ANNEXURE-I

CENTRAL UNIVERSITY OF HARYANA

(*Established under the Central Universities Act, 2009*)
(NAAC Accredited 'A' Grade)

CBCS, LOCF and NEP-2020 Based
Curriculum and Syllabi
Of
M.Sc. Geography

(w.e.f. 2021-22)

DEPARTMENT OF GEOGRAPHY
SCHOOL OF BASIC SCIENCES

Approved by:	BOS	School Board	Academic Council
Approval Status:	√		
Approval Date:	13/09/2021	20/09/2021	12/10/2021

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VISION AND MISSION

Vision and Mission of the University

Vision

To develop enlightened citizenship of a knowledge society for peace and prosperity of individuals, nation and the world, through promotion of innovation, creative endeavors, and scholarly inquiry.

Mission

To serve as a beacon of change, through multi-disciplinary learning, for creation of knowledge community, by building a strong character and nurturing a value-based transparent work ethics, promoting creative and critical thinking for holistic development and self-sustenance for the people of India. The University seeks to achieve this objective by cultivating an environment of excellence in teaching, research and innovation in pure and applied areas of learning.

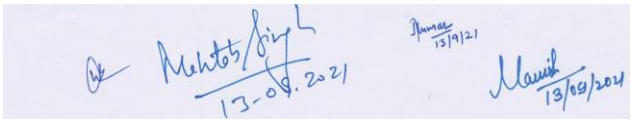
1. BACKGROUND

1.1. NEP-2020 and LOCF an integrated Approach

Considering the curricular reforms as instrumental for desired learning outcomes, all the academic departments of Central University of Haryana made a rigorous attempt to revise the curriculum of undergraduate and postgraduate programmes in alignment with National Education Policy-2020 and UGC Quality Mandate for Higher Education Institutions-2021. The process of revising the curriculum could be prompted with the adoption of "Comprehensive Roadmap for Implementation of NEP-2020" in 32nd meeting of the Academic Council of the University held on April 23, 2021. The Road map identified the key features of the Policy and elucidated the Action Plan with well-defined responsibilities and indicative timeline for major academic reforms.

The process of revamping the curriculum started with the series of webinars and discussions conducted by the University to orient the teachers about the key features of the Policy, enabling them to revise the curriculum in sync with the Policy. Proper orientation of the faculty about the vision and provisions of NEP-2020 made it easier for them to appreciate and incorporate the vital aspects of the Policy in the revised curriculum focused on 'creating holistic, thoughtful, creative and well-rounded individuals equipped with the key 21st century skills' for the 'development of an enlightened, socially conscious, knowledgeable, and skilled nation'.

With NEP-2020 in background, the revised curricula articulate the spirit of the policy by emphasising upon—integrated approach to learning; innovative pedagogies and assessment strategies; multidisciplinary and cross-disciplinary education; creative and critical thinking; ethical and Constitutional values through value-based courses; 21st century capabilities across the range of disciplines through life skills, entrepreneurial and professional skills; community and constructive public engagement; social, moral and environmental awareness; Organic Living and Global Citizenship Education (GCED); holistic, inquiry-based, discovery-based, discussion-based, and analysis-based learning; exposure to Indian knowledge system, cultural traditions and classical literature through relevant courses offering 'Knowledge of India'; fine blend of modern pedagogies with indigenous and traditional ways of learning; flexibility in course choices; student-centric participatory learning; imaginative and flexible curricular structures to enable creative combination of disciplines for study; offering multiple entry and exit points initially in undergraduate



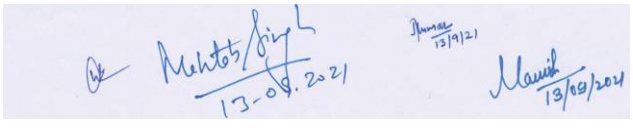
programmes; alignment of Vocational courses with the International Standard Classification of Occupations maintained by the International Labor Organization; breaking the silos of disciplines; integration of extra-curricular and curricular aspects; exploring internships with local industry, businesses, artists and crafts persons; closer collaborations between industry and higher education institutions for technical , vocational and science programmes; and formative assessment tools to be aligned with the learning outcomes, capabilities, and dispositions as specified for each course. In case of UG programmes in Engineering and Vocational Studies, it was decided that the departments shall incorporate pertinent NEP recommendations while complying with AICTE, NBA, NSQF, International Standard Classification of Occupations, Sector Skill Council and other relevant agencies/sources. The University has also developed consensus on adoption of Blended Learning with 40% component of online teaching and 60% face to face classes for each programme.

The revised curricula of various programmes could be devised with concerted efforts of the faculty, Heads of the Departments and Deans of Schools of Study. The draft prepared by each department was discussed in series of discussion sessions conducted at Department, School and the University level. The leadership of the University has been a driving force behind the entire exercise of developing the uniform template and structure for the revised curriculum. The Vice Chancellor of the University conducted series of meetings with Heads and Deans to deliberate upon the vital parameters of the revised curriculum to formulate a uniform template featuring Background, Programme Outcomes, Programme Specific Outcomes, Postgraduate Attributes, Structure of Masters Course, Learning Outcome Index, Semester-wise Courses and Credit Distribution, Course-level Learning Outcomes, Teaching-Learning Process, Blended Learning, Assessment and Evaluation, Keywords, References and Appendices. The experts of various Boards of Studies and School Boards contributed to a large extent in giving the final shape to the revised curriculum of each programme.

To ensure the implementation of curricular reforms envisioned in NEP-2020, the University has decided to implement various provisions in a phased manner. Accordingly, the curriculum may be reviewed annually.

1.2. About the Subject

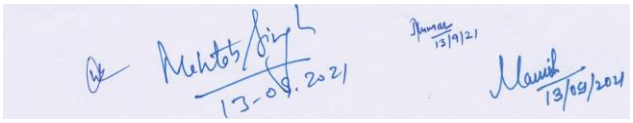
Geography is the study of the Earth (specifically, its surface) in relation to man, and it aims to analyze and comprehend various physical and human phenomena, from the spatial



perspective. It studies where objects are located, why they are there, and how they form and alter over time. It seeks to describe the variable character of the earth.

Geography, through its branches deals with a plethora of physical and human features, phenomena and processes taking place on the surface of the earth. Geomorphology studies landforms, geomorphic processes, landform genetics and evolution and stands crucial in the areas of regional planning, hazard management, urbanization, infrastructure development and mineral exploration. Climatology focuses upon the atmospheric constituents and their dynamics across the areas of distribution, and on the meteorological aspects of a place. This is highly useful in the context of environmental management and addressing the contemporary issues including climate change, global warming, sea-level changes, and human induced climatic phenomenon like urban heat island effects, urban flooding etc. Oceanography relates to the understanding of ocean water dynamics, studying the oceanic habitats and to sourcing of the mineral, energy and food resources from the oceans. Environment, flora and fauna are the main concern of the branch of biogeography. Various branches of human geography include economic geography, social geography, cultural geography, political geography, population geography, settlement geography, medical geography, anthropogeography and historical geography which analyze and explain the spatial aspects of their respective themes. Cartography, statistical analysis of geographical phenomena, and quantitative analysis of geographical phenomena are examples of traditional geographic techniques, while geoinformatics (remote sensing, GIS, and GNSS) is an example of a new geographic technique.

