | 4 | 4 | - | - |
| 3. | Introduction to GIScience(Practical) | 4 | - | - | 8 |
| 4. | Thematic Atlas(Practical) | 4 | - | - | 8 |

**D. GENERIC ELECTIVES COURSES/INTERDISCIPLINARY**

(4 Papers of 6 credits each)

| S.N. | Name of the Course | Credits (4x6=24) | Credit Hours | | |
|---|---|---|---|---|---|
| | | | L | T | P |
| 1. | Disaster Management | 6 | 5 | 1 | - |
| 2. | Geography of Tourism and Pilgrimage | 6 | 5 | 1 | - |
| 3. | Spatial Information Technology | 6 | 5 | 1 | - |
| 4. | Coupled Human and Environment System | 6 | 5 | 1 | - |
| 5. | Climate Change Vulnerability and Adaptation | 6 | 5 | 1 | - |
| 6. | Rural Development | 6 | 5 | 1 | - |
| 7. | Industrial Development | 6 | 5 | 1 | - |
| 8. | Sustainable Resource Development | 6 | 5 | 1 | - |

## E. ABILITY ENHANCEMENT COMPULSORY COURSES

(2 Papers of 4 credits each)

| S.N. | Name of the Course | Credits (4x2=8) | Credit Hours | | |
|---|---|---|---|---|---|
| | | | L | T | P |
| 1. | Art of Communication / MIL | 4 | 4 | - | - |
| 2. | Environmental Studies | 4 | 4 | - | - |

**NOTE**

4. For Theory courses : Theory and Tutorial (5+1/week)
5. For practical core courses 6 credits without tutorials. One credit is equivalent to two continuous hours.
6. For practical SEC courses 4 credits without tutorials. One credit is equivalent to two continuous hours.

| **Table 4: SEMESTER-WISE PLACEMENT OF COURSES** | | | | | | |
|---|---|---|---|---|---|---|
| **Year** | **Semester** | **AECC (2)** | **CC(14)** | **DSEC (4)** | **SEC (2)** | **GEC (4)** |
| I | I | Art of Communication/ MIL | Geomorphology<br>Cartographic Techniques(Practical) | | | Disaster Management<br>Or<br>Geography of Tourism and Pilgrimage |
| | II | Environmental Studies | Human Geography<br>Thematic Cartography (Practical) | | | Spatial Information Technology<br>Or<br>Coupled Human and Environment System |
| II | III | | Climatology<br>Statistical Methods in Geography (Practical)<br>Geography of India | | Geographic Information System (Practical)<br>or<br>Advanced Spatial Statistical Techniques | Climate Change Vulnerability and Adaptation<br>Or<br>Rural Development |
| | IV | | Economic Geography<br>Environmental Geography<br>Field Work and Research Methodology (Practical) | | Introduction to GIScience (Practical)<br>or<br>Thematic Atlas (Practical) | Industrial Development<br>Or<br>Sustainable Resource Development |
| III | V | | Regional Planning and Development<br>Remote Sensing and GIS (Practical) | Demography and Population Studies<br>Or<br>Hydrology and Soil Studies<br>Urbanization and Urban System<br>or<br>Agriculture and Food Security | | |
| | VI | | Evolution of Geographical Thought<br>Disaster Management based Project Work (Practical) | Geography of Health<br>or<br>Introduction to Political Geography<br>Biogeography and Biodiversity<br>Or<br>Geography of Social Wellbeing | | |

**SYLLABUS OF COURSES TO BE OFFERED**

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

**Core Courses**

**Semester I**

1. Geomorphology
2. Cartographic Techniques(Practical)

**Semester II**

3. Human Geography
4. Thematic Cartography (Practical)

**Semester III**

5. Climatology
6. Statistical Methods in Geography (Practical)
7. Geography of India

**Semester IV**

8. Economic Geography
9. Environmental Geography
10. Field work and Research Methodology (Practical)

**Semester V**

11. Regional Planning and Development
12. Remote Sensing and GIS (Practical)

**Semester VI**

13. Evolution of Geographical Thought
14. Disaster Management based Project Work(Practical)

**Skill Enhancement Course (any 2)**

**Semester III**

1. Geographic Information System(Practical)
2. Advanced Spatial Statistical Techniques

**Semester IV**

3. Introduction to GIScience (Practical)
4. Thematic Atlas (Practical)

**Discipline Specific Elective Courses (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. Introduction to Political Geography

**DSE-4**

7. Biogeography and Biodiversity
8. Geography of Social Wellbeing

**Generic Elective Courses**
**Semester I**

1. Disaster Management
2. Geography of Tourism and Pilgrimage

**Semester II**

1. Spatial Information Technology
2. Coupled Human and Environment System

**Semester III**

1. Climate Change Vulnerability and Adaptation
2. Rural Development

**Semester IV**

1. Industrial Development Sustainable
2. Resource Development

## 7.3. TEACHING-LEARNING PROCESS

- Classroom discussions and interactive learning.
- Audio visual presentation/ teaching methods.
- Presentation by students.
- Individuals/group training to work with software.
- Developing research skills through assignments/projects.
- Conduct theme based group activities.
- Developing Effective communication skills through group discussion.
- Beyond classroom teaching/learning through field excursions.
- Writing of reports/project.

## 7.4. ASSESSMENT METHODS

Different methods will be applied to assess the students over the duration of the programme. These include written assignments and oral examinations, group discussions and presentations, problem-solving exercises, field study, experimental design planning, seminars, preparation and presentation of reports and practical record book.

All papers carry 100 marks. Each theory paper is divided into two parts: main examination and internal assessment of 75 and 25 marks respectively. For practical papers, 50 marks ( 25 marks for internal assessment and 25 marks for practical record file) is assessed through continuous evaluation to be done at college level and 50 marks end semester examination to be conducted by the internal and external examiner.

**SYLLABUS B.A. (HONS.) GEOGRAPHY**

# 1. Geomorphology

## Course Objectives:

1. To understand the associations between geomorphologic landforms, concepts and processes.
2. To critically evaluate and connect information about geomorphic processes.
3. To provide a theoretical and empirical framework for understanding landscape evolution and the characteristics of individual types of geomorphic landscapes

## Learning Outcomes:

After completion of this course, students will be able 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:

1. Geomorphology: Nature, Scope and Approaches; Earth: Interior Structure and Isostasy.
2. Earth Movements: Plate Tectonics, Types of Folds and Faults, Earthquakes and Volcanoes.
3. Geomorphic Processes: Weathering, Mass Wasting, Cycle of Erosion (Davis and Penck).
4. Evolution of Landforms (Erosional and Depositional): Fluvial, Karst, Aeolian, Glacial, and Coastal.
5. Applied Geomorphology

## References:

## Essential:


1. Dayal, P. (1996). *A Text book of Geomorphology*. Patna, India: Shukla Book Depot
2. Huggett, R.J. (2007): *Fundamentals of Geomorphology*. New York, U.S.A.: Routledge.
3. Khullar, D.R. (2012). *Physical Geography*. New Delhi. India: Kalyani Publishers.
4. Strahler, A. H. and Strahler, A N. (2001): *Modern Physical Geography* (4/E). New York, U.S.A.: John Wiley and Sons, Inc.
5. Thornbury, W. D. (2004): *Principles of Geomorphology*. New York, U.S.A.: Wiley.


### Suggestive:


1. Bloom, A. L. (2003). *Geomorphology: A Systematic Analysis of Late Cenozoic Landforms*, New Delhi, India: Prentice-Hall of India
2. Christopherson, R. W. and Birkeland, G. H. (2012). *Geosystems: An Introduction to Physical Geography* (8th edition). New Jersey, USA: Pearson Education.

3. Kale, V. S. and Gupta A. (2001). *Introduction to Geomorphology*. Hyderabad, India: Orient Longman.

4. Mal, Suraj, Singh, R.B. and Huggel, C. (2018). *Climate Change, Extreme Events and Disaster Risk Reduction*. Switzerland: Springer. pages 309.
5. Singh, S. (2009):*Bhautik Bhugolka Swaroop (Hindi).* Allahabad, India: PrayagPustak.

## Teaching Learning Plan

Week 1: Unit I

Week 2: Unit I

Week 3: Unit II

Week 4: Unit II

Week 5: Unit III

***Week 6: Mid-Semester Examinations***

***Week 7: Mid-Semester Break***

Week 8**:** Unit III

Week 9: Unit IV

Week 10: Unit IV

Week 11: Unit V

Week 12: Unit V

**Assessment Methods:**

| Unit No. | Course Learning Outcomes | Teaching and Learning Activity | Assessment Tasks |
|---|---|---|---|
| **1** | Geomorphology: Nature, Scope and Approaches; Earth: Interior Structure and Isostasy. | Classroom Lectures, Tutorials, PPT | Assignments, Discussions/Debates classroom test. |
| **2** | Earth Movements: Plate Tectonics, Types of Folds and Faults, Earthquakes and Volcanoes. | Classroom Lectures, Tutorials, PPT | Assignments, Discussions/ Debates, classroom test. |
| **3** | Geomorphic Processes: Weathering, Mass Wasting, Cycle of Erosion (Davis and Penck). | Classroom Lectures, Tutorials, PPT | Assignments, Discussion/Debates, classroom test. |
| **4** | Evolution of Landforms (Erosional and Depositional): Fluvial, Karst, Aeolian, Glacial, and Coastal. | Classroom Lectures, Tutorials, PPT | Assignments, Discussions/Debates, classroom test. |
| **5** | Applied Geomorphology | Classroom Lectures, Tutorials, PPT | Assignments, Discussions/Debates classroom test. |

**Keywords:** Geomorphology, Earth, Isostasy, Movements, Processes, Erosion, Landform

# 2. Cartographic Techniques (Practical)

## Course Objectives:

1. Create professional and aesthetically pleasing maps through thoughtful application of cartographic conventions;
2. Develop an understanding of the concepts regarding scale, map projections to suit map purposes;
3. Better understand the techniques of interpretation of topographical and weather maps

## Learning Outcome:

This is a practical, hands-on course; when you have completed it, you will be able to:

1. Explain how maps work, conceptually and technically and will be able to understand science and art of cartography

2. Recognize the benefits and limitations of some common map projections and their use.

3. Understand and perform interpretation of topographical maps and weather maps.

## 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.
3. Profiles -Introduction to Cross and Longitudinal Profiles, Slope analysis using Wentworth's Method.
4. Topographical Maps- Interpretation.
5. Weather Maps- Interpretation

## Practical Record:

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

## References:

## Essential:


1. Kraak, M.J. (2010). *Cartography: Visualization of Geospatial Data* (3rd edition). London. UK.: Pearson Education Ltd.
2. Misra, R.P. (2014). *Fundamentals of Cartography (*Second Revised and Enlarged Edition). New Delhi. India: Concept Publishing.
3. Monkhouse, F. J. and Wilkinson, H. R. (1973). *Maps and Diagrams*. London, India: Methuen.
4. Singh, R.L. &Dutta, P.K. (2012). *Prayogatmak Bhugol (Hindi),* Central Book Depot, Allahabad
5. Singh,Gopal. (1998). *Map Work and Practical Geography (4th Edition)*. Ahmedabad, India: Vikas Publishing House.


## Suggestive:


1 Rhind, D. W. and Taylor D. R. F. (eds.) (1989). *Cartography: Past, Present and Future*. U.S.A.: Elsevier, International Cartographic Association.

2 Sarkar, A. (2015). *Practical geography: A systematic approach*. New Delhi, India: Orient Black Swan Private Ltd.

3 Sharma, J. P. (2010). *PrayogicBhugol(Hindi)*, Rastogi Publishers, Meerut.

4 Singh, R.L. and Singh R.P.B. (1999). *Elements of Practical Geography*, Kalyani Publishers, New Delhi.

5 Singh,R.L.,& Singh, Rana. P.B. (1991): *Prayogtmak Bhugolke Mool Tatva (Hindi)*, New Delhi. India: Kalyani Publishers.

## Teaching Learning Plan

Week 1: Unit I

Week 2: Unit I

Week 3: Unit II

Week 4: Unit II

Week 5: Unit III

***Week 6 : Mid-Semester Examinations***

***Week 7: Mid-Semester Break***

Week 8**:** Unit III

Week 9: Unit IV

Week 10: Unit IV

Week 11: Unit V

Week 12: Unit V

## Assessment Methods:

| Unit No. | Course Learning Outcomes | Teaching and Learning Activity | Assessment Tasks |
|---|---|---|---|
| **1** | Nature and Scope, Concept and application, Graphical Construction | Classroom Lectures, Practical demonstration | Assignments, Hans-on exercise, classroom test. |
| **2** | Map Projections – Classification, Properties and Uses; Merits and Demerits | Classroom Lectures, Practical demonstration | Assignments, Hans-on exercise, classroom test. |
| **3** | Profiles-Introduction to Cross and Longitudinal Profiles. | Classroom Lectures, Practical demonstration | Assignments, Hans-on exercise, midterm examination. |
| **4** | Topographical Maps-Interpretation and Slope Analysis | Classroom Lectures, Practical demonstration | Assignments, Hans-on exercise, classroom test. |

| | | | |
|---|---|---|---|
| **5** | Interpretation of Weather Map | Classroom Lectures, Practical demonstration | Assignments, Hans-on exercise, classroom test, end semester examination. |

**Keywords:** Cartography, Map Projections, Profiles, Topographical Maps

# 3. Human Geography

## Course Objectives:

1. Various dimensions of human geography and cultural landscape.
2. Detailed analysis of population growth and distribution.
3. Understanding of the relationship between population and resource.

## Learning Outcomes:

1. Detailed exposure of contemporary relevance of cultural landscape.
2. In-depth knowledge of space and society of cultural regions.
3. Understanding the settlement pattern and population resource relationship.

## Course Content:

1. Human Geography: Definition, Scope and Principles; Contemporary Relevance, Understanding Cultural Landscape.
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: Ackerman's Population-Resource Regions and Regional Resource Development

## References:

## Essential:

1. Chandna, R.C. (2017). *Population Geography*. New Delhi, U.S.A.: Kalyani Publishers.
2. Daniel, P.A. and Hopkinson, M.F. (1989). *The Geography of Settlement*. London. UK: Oliver & Boyd.
3. Hussain, Majid. (2012). *Manav Bhugol,*. Jaipur. India: Rawat Publications.
4. Johnston, R., Gregory, D.,& Pratt, G., et al. (2008). *The Dictionary of Human*

*Geography*, Blackwell Publication.

5. Singh, R.B., (Ed.) (2015). *Urban Development Challenges, Risk and Resilience in Asian Mega Cities-Sustainable Urban Future of Emerging Asian Mega Region*, Tokyo, Japan: Springer. Pages 488, 2015.

## Suggestive:

1 Hassan, M.I. (2005). *Population Geography*. Jaipur, India: Rawat Publications.

2 Jordan-Bychkov., et al. (2006). *The Human Mosaic: A Thematic Introduction to Cultural Geography.* New York, U.S.A.: W. H. Freeman and Company.

3 Kaushik, S.D. (2010). *ManavBhugol*. Meerut, India: Rastogi Publication

4 Maurya, S.D. (2012). *ManavBhugol*. Allahabad, India: ShardaPustakBhawan.

5 Rozenblat., Celine., Pumain., Denise and Velasquez., Elkin Eds. (2018). *International and Transnational Perspectives on Urban Systems.*Tokyo, Japan: Springer pages 393.

## Teaching Learning Plan

Week 1: Unit I

Week 2: Unit I

Week 3: Unit II

Week 4: Unit II

Week 5: Unit III

***Week 6: Mid-Semester Examinations***

***Week 7: Mid-Semester Break***

Week 8**:** Unit III

Week 9: Unit IV

Week 10: Unit IV

Week 11: Unit V

Week 12: Unit V

## Assessment Method:

| Unit No. | Course Learning Outcomes | Teaching and Learning Activity | Assessment Tasks |
|---|---|---|---|
| I | Introduction to the basic concepts of Human geography | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions. |
| II | Detailed discussion of different theories related to human development | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions. |
| III | Deep understanding of cultural regions; race; tribes, religion and language | Classroom Lectures, PPTs, documentaries, discussions, fieldworks and tutorials. | Assignments, presentations, discussions. |
| IV | Detailed analysis of different types of settlement in rural as well as urban areas | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions and debates. |
| V | Understanding the regional resource development of India | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions and debates. |

**Keywords:** Human Geography, Demographic Transition Theories, Cultural Regions, Space and Society, Settlement Patterns

# 4. Thematic Cartography (Practical)

## Course Objectives:

1. Create thematic maps through thoughtful application of Cartographic conventions;
2. Enhance understanding of the concepts regarding thematic mapping techniques
3. Better understand preparation and interpretation of thematic maps

## Learning Outcome:

This is a practical, hands-on course; when you have completed it, you will be able to:

1. Explain how maps work, conceptually and technically and will be able to understand science and art of cartography

2. Recognize the benefits and limitations of Diagrammatic Data Presentation.

3. Understand and perform interpretation of thematic maps.

## Course Content:

1. Maps – Classification and Types; Principles of Map Design.
2. Diagrammatic Data Presentation – Line, Bar and Circle.
3. Thematic Mapping Techniques – Properties, Uses and Limitations; Areal Data - Choropleth, Dot, Proportional Circles; Point Data – Isopleths.
4. Cartographic Overlays – Point, Line and Areal Data.
5. Thematic Maps – Preparation and Interpretation.

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

## References:

## Essential:


1. Cuff J. D. and Mattson M. T., 1982: Thematic Maps: Their Design and Production, Methuen Young Books.
2. Dent B. D., Torguson J. S., and Holder T. W., 2008: Cartography: Thematic Map Design (6th Edition), Mcgraw-Hill Higher Education
3. Gupta K. K. and Tyagi V. C., 1992: Working with Maps, Survey of India, DST, New Delhi.
4. Mishra R. P. and Ramesh A., 1989: Fundamentals of Cartography, Concept, New
5. Sharma J. P., 2010: Prayogic Bhugol, Rastogi Publishers, Meerut.


## Suggestive:


1. Singh R. L. and Singh R. P. B., 1999: Elements of Practical Geography, Kalyani PublishersRogerson, P.A.(2010) Statistical Methods in Geography,Sage Publications.
2. Slocum T. A., Mcmaster R. B. and Kessler F. C., 2008: Thematic Cartography and Geovisualization (3rd Edition), Prentice Hall.
3. Tyner J. A., 2010: Principles of Map Design, The Guilford Press.
4. Sarkar, A. (2015) Practical geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi

5. Singh, L R & Singh R (1977): Manchitra or Pryaogatamek Bhugol , Central Book, Depot, Allahabad

## Teaching Learning Plan

Week 1: Unit I

Week 2: Unit I

Week 3: Unit II

Week 4: Unit II

Week 5: Unit III

***Week 6: Mid-Semester Examinations***

***Week 7: Mid-Semester Break***

Week 8**:** Unit III

Week 9: Unit IV

Week 10: Unit IV

Week 11: Unit V

Week 12: Unit V

## Assessment Method:

| **Unit No.** | **Course Learning Outcomes** | **Teaching and Learning Activity** | **Assessment Tasks** |
|---|---|---|---|
| I | Maps – Classification and Types; Principles of Map Design. | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions. |
| II | Diagrammatic Data Presentation – Line, Bar and Circle. | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions. |
| III | Thematic Mapping Techniques | Classroom Lectures, PPTs, documentaries, discussions, fieldworks and tutorials. | Assignments, presentations, discussions. |
| IV | Cartographic Overlays – Point, Line and Areal Data | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions and debates. |

| | | | |
|---|---|---|---|
| V | Thematic Maps – Preparation and Interpretation. | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions and debates. |

**Keywords:** Maps, Thematic Mapping, Cartographic Overlays

# 5.Climatology

## Course Objectives:

1. Various dimensions of climatology like structure and composition.
2. Detailed analysis of global atmospheric pressure and wind system.
3. Understanding of the concept of oceanic topography.

## Learning Outcomes:

1. Detailed exposure of climatology and oceanic relief features.
2. In-depth knowledge of upper atmospheric conditions and cyclonic features.
3. Understanding the characteristics of climatic regions.

## Course Content:

1. Atmospheric Composition and Structure: Variation with Altitude, Latitude and Season; Insolation and Temperature: Factors and Distribution, Heat Budget, Temperature Inversion.
2. Atmospheric Pressure and Winds: Planetary Winds, Forces affecting Winds, General Circulation of Air, Jet Streams;
3. Atmospheric Moisture: Evaporation, Humidity, Condensation, Fog and Clouds, Precipitation Types, Stability and Instability;
4. Cyclones: Tropical Cyclones, Temperate Cyclones, Monsoon - Origin and Mechanism.
5. Climatic Regions.

## References:

## Essential:


1. Barry, R. G., and Chorley, R. J. (2009). *Atmosphere, Weather and Climate (9th Edition.* New York, USA: Routledge.
2. Critchfield, H. J. (1987). *General Climatology*, New Delhi, India: Prentice-Hall of India.
3. Lal, D. S. (2006). *Jalvayu Vigyan (Hindi).* Allahabad, India: Prayag Pustak Bhavan,
4. Oliver J. E. and Hidore J. J., 2002: Climatology: An Atmospheric Science, Pearson Education, New Delhi.
5. Strahler, A.N. (1987). *Modern Physical Geography*. New York and Singapore: John Wiley and Sons.


## Suggestive:


1. Gupta, L.S. (2000). *JalvayuVigyan(Hindi)* ,Delhi, India: Madhyam Karyanvay Nidishalya
2. Lutgens, F. K. Tarbuck E. J. and Tasa D., (2009). *The Atmosphere: An Introduction to Meteorology*. Englewood Cliffs, New Jersey, USA: Prentice-Hall.
3. Singh, M. Singh, R.B. and Hassan, M.I. (Eds.). (2014). *Climate Change and Biodiversity. Proceedings of IGU Rohtak Conference*, Volume 2. Advances in Geographical and Environmental Studies, Springer.
4. Singh, S. (2009). *JalvayuVigyan(Hindi).* Allahabad, India: PrayagPustakBhawan.


## Teaching Learning Plan

Week 1: Unit I

Week 2: Unit I

Week 3: Unit II

Week 4: Unit II

Week 5: Unit III

***Week 6: Mid-Semester Examinations***

***Week 6: Mid-Semester Break***

Week 8**:** Unit III

Week 9: Unit IV

Week 10: Unit IV

Week 11: Unit V

Week 12: Unit V

## Assessment Method:

| Unit No. | Course Learning Outcomes | Teaching and Learning Activity | Assessment Tasks |
|---|---|---|---|
| I | Introduction to the basic concepts of climatology and oceanography | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions. |
| II | Detailed discussion of global wind pattern and atmospheric conditions | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions. |
| III | Deep understanding of cyclonic storms of different regions | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions. |
| IV | Atmospheric Moisture and Cyclones | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions and debates. |
| V | Climatic Regions | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions and debates. |

**Key words:** Climatology, Oceanography, Cyclone, Wave, Salinity.

# 6. Statistical Methods in Geography (Practical)

## Course Objectives

1. The concept of quantitative information in general and Geographical data in particular. The importance of data analytics. The ways data is collected or data is taken from different sources. The sampling methods' application for data collection purposes.
2. The ways to handle the collected data through classification, tabulation and stigmatization. The data presentation using graphical and diagrammatic ways.
3. To calculate different averages on data and to identify the variations in data.
4. To compute relations and impacts among the data series.
5. The concept of probability particularly normal curve.

## Learning Outcomes:

**The following will be the outcomes of this course, student shall be able:**

1. To differentiate between qualitative and quantitative information.
2. To know the nature of various data , different sources and methods of data collection.

3. To apply sampling methods for data collection.
4. To classify, summarize and produce various types of data tabulations.
5. To present data through graphical and diagrammatic formats.
6. To apply different forms of averages, their relevance on descriptive data and geographical descriptive data as well.
7. To analyze the variations in spatial and non-spatial data.
8. To study the associations and cause/effect or impact from the data series
9. To use the concept of probability mainly the normal distribution.

## Course Content:

6. Use of Data in Geography: Geographical Data Matrix, Significance of Statistical Methods in Geography; Sources of Data, Scales of Measurement (Nominal, Ordinal, Interval, Ratio)
7. Tabulation and Descriptive Statistics: Frequency Distribution Table, Cross Tabulation, Graphical Presentation of Data ( Bar diagram, Histograms, Frequency Curve and Cumulative Frequency Curves), Measurement of Central Tendencies (Mean, Median and Mode), Measurement of Partitions (Deciles, Quartiles and Percentiles), Dispersion (Standard Deviation, Variance and Coefficient of Variation).Centro-graphic Techniques (Geographic Centre, Mean Centre of Population, Median points and Median Centre (based on Minimum Aggregate Distance Traveled), and Distance Deviation from the Mean Centre.
8. Sampling: Purposive, Random, Systematic and Stratified.
9. Theoretical Distribution: Concept of Probability Distribution (theory only), Normal Distribution (Its Characteristics and Application of Area Under Normal Curve)
10. Correlation: Rank Correlation and Product Moment Correlation, Simple Regression and Mapping of Residuals from Regression

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

1. Construct a data matrix of about (100 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, Plot mean centre for population and standard distance deviation on the selected map for the spatial units.

3. Histograms and frequency curve would be prepared on 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 Percent) would be drawn using, random - systematic and stratified methods of sampling and locate the samples on a map with a short note on methods used.

5. Based on of 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:

## Essential:


6. Berry B. J. L. and Marble D. F. (eds.). (1968). *Spatial Analysis – A Reader in Geography*. U.S.A.: Prince-Hall.
7. Ebdon D. (1977). *Statistics in Geography: A Practical Approach*. Oxford, UK.: Blackwell
8. Hammond P. and McCullagh P. S. (1978): *Quantitative Techniques in Geography: An Introduction*. UK: Oxford University Press.
9. King L. S. (1969). *Statistical Analysis in Geography*. U.S.A.: Prentice-Hall.
10. Pal S. K. (1998): *Statistics for Geoscientists*, New Delhi, India: Tata McGraw Hil.
11. Silk J. (1979). *Statistical Concepts in Geography*. London, UK.: Allen and Unwin.


## Suggestive:


6. Harris, R. and Jarvis, C. (2011). *Statistics for Geography and Environmental Science*. London, UK.: Pearson Education Ltd.
7. Rogerson, P.A.(2010) Statistical Methods in Geography,Sage Publications.
8. Shinha, I. (2007). *Sankhyiki bhugol*. New Delhi, India: Discovery Publishing House.
9. Walfford,Nigel (2011) Practical Statistics for Geographers and Earth Scientists, Wiley-Blackwell.
10. Yeates M., 1974: *An Introduction to Quantitative Analysis in Human Geography*. New Delhi, India.: McGraw Hill


## Teaching Learning Plan

Week 1: Unit I

Week 2: Unit I

Week 3: Unit II

Week 4: Unit II

Week 5: Unit III

***Week 6: Mid-Semester Examinations***

***Week 7: Mid-Semester Break***

Week 8**:** Unit III

Week 9: Unit IV

Week 10: Unit IV

Week 11: Unit V

Week 12: Unit V

## Assessment Method:

| Unit No. | Course Learning Outcomes | Teaching and Learning Activity | Assessment Tasks |
|---|---|---|---|
| I | Use of Data in Geography | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions. |
| II | Tabulation and Descriptive Statistics | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions. |
| III | Sampling: Purposive, Random, Systematic and Stratified | Classroom Lectures, PPTs, documentaries, discussions, fieldworks and tutorials. | Assignments, presentations, discussions. |
| IV | Theoretical Distribution: Concept of Probability Distribution (theory only), Normal Distribution | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions and debates. |
| V | Correlation: Rank Correlation and Product Moment Correlation, Simple Regression and Mapping of Residuals from Regression | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions and debates. |

**Keywords:** Statistical Methods, Tabulation, Descriptive Statistics, Sampling, Theoretical Distribution, Correlation

# 7. Geography of India

## Course Objectives:

1. Various dimensions of the geographical features of India and their spatial distribution.
2. Detailed analysis of economic resources of India
3. Understanding of regional divisions of India.

## Learning Outcome:

1. Detailed exposure to the human and physical features of India.
2. In-depth knowledge of different resource base of India.
3. Understanding socio-cultural base of India.

## Course Content:

4. Physical: Location, Physiographic Divisions, Climate: characteristics and classification; Soil and Natural vegetation
5. Population: Distribution and Growth, Structure; Social: Distribution of Population by Race, Caste, Religion, Language, Tribes and their Correlates.
6. Regionalisation of India: Physiographic (R. L. Singh), Socio-Cultural (Sopher), Economic (Sengupta)
7. Economic: Mineral and Power Resources: Distribution and Utilization of Iron Ore, Coal, Petroleum, Gas; Agricultural Production of Rice, Wheat, Cotton and Sugarcane;
8. Spatial Patterns of Industrial Development: Automobile and Information Technology

## References:

## Essential:


1. Majid, H. (2009). *Geography of India*. Delhi, India: Tata McGraw Hill Education Private Ltd.
2. Nag, P. and Sengupta, S., (1992). *Geography of India*. Delhi, India: Concept Publishing.
3. Sdyasuk Galina and P Sengupta (1967) Economic Regionalization of India, Census of India.
4. Singh R. L. (1971). *India: A Regional Geography*, National Geographical Society of India.
5. Singh, Gopal, (1976). *A Geography of India*. Delhi, India: Atma Ram.
6. Sopher, David E. An Exploration of India: Geographical Perspective on Society and Culture. Cornell University Press.Ithaca,New York
7. Spate O.H.K. and Learmonth A.T.A., 1967: *India and Pakistan: A General and Regional Geography*, Methuen.
8. Tiwari, R.C.(2007) Geography of India. Prayag Pustak Bhawan, Allahabad.


## Suggestive:


1. Sharma, T. C. and Coutinho O., (1997). *Economic and Commercial Geography of India*. Delhi, India: Vikas Publishing.
2. Sharma, T.C. (2013). *Economic Geography of India*. Jaipur, India: Rawat Publication.
3. Singh Surender and Saroha Jitender (2018) Geography of India (Second Edition), Access Publishing, New Delhi
4. Singh, R. B. and Prokop, Pawel.(2016). *Environmental Geography of South Asia.* Japan : Springer.
5. Tirtha, R. (2002) *Geography of India.* Jaipur & New Delhi., India: Rawat Publs.

## Teaching Learning Plan

Week 1: Unit I

Week 2: Unit I

Week 3: Unit II

Week 4: Unit II

Week 5: Unit III

***Week 6 : Mid-Semester Examinations***

***Week 7: Mid-Semester Break***

Week 8 **:** Unit III

Week 9: Unit IV

Week 10: Unit IV

Week 11: Unit V

Week 12: Unit V

## Assessment Method:

| **Unit No.** | **Course Learning Outcomes** | **Teaching and Learning Activity** | **Assessment Tasks** |
|---|---|---|---|
| I | Physical Setting – Location, Structure and Relief, Drainage, Climate | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions. |
| II | Population – Size and Growth since 1901, Population Distribution, Literacy, Sex Ratio. | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions. |
| III | Settlement System - Rural Settlement Types and Patterns, Urban Patterns | Classroom Lectures, PPTs, documentaries, discussions, fieldworks and tutorials. | Assignments, presentations, discussions. |
| IV | Resource Base – Livestock, Power, Minerals | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions and debates. |

| | | | |
|---|---|---|---|
| V | Economy – Agriculture, Industries, Transportation Modes | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions and debates. |

**Keywords**: Human geography, Demography, Resources, Society, Region

# 8. Economic Geography

## Course Objectives:

1. To understand the concept and spatial distribution of economic activities in the world.
2. To analyse the factors affecting the economics activity focusing on Von Thunen and Weber theory.
3. To describe in the details the regionalization of different economic activities.

## Learning Outcome:

After learning, students should be able to:

1. Distinguish to 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. Economic 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.
5. Tertiary Activities: Transport, Trade and Services.

## References:

## Essential:


1. Bagchi-Sen, S. and Smith, H. L. (2006). *Economic Geography: Past, Present and Future*. UK: Taylor and Francis.
2. Clark, Gordon L.; Feldman, M.P. and Gertler, M.S., eds. (2000). *The New Oxford Handbook of Economic Geography*. UK: Oxford Press.