Application of the geographical knowledge and skill to the resolution of the real-world problems is recently gaining attention but not a new thing, *per se.* Geography is as old as man himself, but its academic age is limited to the last few centuries. In twentieth century, geography saw a transition from an exceptional, descriptive regional field of enquiry to an analytical discipline with wide interdisciplinary outlook; a multifaceted field of enquiry that encompasses not only a broad range of physical and life sciences, but also social sciences. For this integration geographers gain thorough knowledge of a broad range of subjects such as history, economics, politics, sociology, society, statistics, and so on. Geoinformatics has recently aided the transformation of geography into an applied discipline. As a result, geographers have evolved into problem-solvers that deal with social, fiscal, and environmental issues all around the world. They are the best planners and managers because of their ability to visualize structures and phenomena.



1.3. About the Programme (Nature, extent and aims)

1.3.1. Nature and extent of the Programme

The post-graduate Geography course, developed in accordance with the learning outcome-based curriculum system (LOCF), includes both fundamental and applied considerations. The course is designed in such a way that essential and foundational knowledge stands supplemented by lessons of applied interest, all while taking place in consideration with the modern geographical dynamics.

Instead of continuing the previous curriculum, LOCF suggests an alternative solution to enhancing higher education quality by identifying milestones in terms of outcomes (knowledge, understanding, skills, attitudes and values) and academic standards expected from students upon completion of their degrees. It also aims to materialize global competition and strengthen the applied facets of the disciplines.

1.3.2. Aims of the Programme

On completion of their Master's Degree Programme, students of geography will:

- Have a strong understanding of philosophy, methodology and subject matter of geography and its subfields.
- Have a thorough understanding of the earth's natural ecosystem, including landforms, oceans, weather, climate, seasons, soils, irrigation, and so on.
- Comprehend the evolution of human groups' relationships with their physical environment, as well as the growth of inter regional linkages as influenced by geographical circumstances.
- Know and apply the geographical research approaches along with geoinformatics, cartography and statistical analysis.
- Develop the ability to collect and analyze geographical data in such a way that it contributes to a better understanding of spatial phenomena and subsequent implementation of the analysis outcomes.
- Become the human resource, resolving the problems at hand, especially the ones related to disaster management, regional planning and environmental issues.
- Develop the ability to critically analyze seemingly universal models of thought, value orientations, and practices.

1.4 Qualification Descriptors (Possible Career Pathways)

The qualification descriptors for the M.Sc. programme in geography shall include learning attributes such as understanding, communication, expansion and application of subject knowledge with a clear understanding of one's location. This also involves awareness among the students' part of differences pertaining to class, caste, gender, community, region, etc. in order that they can transcend these differences with transparency of purpose and thought. The key qualification descriptor for M.Sc. Geography shall be clarity of concepts as well as critical thinking and their practical use. Each Post Graduate in geography should be able to:

(a) ***Demonstrate*** a coherent and systematic knowledge and understanding of the field of geography and theoretical developments in this field in the world context. This would also include the student's ability to identify, speak and write about genres, forms, periods, movements and conventions of geography as well as the ability to understand and engage with critical concepts and theories.

(b) ***Demonstrate*** the ability to understand the role of nature and its associating factors in a changing world from the disciplinary perspective as well as in relation to its professional and everyday use. While the aspect of disciplinary attribute is covered by the ability of the students to read data with close attention to themes, conventions, contexts and value systems, a key aspect of this attribute is to understand different parameters which directly or indirectly affecting dynamics of earth surface features.

(c) ***Demonstrate*** the ability to think and relate different processes which occurs on earth surface.

(d) ***Communicate*** ideas, opinions and values—both traditional values and values of life in all shades and shapes—in order to expand the knowledge of the subject as it moves from the classroom to real life world.

(e) ***Demonstrate*** the ability to share the results of academic and disciplinary learning through different forms of communication such as essays, dissertations, reports, findings, notes, etc., on different platforms of communication such as the classroom, conferences, seminars, workshops, the media and the internet.

(f) ***Recognize*** the scope of geography through geospatial techniques and values in terms of career opportunities, employment and lifelong engagement in teaching, publishing, translation, communication, media, soft skills and other allied fields.

(g) ***Apply*** subject-specific skills in society to foster a larger sense of ethical and moral

responsibility among fellow humans in order to see and respect differences in and among various species and life-forms and learn to transcend them.

(h) ***Communicate*** the results of studies undertaken in an academic field accurately in a range of different contexts using the main concept, constructs and techniques of the subjects of the study.

(i) ***Apply*** one's disciplinary knowledge and transferable skills to new/unfamiliar contexts and to identify and analyze problems and issues and seek solutions to real-life problems.

(j) ***Use*** knowledge, understanding and skills for critical assessment of a wide range of ideas and complex problems and issues relating to the chosen field of study.

(k) ***Demonstrate*** skills in identifying information needs, collection of relevant quantitative and/or qualitative data drawing on a wide range of sources, analysis and interpretation of data using methodologies as appropriate to the subject(s) for formulating evidence-based solutions and arguments.

(l) ***Address*** one's own learning needs relating to current and emerging areas of study, making use of research, development and professional materials as appropriate, including those related to new frontiers of knowledge.

The programme will strengthen the student's ability to draw on narratives that alert us to layers and levels of meaning and differences in situations and complexities of relations. Linguistic and Cultural competence should help the students identify, analyze and evaluate key issues in the text and around in the world—thematic, contextual, professional, processual and think of ways to find acceptable and sustainable solutions. Students will have the ability to understand and articulate with clarity and critical thinking one's position in the world.

Student has an option to pursue a Post Graduate degree in geography where the fundamentals of the subject and academic achievements are understood and conceived by him. Also, the teachers will be benefited as they shall have to keep abreast with latest developments, discoveries, research methodologies and application of various other disciplines in the subject.

1.4.1 Possible Career Pathways

The geography as a subject is concerned with the study of the earth, with its physical and cultural characteristics distributed and placed, the interrelationship between them and human life and the various phenomenon's of the earth. In this discipline, the

relationships between people and the environment are examined. A degree in geography from the Central University of Haryana opens many new doors in terms of your career choices. Our expertise in physical geography and other geospatial techniques will enable our students to pursue a career in much of this vast field. This section looks at some of the careers chosen by geographers and gives information about what the jobs can involve.

Some of the important career options are listed here –

- Teaching
- Research & Development
- Urban and Regional Planners
- Cartographers
- GIS Specialists
- Non-Governmental and Community based Startups
- Environmental Managers
- Disaster Management Experts
- Surveyors
- Draftsmen
- Climatologists
- Meteorologists
- Transport and Tourism Consultant
- Demographers

2. PROGRAMME OUTCOMES (POs)

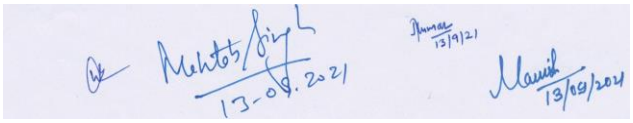
Students enrolled in the Master's Programmes offered by the Departments under the School of Basic Sciences will have the opportunity to learn and master the following components in addition to attain important essential skills and abilities:

PO-NO.	COMPONENT	OUTCOMES
PO-1	Basic Knowledge	Capable of delivering basic disciplinary knowledge gained during the programme.
PO-2	In-depth Knowledge	Capable of describing advanced knowledge gained during the programme.
PO-3	Critical thinking and Problem-Solving abilities	Capable of analyzing the results critically and applying acquired knowledge to solve the problems.
PO-4	Creativity and innovation	Capable to identify, formulate, investigate and analyze the scientific problems and innovatively to design and create products and solutions to real life problems.
PO-5	Research aptitude and global competency	Ability to develop a research aptitude and apply knowledge to find the solution of burning research problems in the concerned and associated fields at global level.
PO-6	Holistic and multidisciplinary education	Ability to gain knowledge with the holistic and multidisciplinary approach across the fields.
PO-7	Skills enhancement	Learn specific sets of disciplinary or multidisciplinary skills and advanced techniques and apply them for betterment of mankind.
PO-8	Leadership and Teamwork abilities	Ability to learn and work in a group and capable of leading a team even.
PO-9	Environmental and human health awareness	Learn important aspects associated with environmental and human health. Ability to develop eco-friendly technologies.
PO-10	Ethical thinking and social awareness	Inculcate the professional and ethical attitude and ability to relate with social problems.
PO-11	Lifelong learning skills and Entrepreneurship	Ability to learn lifelong learning skills which are important to provide better opportunities and improve quality of life. Capable to establish independent startup/innovation center etc.

3. PROGRAMME SPECIFIC OUTCOMES (PSOs)

The post-graduate students shall be able to realise the following specific outcomes by the end of programmme:

NUMBER	PROGRAMME SPECIFIC OUTCOMES
PSO-1	The evolution of geography and its branches over time, as well as the relevance of geographical studies and central places in today's world.
PSO-2	Information and analysis of the earth's surface, its internal characteristics that change over time, and conceptual understanding of climate, including its spatial and temporal variation and impact on humans.
PSO-3	A deep knowledge of hydrology along with comprehensive understanding of important concept of the oceanic movements, waves, currents, tides, and other marine resources, as well as human-ocean interaction.
PSO-4	The patterns and consequences of rural-urban linkages will aid in understanding the process of rurbanisation as well as population attributes, and their spatio-temporal trends.
PSO-5	Developing a deep understanding of the concept of society its components and determinant to ensure balanced and sustainable regional development and planning in India.
PSO-6	Exploring the field and collecting data, as well as analyzing, computing, and presenting the data using a variety of statistical and geo-spatial tools and techniques. Using appropriate research methodology tools will make studies more detailed and comprehensive.
PSO-7	Concept of disaster and hazards, their impacts and mitigation strategies and development of Early Warning System by using geo spatial techniques will strengthen the understanding of Human Environmental Relationship.
PSO-8	Comprehensive understanding of environment, its components and developing an idea about climate change as a major driver of various contemporary environmental issues.
PSO-9	Detailed understanding of geology, physiography, climate, drainage, vegetation, soils, people and natural resource management of India.
PSO-10	Detailed understanding of the challenges that Indian agriculture faces in order to maintain sustainable productivity and ensure homogeneous rural development and human well-being.
PSO-11	Understanding the political and economic structures as a growth factor for both developing and developed countries.
PSO-12	After introducing various research paradigms, research attitude of the students will be developed through minor research project work.



4. POSTGRADUATE ATTRIBUTES

NUMBER	P.G. ATTRIBUTES
PGA-1	Disciplinary Knowledge: Broad understanding of historical development of various branches of geography
PGA-2	A detailed overview of some key concepts in climate, hydrology, oceanic movements and resources, and human-ocean interaction, as well as a study of its spatio-temporal impact on humans using various geospatial techniques.
PGA-3	Gain an understanding of the major theoretical perspectives and debates within evolution of geographical thought, how these have affected our views of the past, and how they may be applied in current world.
PGA-4	Understanding the concept of regional planning and rurbanisation during the phase of India's political evolution in order to overcome global geopolitical challenges.
PGA-5	The importance of central places in ensuring the region's homogeneous development and interdisciplinary human growth.
PGA-6	Understanding the major issues and barriers that the various sectors of economy face as well as the solutions that can be used to ensure long-term productivity and economic growth, which is a crucial element in national development.
PGA-7	Detailed understanding of Indian geography as a whole.
PGA-8	Students' research aptitude and analytical skills are developed by exploring the field for data collection, analysis, computation, and representation using various statistical techniques.

5. STRUCTURE OF MASTER'S COURSE

Nature of the Course	Choice Based Offered Programme Structure							%
	Structure -1 (Total Credit)	%	Structure -2 (Total Credit)	%	Structure -3 (Total Credit)	%	Structure -4 (Total Credit)	
CC	56	58.34	56	58.34	56	58.34	56	58.34
DCEC	32	33.33	24	25.00	16	16.66	10	10.42
GEC	8	8.33	8	8.33	8	8.33	8	8.33
SEC	0	0	8	8.33	16	16.66	22	22.91
TOTAL	96	100	96	100	96	100	96	100

LIST OF COURSES

Sr. No.	Course No	Course Code	Course Title	Course Type	Credit	Semester
CORE COURSES (CC)						
1	CC 1	SBS GEO 1 1 01 C 3104	Introduction to Geomorphology	CC	4	I
2	CC 2	SBS GEO 1 1 02 C 3104	Introduction to Climatology	CC	4	I
3	CC 3	SBS GEO 1 1 03 C 3104	Statistical Techniques in Geography	CC	4	I
4	CC 4	SBS GEO 1 1 04 C 3104	Urban Geography	CC	4	I
5	CC 5	SBS GEO 1 1 05 C 2024	Practical: Cartographic Methods	CC	4	I
6	CC 6	SBS GEO 1 2 06 C 3104	Evolution of Geographical Thought	CC	4	II
7	CC 7	SBS GEO 1 2 07 C 3104	Fundamentals of Photogrammetry and Remote Sensing	CC	4	II
8	CC 8	SBS GEO 1 2 08 C 3104	Hydrology and Oceanography	CC	4	II

9	CC 9	SBS GEO 1 2 09 C 3014	Research Methodology, Field Work and Report Writing (Socio-Economic Aspect)	CC	4	II
10	CC 10	SBS GEO 1 2 10 C 2024	Practical: Photogrammetry and Digital Image Processing	CC	4	II
11	CC 11	SBS GEO 1 3 11 C 3104	Fundamentals of GIS and GNSS	CC	4	III
12	CC 12	SBS GEO 1 3 12 C 3104	Regional Development and Planning	CC	4	III
13	CC 13	SBS GEO 1 3 13 C 3104	Population and Demographic Studies	CC	4	III
14	CC 14	SBS GEO 1 3 14 C 2024	Practical: GIS and GNSS	CC	4	III

Discipline Centric Elective Courses (DCEC)						
1	DCEC 1	SBS GEO 1 2 01 DCEC 3104	Economic Geography	DCEC	4	II
2	DCEC 2	SBS GEO 1 2 02 DCEC 3104	Social and Cultural Geography	DCEC	4	II
3	DCEC 3	SBS GEO 1 2 03 DCEC 3104	Geography of Health and Well Being	DCEC	4	II
4			MOOC 1		4	II
5	DCEC 4	SBS GEO 1 3 04 DCEC 3014	Field Work: Natural Hazards and Disaster Based Project Work	DCEC	4	III
6	DCEC 5	SBS GEO 1 3 05 DCEC3104	Research Methodology, Field Work and Report Writing (Physical Aspect)	DCEC	4	III
6	DCEC 6	SBS GEO 1 3 06 DCEC 3104	Environmental Geography	DCEC	4	III
7			MOOC 2		4	III
8	DCEC 7	SBS GEO 1 4 07 DCEC 3104	Geography of India	DCEC	4	IV
9	DCEC 8	SBS GEO 1 4 08 DCEC 3104	Agricultural Geography	DCEC	4	IV