3. Coe, N. M., Kelly P. F. and Yeung H. W. (2007). *Economic Geography: A Contemporary Introduction*. USA: Wiley-Blackwell.
4. Knox, P. & Marston, S. (2013). *Human Geography: Places and Regions in Global Context*, 6th Edition. New Delhi, India: Pearson Education.
5. Siddhartha, K. (2013). *Economic Geography*, KisalayaPublicationsPvt. Ltd., New Delhi.

## Suggestive:

1. Combes, P., Mayer T. and Thisse, J. F. (2008). *Economic Geography: The Integration of Regions and Nations*, Princeton University Press.
2. Knowles, R. &Wareing, J. (2004). *Economic and Social Geography Made Simple*, Rupa& Co., Kolkata.
3. Prithwish, R. (2014). *Economic Geography - A study of Resources*. Kolkata, India: New Central Book Agency.
4. Saxena, H.M. (2013). *Economic Geography.* Jaipur, India: Rawat Publications
5. Willington, D. E. (2008). *Economic Geography*, New Delhi, India: Read Books.

## Teaching Learning Plan

Week 1: Unit I

Week 2: Unit I

Week 3: Unit II

Week 4: Unit II

Week 5: Unit III

***Week 6: Mid-Semester Examinations***

***Week 7 : Mid-Semester Break***

Week 8**:** Unit III

Week 9: Unit IV

Week 10: Unit IV

Week 11: Unit V

Week 12: Unit V

## Assessment Method

| Unit No. | Course Learning Outcomes | Teaching and Learning Activity | Assessment Tasks |
|---|---|---|---|
| **1** | Introduction to Global Economic System: Concept and classification of economic activities. | Classroom Lectures, Tutorials, PPT | Assignments, Discussions/Debates classroom test. |
| **2** | Theories: Agriculture (Von Thunen); Industry (Weber's theory). | Classroom Lectures, Tutorials, PPT | Assignments, Discussions/ Debates, classroom test. |
| **3** | Primary Activities: Agriculture, Precision agriculture, Forestry, Fishing and Mining. | Classroom Lectures, Tutorials, PPT | Assignments, Discussion/Debates, classroom test. |
| **4** | Secondary Activities: Manufacturing (Cotton Textile, Iron and Steel), Concept of Manufacturing Regions, Special Economic Zones and Technology Parks. | Classroom Lectures, Tutorials, PPT | Assignments, Discussions/Debates, classroom test. |
| **5** | Tertiary Activities: Transport, Trade and Services. | Classroom Lectures, Tutorials, PPT | Assignments, Discussions/Debates classroom test. |

**Keywords**: Global, Economic, Activities, Theory, Primary, Secondary, Tertiary

# 9. Environmental Geography

## Course Objectives:

1. Various dimensions of environment and natural resource management.
2. Detailed analysis of concept, structure and functions.
3. Understanding of the concept of appraisal and conservation of Environment and Natural Resources.

## Learning Outcome:

1. Detailed exposure of human – environment relationship.
2. In-depth knowledge of environmental issues in tropical, temperate and polar ecosystems.
3. Understanding the environmental programmes and policies at local as well as global level.

## Course Content:

1. Introduction to Natural Resource and Environment: Basic Concept; Human-Environment Relationships- Resource Use and abuse, Concept of resource curse
2. Ecosystem: Concept, Structure and Functions; Ecosystem services and ecological footprints.
3. Natural Resource: Concept (Zimmermann), Classification, Utilization, Problems and Management of Land, Water, forest and energy resources.
4. Environmental Issues in Tropical, Temperate and Polar Ecosystems. Global environmental issues: Impacts on land, soil, water, climate and atmosphere, biodiversity loss; and human health
5. Appraisal and Conservation of Environment and Natural Resources and Sustainable Resource Development, Environmental Programmes and Policies – Global, National and Local levels. Management of Environment and Resources: Principle of conservation, restoration and sustainable alternatives; Importance of EIA.

## References:

## Essential:


1. Chandna, R. C. (2002). *Environmental Geography*. Ludhiana, India: Kalyani.
2. Cunninghum, W. P. and Cunninghum, M. A. (2004). *Principals of EnvironmentalScience: Inquiry andApplications*. Delhi: Tata Macgraw Hill.
3. Odum, E. P. et al. (2005). *Fundamentals of Ecolog.* India: Ceneage Learning
4. Singh, R.B., and Hietala, R. (Eds.) (2014). *Livelihood security in Northwestern Himalaya: Case studies from changing socio-economic environments in Himachal Pradesh, India. Advances in Geographical and Environmental Studies*. USA: Springer

5. Singh, Savindra.,(2001). *Paryavaran Bhugol (Hindi),*Allahabad, India: Prayag Pustak Bhawan.

6. Singh,R.B., Prokop**,** Pawel (Eds.) (2016). *Environmental Geography of South Asia*.Tokyo, Japan: Springer.

## Suggestive:

1 Goudie, A. (2001). *The Nature of the Environment*, Oxford, UK: Blackwell.

2 Holechek, J. L. C., Richard, A., Fisher, J. T. and Valdez, R. (2003). *Natural Resources: Ecology, Economics and Policy*. New Jersey, USA: Prentice Hall.

3 Mitchell, B. (1997). *Resource and Environmental Management*. England: Longman Harlow.

4 Saxena, H.M. (2012). *Environmental Studies*. Jaipur, India: Rawat Publications.

## Teaching Learning Plan

Week 1: Unit I

Week 2: Unit I

Week 3: Unit II

Week 4: Unit II

Week 5: Unit III

***Week 6: Mid-Semester Examinations***

***Week 7: Mid-Semester Break***

Week 8**:** Unit III

Week 9: Unit IV

Week 10: Unit IV

Week 11: Unit V

Week 12: Unit V

## Assessment Method:

| Unit No. | Course Learning Outcomes | Teaching and Learning Activity | Assessment Tasks |
|---|---|---|---|
| **I** | Introduction to the basic concepts of environment and NRM | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions. |
| **II** | Detailed discussion of conceptual framework of different ecosystems | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions. |
| **III** | Deep understanding of environmental issues of different regions | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions. |
| **IV** | Detailed analysis of different issues related to environmental conservation | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions and debates. |
| **V** | Understanding the different policies related to conservation of environment at local as well as global level | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions and debates. |

**Keywords:** Natural resource management, Ecosystem, Environment, Biosphere reserve, United nation

# 10. Field Work and Research Methodology (Practical)

## Course Objectives:

1. Various dimensions of field work and its role in geographical studies..
2. Detailed analysis of different field techniques.
3. Understanding of the report writing and field tools.

## Learning Outcome:

1. Detailed exposure of new geographical landscape as study area.
2. In-depth knowledge of different field techniques.
3. Understanding the field ethics and different tools of field study.

## Course Content:

1. Field Work In Geographical Studies – Role, Value, Data and Ethics of Field-Work; Defining the Field and Identifying the Case Study – Rural / Urban / Physical / Human / Environmental.

2. Data Collection: Type and Sources of Data; Methods of Collection; Data Analysis: Qualitative Data Analysis; Quantitative 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; Space Survey (Transects and Quadrants, Constructing a Sketch)
4. Use of Field Tools – Collection of Material for Physical and Socio-Economic Surveys.
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 field work.
2. The duration of the field work 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 A 4 size paper should be submitted in soft binding.

## References:

## Essential:


1. Creswell, J., (1994). *Research Design: Qualitative and Quantitative Approaches.* UK: Sage Publications.
2. Dikshit, R. D. (2003). *The Art and Science of Geography: Integrated Readings*. New Delhi, India: Prentice-Hall of India.
3. Mukherjee, Neela. (1993). *Participatory Rural Appraisal: Methodology and Application.* Delhi, India: Concept Publs. Co.
4. Robinson, A. (1998). *Thinking Straight and Writing That Way*. In Pryczak, F. and Bruce, R. P. eds.. *Writing Empirical Research Reports: A Basic Guide for Students of the Social and Behavioural Sciences*. Los Angeles, USA: Routlege.
5. Special Issue on "Doing Fieldwork" *The Geographical Review* 91:1-2 (2001).

## Suggestive:


1. Evans, M. (1988). *Participant Observation: The Researcher as Research Tool*. In Eylesand, J and D. Smith (eds). *Qualitative Methods in Human Geography*. Cambridge, UK: Polity.
2. Mukherjee, N. (2002). *Participatory Learning and Action: with 100 Field Methods*. Delhi, India: Concept Publs. Co.
3. Stoddard, R. H. (1982). *Field Techniques and Research Methods in Geography*. USA: Kendall/Hunt.
4. Wolcott, H. (1995). *The Art of Fieldwork*. CA, USA: Alta Mira Press.


## Teaching Learning Plan

Week 1: Unit I

Week 2: Unit I

Week 3: Unit II

Week 4: Unit II

Week 5: Unit III

***Week 6: Mid-Semester Examinations***

***Week 7: Mid-Semester Break***

Week 8**:** Unit III

Week 9: Unit IV

Week 10: Unit IV

Week 11: Unit V

Week 12: Unit V

## Assessment Method:

| **Unit No.** | **Course Learning Outcomes** | **Teaching and Learning Activity** | **Assessment Tasks** |
|---|---|---|---|
| I | Introduction to the role and value of field study | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions. fieldwork |
| II | Detailed discussion on selection of field area and its exposure | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions. fieldwork |

| | | | |
|---|---|---|---|
| III | Deep understanding of field techniques and statistical methods | Classroom Lectures, PPTs, documentaries, discussions, fieldworks and tutorials. | Assignments, presentations, discussions. fieldwork |
| IV | Detailed analysis of primary survey and field ethics | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions and debates.fieldwork |
| V | Understanding the different parameters of field report | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions and debates, fieldwork |

**Keywords:** Field study, Technique, Methods, Survey, Ethics

# 11. Regional Planning and Development

## Course Objectives:

1. To understand the concept of Region and Regional Planning.
2. To familiarize the students with Theories and Models for Regional Planning.
3. To develop understanding about concept of Development, Sustainable Development and different programmes and policies.

## Learning Outcome:

After studying, students will be able to:

1. Conceptualize the Regional Planning and its theories.
2. Get the overview of Sustainable Regional Development.
3. Have sound knowledge to Sustainable Development Policies and Programmes.

## Course Content:

1. Definition of Region, Evolution and Types of Regional planning: Formal, Functional, and Planning Regions and Regional Planning;
2. Choice of a Region for Planning: Regionalization of India for Planning (Agro Ecological Zones)
3. Theories and Models for Regional Planning: Growth Pole Model of Perroux; Myrdal, Hirschman, Rostow and Friedmann;
4. Sustainable Development: Concept of Development and Underdevelopment; Efficiency-Equity Debate: Definition, Components and Sustainability for

Development. Indicators (Economic, Social and Environmental).

5. Sustainable Development Policies and Programmes: Rio+20; Goal-Based Development; Principles of Good Governance.

## References:

## Essential:


1. Agyeman, Julian, Robert, D. Bullard and Bob,Evans. (Eds.) (2003). *Just Sustainabilities: Development in an Unequal World*. London: Earthscan. (Introduction and conclusion.).
2. Anand, Subhash.,( 2011). *Ecodevelopment : Glocal Perspectives*. New Delhi, India: Research India Press.
3. Friedmann, J. and Alonso W. (1975). *Regional Policy - Readings in Theory and Applications*. Massachusetts, USA: MIT Press.
4. Misra, R. P., Sundaram, K.V., and Rao, V.L.S. (1974). *Regional Development planning in India*. Delhi, India: Vikas Publishing House.
5. Peet, R. (1999). *Theories of Development*. New York, USA: The Guilford Press.


## Suggestive:


1. Ayers, Jessica, and David D. (2010). *Climate change adaptation and development I: the state of the debate*. UK: Progress in Development Studies *10(2): 161-168.* SAGE.
2. Baker, Susan., (2006). *Sustainable Development*. Milton Park, Abingdon, Oxon; New York, N.Y.: Routledge. (Chapter 2, "*The concept of sustainable development*").
3. Gore C. G. (1984). *Regions in Question: Space, Development Theory and Regional Policy*. London, UK: Methuen.
4. Haynes J. (2008). *Development Studies*. London: Polity Short Introduction Series.
5. Johnson E. A. J. (1970). *The Organization of Space in Developing Countries*, Massachusetts , USA: MIT Press.


## Teaching Learning Plan

Week 1: Unit I

Week 2: Unit I

Week 3: Unit II

Week 4: Unit II

Week 5: Unit III

***Week 6: Mid-Semester Examinations***

***Week 7: Mid-Semester Break***

Week 8**:** Unit III

Week 9: Unit IV

Week 10: Unit IV

Week 11: Unit V

Week 12: Unit V

## Assessment Method:

| **Unit No.** | **Course Learning Outcomes** | **Teaching and Learning Activity** | **Assessment Tasks** |
|---|---|---|---|
| I | Definition of Region, Evolution and Types of Regional planning | Classroom Lectures, PPTs, discussions and tutorials. | Assignments, presentations, discussions. |
| II | Regionalization of India for Planning | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions. |
| III | Theories and Models for Regional Planning | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions. |
| IV | Sustainable Development | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions and debates. |
| V | Sustainable Development Policies and Programmes | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions and debates. |

**Keywords:** Region, Regional Planning, Regionalization, Sustainable Development

# 12. Remote Sensing and GIS (Practical)

## Course Objectives:

1. The course aim is to give basic technical knowledge and practical experience in digital remote sensing.
2. Knowledge and practical experience in handling satellite images focusing on hands-on experience of image pre-processing, enhancement and classification;
3. Better understand the techniques for the study of land use land cover and urban study.

## Learning Outcome:

This is a practical, hands-on course; when you have completed it, you will be able to:

1. Explain principles of remote sensing, different satellite systems and sensors;
2. Perform image pre-processing, enhancement and classification and interpretation of satellite images;
3. Apply Image preprocessing for land use land cover and urban studies;

## Course Content:

**Unit 1.** Remote Sensing and GIS: Definition and Components, Development, Platforms and Types

**Unit 2**. Aerial Photography and Satellite Remote Sensing: Principles, Types and Geometry of Aerial Photograph; Principles of Remote Sensing, EMR Interaction with Atmosphere and Earth Surface; Satellites (Landsat and IRS) and Sensors.

**Unit 3.** GIS Data Structures: Types (spatial and Non-spatial), Raster and Vector Data Structure

**Unit 4.** Image Processing (Digital and Manual) and Data Analysis: Pre-processing (Radiometric and Geometric Correction), Enhancement (Filtering); Classification (Supervised and Un-supervised), Geo-Referencing; Editing and Output; Overlays

**Unit 5**. Interpretation and Application of Remote Sensing and GIS: Land use/ Land Cover, Urban Sprawl Analysis; Forests Monitoring

**Practical Record**: A project file consisting of 5 exercises using open source software on above topic.

## References:

## Essential:


2. Bhatta, B. (2008). *Remote Sensing and GIS*. New Delhi, India: Oxford University Press.
3. Campbell J. B. (2007). *Introduction to Remote Sensin*g. UK: Guildford Press
4. Jensen, J. R. (2005). *Introductory Digital Image Processing: A Remote Sensing Perspective*. USA: Pearson Prentice-Hall.
5. Lillesand T. M., Kiefer R. W. and Chipman J. W. (2004). *Remote Sensing and Image Interpretation*. USA: Wiley. (Wiley Student Edition).

6. Singh R. B. and Murai S. (1998). *Space-informatics for Sustainable Development.* UK: Oxford and IBH Pub.
7. Wolf P. R. and Dewitt B. A., 2000: Elements of Photogrammetry: With Applications in GIS, McGrawHill.

## Suggestive:

1. Chauniyal, D.D. (2010). *Sudur Samvedan evam Bhogolik Suchana Pranali*. Allahabad, India: Sharda Pustak Bhawan.
2. Li, Z., Chen, J. and Batsavias, E. (2008). *Advances in Photogrammetry, Remote Sensing and Spatial Information Sciences*. London, UK: CRC Press, Taylor and Francis.
3. Mukherjee, S. (2004). *Textbook of Environmental Remote Sensing*. Delh, India: Macmillan.
4. Nag P. and Kudra, M. (1998). *Digital Remote Sensing*. Delhi, India: Concept.
5. Sarkar, A. (2015). *Practical geography: A systematic approach*. Delhi, India: Orient Black Swan Private Ltd.