10	DCEC 9	SBS GEO 1 4 09 DCEC 3104	Geography of Central Places	DCEC	4	IV
11	DCEC 10	SBS GEO 1 4 10 DCEC 3104	Political Geography	DCEC	4	IV
12	DCEC 11	SBS GEO 1 4 11 DCEC 3104	Rural Geography	DCEC	4	IV
13	DCEC 12	SBS GEO 1 4 12 DCEC 3104	Natural Hazards and Disaster Management	DCEC	4	IV
14	DCEC 13	SBS GEO 1 4 13 DCEC 3104	Practical: Advanced Spatial Information Technology	DCEC	4	IV
15			MOOC 3		4	IV
16			MOOC 4		4	IV
17			MOOC 5		4	IV
18			MOOC 6		2	IV

GENERIC ELECTIVE COURSES (GEC)						
1	GEC 1	SBS GEO 1 1 01 GE 3104	Climate Change Vulnerability and Adaptation	GEC	4	I
2	GEC 2	SBS GEO 1 1 02 GE 3104	Natural Hazards and Disaster Management	GEC	4	I
3	GEC3	SBS GEO 1 2 03 GE 3104	Contemporary Environmental Issues	GEC	4	II
4	GEC4	SBS GEO 1 2 04 GE 3104	Geography of India	GEC	4	II

SKILL ENHANCEMENT COURSE (SEC)						
Semester III						
1	SEC		Dissertation	SEC	8	III
Semester IV						
1.1	SEC		Dissertation	SEC	8	IV
		Or				
1.2	SEC		Dissertation	SEC	16	IV

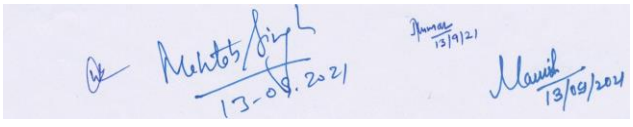
6. LEARNING OUTCOME INDEX

6.1 Core Courses (CC):

'PSOs Course No.	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10	PSO 11	PSO 12
CC 1		√		√	√	√	√	√	√			√
CC 2	√	√		√	√	√	√	√	√	√	√	√
CC 3	√	√	√	√	√		√	√	√		√	√
CC 4	√	√		√	√				√			√
CC 5	√	√	√	√	√		√	√	√	√	√	√
CC 6		√		√	√	√	√	√	√	√		√
CC 7		√		√	√	√	√	√	√			√
CC 8		√						√				√
CC 9		√		√	√	√	√	√	√			√
CC 10	√	√	√	√	√	√	√	√	√	√	√	√
CC 11	√	√	√	√	√	√	√	√	√	√	√	√
CC 12	√	√	√		√		√	√	√	√	√	√
CC 13	√	√	√		√		√	√	√	√	√	√
CC 14	√	√			√		√	√	√	√		√

6.2 Discipline Centric Elective Courses (DCEC):

PSOs Course No.	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10	PSO 11	PSO 12
DCEC 1	√	√	√		√			√	√	√	√	√
DCEC 2	√	√	√	√	√	√	√	√	√	√	√	√
DCEC 3		√	√		√			√	√		√	√
DCEC 4	√	√	√	√	√	√	√	√	√	√	√	√
DCEC 5	√		√		√	√	√	√	√		√	√
DCEC 6		√		√	√	√	√	√	√			√
DCEC 7		√	√	√	√	√	√	√	√	√		√
DCEC 8	√	√	√	√	√	√	√	√	√	√	√	√



DCEC 9	√	√	√	√	√	√	√	√	√	√	√	√
DCEC 10	√	√	√	√	√			√	√	√	√	√
DCEC 11		√	√		√		√		√			√
DCEC 12	√	√	√		√				√			√
DCEC 13	√	√		√		√	√	√	√			√

6.3 Generic Elective Course (GEC):

PSOs / Course No.	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10	PSO 11	PSO 12
GEC 1	√	√	√	√	√		√	√	√	√	√	√
GEC 2		√	√	√	√	√	√	√	√			√
GEC 3	√	√	√		√		√	√	√	√	√	√
GEC 4	√	√	√		√		√	√	√	√	√	√

6.4 Skill Enhancement Course (SEC):

PSOs / Course No.	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10	PSO 11	PSO 12
SEC	√	√		√	√	√	√	√		√	√	√

7. SEMESTER-WISE COURSES AND CREDIT DISTRIBUTION

SEMESTER-I (Total Credits = 24)

Sr. No.	Course No	Course Code	Course Title	L	T	P	Hrs/Week	Total Credit
Core Courses								
1	CC 1	SBS GEO 1 1 01 C 3104	Introduction to Geomorphology	3	1	0	4	4
2	CC 2	SBS GEO 1 1 02 C 3104	Introduction to Climatology	3	1	0	4	4
3	CC 3	SBS GEO 1 1 03 C 3104	Statistical Techniques in Geography	3	1	0	4	4
4	CC 4	SBS GEO 1 1 04 C 3104	Urban Geography	3	1	0	4	4
5	CC 5	SBS GEO 1 1 05 C 2024	Practical: Cartographic Methods	2	0	4	6	4
Generic Elective Courses (for students of other Departments)**								
6	GEC 1	SBS GEO 1 1 01 GE 3104	Climate Change Vulnerability and Adaptation	3	1	0	4	4
7	GEC 2	SBS GEO 1 1 02 GE 3104	Natural Hazards and Disaster Management	3	1	0	4	4
Total Credit Semester I							**24**	

SEMESTER-II (Total Credits =28)

Sr. No.	Course No	Course Code	Course Title	L	T	P	Hrs/Week	Total Credit
Core Courses								
1	CC 6	SBS GEO 1 2 06 C 3104	Evolution of Geographical Thought	3	1	0	4	4
2	CC 7	SBS GEO 1 2 07 C 3104	Fundamentals of Photogrammetry and Remote Sensing	3	1	0	4	4
3	CC 8	SBS GEO 1 2 08 C 3104	Hydrology and Oceanography	3	1	0	4	4

4	CC 9	SBS GEO 1 2 09 C 3014	Research Methodology, Field Work and Report Writing (Socio-Economic Aspect)	3	0	2	5	4
5	CC 10	SBS GEO 1 2 10 C 2024	Practical: Photogrammetry and Digital Image Processing	2	0	4	6	4
Discipline Centric Elective Courses (any one from the list)								
6	DCEC 1	SBS GEO 1 2 01 DCEC 3104	Economic Geography	3	1	0	4	4
7	DCEC 2	SBS GEO 1 2 02 DCEC 3104	Social and Cultural Geography	3	1	0	4	4
8	DCEC 3	SBS GEO 1 2 03 DCEC 3104	Geography of Health and Well Being	3	1	0	4	4
9		-	MOOC 1	-	-	-	-	4
Generic Elective Courses (for students of other Departments)								
10	GEC3	SBS GEO 1 2 03 GE 3104	Contemporary Environmental Issues	3	1	0	4	4
11	GEC4	SBS GEO 1 2 04 GE 3104	Geography of India	3	1	0	4	4
Total Credit Semester II							**28**	

SEMESTER-III (Total Credits =24)

Sr. No.	Course No	Course Code	Course Title	L	T	P	Hrs/Week	Total Credit
Core Courses								
1	CC 11	SBS GEO 1 3 11 C 3104	Fundamentals of GIS and GNSS	3	1	0	4	4
2	CC 12	SBS GEO 1 3 12 C 3104	Regional Development and Planning	3	1	0	4	4
3	CC 13	SBS GEO 1 3 13 C 3104	Population and Demographic Studies	3	1	0	4	4
4	CC 14	SBS GEO 1 3 14 C 2024	Practical: GIS and GNSS	2	0	4	6	4
Choose any one option from Option I and II								
Option I (Any two from the following Discipline Centric Elective Courses)								
6		SBS GEO 1 3 04 DCEC	Field Work: Natural	3	0	2	5	4

	DCEC 4	3014	Hazards and Disaster Based Project Work					
7	DCEC 5	SBS GEO 1 3 05 DCEC 3104	Research Methodology, Field Work and Report Writing (Physical Aspect)	3	0	2	5	4
8	DCEC 6	SBS GEO 1 3 06 DCEC 3104	Environmental Geography	3	1	0	4	4
9		-	MOOC 2	-	-	-	-	4
Option II Skill Enhancement Course (SEC)								
10	SEC		Dissertation					8
Total Credit Semester III							**24**	

SEMESTER-IV (Total Credits =20)

Sr. No.	Course No	Course Code	Course Title	L	T	P	Hrs/Week	Total Credit
	Option chosen in Sem III shall be continued in Sem IV							
Option I (Any five from the following Discipline Centric Elective Courses)								
1	DCEC 7	SBS GEO 1 4 07 DCEC 3104	Geography of India	3	1	0	4	4
2	DCEC 8	SBS GEO 1 4 08 DCEC 3104	Agricultural Geography	3	1	0	4	4
3	DCEC 9	SBS GEO 1 4 09 DCEC 3104	Geography of Central Places	3	1	0	4	4
4	DCEC 10	SBS GEO 1 4 10 DCEC 3104	Political Geography	3	1	0	4	4
5	DCEC 11	SBS GEO 1 4 11 DCEC 3104	Rural Geography	3	1	0	4	4
6	DCEC 12	SBS GEO 1 4 12 DCEC 3104	Natural Hazards and Disaster Management	3	1	0	4	4
7	DCEC 13	SBS GEO 1 4 13 DCEC 3104	Practical: Advanced Spatial Information Technology	2	0	4	6	4
8		-	MOOC 3	-	-	-	-	4
9		-	MOOC 4	-	-	-	-	4

Total Credit Semester IV							**20**	
Option II								
1	SEC		Dissertation					8
2		-	Any three from DCEC					12
Total Credit Semester IV							**20**	
Option III								
1	SEC		Dissertation					14
			MOOC 5					4
			MOOC 6					2
Total Credit Semester IV							**20**	

Note: Two credit courses on internship programme of four weeks (optional) will be available to interested students during the semester I to IV.

8. COURSE-LEVEL LEARNING OUTCOMES

Course Structure SEMESTER- I

<table>
<tr><td>Course No: CC 1</td><td colspan="3">Course Name: Introduction to Geomorphology</td><td colspan="4">Course Code: SBS GEO 1 1 01 C 3104</td></tr>
<tr><td rowspan="2">Batch:

2021-2023</td><td rowspan="2">Programme:

M.Sc. Geography</td><td rowspan="2">Semester:

I</td><td>L</td><td>T</td><td>P</td><td>Credits</td><td>Contact Hrs per Week: 4</td></tr>
<tr><td>3</td><td>1</td><td>0</td><td>4</td><td>Total Hours: 60</td></tr>
<tr><td colspan="3">Total Evaluation Marks: 100

CIE: 30 Marks

TEE: 70 Marks</td><td colspan="4">Examination Duration: 3 hours

Pre-requisite of course: Basic knowledge of Plate Tectonic, Landform features, and natural hazards.</td></tr>
<tr><td>Course Objective</td><td colspan="7">Understanding the basics of geomorphology along with various important concepts and current relevance of geomorphology, knowledge about the geo-spatial genesis of various landscapes and learning the regional geomorphology and various geomorphic hazards case study from India.</td></tr>
<tr><td>Course Outcomes:</td><td colspan="7">After completing this course, student is expected:

CO1: To understand the concept of Geomorphology and morphogenetic regions along with the understanding of recent trends.
CO2: To know about the origin of continents and oceans, concept of plate tectonics.
CO3: To understand the concept of Isostasy, Mountain Building and Cycle of Erosion.
CO4: To understand about various theories of landform and process involved in landforms development.
CO5: To understand the applications of Geomorphic knowledge that may be of concern to society and wherever relevant, provide solutions to problems of geomorphic context.
CO6: To provide an idea about geomorphological regions with special reference to India and various geomorphic hazards and their mitigation.</td></tr>
<tr><td colspan="8">COURSE SYLLABUS</td></tr>
<tr><td colspan="8">NOTE: Eight questions will be set, two from each of the UNIT. The candidates are required to attempt any five questions in all selecting at least one question from each section. All questions carry equal marks. Unit IV will be taught via online mode.</td></tr>
<tr><td>Unit No.</td><td colspan="5">Content of Each Unit</td><td colspan="2">Hours of Each Unit</td></tr>
<tr><td>I</td><td colspan="5">CONCEPTS AND SCOPE OF GEOMORPHOLOGY, MODELS AND RECENT TRENDS IN GEOMORPHOLOGY
[Course Outcome (s) No.: 1]
Fundamental Concepts and Scope of Geomorphology; Concepts of Time: Cyclic, Graded and Steady State; Concept of Morphogenetic Regions; Concept of Dynamic Equilibrium; Approaches and Models in Geomorphology; System Concept in Geomorphology; Recent Trends in Geomorphological Studies.</td><td colspan="2">15</td></tr>
</table>

II	**TECTONIC MOVEMENTS** **[Course Outcome (s) No.: 2 & 3]** Origin of Continent and Ocean: Continental Drift Theory; Plate Tectonic Theory and Resultant Landforms; Concept of Isostasy; Mountain Building; Denudation process; Cycle of Erosion: Interruption, Rejuvenation and Polycyclic Reliefs.	15
III	**LANDFORMS & SLOPE DEVELOPMENT** **[Course Outcome (s) No.: 4]** Theories and Process of Slope Development; Landforms: Fluvial, Karst, Aeolian, Glacial (Process) in Geomorphology; Fluvial Morphology.	15
IV	**APPLIED GEOMORPHOLOGY AND GEOMORPHIC HAZARDS** **[Course Outcome (s) No.: 5 & 6]** Regional Geomorphology: Study of any two regions of India; Applied Geomorphology; Concept, Causes and Mitigation of Geomorphic Hazards: Earthquakes, Volcanoes, Landslides and Avalanches.	15

Suggested Readings:

1. Singh, S. (2020). **Bhooakriti Vigyan**. Pravalika Publication, Allahabad.
2. Singh, S. (2020). **Geomorphology**. Pravalika Publication, Allahabad.
3. Strahler, A.H. and Strahler, A.N. (2006). **Modern Physical Geography** (Fourth Edition). Willey-India, New Delhi.
4. Thornbury, W.D. (2005). **Principles of Geomorphology**. John Wiley and Sons, New York.
5. Kale, V. and Gupta, A. (2001). **Introduction to Geomorphology**. Orient Longman, Hyderabad.
6. Bloom, A. L. (1998/ 2001). **Geomorphology** (3rd edition). Prentice Hall of India, New Delhi.
7. Ahmed, E. (1999). **Geomorphology**. Kalyani Publishers, New Delhi.
8. Dayal, P. (1994). **A Text Book of Geomorphology**. Kalyani Publishers, New Delhi.
9. Sparks, B.W. (1986). **Geomorphology**. Longmans, London.
10. Chorley, R.J., Schumm, S. A. and Sugden, D. E. (1984). **Geomorphology**. Methuen & Company Ltd., London.
11. Gregory, K.J. and Walling, D.E. (1973). **Drainage Basin Form and Process**. Edward Arnold, London.
12. Goh Cheng, L. (1972). **Certificate Physical and Human Geography**. Oxford University press, Oxford.
13. Fairbridge, R.W. (ed.) (1968**). Encyclopaedia of Geomorphology**. Reinhold Book Corporation., New York.
14. King, C.A.M. (1966). **Techniques in Geomorphology**. Edward Arnold, London.
15. Wooldridge, S.W. and Morgan, R.S. (1959). **The Physical Basis of Geography- An Outline of Geomorphology**. Longman, London.