## Teaching Learning Plan

Week 1: Unit I

Week 2: Unit I

Week 3: Unit II

Week 4: Unit II

Week 5: Unit III

***Week 6 : Mid-Semester Examinations***

***Week 7: Mid-Semester Break***

Week 8**:** Unit III

Week 9: Unit IV

Week 10: Unit IV

Week 11: Unit V

Week 12: Unit V

**Assessment Methods:**

| Unit No. | Course Learning Outcomes | Teaching and Learning Activity | Assessment Tasks |
|---|---|---|---|
| **1** | Definition and Components | Classroom Lectures, Practical demonstration | Assignments, Hans-on exercise, classroom test. |
| **2** | Aerial Photography and Satellite Remote Sensing | Classroom Lectures, Practical demonstration | Assignments, Hans-on exercise, classroom test. |
| **3** | GIS Data Structures. | Classroom Lectures, Practical demonstration | Assignments, Hans-on exercise, midterm examination. |
| **4** | Image Processing (Digital and Manual) and Data Analysis | Classroom Lectures, Practical demonstration | Assignments, Hans-on exercise, classroom test. |
| **5** | Interpretation and Application of Remote Sensing and GIS | Classroom Lectures, Practical demonstration | Assignments, Hans-on exercise, classroom test, end semester examination. |

**Keywords:** Satellite Remote Sensing, GIS, Land Use Land Cover, Urban Studies.

# 13. Evolution of Geographical Thought

## Course Objectives:

1.Understanding historical evolution of geographic thought

2.Detailed analysis of different paradigms in geography

3.Evaluating the contemporary trends in geographical studies

## Learning Outcomes:

1. In depth understanding about the evolution of geographical thought
2. Detailed knowledge about the paradigms and debates in the geographical studies.
3. Understanding of recent traditions in geography

## Course Content:

1. **Paradigms** in Geography
2. **Pre-Modern** – Early Origins of Geographical Thinking with reference to the Classical and Medieval Philosophies.
3. **Modern** – Evolution of Geographical Thinking and Disciplinary Trends in Germany, France, Britain, United States of America.
4. **Debate**s – Environmental Determinism and Possibilism, Systematic and Regional, Ideographic and Nomothetic.
5. **Trends** – Quantitative Revolution and its Impact, Behaviouralism, Systems Approach, Radicalism, Feminism; Towards Post Modernism – Changing Concept of Space in Geography, Geography in India, Future of Geography.

## References:

## Essential:


1. Bhat, L.S. (2009). *Geography in India* (Selected Themes). Delhi, India: Pearson.
2. Hartshone, R. (1959). *Perspectives of Nature of Geography*. UK: Rand MacNally and Co.
3. Harvey, David. (1969). *Explanation in Geography*, London, UK: Arnold.
4. Holt-Jensen, A. (2011). *Geography: History and Its Concepts: A Students Guide*. UK: SAGE.
5. Johnston, R. J., (1997). *Geography and Geographers, Anglo-American Human Geography since (1945)*. London, UK: Arnold.
6. Kapur, A. (2001). *Indian Geography Voice of Concern*. Delhi, India: Concept Publications.


## Suggestive:


1. Dikshit, R. D. (1997). *Geographical Thought: A Contextual History of Ideas*. Delhi, India: Prentice– Hall India.
2. Martin Geoffrey J. (2005). *All Possible Worlds: A History of Geographical Ideas*, UK: Oxford.
3. Singh, R.B. (2016). *Progress in Indian Geography*. New Delhi, India: Indian National Science Academy.
4. Sudeepta, A. (2015). *Fundamentals of Geographical Thought*. Delhi, India: Orient black swan private limited.

## Teaching Learning Plan

Week 1: Unit I

Week 2: Unit I

Week 3: Unit II

Week 4: Unit II

Week 5: Unit III

***Week 6: Mid-Semester Examinations***

***Week 7: Mid-Semester Break***

Week 8**:** Unit III

Week 9: Unit IV

Week 10: Unit IV

Week 11: Unit V

Week 12: Unit V

## Assessment Method:

| Unit No. | Course Learning Outcomes | Teaching and Learning Activity | Assessment Tasks |
|---|---|---|---|
| **I** | Understanding the paradigms in geography | Classroom Lectures, PPTs, discussions, and debates | Assignments, Tests, Presentations |
| **II** | Detailed discussion on the Classical and Medieval Geographic traditions | Classroom Lectures, PPTs, discussions, and debates | Assignments, Tests, Presentations |
| **III** | Evaluating the contribution of modern schools in geography | Classroom Lectures, PPTs, discussions, and debates | Assignments, Tests, Presentations |
| **IV** | In-depth discussions about the debates in geography | Classroom Lectures, PPTs, discussions, and debates | Assignments, Tests, Presentations |
| **V** | Understanding the post-modern trends in geography | Classroom Lectures, PPTs, discussions, and debates | Assignments, Tests, Presentations |

**Keywords:** Paradigm, Tradition, Schools, Debate, Postmodernism

# 14.Disaster Management based Project Work (Practical

## Course Objectives:

1. Understanding the basic concepts of disaster management
2. Detailed analysis about the different types of disasters in India
3. Evaluating the various dimensions of disaster management through field works

## Learning Outcomes:

1. In depth understanding about the various disasters in the country
2. It will provide thorough understanding about the human responses to the disasters
3. It will give an in-depth knowledge about the disasterscapes through fieldworks

## Course Content:

1. Introduction to Disaster Management: Basic concepts; Disaster Management Cycle: components and stages; Community Based Disaster Management
2. Flood and Drought
3. Cyclone and Hailstorms
4. Earthquake and Volcanoes
5. Landslides
6. Human Induced Disasters: Fire Hazards, Chemical, Industrial accidents

(Practical Record: Project work to be based on any two of the above topics of their Choice. First should be field-based case study and second should be local / college-based. )

## References:

## Essential:


1. Government of India. (2011). *Disaster Management in India*. Delhi, India: Ministry of Home Affairs.
2. Government of India. (2008). *Vulnerability Atlas of India*. New Delhi, India: Building Materials & Technology Promotion Council, Ministry of Urban Development, Government of India
3. Kapur, A. (2010). *Vulnerable India: A Geographical Study of Disasters*. Delhi, India: Sage Publication.
4. Modh, S. (2010). *Managing Natural Disaster: Hydrological, Marine and Geological Disasters*. Delhi, India: Macmillan.
5. Ramkumar, M. (2009). *Geological Hazards: Causes, Consequences and Methods of Containment*. New Delhi, India: New India Publishing Agency.

## Suggestive:


1 Savindra, S. and Jeetendra, S. (2013): *Disaster Management*. Allahabad, India: Pravalika Publications.

2 Singh Jagbir. (2007). *Disaster Management Future Challenges and Oppurtunities* 2007. Publisher- New Delhi, India : I.K. International Pvt. Ltd.

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

4 Singh, R.B. (2005). *Risk Assessment and Vulnerability Analysis*. New Delhi , India: IGNOU. Chapter 1, 2 and 3

5 Stoltman, J.P., et al. (2004). *International Perspectives on Natural Disasters*. Dordrecht, the Netherlands: Kluwer Academic Publications.


## Teaching Learning Plan

Week 1: Unit I

Week 2: Unit I

Week 3: Unit II

Week 4: Unit II

Week 5: Unit III

***Week 6: Mid-Semester Examinations***

***Week 7: Mid-Semester Break***

Week 8**:** Unit III

Week 9: Unit IV

Week 10: Unit IV

Week 11: Unit V

Week 12: Unit V

## Assessment Method:

| Unit No. | Course Learning Outcomes | Teaching and Learning Activity | Assessment Tasks |
|---|---|---|---|
| **I** | Introduction to the basic concepts in disaster management | Classroom Lectures, PPTs, discussions, and Fieldwork | Assignments, Tests, Presentations, Project Report |
| **II** | Detailed discussion on the natural disasters in India | Classroom Lectures, PPTs, discussions, and Fieldwork | Assignments, Tests, Presentations, Project Report |
| **III** | Understanding the implications of natural disasters in India | Classroom Lectures, PPTs, discussions, and Fieldwork | Assignments, Tests, Presentations, Project Report |
| **IV** | In-depth assessment of the causes and impacts of manmade disasters | Classroom Lectures, PPTs, discussions, and Fieldwork | Assignments, Tests, Presentations, Project Report |
| **V** | In-depth observation on the management strategies for disasters from micro to macro levels | Classroom Lectures, PPTs, discussions, and Fieldwork | Assignments, Tests, Presentations, Project Report |

**Keywords:** Disaster, Management, India, Impacts, Strategies

# B. DISCIPLINE CENTRIC ELECTIVES (ANY FOUR)

## 1 Demography and Population Studies

### Course Objectives:

1. It introduces the basic concepts of population Geography to the students.
2. An understanding of the importance and need of Demographic data.
3. Spatial understanding of population dynamics.

### Learning Outcomes:

1. This paper would bring an understanding of Population Geography along with relevance of Demographic data.
2. The students would get an understanding of distribution and trends of population growth in the developed and less developed countries, along with population theories.
3. The students would get an understanding of the dynamics of population.
4. An understanding of the implications of population composition in different regions of the world.
5. An appreciation of the contemporary issues in the field of population studies

### Course Contents:

**Contents:**

1. Nature and scope of Population Geography and its relation to Demography. Demographic data requirement and its relevance. Population Censuses across the world. Indian Census: various heads under which data is available in the Census of India.
2. Population distribution: determinants and world pattern; Population Growth: past, present trends and future projections of population in the world and its relation to Demographic Transition Theory; Malthusian perspective on population.
3. Population Composition: Age-Sex composition; Rural and Urban composition: literacy
4. Population Dynamics: Fertility, Mortality and Migration-Measures, determinants and implications.
5. Contemporary Issues: Ageing of Population, Declining Sex Ratio; Demographic Dividend.

### References:

### Essential:


1. Barrett, H. R. (1995). *Population Geography*. UK: Oliver and Boyd.
2. Bhende, A. and Kanitkar, T. (2000). *Principles of Population Studies*. India: Himalaya Publishing House.
5. Chandna, R.C. (2006). *JansankhyaBhugol*. Delhi, India: Kalyani Publishers.

6. Chandna,R.C. (2006). *Geography of Population*. Ludhiana, India: Kalyani Publishers.
7. Clarke, J. I., (1965). *Population Geography*. Oxford, UK: Pergamon Press.

## Suggestive:

1 Debjani,Roy. *Population Geography*. Kolkata, India: Books and Allied Private Limited.
2 Jones, H. R., (2000). *Population Geography,* 3rd ed. London, UK: Paul Chapman.
3 Lutz, W., Warren, C. S. and Scherbov, S. (2004). *The End of the World Population Growth in the 21st Century*. UK: Earthscan
4 Maurya, S. D. (2009). *Jansankya Bhugol*. Allahabad, India: Sharda Putak Bhawan.
5 Newbold, K. B. (2009). *Population Geography: Tools and Issues*. NY, USA: Rowman and Littlefield Publishers.

## Teaching Learning Plan

Week 1: Unit I

Week 2: Unit I

Week 3: Unit II

Week 4: Unit II

Week 5: Unit III

***Week 6: Mid-Semester Examinations***

***Week 7: Mid-Semester Break***

Week 8**:** Unit III

Week 9: Unit IV

Week 10: Unit IV

Week 11: Unit V

Week 12: Unit V

## Assessment Method:

| Unit No. | Course Learning Outcomes | Teaching and Learning Activity | Assessment Tasks |
|---|---|---|---|
| **I** | Nature and scope of Population Geography and its relation to Demography | Classroom Lectures, PPTs, discussions, and Fieldwork | Assignments, Tests, Presentations, Project Report |
| **II** | Population distribution | Classroom Lectures, PPTs, discussions, and Fieldwork | Assignments, Tests, Presentations, Project Report |
| **III** | Population Composition: Age-Sex composition; Rural and Urban composition: literacy | Classroom Lectures, PPTs, discussions, and Fieldwork | Assignments, Tests, Presentations, Project Report |
| **IV** | Population Dynamics: Fertility, Mortality and Migration-Measures, determinants and implications. | Classroom Lectures, PPTs, discussions, and Fieldwork | Assignments, Tests, Presentations, Project Report |
| **V** | Contemporary Issues: Ageing of Population, Declining Sex Ratio; Demographic Dividend. | Classroom Lectures, PPTs, discussions, and Fieldwork | Assignments, Tests, Presentations, Project Report |

**Keywords:** Population, Demography, Fertility, Projection, Migration, etc.

# 2. Hydrology and Soil Studies

## Course Objectives

1. To understand the basics of hydrological regime
2. to explain the integrated concept of water resource management
3. to describe the basic characteristics of soil resource

## Learning Outcomes

After studying this course, students will be able to:

1. Understand the basic components of hydrological cycle and learn best practices of integrated watershed management,
2. Explain various components of water balance and management of river basins,
3. Identify different types of soil, distribution and management of soil resources.

## Course Content:

1. Hydrological Cycle: Systems approach in hydrology, Components of hydrological cycle: precipitation, interception, evaporation, evapo-transpiration, infiltration, percolation, run-off and over land flow, ground water-table, flow of water in aquifers;

2. Water Balance of River Basins: Inter- relationships between components of water balance: water balance equation, concept of potential and actual evapo-transpiration, soil moisture storage, water deficit and water surplus, Characteristics of river basins: basin parameters, river network, discharge, runoff, inter-flow and base-flow.

3. Water Resource Management: Integrated water resource management: watershed delineation, conjunctive, use of ground-water and management strategies with case studies, Water harvesting, artificial recharge of ground-water, River Water Disputes: nature of dispute, sharing principles, river linkages, solution with case studies

4. Soil Resource: Properties of soil, soil water balance, soil profile, soil forming processes, Soil classification systems, orders and distribution of soil

5. Soil Resource Management: Utilisation of soil resource; soil erosion, estimation of soil losses, Problems, treatment and management of soil resource.

## References:

## Essential:


1. Andrew. D.W., and Stanley, T. (2004). *Environmental Hydrology*, 2nd edition. USA: Lewis Publishers, CRC Press.
2. Fetter, C.W. (2005). *Applied Hydrogeology*. New Delhi, India: CBS Publishers & Distributors.
3. Karanth, K.R. (1988). *Ground Water: Exploration, Assessment and Development.* New Delhi, India:- Tata- McGraw Hill.
4. Lyon, J.G. (2003). *GIS for Water Resource and Watershed Management*, NY, USA: Taylor and Francis.
5. Singh, M., Singh, R.B., and Hassan, M.I. (Eds.) (2014): *Landscape ecology and water management*, Proceedings of IGU Rohtak Conference, Volume 2. *Advances in Geographical and Environmental Studies*, Springer.
6. Strahler A. and Strahler A. (2008). *Physical Geography: Science and Systems of the Physical Environment*. New York , USA: John Wiley & Sons.


## Suggestive:


1. Rao, K.L. (1982). *India's Water Wealth*,2nd edition. Delhi, India: Orient Longman.
2. Reddy, K. Ramamohan, VenkateswaraRao,B, Sarala, C. (2014). *Hydrology and Watershed Management*. India: Allied Publishers.
3. Singh, V. P. (1995). *Environmental Hydrology*. The Netherlands: Kluwar Academic Publications.
4. Tideman, E.M. (1999). *Watershed management - Guidelines for Indian Conditions*. Delhi, India: Omega Scientific Publishers.
5. Todd, D.K. (1959). *Ground water Hydrology*. New Delhi, India: Wiley India Edition.

## Teaching Learning Plan

Week 1: Unit I

Week 2: Unit I

Week 3: Unit II

Week 4: Unit II

Week 5: Unit III

***Week 6: Mid-Semester Examinations***

***Week 7: Mid-Semester Break***

Week 8**:** Unit III

Week 9: Unit IV

Week 10: Unit IV

Week 11: Unit V

Week 12: Unit V

## Assessment Method:

| **Unit No.** | **Course Learning Outcomes** | **Teaching and Learning Activity** | **Assessment Tasks** |
|---|---|---|---|
| I | Hydrological Cycle | Classroom Lectures, PPTs, discussions, and Fieldwork | Assignments, Tests, Presentations, Project Report |
| II | Water Balance of River Basins | Classroom Lectures, PPTs, discussions, and Fieldwork | Assignments, Tests, Presentations, Project Report |
| III | Water Resource Management | Classroom Lectures, PPTs, discussions, and Fieldwork | Assignments, Tests, Presentations, Project Report |
| IV | Soil Resource | Classroom Lectures, PPTs, discussions, and Fieldwork | Assignments, Tests, Presentations, Project Report |

| | | | |
|---|---|---|---|
| V | Soil Resource Management | Classroom Lectures, PPTs, discussions, and Fieldwork | Assignments, Tests, Presentations, Project Report |

**Keywords:** Hydrological Cycle, Water Balance, Soil Resource , Resource Management

# 3 Urbanization and Urban System

## Course Objectives:

1. To introduce the students with concepts and approach to studying the urban geography.
2. To study with patterns and functional attributes of urban places.
3. To analyze the urban contemporary issues focusing on Indian mega cities.