Course No: CC 2	**Course Name:** Introduction to Climatology				**Course Code:** SBS GEO 1 1 02 C 3104		
Batch: 2021-2023	**Programme:** M.Sc. Geography	**Semester:** I	**L**	**T**	**P**	**Credits**	**Contact Hrs per Week: 4**
			3	1	0	4	**Total Hours: 60**
Total Evaluation Marks: 100 **CIE:** 30 Marks **TEE:** 70 Marks		**Examination Duration:** 3 hours					
		Pre-requisite of course: Basic knowledge of Air Masses, World Climatic zones and Climate change.					
Course Objective	Developing the basic concept of climatology and understanding about atmosphere and various atmospheric processes with the help of generic theories and understanding climatic classification, its changes and disaster with a knowledge of climatic conventions and policies.						
Course Outcomes:	After completing this course, student is expected: **CO1:** To understand the concepts of climatology. **CO2:** To understand the concepts of radiation, temperature, stability and precipitation. **CO3:** To understand the concept of ENSO and its effect. **CO4:** To learn the world climatic classification. **CO5:** To comprehend recent trend and application of various themes of Climatology. **CO6:** To understand various climatic hazards along with the concept of climate change.						

COURSE SYLLABUS

NOTE:
Eight questions will be set, two from each of the UNIT. The candidates are required to attempt any five questions in all selecting at least one question from each section. All questions carry equal marks. Unit IV will be taught via online mode.

Unit No.	Content of Each Unit	Hours of Each Unit
I	**CONCEPT, SCOPE AND THEORIES** **[Course Outcome (s) No.: 1 & 2]** Meaning and Scope of Climatology; Composition and Structure of Atmosphere; Radiation Laws: Wave Nature, Particle Nature, Stefans-Boltzman & Weins Law; Solar Constant; Process of Precipitation; Adiabatic Temperature Change; Stability and Instability; Theories of Origin of Precipitation and Related Forms.	15
II	**CIRCULATION PROCESS** **[Course Outcome (s) No.: 3]** Tricellular Meridional Circulation and Jet Stream; Walker Circulation and El-Nino-Southern Oscillation (ENSO); Air Masses; Fronts; Cyclones: Tropical and Temperate; Anticyclones.	15

III	**WORLD CLIMATE CLASSIFICATION AND HEAT BUDGET** **[Course Outcome (s) No.: 4]** World Climatic Classifications: Koppen and Thornthwaite; Biomes; Insolation and Heat Budget; Weather Analysis, Forecasting and Modification.	15
IV	**APPLIED CLIMATOLOGY AND CLIMATE CHANGE** **[Course Outcome (s) No.: 5 & 6]** Climatic Change: Causes and Theories; Global Warming: Causes, Effects and its Evidences; Atmospheric Hazards and Disasters: Cloud-Bursts, Glacial Lake Outburst Flood (GLOF); Applied Climatology; International Programmes and Policies- Brundtland, Kyoto, Agenda-21, SDGs and Paris Agreement.	15

Suggested Readings:

1. Lal, D.S. (2020). **Climatology**. Sharda Pustak Bhawan, Allahabad.
2. Singh, S. (2020). **Climatology**. Pravalika Publication, Allahabad.
3. Singh, S. (2020). **Jalvayu Vigyan**. Pravalika Publication, Allahabad.
4. Oliver, J.E. and Hidore, J.J. (2003). **Climatology: An Atmospheric Science**. Pearson Education Private Ltd, Patparganj, Delhi.
5. Critchfield, H.J. (2002). **General Climatology**. Prentice-Hall of India, New Delhi.
6. Barry, R.G. and Carleton, M. (2001). **Synoptic and Dynamic Climatology**. Routledge, London.
7. Chorley, R.J. (2001). **Atmosphere, Weather and Climate**. Methuen, London.
8. Robinson, P. J. and Henderson, S. (1999). **Contemporary Climatology** (2nd edition). Pearson Education Ltd., Harlow, UK.
9. Singh, M.B. (1999). **Jalvayu Avam Jal Vigyan**. Tara Book Agency, Varanasi.
10. Kendrew, W.C. (1998). **Climatology (**5th edition). Edward Arnold, London.
11. Singh, M.B. (1998). **Jalvayu Avam Samudra Vigyan**. Tara Book Agency, Varanasi.
12. Das, P.K. (1987). ***Monsoons.*** National Book Trust, New Delhi.
13. Griffith, J.F. and Driscell, D.M. (1982), **Survey of Climatology**. Charles Merril, New York.
14. Trewartha, G.T. (1981). **An Introduction to Climate**. McGraw Hill, New York.
15. Finch, J. C. and Trewartha, G. T. (1937). **Elements of Weather and Climate**. Prentice-Hall, London.

Course No: CC 3	Course Name: Statistical Techniques in Geography				Course Code: SBS GEO 1 1 03 C 3104		
Batch:	**Programme:**	**Semester:**	**L**	**T**	**P**	**Credits**	**Contact Hrs per Week: 4**
2021-2023	M.Sc. Geography	I	3	1	0	4	**Total Hours: 60**
Total Evaluation Marks: 100 **CIE:** 30 Marks **TEE:** 70 Marks	**Examination Duration:** 3 hours						
	Pre-requisite of course: Basic knowledge of qualitative and quantitative data, Different sources and methods of data collection and Central tendency.						

Course Objective	Understanding the basic concept of quantitative information in general and geographical data in particular. Learning the ways to handle the collected data through classification, tabulation and stigmatization. To compute relations and impacts among the data series.
Course Outcomes:	After completing this course, student is expected: **CO 1:** To differentiate between qualitative and quantitative information. **CO 2:** To differentiate primary and secondary data and various levels of data measurement. **CO 3:**To know about the nature of various data, different sources and methods of data collection. **CO 4:** To learn the measurement of central tendency. **CO 5:** To learn the measures of dispersion, concentration, correlation and regression. **CO 6:** To understand and apply the different forms of averages, their relevance.

COURSE SYLLABUS

NOTE:
Eight questions will be set, two from each of the UNIT. The candidates are required to attempt any five questions in all selecting at least one question from each section. All questions carry equal marks. Unit IV will be taught via online mode.