## Learning Outcome

After studying, students will be able to:

1. Understand the fundamentals and patterns of urbanization process
2. Learn the functional classification of cities and central place theories.
3. Know contemporary problems of Delhi, Mumbai, Kolkata and Chennai.

## Course Content:

1 Urban studies in Geography: Introduction, nature, scope and approaches.

2 Concept of urban system, Patterns of Urbanization in developed and developing countries

3 Functional classification of cities: Quantitative and Qualitative Methods; Ashok Mitra's classification

4 Cities and Central Place Theory: Christaller

5 Urban Issues: problems of housing, slums, civic amenities (water and transport); Case studies of Delhi, Mumbai, Kolkata, Chennai.

## References:

## Essential:


1. Fyfe, N. R. and Kenny, J. T. (2005). *The Urban Geography Reade.* London, UK: Routledge.
2. Knox, P. L., and McCarthy, L. (2005). *Urbanization: An Introduction to Urban Geography*. New York, USA: Pearson Prentice Hall.
3. Pacione, M. (2009). *Urban Geography: A Global Perspective*. UK Taylor and Francis.
4. Ramachandran, R., (1989). *Urbanisation and Urban Systems of India*. New delhi, India: Oxford University Press.
5. Singh, R.B., (Ed.) (2015). *Urban development, challenges, risks andresilience in Asian megacitie.* Japan: Advances in Geographical and Environmental Studies, Springer

## Suggestive:


1. Kaplan, D. H., Wheeler, J. O. and Holloway, S. R. (2008). *Urban Geography*. NY, USA: John Wiley.
2. Knox, P. L., and Pinch, S. (2006). *Urban Social Geography: An Introduction*, NY, USA: Prentice-Hall.
3. Sassen, S. (2001). *The Global City: New York, London and Tokyo*. USA: Princeton University Press.
4. Sharma, V.R. and Chadrakanta. (2019). *Making Cities Resilient*. Delhi, India: Springer.
5. Sharma, P. and Rajput, S. (Eds.) (2017). *Sustainable Smart Cities in India; Challenges and Future Perspectives*. Delhi, India: Springer.


## Teaching Learning Plan

Week 1: Unit I

Week 2: Unit I

Week 3: Unit II

Week 4: Unit II

Week 5: Unit III

***Week 6: Mid-Semester Examinations***

***Week 7: Mid-Semester Break***

Week 8**:** Unit III

Week 9: Unit IV

Week 10: Unit IV

Week 11: Unit V

Week 12: Unit V

## Assessment Methods:

| Unit No. | Course Learning Outcomes | Teaching and Learning Activity | Assessment Tasks |
|---|---|---|---|
| **1** | Urban geography: Introduction, nature, scope and approaches. | Classroom Lectures, Tutorials, PPT | Assignments, Discussions/Debates classroom test. |
| **2** | Patterns of Urbanisation in developed and developing countries | Classroom Lectures, Tutorials, PPT | Assignments, Discussions/ Debates, classroom test. |
| **3** | Functional classification of cities: Quantitative and Qualitative Methods | Classroom Lectures, Tutorials, PPT | Assignments, Discussion/Debates, classroom test. |
| **4** | Cities and central place theory: Christaller and Losch | Classroom Lectures, Tutorials, PPT | Assignments, Discussions/Debates, classroom test. |
| **5** | Urban Issues: problems of housing, slums, civic amenities (water and transport); Case studies of Delhi, Mumbai, | Classroom Lectures, Tutorials, PPT | Assignments, Discussions/Debates classroom test. |
| | Kolkata, Chennai. | | |

**Keywords:** Urban geography, Urbanisation, Functional classification, central place theory, Urban Issues

# 4 Agriculture and Food Security

## Course Objectives:

1. To understand the concept of land use/land cover classification and determinants of agriculture.
2. To familiarize the students with agriculture regions of India and various types of agriculture system in India.
3. To analyze the food security along with various agricultural revolutions and government policies in India.

## Learning Outcome:

After studying, students will be able to:

1. Conceptualize 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:

## Essential:


1. Basu, D.N., and Guha, G.S. (1996). *Agro-Climatic Regional Planning in India*, Vol.I& II. New Delhi, India: Concept Publication.
2. Bryant, C.R., Johnston, T.R, (1992): *Agriculture in the City Countryside*. London, UK: Belhaven Press.
3. Burger, A. (1994). *Agriculture of the World*. Avebury, UK: Aldershot,
4. Grigg, D.B. (1984). *Introduction to Agricultural Geography*. London, UK: Hutchinson.
5. Hussain, M. (1996). *Systematic Agricultural Geography*, Jaipur, India: Rawat Publications.

## Suggestive:


1. Ilbery, B. W. (1985). *Agricultural Geography: A Social and Economic Analysis*. UK: Oxford University Press.
2. Mohammad, N. (1992). *New Dimension in Agriculture Geography*, Vol. I to VIII. Delhi, India: Concept Pub.
3. Roling, N.G., and Wageruters, M.A.E. (ed.). (1998). *Facilitating Sustainable Agriculture.* Cambridge, UK: Cambridge University Press.
4. Shafi, M. (2006). *Agricultural Geography*. Delhi, India: Doring Kindersley India Pvt. Ltd.
5. Tarrant, J. R. (1973). *Agricultural Geography*, Devon, UK: David and Charles.


## Teaching Learning Plan

Week 1: Unit I

Week 2: Unit I

Week 3: Unit II

Week 4: Unit II

Week 5: Unit III

***Week 6: Mid-Semester Examinations***

***Week 7: Mid-Semester Break***

Week 8**:** Unit III

Week 9: Unit IV

Week 10: Unit IV

Week 11: Unit V

Week 12: Unit V

## Assessment Methods:

| Unit No. | Course Learning Outcomes | Teaching and Learning Activity | Assessment Tasks |
|---|---|---|---|
| **1** | Defining the Field: Introduction, nature and scope; Land use/ land cover definition and classification | Classroom Lectures, Tutorials, PPT | Assignments, Discussions/Debates classroom test. |
| **2** | Determinants of Agriculture: Physical, Technological and Institutional | Classroom Lectures, Tutorials, PPT | Assignments, Discussions/ Debates, classroom test. |
| **3** | Agricultural Regions of India: Agro-climatic, Agro-ecological & Crop Combination Regions. | Classroom Lectures, Tutorials, PPT | Assignments, Discussion/Debates, classroom test. |
| **4** | Agricultural Systems of the World (Whittlesey's classification) and Agricultural Land use model (Von Thunen, modification and relevance). | Classroom Lectures, Tutorials, PPT | Assignments, Discussions/Debates, classroom test. |
| **5** | Food Security: Concept, approaches, pattern, Indian revolution and government policies | Classroom Lectures, Tutorials, PPT | Assignments, Discussions/Debates classroom test. |

**Keywords:** Agriculture, Agricultural Regions, Agricultural Systems, Food Security

# 5 Geography of Health

## Course Objectives:

1. Various dimensions of health geography and its linkages with environment.
2. Detailed analysis of environment and health quality and exposure to risk.
3. Understanding of the relationship between climate change and human health.

## Learning Outcome:

1. Detailed exposure of health geography and environment.
2. In-depth knowledge of health risk and exposure.
3. Understanding the impact of climate change and human health.

## Course Content:

1. 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; industralisation; transport and energy.
3. Exposure and Health Risks: Air pollution; household wastes; water; 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: Impact of climate change on health and disease; nutrition and food security.

## References:

## Essential:


1. Avon, Joan, L. and Jonathan, A, Patzed. (2001). *Ecosystem Changes and Public Health*. USA: Baltimin, John Hopling Unit Press(ed).
2. Bradley,D. (1977). *Water, Wastes and Health in Hot Climates*, USA: John Wiley Chichesten.
3. Christaler, G. and Hristopoles, D. (1998). *Spatio-Temporal Environment Health Modelling*. Boston, USA: Kluwer Academic Press.
4. Cliff, A.D. and Peter,H. (1988). *Atlas of Disease Distributions*. Oxford, UK: Blackwell Publishers.
5. Rais, Akhtar. (Ed.) (1990). *Environment and Health Themes in Medical Geography*. Delhi, India: Ashish Publishing House.


## Suggestive:


1. Gatrell, A. and Loytonen, (1998). *GIS and Health*. London, UK: Taylor and Francis Ltd.
2. Harpham T. and Tanner, M.,(eds) (1995). *Urban Health in Developing Countries; Progress and Prospects*. London , UK: Routledge.
3. Hazra, J. (1997). *Health Care Planning in Developing Countries*. Calcutta, India: University of Calcutta.
4. Moeller, Dade, wed. (1993). *Environmental Health*, Cambridge, USA: Harward Univ. Press.
5. Narayan, K.V. (1997). *Health and Development Inter-Sectoral Linkages in India*. Jaipur, Rawat Publications.


## Teaching Learning Plan

Week 1: Unit I

Week 2: Unit I

Week 3: Unit II

Week 4: Unit II

Week 5: Unit III

***Week 6: Mid-Semester Examinations***

***Week 7 : Mid-Semester Break***

Week 8**:** Unit III

Week 9: Unit IV

Week 10: Unit IV

Week 11: Unit V

Week 12: Unit V

## Assessment Methods:

| **Unit No.** | **Course Learning Outcomes** | **Teaching and Learning Activity** | **Assessment Tasks** |
|---|---|---|---|
| I | Introduction to the basic concepts of health geography and environment | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions. |
| II | Detailed discussion of health quality and climate change | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions. |
| III | Deep understanding of different types of pollution and health risk | Classroom Lectures, PPTs, documentaries, discussions, fieldworks and tutorials. | Assignments, presentations, discussions. |
| IV | Detailed analysis of health disease and their pattern | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions and debates. |
| V | Understanding the relationship between climate change and health | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions and debates. |

**Keywords:** Health, Climate change, Pollution, Disease, Risk

# 6. Introduction to Political Geography

## Course Objectives:

1. To critically understand the concepts of state, nation and nation state,
2. To develop the linkages between electoral geography and political geography
3. To interpret the politics of displacement focusing on Dams and SEZ.

## Course Learning Outcomes:

After studying, students will be able 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.
4. Political Geography of Resource Conflicts – Water Sharing Disputes, Disputes and Conflicts Related to Forest Rights and Minerals.
5. Politics of Displacement: Issues of relief, compensation and rehabilitation: with reference to Dams and Special Economic Zones

## References:

## Essential:


1. Adhikari, S. (2013). *Political Geography of India*. Allahabad, India: Sharda Pustak Bhawan.
2. Agnew, J. (2002). *Making Political Geography*. London, UK: Arnold.
1. Cox, K. R., Low M. and Robinson J. (2008). *The Sage Handbook of Political Geography*. USA: Sage Publications.
2. Gallaher, C., et al, (2009). *Key Concepts in Political Geography*. USA: Sage Publications.
3. Glassner, M. (1993). *Political Geography*. USA: Wiley.


## Suggestive:


1. Cox, K. (2002). *Political Geography: Territory, State and Society*. USA: Wiley-Blackwell
2. Jones, M. (2004). *An Introduction to Political Geography*: UK: Space, Place and Politics, Routlede.
3. Painter, J. and Jeffrey, A. (2009). *Political Geography*. USA: Sage Publications.
4. Taylor, P. and Flint, C. (2000). *Political Geography*. UK: Pearson Education.
5. Verma, M. K. (2004). *Development, Displacement and Resettlement*. Delhi, India: Rawat Publications.


## Teaching Learning Plan

Week 1: Unit I

Week 2: Unit I

Week 3: Unit II

Week 4: Unit II

Week 5: Unit III

***Week 6: Mid-Semester Examinations***

***Week 7: Mid-Semester Break***

Week 8**:** Unit III

Week 9: Unit IV

Week 10: Unit IV

Week 11: Unit V

Week 12: Unit V

## Assessment Methods:

| Unit No. | Course Learning Outcomes | Teaching and Learning Activity | Assessment Tasks |
|---|---|---|---|
| **1** | Introduction: Concepts, Nature and Scope. | Classroom Lectures, Tutorials, PPT | Assignments, Discussions/Debates classroom test. |
| **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) | Classroom Lectures, Tutorials, PPT | Assignments, Discussions/ Debates, classroom test. |
| **3** | Electoral Geography – Geography of Voting, Geographic Influences on Voting pattern, Geography of Representation, Gerrymandering. | Classroom Lectures, Tutorials, PPT | Assignments, Discussion/Debates, classroom test. |
| **4** | Political Geography of Resource Conflicts – Water Sharing Disputes, Disputes and Conflicts Related to Forest Rights and Minerals. | Classroom Lectures, Tutorials, PPT | Assignments, Discussions/Debates, classroom test. |
| **5** | Politics of Displacement: Issues of relief, compensation and rehabilitation: with reference to Dams and Special Economic Zones. | Classroom Lectures, Tutorials, PPT | Assignments, Discussions/Debates classroom test. |

**Keywords:** State, Nation, Electoral, Political, Geography, Resource, Conflict, Displacement

# 7 Biogeography and Biodiversity

## Course Objectives:

1. Various dimensions of biogeography and biodiversity.
2. Detailed analysis of energy cycles and their function.
3. Understanding of the concept of ecological succession and floral faunal biodiversity.

## Learning Outcome:

1. Detailed exposure of biogeography and biodiversity.
2. In-depth knowledge of circulation of atmospheric cycles.
3. Understanding the climatic patterns and classification.

## Course Content:

1. Introduction to Bio-geography: Nature, scope, and components.
2. Energy in the earth-atmosphere system; Circulations within the atmosphere.
3. World Climatic Patterns (Koppen)
4. Evolution of major groups of floral and faunal provinces.
5. Ecological successions: stages and climax.

## References:

## Essential:


1. Bhattacharyya, N.N. (2003). *Biogeography.* New Delhi, India: Rajesh Publications.
2. Hoyt, J.B. (1992). *Man, and the Earth*. USA: Prentice Hall.
3. Huggett, R.J. (1998). *Fundamentals of Biogeography*, USA: Routeldge
4. Lal, D. S. (2003). *Climatology*.Allahabad, India: ShardaPustakBhawan.
5. Mal, Suraj., and Singh, R.B. (Eds.) (2009). *Environmental Change and Biodiversity*. Jaipur, India: Rawat Publication.
6. Singh, R.B. (Eds) (2009). *Biogeography and Biodiversity*. Jaipur, India: Rawat Publication.

## Suggestive:


1. Clarke, G. L. (1967). *Elements of ecology*. New York, USA: John Wiley Pub.
2. Haden-Guest, S., Wright, J. K. and Teclaff, E. M. (1956). *World Geography of Forest Resources*. New York, USA: Ronald Press Co.
3. Mathur, H.S. (1998). *Essentials of Biogeography*. Jaipur, India: Anuj Printers.
4. Singh,Savindra. (2015). *Paryawaran Bhoogol (Hindi)*. Allahabad, India: Prayag Pushtak Bhawan,.
5. Sivaperuman, Chandrakasan et al. (2018). *Biodiversity and Climate Change Adaptation in Tropical Islands*. London, UK: Academic Press.