Unit No.	Content of Each Unit	Hours of Each Unit
I	**BASICS OF STATISTICAL DATA:** **[Course Outcome (s) No.: 1, 2 & 3]** Introduction and Significance of Statistics in Geographical Studies; Primary and Secondary Data; Levels of Data Measurement: Nominal, Ordinal, Interval, and Ratio.	15
II	**MEASUREMENT OF CENTRAL TENDENCIES:** **[Course Outcome (s) No.: 4]** Measures of Central Tendency: Arithmetic Mean, Median, Mode and their Geographical Significance; Centrographic Techniques: Mean Centre, Median Centre and Standard Distance.	15
III	**DISPERSION AND CONCENTRATION MEASURES:** **[Course Outcome (s) No.: 5]** Measures of Dispersion and Concentration: Mean Deviation, Standard Deviation; Coefficient of Variation, Lorenz Curve and Gini's Coefficient;	15

	Location Quotient; Skewness.	
IV	**CORRELATION AND REGRESSION:** **[Course Outcome (s) No.: 5 & 6]** Correlation and Regression: Scatter Diagram, Correlation by Spearman's Rank Difference and Karl Pearson's Product Moment, Testing of Significance; Regression Analysis and Equations of Regression Line, Computation of Residuals and Mapping.	15

Suggested Readings:

1. Gupta, S.P., (2021). **Statistical Methods (46 Edition).** Sultan Chand and Sons.
2. Pal, S.K. (1998). **Statistics for Geoscientists; Techniques and Applications**. Concept Publishing Company, New Delhi.
3. Mathews, J.A. (1987). **Quantitative and Statistical Approaches to Geography, Practical Manual**. Pergmon, Oxford.
4. Ebdon, D (1983). **Statistics in Geography: A Pratical Approach**. Blackewell, London.
5. Gregory, S. (1978). **Statistical Methods and the Geographer (4th Edition).** Longman, London.
6. Peter, J. Taylor (1977). **Quantitative Methods in Geography**. Houngton Mifflin Company, Boston.
7. David M. Smith (1975). **Patterns in Human Geography**, Penguin, Harmonsworth.
8. Robert Hammond and Patrik Mc. Cullagh (1974). **Quantitative Methods in Geography**. Clarendon Press, Oxfords.
9. Yeates, Mauris (1974). **An Introduction to Quantitative Analysis in Human Geography**. McGraw Hill, NewYork
10. Cooley, W.W. and Lohnes, P. R. (1971). **Multivariate Data Analysis.** John Wiley and Sons, New York.
11. Morrison, D. F. (1967). **Multivariate Statistical Methods.** McGraw- Hills Inc, New York.
12. Rao, C. R. (1965). **Linear Statistical Inference and its Application.** John Wiley, New York.
13. Johnston, J. (1960). **Econometric Methods.** McGraw- Hills, New York.
14. Anderson, T.W. (1958). **Introduction to Multivariate Statistical Methods.** John Wiley & Sons, New York.
15. Kendall, M. G. (1957). **A Course in Multivariate Analysis.** Charles Griffin, London.

Course No: CC 4	**Course Name:** Urban Geography				**Course Code:** SBS GEO 1 1 04 C 3104		
Batch:	**Programme:**	**Semester:**	**L**	**T**	**P**	**Credits**	**Contact Hrs per Week: 4**
2021-2023	M.Sc. Geography	I	3	1	0	4	**Total Hours: 60**
Total Evaluation Marks: 100 **CIE:** 30 Marks **TEE:** 70 Marks		**Examination Duration:** 3 hours **Pre-requisite of course:** Basic knowledge of towns/cities, urbanization and urban planning concepts.					
Course Objective	*Understanding key concepts in urban geography and developing skills in critical analysis of urban theory, urbanisation, and urban problems, with the goal of applying this knowledge in urban planning and policy.*						
Course Outcomes:	After completing this course, student is expected: **CO1:** To understand the key concepts of urban geography. **CO2:** To know about modern cities and various aspects of urbanisation process and problems in developed and developing countries. **CO3:** To understand the origin and historic development of Indian urbanisation and metropolitan cities. **CO4:** To understand and analyze the internal structure and hierarchy of cities using appropriate techniques, models and theories. **CO5:** To learn about rural-urban linkages. **CO6:** To understand the geographical perspective of urbanisation and linkages with urban planning and policy issues.						

COURSE SYLLABUS

NOTE:
Eight questions will be set, two from each of the UNIT. The candidates are required to attempt any five questions in all selecting at least one question from each section. All questions carry equal marks. Unit IV and few topics from Unit II will be taught via online mode.

Unit No.	Content of Each Unit	Hours of Each Unit
I	**CONCEPTS AND SCOPE** **[Course Outcome (s) No.: 1]** Definition, Nature and Scope of Urban Geography; Classification of Urban Places in India; Aspects of Urban Places: Definition and Significance of Location, Site and Situation; Concepts of Megacities; Global Cities; Edge Cities, Satellite Towns and Rural-Urban Fringe.	15
II	**PROCESS OF URBANISATION** **[Course Outcome (s) No.: 2 & 3]** Characteristics, Processes and Problems of Urbanization in Developed and Developing Countries; Urbanisation Process in India: Colonial Legacy, The Post-Independence Characteristics and the Origin and Growth of Metropolitan Cities.	15

III	**URBAN MODELS AND THEORIES** **[Course Outcome (s) No.: 4 & 5]** The Law of the Primate City; Rank Size Rule; Central Place Theory of Christaller and Losch; Urban Land Use: Burgess, Harris & Ullman, and Hoyt.	15
IV	**URBAN PLANNING AND PROGRAMMES** **[Course Outcome (s) No.: 6]** Concept of Urban Planning; Urban E-Governance; Urban Development Programmes: Smart Cities, AMRUT and JNNURM.	15

Suggested Readings:

1. Grover, A. and Singh, R.B. (2020). **Urban Health and Wellbeing-Indian Case Studies**, Springer.
2. Bansal, S.C. (2019). **Urban Geography**. Meenakshi Publication, Meerut.
3. Schwanen, T. and Van Kempen, R. (Eds.) (2019). **Handbook of Urban geography**. Edward Elgar Publishing, Cheltenham.
4. Short, J. R. (2017). **An Introduction to Urban Geography**. Routledge.
5. Husain, M. (2015). **Models in Geography**. Rawat Publications, Jaipur.
6. Singh, R.B. (2015). **Urban Development Challenges, Risk and Resilience in Asian Mega Cities**-Sustainable Urban Future of Emerging Asian Mega Region, Springer, Tokyo.
7. Johnston, R. J. (2013). **City and society: An outline for Urban Geography**. Routledge.
8. Pacione, M. (2009). **Urban Geography: A Global Perspective**. Routledge, Oxford.
9. Mandal, R. B. (2008). **Urban Geography: A Textbook**. Concept Publishing Company, New Delhi.
10. Fyfe, N. and Kenny, J. (Eds.) (2005). **The Urban Geography Reader**. Routledge, London
11. Ramachandran, R. (2005). **Urbanization and Urban Systems in India**. Oxford University Press.
12. Kaplan, D. H., Wheeler, J. O., & Holloway, S. (2004). **Urban Geography**. John Wiley & Sons.
13. Kumar, B. and Singh, R.B. (2003). **Urban Development and Anthropogenic Climate Change-Experience in Indian Metropolitan Cities**, Manak Pub., New Delhi.
14. Singh, R.B. (2001). **Urban Sustainability in the Context of Global Change**, Science Pub., Inc., Enfield (NH), USA and Oxford & IBH Pub., New Delhi.
15. Carter, H. (1972). **The Study of Urban Geography**. Edward Arnold, London.

Course No: CC 5	Course Name: Practical: Cartographic Methods				Course Code: SBS GEO 1 1 05 C 2024		
Batch:	**Programme:**	**Semester:**	**L**	**T**	**P**	**Credits**	**Contact Hrs per Week: 6**
2021-2023	M.Sc. Geography	I	2	0	4	4	**Total Hours: 90**
Total Evaluation Marks: 100 **CIE:** 30 Marks **TEE:** 70 Marks		**Examination Duration:** 3 hours					
		Pre-requisite of course: Methods in Geographical Analysis, History of Map Making, Surveying Methods					

Course Objective	Introducing the basics of topographical sheet, the basis of interpretation of physical and cultural features on topographical sheet; learning the methods of map projections through the mathematical method; and familiarizing the students about the techniques of morphometric analysis of drainage basin, slope analysis and profile analysis, relief aspects and surveying methods in geography.
Course Outcomes:	After completing this course, student is expected: **CO1:** To know the basics of topographical sheet and its interpretation. **CO2:** To learn and interpret various physical and cultural features on Toposheets. **CO3:** To know the methods of developing various types of map projections through mathematical method. **CO4:** To know the techniques of morphometric analysis of drainage basin, slope analysis and profile analysis. **CO5:** To learn hands on experience on relief aspects including hypsometric analysis. **CO6:** To learn the surveying methods in geography.