## Teaching Learning Plan

Week 1: Unit I

Week 2: Unit I

Week 3: Unit II

Week 4: Unit II

Week 5: Unit III

***Week 6: Mid-Semester Examinations***

***Week 7: Mid-Semester Break***

Week 8**:** Unit III

Week 9: Unit IV

Week 10: Unit IV

Week 11: Unit V

Week 12: Unit V

## Assessment Methods:

| Unit No. | Course Learning Outcomes | Teaching and Learning Activity | Assessment Tasks |
|---|---|---|---|
| I | Introduction to the basic concepts of biogeography and its scope | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions. |
| II | Detailed discussion of earth atmosphere system and cycles | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions. |
| III | Deep understanding of global climatic pattern and classification | Classroom Lectures, PPTs, documentaries, discussions, fieldworks and tutorials. | Assignments, presentations, discussions. |
| IV | Detailed analysis of evolution of floral and faunal communities | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions and debates. |
| V | Understanding the ecological succession and climax of geographical regions | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions and debates. |

**Keywords:** Biogeography, Cycles, Climate, Flora, Succession

# 8. Geography of Social Wellbeing

## Course Objectives:

1. To familiarise the student with the theoretical foundations and conceptual grounding of unique geography of social well-being.
2. To appreciate the roles of geographic factors in socio-cultural diversity and well-being.
3. To analyse in details the social wellbeing, problems and welfare programmes and policies.

## Learning Outcomes:

After studying, students will be able to:

1. Get Knowledge of the geography of social well-being and social diversity.
2. Appraise the key concepts of social geography in regional context; geographic factors underlying patterns of social well-being and inclusive development.
3. Explain the social problems and the welfare programs and policies.

## Course Content:

1. Geography of Social Wellbeing: Concept, Origin, Nature and Scope.
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:

## Essential:


1. Ahmed, A. (1999). *Social Geography*. Jaipur, India: Rawat Publications.
2. Casino, V. J. D., Jr. (2009). *Social Geography: A Critical Introduction*. USA: Wiley Blackwell.
3. Cater, J. and Jones, T. (2000). *Social Geography: An Introduction to Contemporary Issues*. UK: Hodder Arnold.
4. Holt, L. (2011). *Geographies of Children, Youth and Families: An International Perspective.* UK: Taylor & Francis.
5. Panelli, R. (2004). *Social Geographies: From Difference to Action*. USA: Sage.
6. Smith, D. M. (1977).*Human geography: A Welfare Approach*. UK: Edward

Arnold.

## Suggestive:

1. *Introducing Social Geographies.* UK: Oxford University Press.
2. Rachel, P., Burke, M., Fuller, D., Gough, J., Macfarlane, R. and Mowl, G. (2001).
3. Smith, S. J., Pain, R., Marston, S. A., Jones, J. P. (2009). *The SAGE Handbook of Social Geographies*. USA: Sage Publications.
4. Sopher, David. (1980). *An Exploration of India.* Ithasa, USA: Cornell University Press.
5. Valentine, G. (2001). *Social Geographies: Space and Society*. USA: Prentice Hall.

## Teaching Learning Plan

Week 1: Unit I

Week 2: Unit I

Week 3: Unit II

Week 4: Unit II

Week 5: Unit III

***Week 6: Mid-Semester Examinations***

***Week 7: Mid-Semester Break***

Week 8**:** Unit III

Week 9: Unit IV

Week 10: Unit IV

Week 11: Unit V

Week 12: Unit V

## Assessment Methods:

| Unit No. | Course Learning Outcomes | Teaching and Learning Activity | Assessment Tasks |
|---|---|---|---|
| **1** | Geography of Social Wellbeing: Concept, Origin, Nature and Scope. | Classroom Lectures, Tutorials, PPT | Assignments, Discussions/Debates classroom test. |
| **2** | Social Diversity: Caste, Class, Religion, Race and Gender and their Spatial distribution | Classroom Lectures, Tutorials, PPT | Assignments, Discussions/ Debates, classroom test. |
| **3** | Social Wellbeing and Inclusive Development: Concept and Components – Healthcare, Housing and Education. | Classroom Lectures, Tutorials, PPT | Assignments, Discussion/Debates, classroom test. |
| **4** | Social Geographies of Inclusion and Exclusion, Slums, Gated Communities, Communal Conflicts and Crime. | Classroom Lectures, Tutorials, PPT | Assignments, Discussions/Debates, classroom test. |
| **5** | Social welfare program and policies. | Classroom Lectures, Tutorials, PPT | Assignments, Discussions/Debates classroom test. |

**Keywords:** Wellbeing, Diversity, Inclusion, Exclusion, Development, Welfare

# A. GENERIC ELECTIVE COURSES (ANY FOUR)

## 1. Disaster Management

### Course Objectives

1. Understanding the basic concepts of disaster management.
2. Detailed analysis about the different types of disasters in India.
3. Evaluating the role of institutional frameworks to mitigate the disasters in the country.

### Course Learning Outcomes:

1. In depth understanding about the various disasters in the country.
2. It will provide thorough understanding about the human responses to the disasters.
3. It will highlight the responses and mitigation measures to both natural and manmade 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; Cyclone: Causes, Impact, Distribution and Mapping.
4. Manmade disasters: Causes, Impact, Distribution and Mapping
5. Response and Mitigation to Disasters: Mitigation and Preparedness, Institutional Framework including functioning of NDMA and NIDM; Indigenous Knowledge and Community-Based Disaster Management; Do's and Don'ts During andPost Disasters.

### References:

### Essential:

1. Government of India, (2008): *Vulnerability Atlas of India*. New Delhi, India: Building Materials & Technology Promotion Council, Ministry of Urban

Development, Government of India.

2. Govt. of India. (2011). *Disaster Management in India*. New Delhi, India: Ministry of Home Affairs.
3. Kapur, A. (2010). *Vulnerable India: A Geographical Study of Disasters*. Delhi, India: Sage Publication.
4. Modh, S. (2010). *Managing Natural Disaster: Hydrological, Marine and Geological Disasters*. Delhi, India: Macmillan.
5. Singh, R. B. (ed.), (2006). Nat*ural Hazards and Disaster Management: Vulnerability and Mitigation*. New Delhi, India: Rawat Publications.
6. Singh, R.B. (2005). *Risk Assessment and Vulnerability Analysis*. Delhi, India: IGNOU. Chapter 1, 2 and 3

**Suggestive:**

1. Pandey, B. W. (2002). *Geo-environmental Hazards in Himalaya*. New Delhi, India: Mittal Publication.
2. Singh, J. (2019). *Disaster Management: A Data Analysis Approaches*. Delhi, India: Research India Press.
3. Sinha, A. (2001). *Disaster Management: Lessons Drawn and Strategies for Future*. Delhi, India: New United Press.
4. Stoltman, J.P., et al. (2004): *International Perspectives on Natural Disasters*. Dordrecht , The Netherlands: Kluwer Academic Publications.

## Teaching Learning Plan

Week 1: Unit I

Week 2: Unit I

Week 3: Unit II

Week 4: Unit II

Week 5: Unit III

***Week 6: Mid-Semester Examinations***

***Week 7: Mid-Semester Break***

Week 8: Unit III

Week 9: Unit IV

Week 10: Unit IV

Week 11: Unit V

Week 12: Unit V

## Assessment Methods:

| Unit No. | Course Learning Outcomes | Teaching and Learning Activity | Assessment Tasks |
|---|---|---|---|
| I | Introduction to the basic concepts in disaster management | Classroom Lectures, PPTs, discussions, and debates | Assignments, Tests, Presentations |
| II | Detailed discussion on the natural disasters in India | Classroom Lectures, PPTs, discussions, and debates | Assignments, Tests, Presentations |
| III | Understanding the implications of natural disasters in India | Classroom Lectures, PPTs, discussions, and debates | Assignments, Tests, Presentations |
| IV | In-depth assessment of the causes and impacts of manmade disasters | Classroom Lectures, PPTs, discussions, and debates | Assignments, Tests, Presentations |
| V | In-depth observation on the management strategies for disasters from micro to macro levels | Classroom Lectures, PPTs, discussions, and debates | Assignments, Tests, Presentations |

**Keywords**: Disaster, Cloudburst, India, Impacts, Strategies

# 2. Geography of Tourism and Pilgrimage

## Course Objective:

1. To Understand the various dimensions of geography of tourism and pilgrimage,.
2. To make aware the students with national and international trends and patterns of tourism with its impacts.
3. To critically evaluates the infrastructure in tourism in India focusing with having case studies along with the reviewing the tourism policy in country.

## Learning Outcome:

After studying, students will be able to:

1. Equip with a basic understanding of nature and scope, trends and patterns of various types of tourisms.
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: Concept of tourism geography, Inter- Relations of Tourism, Recreation and Leisure; Geographical Parameters of Tourism by Robinson.
2. Types: Nature Tourism, Cultural Tourism, Medical Tourism, Pilgrimage; Contemporary Types: Eco-Tourism, Sustainable Tourism, Meetings Incentives Conventions and Exhibitions (MICE), Space tourism.
3. Recent Trends and Patterns of Tourism: International and Regional; Domestic (India)
4. Impact of Tourism: Economy; Environment; Society using case Studies of Mountain, Desert and Coastal Areas.
5. Tourism in India: Tourism Infrastructure and hospitality Industry; National Tourism Policy.

## References:

## Essential:


1. Alan, A. Lew, (2017). *New Research Paradigms in Tourism Geography*, Routledge.
2. Boniface,B. and Cooper,C( 2005)The Geography of Travel and Tourism,Butterworth.
3. Dhar, P.N. (2006). *International Tourism: Emerging Challenges and Future Prospects.* New Delhi, India: Kanishka
4. Hall, M., and Stephen, P. (2006). *Geography of Tourism and Recreation* –

*Environment, Place and Space*. London , UK: Routledge.

5. Kamra, K. K., and Chand, M. (2007). *Basics of Tourism: Theory, Operation and Practise*. Pune, India: Kanishka Publishers.
6. Robinson, H. A. (1996). *Geography of Tourism,* London, UK: Macdonald and Evans.

## Suggestive:

1. Milton, D. (1993). *Geography of World Tourism.* NY, USA: Prentice. Hall.
2. Nelson, V., (2017): *An Introduction to the Geography of Tourism*, NY, USA: Rowman& Littlefield.
3. Page, S. J. (2011). *Tourism Management: An Introduction*. USA: Butterworth-Heinemann.
4. Raj, R. and Nigel, D. (2007). *Morpeth Religious Tourism and Pilgrimage Festivals Management: An International perspective by CABI*. USA: Cambridge.
5. Widawski, K., and Wyrzykowski, J. (2017). *The Geography of Tourism of Central and Eastern European Countries*, Switz: Springer.

## Teaching Learning Plan

Week 1: Unit I

Week 2: Unit I

Week 3: Unit II

Week 4: Unit II

Week 5: Unit III

***Week 6: Mid-Semester Examinations***

***Week 7: Mid-Semester Break***

Week 8**:** Unit III

Week 9: Unit IV

Week 10: Unit IV

Week 11: Unit V

Week 12: Unit V

## Assessment Methods:

| Unit No. | Course Learning Outcomes | Teaching and Learning Activity | Assessment Tasks |
|---|---|---|---|
| **1** | Scope and Nature: Concepts and Issues, Tourism, Recreation and Leisure Inter- Relations; Geographical Parameters of Tourism by Robinson. | Classroom Lectures, Tutorials, PPT | Assignments, Discussions/Debates classroom test. |
| **2** | Trends and Patterns: Nature Tourism, Cultural Tourism, Medical Tourism, Pilgrimage, Geo- tourism. | Classroom Lectures, Tutorials, PPT | Assignments, Discussions/ Debates, classroom test. |
| **3** | Recent Trends of Tourism: International and Regional; Domestic (India); Eco-Tourism, Sustainable Tourism, Meetings Incentives Conventions and Exhibitions (MICE) | Classroom Lectures, Tutorials, PPT | Assignments, Discussion/Debates, classroom test. |
| **4** | Impact of Tourism: Economy; Environment; Society | Classroom Lectures, Tutorials, PPT | Assignments, Discussions/Debates, classroom test. |
| **5** | Tourism in India: Tourism Infrastructure; Case Studies of Himalaya, Desert and Coastal Areas; National Tourism Policy | Classroom Lectures, Tutorials, PPT | Assignments, Discussions/Debates classroom test. |

**Keywords:** Tourism, Parameters, Trends, Patterns, Infrastructure, Case Studies, Policy

# 3. Spatial Information Technology

## Course Objectives:

1. The main objective of this course is to give students an insight on the concepts of spatial information technology.
2. The paper discusses the concept, historical developments, functioning and application of spatial information technology in detail.

## Learning Outcome:

Upon successful completion of the course, the students:

1. will be familiar with the concept, components of SIT.
2. will gained knowledge on various data sources, structures, and their interpolation and modeling.
3. will acquire in-depth knowledge of various functions applied in SIT.
4. will gather detailed information on the application of SIT in various fields of mapping

## Course Content:

1. Introduction: Definitions, Concept, Components and Historical Development
2. Spatial Information/Data: Web data sources; Registration and projection; Data types structures; Data interpolation and modeling
3. Working on spatial information system: Data creation with GIS software's, making layers, data editing and cleaning, spatial and non-spatial data linking, extracting information
4. Functions of Spatial Information System: Overlay Analysis; Buffer Analysis, Network Analysis.
5. Application of Spatial Information Technology for sustainable development

## References:

## Essential:

1. D. Tomlin. (1990). *Geographic Information Systems and Cartographic Modeling*. USA: Prentice-Hall, Englewood Cliffs, NJ, ISBN 0-13-350927-3.

2. Esperança and Samet, H. (1997). *An overview of the SAND spatial database system, to appear in Communications of the ACM.* (http://www.cs.umd.edu/~hjs/pubs/sandprog.ps.gz)
3. G. Hjaltason and Samet, H. *Ranking in Spatial Databases in Advances in Spatial Databases —4th Symposium*, SSD'95, M. J. Egenhofer and J. R. Herring, Eds., Lecture Notes in Computer Science 951
4. Heywood, I., Comelius, S., and Carver, S. (1988). *An Introduction to Geographical Information Systems*. New York , USA: Addison Wiley Longmont.
5. Kumar, Dilip., Singh, R.B**.,** and Kaur, Ranjeet. (2019). *Spatial Information Technology for Sustainable Development Goals*. Delhi, India: Springer.

## Suggestive:

1. Samet, H. (1990). *Applications of Spatial Data Structures: Computer Graphics, Image Processing, and GIS*. USA: Addison-Wesley, Reading, MA, ISBN 0-201- 50300-0.
2. Samet, H. (1990). *The Design and Analysis of Spatial Data Structures*. USA: Addison- Wesley, Reading, MA, ISBN 0-201-50255-0.
3. Samet, H. (1995). *Spatial Data Structures in Modern Database Systems: The Object Model, Interoperability, and Beyond*, W. Kim, Ed., USA: Addison-Wesley/ACM Press, 361-
4. http://www.cs.umd.edu/~hjs/pubs/kim.ps
5. http://www.cs.umd.edu/~hjs/pubs/kim2.ps

## Teaching Learning Plan

Week 1: Unit I

Week 2: Unit I

Week 3: Unit II

Week 4: Unit II

Week 5: Unit III

***Week6 : Mid-Semester Examinations***

***Week 7: Mid-Semester Break***

Week 8**:** Unit III

Week 9: Unit IV

Week 10: Unit IV

Week 11: Unit V

Week 12: Unit V

## Assessment Methods:

| Unit No. | Course Learning Outcomes | Teaching and Learning Activity | Assessment Tasks |
|---|---|---|---|
| **1** | Introduction: Definitions, Concept and Historical Development | Classroom Lectures, Practical demonstration | Assignments, PPT, classroom test. |
| **2** | Spatial Information/Data | Classroom Lectures, Practical demonstration | Assignments, Hans-on exercise, practical lesson |
| **3** | Working on spatial information system | Classroom Lectures, PPT | Assignments, midterm examination. |
| **4** | Functions of Spatial Information System | Classroom Lectures, Practical demonstration | Assignments, Hans-on exercise, practical lesson |
| **5** | Application of Spatial Information Technology for sustainable development | Classroom Lectures, Practical demonstration | Assignments, classroom test, end semester examination. |

**Keywords:** Spatial Information Technology, Spatial data, Spatial Information System

# 4. Coupled Human and Environment System

## Course Objectives:

1. Various dimensions of concepts, components and theories of coupled human environment system.
2. Detailed analysis of different biogeochemical cycles.
3. Understanding of the concept of lowland and highland interaction.

## Learning Outcome:

1. Detailed exposure of climate change and related issues.
2. In-depth knowledge of interactions and impact between human and natural systems.
3. Understanding the management and policies related to human and environment system.

## Course Content:

1. Concepts, components and theories of coupled human environment system.
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.
5. Management, Governance and Policies.

## References:

## Essential:


1. Clarke, G. L. (1967). *Elements of ecology*. New York, USA: John Wiley Pub.
2. Haden-Guest, S., Wright, J. K., and Teclaff, E. M. (1956). *World Geography of Forest Resources*. New York, USA: Ronald Press Co.
3. Hoyt, J.B. (1992). *Man, and the Earth*. USA: Prentice Hall.
4. Lapedes, D.N. (1974). *Encyclopaedia of Environmental Science (eds.).* USA: McGraw Hill.
5. Parmesan, C., Yohe, G. (2003). *A globally coherent fingerprint of climate change impacts across natural systems*. UK: Nature, 421 (6918), 37–42.
6. Singh, R.B., Schickhoff, U., and Mal, Suraj. (2016). *Climate Change, Glacier*

*Response and Vegetation Dynamics in the Himalaya*. Switzerland: Springer.

7. Trewartha G. T. (1980). *An Introduction to Climate*. NY, USA: McGraw Hill Company.

## Suggestive:

1. Singh Savindra., (2015). *ParyawaranBhoogol (Hindi)*. Allahabad, India: PrayagPushtakBhawan.
2. Singh, R.B., Prokop, Pawel., (Eds.) (2016). *Environmental Geography of South Asia*. Tokyo, Japan : Springer.
3. Sivaperuman, Chandrakasan. et al. (2018). *Biodiversity and Climate Change Adaptation in Tropical Islands*. London, UK: Academic Press.

## Teaching Learning Plan

Week 1: Unit I

Week 2: Unit I

Week 3: Unit II

Week 4: Unit II

Week 5: Unit III

***Week 6: Mid-Semester Examinations***

***Week 7: Mid-Semester Break***

Week 8**:** Unit III

Week 9: Unit IV

Week 10: Unit IV

Week 11: Unit V

Week 12: Unit V

## Assessment Methods:

| Unit No. | Course Learning Outcomes | Teaching and Learning Activity | Assessment Tasks |
|---|---|---|---|
| I | Introduction to the basic concepts of human environment system | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions. |
| II | Detailed discussion of different biogeochemical cycles | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions. |
| III | Deep understanding of case studies from different altitude and regions | Classroom Lectures, PPTs, documentaries, discussions, fieldworks and tutorials. | Assignments, presentations, discussions. |
| IV | Detailed analysis of assessment of vulnerability risk; resilience and sustainability | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions and debates. |
| V | Understanding the management and policies related to human environment system | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions and debates. |

**Keywords:** Environment, Cycles. Region, Sustainability, Management

# 5. Climate Change Vulnerability and Adaptation

## Course Objectives:

1. Various dimensions of climate change and adaptability.
2. Detailed analysis of vulnerability and its impacts.
3. Understanding of the concept of mitigation and planning.

## Learning Outcome:

1. Detailed exposure of climate change and related issues.
2. In-depth knowledge of vulnerability of flora and fauna.
3. Understanding the impact of climate change and its planning.

## Course Content:

1. 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. Impact of Climate Change: Agriculture and Water; Flora and Fauna; Human Health
4. Adaptation and Mitigation: Global Initiatives with Particular Reference to South Asia.
5. The Climate Change Policy Framework: Global Initiatives UNFCCC and COPs; National and Local Action Plan on Climate Change

## References:

## Essential:

1. IPCC. (2014). *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. NY, USA: Cambridge University Press, Cambridge, United Kingdom and New York.

2. Sen, Roy, S., and Singh, R.B., (2002). *Climate Variability, Extreme Events and Agricultural Productivity in Mountain Regions*. Delhi, India: Oxford & IBH Pub.
3. Singh, M., Singh, R.B., and Hassan, M.I., (Eds.) (2014):*Climate change and biodiversity*, Proceedings of IGU Rohtak Conference, Volume 1. Advances in Geographical and Environmental Studies, Springer
4. Singh, R.B., Mal,Suraj, and Huggel, C. (2018). *Climate Change, Extreme Events and Disaster Risk Reduction*. Switzerland : Springer, , pages 309.

## Suggestive:

1. IPCC. (2007). *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.* NY, USA: Cambridge University Press, Cambridge, United Kingdom and New York.
2. OECD. (2008). *Climate Change Mitigation: "What do we do?"*(Organisation and Economic Co-operation and Development).
3. UNEP. (2007). *Global Environment Outlook: GEO4: Environment for Development*. Nairobi, Kenya: United Nations Environment Programme.

## Teaching Learning Plan

Week 1: Unit I

Week 2: Unit I

Week 3: Unit II

Week 4: Unit II

Week 5: Unit III

***Week6 : Mid-Semester Examinations***

***Week7 : Mid-Semester Break***

Week 8**:** Unit III

Week 9: Unit IV

Week 10: Unit IV

Week 11: Unit V

Week 12: Unit V

## Assessment Methods:

| Unit No. | Course Learning Outcomes | Teaching and Learning Activity | Assessment Tasks |
|---|---|---|---|
| I | Introduction to the basic concepts of climate change and its science | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions. |
| II | Detailed discussion of different types of vulnerability | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions. |
| III | Deep understanding of climate change impacts on different sectors | Classroom Lectures, PPTs, documentaries, discussions, fieldworks and tutorials. | Assignments, presentations, discussions. |
| IV | Detailed analysis of different adaptation and mitigation strategies | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions and debates. |
| V | Understanding the different policies related to climate change at local as well as global level | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions and debates. |

**Keywords:** Climate change, Vulnerability, Adaptation, Mitigation, Policy

# 6. Rural Development

## Course Objectives

1. The main objectives of this course is to give students an insight into the concepts , approaches and planning process related to rural development in India.

2. The students will learn the rural economic base, rural development process and provision of services in rural areas.

## Learning Outcomes

Upon successful completion of the course, the students:

1. Will be acquainted with the need and approaches to rural development,
2. Will gain knowledge on rural economic base especially about the significance of development of non-farm sector in rural areas,
3. Will have in-depth knowledge of pre and post-independence period of rural development,
4. Will be sensitized to understand the relevance of access to services like health, education in rural areas.

## Course Content:

1. Define Rural Development, Need for Rural Development, Approaches to Rural Development.
2. Rural Economic Base- Panchayati Raj System, Agriculture Sector development, Importance of Non-Farm Sector Development in rural areas, Concept and Importance of non-farm sector in rural areas and difference with the farm sector, Programmes and Policies for non-farm sector, Cottage and Small Scale Industries, Agro Industries, Case Study with reference to the above sections.
3. Phases of Rural Development in India: Rural Development in pre-Independence India, Martandan Experiment, Sriniketan Experiment, Gurgaon Experiment, Gandhian Approach, Bhoodan and Gramdan Movement.
4. Rural Development in India- Post Independence: Government approaches through Five Year Plans with special reference to the changing focus on, Area based Approach, Target Group Approach,Integrated Rural Development Approach
5. Provision of Services: Access to Elementary education in rural areas, Access to Primary Health Care in rural India, Micro Credit, PURA.

## References:

## Essential:


1. Anand, Subhash. (2013). *Dynamics of Rural Development*. Delhi, India: Research India Press.
2. Krishnamurthy, J. (2000). *Rural Development - Problems and Prospects.* Jaipur, India: Rawat Publs.
3. Singh, R.B. (1985): *Geography of Rural Development*. New Delhi, India: Inter India.
4. Misra, R. P. (ed.) (1985). *Rural Development: Capitalist and Socialist Paths*, Vol. 1. New Delhi, India: Concept.
5. Ramachandran, H., and Guimaraes, J.P.C. (1991). *Integrated Rural Development in Asia–Leaning fromRecent Experience.* New Delhi, India: Concept Publishing.


## Suggestive:


1. Gilg, A. W. (1985). *An Introduction to Rural Geography.* London, UK: Edwin Arnold.
2. Lee, D. A. and Chaudhri, D. P., (eds.) (1983). *Rural Development and State*. London, UK: Methuen.
3. Palione, M. (1984). *Rural Geography*. London, UK: Harper and Row.
4. Robb, P. (1983). *Rural South Asia: Linkages, Change and Development*. UK: Curzon Press.
5. UNAPDI. (1986). *Local Level Planning and Rural Development: Alternative Strategies*.New Delhi, India: (United Nations Asian & Pacific Development Institute, Bangkok), Concept Publs. Co.


## Teaching Learning Plan

Week 1: Unit I

Week 2: Unit I

Week 3: Unit II

Week 4: Unit II

Week 5: Unit III

***Week 6: Mid-Semester Examinations***

***Week 7: Mid-Semester Break***

Week 8**:** Unit III

Week 9: Unit IV

Week 10: Unit IV

Week 11: Unit V

Week 12: Unit V

## Assessment Methods:

| **Unit No.** | **Course Learning Outcomes** | **Teaching and Learning Activity** | **Assessment Tasks** |
|---|---|---|---|
| I | Define Rural Development, Need for Rural Development, Approaches to Rural Development. | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions. |
| II | Rural Economic Base- Panchayati Raj System, Agriculture Sector development etc. | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions. |
| III | Phases of Rural Development in India | Classroom Lectures, PPTs, documentaries, discussions, fieldworks and tutorials. | Assignments, presentations, discussions. |
| IV | Rural Development in India- Post Independence | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions and debates. |
| V | Provision of Services: Access to Elementary education in rural areas, Access to Primary Health Care in rural India, Micro Credit, PURA | Classroom Lectures, PPTs, documentaries, discussions and tutorials. | Assignments, presentations, discussions and debates. |

**Keywords:** Rural Development, Panchayati Raj System, Non-Farm Sector, Provision of Services

# 7. Industrial Development

## Course Objective:

1. To understand the nature of industrial geography and appreciate the importance of Industrial Development
2. To analyze the industrial regions and associated impacts of industrialization and challenges.
3. To critical evaluate the industrial policy of India.

## Learning Outcome:

After Studying, Students will be able to:

1. Acquaint with the nature and scope of Industrial geography and theories of location of industries.
2. Classify the typology of Industries and understand the physical, cultural, economic and demographic aspects with reference to mega industrial complexes of India.
3. Assess the impacts of industrialization and industrial policy on India.

## Course Content:

1. Nature and Scope of Industrial Geography
2. Types, Geographical Characteristics and Location of Industries (Weber's Theory): Small and Medium Industries, Heavy Industries, Coal and Iron based industries, Rural based Industries, Footloose Industry.
3. Mega Industrial Complexes: National Capital Region, Mumbai-Pune Industrial Region, Bengaluru-Chennai Industrial Region and Chota Nagpur Industrial Region
4. Impact of Industrialisation in India: Environmental; Social and Economic
5. Industrial Policy of India.

## References:

## Essential:


1. Gunnar,A. (1967). *Geography of Manufacturing*. NJ, USA: Prentice Hall
2. Leong, G.C. (1997). *Human and economic geography*. NY, USA: Oxford University Press.
3. Miller, E. (1962). *Geography of Manufacturing.* NJ, USA: Prentice Hall.
4. Pathak, C. R. (2003). *Spatial Structure and Processes of Development in India*. Kolkata, India: Regional Science Assoc.
5. Sharma, T.C. (2013). *Economic Geography of India*. Jaipur: Rawat Publication.
6. Singh, J. (2003). *India - A Comprehensive & Systematic Geography*. Gorakhpur, India: Gyanodaya Prakashan,

## Suggestive:


1. Thoman, R.S., Conkling E.C., and Yeates. M.H. (1968). *Geography of Economic Activity*. NY, USA: McGraw Hill Book Company.
2. Tirtha, R. (2002). *Geography of India.* Jaipur & New Delhi: Rawat Publ.
3. Tiwari, R.C. (2007). *Geography of India*. Allahabad, India: Prayag Pustak Bhawan.
4. Truman, A. H., and John W. A. (2000). *Economic Geography.* New Delhi, India: Prentice Hall of India Ltd.


## Teaching Learning Plan

Week 1: Unit I

Week 2: Unit I

Week 3: Unit II

Week 4: Unit II

Week 5: Unit III

***Week 6: Mid-Semester Examinations***

***Week 7: Mid-Semester Break***

Week 8**:** Unit III

Week 9: Unit IV

Week 10: Unit IV

Week 11: Unit V

Week 12: Unit V

## Assessment Methods:

| Unit No. | Course Learning Outcomes | Teaching and Learning Activity | Assessment Tasks |
|---|---|---|---|
| **1** | Nature and Scope of Industrial Geography | Classroom Lectures, Tutorials, PPT | Assignments, Discussions/Debates classroom test. |
| **2** | Types, Geographical Characteristics and Location of Industries (Weber's Theory): Small and Medium Industries, Heavy Industries: Coal and Iron based industries, Rural based Industries, Footloose Industry. | Classroom Lectures, Tutorials, PPT | Assignments, Discussions/ Debates, classroom test. |
| **3** | Mega Industrial Complexes: National Capital Region, Mumbai-Pune Industrial Region, Bengaluru-Chennai Industrial Region and Chota Nagpur Industrial Region. | Classroom Lectures, Tutorials, PPT | Assignments, Discussion/Debates, classroom test. |
| **4** | Impact of Industrialisation in India: Environmental; Social and Economic | Classroom Lectures, Tutorials, PPT | Assignments, Discussions/Debates, classroom test. |
| **5** | Industrial Policy of India | Classroom Lectures, Tutorials, PPT | Assignments, Discussions/Debates classroom test. |

**Keywords:** Industries, Types, Location, Complexes, Impact, Policy

# 8. Sustainable Resource Development

## Course Objective:

1. To learn the concepts related with Sustainable development and its role in reducing poverty and inequality in the world.
2. To get updated knowledge of Millennium Development Goals & Sustainable Development Goals.
3. To critically evaluate the global policies and programmes for sustainable development.

## Learning Outcome:

After Studying, Students will be able to

1. Understand the basic concept of sustainable resource development and differentiate between the Millennium development goals and Sustainable development goals.
2. Assess the issues associated with the Inclusive Development.
3. Explain the sustainable development policies and programmes

## Course Content:

1. Sustainable Development and Sustainability: Definition, Components and Limitations
2. The Millennium Development Goals: Experiences, India's Effort, Performance and Strategies.
3. Sustainable Resource Development: Water Sustainability in Arid Regions, Forest Sustainability in Mountain Regions, Marine Resource Sustainability, Resources and Sustainable Cities.
4. Inclusive Development: Poverty and Inequality; Education (The role of higher education in sustainable resource development), Health: The Challenges of Universal Health Coverage; Climate Change: Policies and Global Cooperation for Climate Change
5. Sustainable Development Policies and Programmes: The proposal for SDGs at Rio+20; Illustrative SDGs; Goal-Based Development; Financing for Sustainable Development; Principles of Good Governance; CDM.

## References:

## Essential:


1. Agyeman, J., Robert D. B., and Bob, E. (Eds.) (2003). *Just Sustainabilities: Development in an Unequal World.* London, UK: Earthscan. (Introduction and conclusion.).
2. Ayers, Jessica and David,Dodman. (2010). *Climate change adaptation and development I: the state of the debate*. USA: Sage, Progress in Development Studies 10(2): 161-168.

3. Baker, Susan. (2006). *Sustainable Development.* New York, N.Y.: Routledge.
4. Brosius, P. (1997). *Endangered forest, endangered people: Environmentalist representations of indigenous knowledge.* Human Ecology 25: 47-69.
5. Singh, R.B. (Ed.) (2001): *Urban Sustainability in the Context of Global Change*. Science Pub., Inc., New Delhi, India: Enfield (NH), USA and Oxford & IBH Pub.

## Suggestive:

1. Lohman, Larry. (2003). *Re-imagining the population debate*. UK: Corner House Briefing.
2. Martínez-Alier, Joan. (2010). *Sustainable de-growth: Mapping the context, criticisms and future prospects of an emergent paradigm*. Ecological Economics 69: 1741-1747.
3. Merchant, Carolyn. (Ed.). (1994):*Ecology. Atlantic Highlands*, N.J., USA: Humanities Press. (Introduction, pp 1-25.)
4. Osorio, Leonardo., et al. (2005). *Debates on sustainable development: towards a holistic view of reality*. Switzertland: Environment, Development and Sustainability 7: 501-518.
5. Robbins, Paul. (2004). *Political Ecology: A Critical Introduction*. UK: Blackwell Publishing.

## Teaching Learning Plan

Week 1: Unit I

Week 2: Unit I

Week 3: Unit II

Week 4: Unit II

Week 5: Unit III

***Week 6: Mid-Semester Examinations***

***Week 7: Mid-Semester Break***

Week 8**:** Unit III

Week 9: Unit IV

Week 10: Unit IV

Week 11: Unit V

Week 12: Unit V

## Assessment Methods:

| Unit No. | Course Learning Outcomes | Teaching and Learning Activity | Assessment Tasks |
|---|---|---|---|
| **1** | Sustainable Resource Development: Definition, Components and Limitations | Classroom Lectures, Tutorials, PPT | Assignments, Discussions/Debates classroom test. |
| **2** | The Millennium Development Goals: National Strategies and International Experiences | Classroom Lectures, Tutorials, PPT | Assignments, Discussions/ Debates, classroom test. |
| **3** | Sustainable Regional Development: Need and examples from different Ecosystems. | Classroom Lectures, Tutorials, PPT | Assignments, Discussion/Debates, classroom test. |
| **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, | Classroom Lectures, Tutorials, PPT | Assignments, Discussions/Debates, classroom test. |
| **5** | Inclusive Development: Poverty and Inequality; Education, Health; Climate Change: The role of higher education in sustainable resource development; The Challenges of Universal Health Coverage, | Classroom Lectures, Tutorials, PPT | Assignments, Discussions/Debates classroom test. |

**Keywords:** Sustainable, Resource, Development, MDGs, SDGs, Inclusive, Policies, Programmes

# SKILL ENHANCEMENT COURSES

## 1. Geographical Information System (Practical)

### Course Objectives:

1. The course aim is to give basic understanding of concept of GIS, its definitions and components;
2. To gain working experience geographical data collection using GPS;
3. To do analysis and application of geographical data in land use, urban sprawl, and forest study.

### Learning Outcome:

This is a practical, hands-on course; when you have completed it, you will be able to:

1. Develop basic understanding and hands-on on GIS software and GPS ;
2. Understand GIS Data Structures and GIS Data Analysis ;
3. Apply GIS for natural resource management, urban and land use land cover study;

### Course Content:

1. Geographical Information System (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, Output and Query; Overlays.
5. Application of GIS: Land Use Mapping; Urban Sprawl Analysis; Forests Monitoring.

### Practical Record:

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

### References:

### Essential:

1. Bhatta, B. (2010). *Analysis of Urban Growth and Sprawl from Remote Sensing*, Berlin, Germany: Springer.

2. Burrough, P.A., and McDonnell, R.A. (2000). *Principles of Geographical Information System-Spatial Information System and Geo-statistics*. UK: Oxford University Press

3. Gomarasca, M. A. (2009). *Basics of Geomatics.* NY, USA: Springer Science.

4. Heywoods, I., Cornelius, S and Carver, S. (2006). *An Introduction to Geographical Information system.* NJ, USA: Prentice Hall.

5. Singh, R.B. and Murai, S. (1998). *Space Informatics for Sustainable Development*. New Delhi, India: Oxford and IBH.

## Suggestive:

1. Chauniyal, D.D. (2010). *Sudur Samvedanevam Bhogolik Suchana Pranal.* Allahabad, India: Sharda Pustak Bhawan.

2. Jha, M.M. and Singh, R.B. (2008). *Land Use: Reflection on Spatial Informatics Agriculture and Development,* New Delhi: Concept.

3. Kumar, Dilip, Singh, R.B. and Kaur, R. (2019). *Spatial Information Technology for Sustainable Development Goals* .New Delhi, India: Springer.

4. Nag, P. (2008). *Introduction to GIS.* New Delhi, India: Concept India.

5. Sarkar, A. (2015) *Practical geography: A systematic approach*. New Delhi, India: Orient Black Swan Private Ltd.

## Teaching Learning Plan

Week 1: Unit I

Week 2: Unit I

Week 3: Unit II

Week 4: Unit II

Week 5: Unit III

***Week 6 : Mid-Semester Examinations***

***Week 7: Mid-Semester Break***

Week 8**:** Unit III

Week 9: Unit IV

Week 10: Unit IV

Week 11: Unit V

Week 12: Unit V

## Assessment Methods:

| Unit No. | Course Learning Outcomes | Teaching and Learning Activity | Assessment Tasks |
|---|---|---|---|
| **1** | Geographical Information System (GIS): Definition and Components | Classroom Lectures, Practical demonstration | Assignments, PPT, classroom test. |
| **2** | Global Positioning System (GPS): Principles and Uses. | Classroom Lectures, Practical demonstration of using GIS Softwares | Assignments, Hans-on exercise in GIS environment, practical lesson |
| **3** | GIS Data Structures: Types (spatial and Non- spatial), Raster and Vector Data Structure. | Classroom Lectures, Practical demonstration using GIS softwares | Assignments, Hans-on exercise, midterm examination. |
| **4** | GIS Data Analysis: Input; Geo-Referencing; Editing, Output and Query; Overlays. | Classroom Lectures, Practical demonstration using GIS softwares | Assignments, Hans-on exercise, practical lesson |
| **5** | Application of GIS: Land Use Mapping; Urban Sprawl Analysis; Forests Monitoring. | Classroom Lectures, Lectures on case study of different applications | Assignments, classroom test, end semester examination. |

**Keywords:** GIS, Global Positioning System (GPS), GIS Data Structures, Data Analysis, Application of GIS

# 2. Advanced Spatial Statistical Techniques

## Course Objectives:

1. Understanding the application of statistical data in the spatial analysis.
2. Detailed analysis of statistical techniques in geographical study
3. Understanding of statistical applications to analyse both spatial and non-spatial data

## Learning Outcomes:

1. In depth understanding about the use of quantitative data in the geographical studies
2. Detailed knowledge of statistical techniques to analyse the quantitative data
3. Understanding of statistical software package to enhance the students with quantitative analysis

## Course Content:

1. Statistics and Statistical Data: Spatial and non-spatial; indices of inequality and disparity.
2. Probability theory, probability density functions with respect to Normal, Binomial and Poisson distributions and their geographical applications.
3. Sampling: 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 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:

## Essential:


1. Bart, James, E, and Gerald, M. Barber. (1996). *Elementary Statistics for Geographers*. London, UK: The Guieford Press.
2. Cressie, N.A.C. (1991). *Statistics for Spatial Analysis*. New York, USA: Wiley
3. Eldon, D. (1983). *Statistics in Geography: A Practical Approach*. London, UK: Blackwell.
4. Gregory, S., (1978). *Statistical Methods and the Geographer (4th Edition)*. London, UK: Longman.Haining, R.P. (1990). *Spatial Data Analysis in the Social*

*and Environmental Science*. Cambridge, UK: Cambridge University Press.

5. Hammond, R. and McCullagh, P.S. (1974). *Quantitative Techniques in Geography: An Introduction.* Oxford, UK: Clarendan Press.

## Suggestive:

1. Mathews, J.A. (1987). *Quantitative and Statistical Approaches to Geography: A Practical Manual*. Oxford, UK: Pergamon.
2. Mc Grew, Jr. and Cahrles, B. M. (1993). *An Introduction to Statistical Problem Solving in Geography*. New Jersey, USA: W.C. Brocan Publishers.
3. Rogerson, P. A. (2001). *Statistical Methods for Geography*. New Delhi, India: Sage Publications.
4. Yeates, M. (1974). *An Introduction to Quantitative Analysis in Human Geography*. New York, USA: McGrawhill.

## Teaching Learning Plan

Week 1: Unit I

Week 2: Unit I

Week 3: Unit II

Week 4: Unit II

Week 5: Unit III

***Week 6: Mid-Semester Examinations***

***Week 7: Mid-Semester Break***

Week 8**:** Unit III

Week 9: Unit IV

Week 10: Unit IV

Week 11: Unit V

Week 12: Unit V

## Assessment Methods:

| Unit No. | Course Learning Outcomes | Teaching and Learning Activity | Assessment Tasks |
|---|---|---|---|
| **I** | Understanding the basics of statistical data | Classroom Lectures, PPTs, discussions, and Software Application | Assignments, Class Exercises, Software Exercises, Project report |
| **II** | Detailed discussion on the Probability theory | Classroom Lectures, PPTs, discussions, and Software Application | Assignments, Class Exercises, Software Exercises, Project report |
| **III** | Thorough explanations on sampling plans for spatial-and non-spatial data analysis | Classroom Lectures, PPTs, discussions, and Software Application | Assignments, Class Exercises, Software Exercises, Project report |
| **IV** | Understanding of Correlation and regression analysis | Classroom Lectures, PPTs, discussions, and Software Application | Assignments, Class Exercises, Software Exercises, Project report |
| **V** | In-depth explanation of time series analysis and its significance in geographical studies | Classroom Lectures, PPTs, discussions, and Software Application | Assignments, Class Exercises, Software Exercises, Project report |

**Keywords:** Statistics, Probability, Sampling, Regression, Series

# 3. Introduction to GIScience (Practical)

## Course Objectives:

5. The course aim is to give basic understanding of concept of GIScience, its definitions and components;
6. To gain working experience collecting data, preparing and handling geographical data;
7. To do analysis and application of geographical data for land use, urban and forest mapping.

## Learning Outcome:

This is a practical, hands-on course; when you have completed it, you will be able to:

3. Trace and know evolution of GIS and GIScience and roles of various intuitions in data sharing ;
4. Perform preparing different maps integrating spatial and no-spatial data;
5. Professionally do interpretations and analysis of land use land cover maps;

## 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

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

## References:

## Essential:


1. Bhatta, B. (2010. *Analysis of Urban Growth and Sprawl from Remote Sensing*. Berlin Heidelberg, Germany: Springer.
2. Burrough, P.A., and McDonnell, R.A. (2000). *Principles of Geographical Information System-Spatial Information System and Geo-statistics*. UK: Oxford University Press
3. Chauniyal, D.D. (2010). *Sudur Samvedanevam Bhogolik Suchana Pranali*. Allahabad, India: ShardaPustakBhawan.
4. Jha, M.M. and Singh, R.B. (2008). *Land Use: Reflection on Spatial Informatics Agriculture and Development*. Delhi, India: Concept Publishing.
5. Kumar, D, Singh, R.B. and Kaur, R. (2019). *Spatial Information Technology for Sustainable Development Goals*. Delhi, India: Springer.


## Suggestive:


1. Heywoods, I., Cornelius, S and Carver, S., (2006). *An Introduction to Geographical Information syste.* New Jersey, USA: Prentice Hall.
2. Nag, P. (2008). *Introduction to GIS*. New Delhi, India: Concept India.
3. Sarkar, A. (2015). *Practical geography: A systematic approach*. New Delhi, India: Orient Black Swan Private Ltd.
4. Singh, R.B. and Murai, S., (1998). *Space Informatics for Sustainable Development*. New Delhi, India: Oxford and IBH.


## Teaching Learning Plan

Week 1: Unit I

Week 2: Unit I

Week 3: Unit II

Week 4: Unit II

Week 5: Unit III

***Week 6: Mid-Semester Examinations***

***Week 7: Mid-Semester Break***

Week 8**:** Unit III

Week 9: Unit IV

Week 10: Unit IV

Week 11: Unit V

Week 12: Unit V

## Assessment Methods:

| Unit No. | Course Learning Outcomes | Teaching and Learning Activity | Assessment Tasks |
|---|---|---|---|
| **1** | Evolution of GIScience, Institutions and GI data sharing, GIS: Definition and Components | Classroom Lectures, Practical demonstration | Assignments, classroom test. |
| **2** | Global Positioning System (GPS) – Principles and Uses | Classroom Lectures, Practical demonstration of using GPS in the field | Assignments, Hans-on exercise in the field with GPS, classroom test. |
| **3** | GIS Data Structures: Types (spatial and Non-spatial), Raster and Vector Data Structure | Classroom Lectures, Practical demonstration using GIS softwares | Assignments, Hans-on exercise, midterm examination. |
| **4** | GIS Data Analysis: Input; Geo-Referencing; Editing, Query | Classroom Lectures, Practical demonstration using GIS softwares | Assignments, Hans-on exercise, classroom test. |
| **5** | Application of GIS: Land Use Mapping; Urban Sprawl Analysis; Forests Monitoring | Classroom Lectures, Lectures on case study of different applications | Assignments, classroom test, end semester examination. |

**Keywords:** GIScience, Global Positioning System, GIS Data Structures, Application of GIS

## 4. Thematic Atlas (Practical)

### Course Objectives:

1. Create professional and aesthetically pleasing maps through thoughtful application of principles of map design;
2. Develop hands on skill of diagrammatic representation of geographical data;
3. Better understand thematic map techniques, its cartographic representation and Interpretation

### Learning Outcome:

This is a practical, hands-on course; when you have completed it, you will be able to:

1. Explain principles of map design and skill development for diagrammatic data presentation

2. Apply thematic mapping techniques for presentation of geographic data.

3.Skillfully preparation and interpretation of thematic maps.

### Course Content:

1.Maps – Classification and Types; Principles of Map Design.

2.Diagrammatic Data Presentation – Line, Bar and Circle.

3.Thematic Mapping Techniques – Properties, Uses and Limitations; Areal Data - Choropleth, Dot, Proportional Circles; Point Data – Isoline.

4.Cartographic Overlays – Point, Line and Areal Data.

5.Thematic Maps – Preparation and Interpretation.

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

### References:

### Essential:


1. Cuff, J. D. and Mattson, M. T. (1982). *Thematic Maps: Their Design and Production*. London, UK: Methuen Young Books
2. Dent, B. D., Torguson, J. S., and Holder, T. W. (2008). *Cartography: Thematic Map*

*Design* (6th Edition). New Jersey, USA: McGraw Hill Higher Education.

3. Kraak, M.J. and Ormeling, F. (2003). *Cartography: Visualization of Geo-Spatial Data*. New Jersey, USA: Prentice-Hall.
4. Singh, L. R,& Singh. R., (1977). *Manchitra or Pryaogatamek Bhugol (Hindi)*. Allahabad, India: Central Book Depot.
5. Singh, R. L, and Duttta, P. K. (2012). *Prayogatama Bhugol*. Allahabad, India: Central Book Depot.

## Suggestive:

1. Mishra, R. P. and Ramesh, A., (1989): *Fundamentals of Cartography*. Delhi, India: Concept.
2. Sarkar, A. (2015). *Practical geography: A systematic approach*. Delhi, India: Orient Black Swan Private Ltd.
3. Sharma, J. P. (2010). *Prayogic Bhugol (Hindi)*. Meerut, India: Rastogi Publishers.
4. Singh, R. L. and Singh, R. P. B. (1999). *Elements of Practical Geography*. New Delhi, India: Kalyani Publishers.
5. Tyner, J. A. (2010). *Principles of Map Design*. USA: The Guilford Press.

## Teaching Learning Plan

Week 1: Unit I

Week 2: Unit I

Week 3: Unit II

Week 4: Unit II

Week 5: Unit III

***Week 6: Mid-Semester Examinations***

***Week 7: Mid-Semester Break***

Week 8**:** Unit III

Week 9: Unit IV

Week 10: Unit IV

Week 11: Unit V

Week 12: Unit V

## Assessment Methods:

| Unit No. | Course Learning Outcomes | Teaching and Learning Activity | Assessment Tasks |
|---|---|---|---|
| **1** | Maps – Classification and Types; Principles of Map Design. | Classroom Lectures, Practical demonstration | Assignments, Hans-on exercise, classroom test. |
| **2** | Diagrammatic Data Presentation – Line, Bar and Circle | Classroom Lectures, Practical demonstration | Assignments, Hans-on exercise, classroom test. |
| **3** | Thematic Mapping Techniques – Properties, Uses and Limitations; Areal Data -- Choropleth, Dot, Proportional Circles; Point Data – Isopleths | Classroom Lectures, Practical demonstration | Assignments, Hans-on exercise, midterm examination. |
| **4** | Cartographic Overlays – Point, Line and Areal Data | Classroom Lectures, Practical demonstration | Assignments, Hans-on exercise, classroom test. |
| **5** | Thematic Maps – Preparation and Interpretation | Classroom Lectures, Practical demonstration | Assignments, Hans-on exercise, classroom test, end semester examination. |

**Keywords**: Maps, Thematic Mapping, Cartographic Overlays