COURSE SYLLABUS

NOTE: Eight questions will be set, two from each of the UNIT. The candidates are required to attempt any five questions in all selecting at least one question from each section. All questions carry equal marks. Unit I will be taught via online mode.

Unit No.	Content of Each Unit	Hours of Each Unit
I	**INTERPRETATION OF TOPOGRAPHICAL SHEETS** **[Course Outcome (s) No. :1]** Basic Information on Topographical Sheets, Conventional Signs, Interpretation of Relief, Drainage, Settlements, Land-Use, Vegetation and Transport Network on Toposheets.	22
II	**MAP PROJECTIONS** **[Course Outcome (s) No.: 2& 3]** Mathematical Methods: Mercator Projection, Conical Projection with Two Standards Parallel, Gnomonic	22

	Projection and Orthographic Projection.	
III	**MORPHOMETRIC ANALYSIS** **[Course Outcome (s) No. :4]** Linear Aspects- Stream Ordering and Bifurcation Ratio; Areal Aspects-Form Factor, Elongation Ratio and Circularity Ratio; Relief Aspects- Relative Relief and Dissection Index; Slope Analysis: Average Slope (Wentworth's Method); Profile Analysis: Longitudinal and Cross Profile.	22
IV	**RELIEF ASPECTS** **[Course Outcome (s) No. :5 & 6]** Hypsometric Analysis- Hypsometric Curve and Integral Hypsometric Curve, Clinographic Analysis, Altimetric Analysis; Surveying Methods with Instruments.	24

Suggested Readings:

1. Sharma, J.P. (2010). **Prayogic Bhugol**. Rastogi Publishers, Delhi.
2. Sarkar, A. (2008). **Practical Geography: A Systematic Approach**. Orient Blackswan, Kolkata.
3. Robinson, A.H. et al. (2004). **Elements of Cartography** (Sixth Edition). Wiley-India, New Delhi.
4. Singh, G. (2004). **Map Work and Practical Geography**. Vikas Publication House, Delhi.
5. Yadav, H.L. (2002). **Prayogatamak Bhoogol Ke Aadhar**. Radha Publications, New Delhi.
6. Khullar, D.R. (2001). **Essentials of Practical Geography** (Second Edition). New Academic Publishing, Jalandhar.
7. Singh, R.L. (1998). **Prayogic Bhoogol Rooprekha**. Kalyani Publications, New Delhi.
8. Doornkamp, J.C. and King, C.A.M. (1971). **Numerical Analysis in Geomorphology: An Introduction**. Arnold, London.
9. Khan, Md. Z.A. (1998). **Text Book of Practical Geography**. Concept, New Delhi.
10. Mayer, L. (1990). **Introduction to Quantitative Geomorphology**. Prentice Hall, New Jersey.
11. Ishtiaq, M. (1989). **Practical Geography**. Heritage Publishers, New Delhi.
12. Misra, R.P. and Ramesh, A. (1989). **Fundamentals of Cartography** (Revised and Enlarged Edition). Concept, New Delhi.
13. Monkhouse, F.J. and Wilkinson, H.R. (1980). **Maps and Diagrams**. B. I. Publications, Bombay.
14. Singh, R.L. (1979). **Elements of Practical Geography**. Kalyani Publishers, New Delhi.
15. Upton, W.B. (1970). **Landforms and Topographic Maps**. John Wiley, New York.

Course No: GEC 1	Course Name: Climate Change Vulnerability and Adaptation				Course Code: SBS GEO 1 1 01 GE 3104		
Batch:	**Programme:**	**Semester:**	**L**	**T**	**P**	**Credits**	**Contact Hrs per Week: 4**
2021-2023	M.Sc. Geography	I	3	1	0	4	**Total Hours: 60**

Total Evaluation Marks: 100 **CIE:** 30 Marks **TEE:** 70 Marks	**Examination Duration:** 3 hours **Pre-requisite of course:** Basic knowledge about Global warming, Concept of Biodiversity and Policies related to Environment.
Course Objective	Understanding various dimensions of climate change and adaptability. Learning the detailed analysis of vulnerability and its impacts. Understanding of the concept of mitigation and planning.
Course Outcomes:	After completing this course, student is expected: CO 1: To understand the concept of global warming, climate change and related issues. CO 2: To learn the concept of climochronology and climate change assessment. CO 3: To know the impact of climate change and adaptation strategies. CO 4: To understand the concept of ecosystem and biodiversity. CO 5: To know about the in-depth knowledge of vulnerability of flora and fauna. CO 6: To understand the role of policies and organizations in climate change mitigation.

COURSE SYLLABUS

NOTE:
Eight questions will be set, two from each of the UNIT. The candidates are required to attempt any five questions in all selecting at least one question from each section. All questions carry equal marks. Unit IV will be taught via online mode.

Unit No.	Content of Each Unit	Hours of Each Unit
I	**CONCEPTS OF CLIMATE CHANGE AND GLOBAL WARMING:** **[Course Outcome (s) No.: 1 & 2]** Climate Change: Understanding Climate Change; Evidences of Global Warming and Climate Change; Climochronology; Green House Gases and Global Warming; Global Climatic Assessment- IPCC.	15
II	**CLIMATE CHANGE VULNERABILITY:** **[Course Outcome (s) No.: 3 & 4]** Climate Change and Vulnerability: Physical Vulnerability, Economic Vulnerability, Social Vulnerability, Vulnerability of Natural Environment and Associated Services; Natural Ecosystems and Biodiversity; Agriculture, Fisheries and Forestry; Vulnerability of Water Resources.	15

III	**CLIMATE CHANGE: IMPACTS & ADAPTATION** **[Course Outcome (s) No.: 5]** Impact of Climate Change: Agriculture and Water, Flora and Fauna, Human Health; Adaptation and Mitigation to Climate Change; Global Initiatives with Particular Reference to South Asia; Adaptation Strategies with Special Reference to India.	15
IV	**CLIMATE CHANGE: POLICIES & ORGANIZATIONS** **[Course Outcome (s) No.: 6]** Climate Change Policy Framework: Important National and International Initiatives, Kyoto Protocol, Paris Agreement, UNFCCC, NAPCC, INDCS.	15

Suggested Readings:

1. Mishra, R.K, Singh, R.B. and Dubey, Anupama (2021). **Sustainable Climate Action and Water Management**, Springer.
2. Singh, R.B., Mal, Suraj, and Huggel, C. (2018). **Climate Change, Extreme Events and Disaster Risk Reduction**. Springer, pages 309, Switzerland.
3. 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
4. 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
5. Singh, R.B. and Mal, Suraj (2009). **Environmental Change and Biodiversity**, Rawat Publication, Jaipur.
6. OECD. (2008). **Climate Change Mitigation: —What do we do?** (Organisation and Economic Co-operation and Development).
7. 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.
8. UNEP. (2007). **Global Environment Outlook: GEO4: Environment for Development**. Nairobi, Kenya: United Nations Environment Programme.
9. Sen, Roy, S., and Singh, R.B., (2002). **Climate Variability, Extreme Events and Agricultural Productivity in Mountain Regions**. Oxford & IBH Pub, Delhi
10. Singh, Rana P.B. (ed.) (1993). **Environmental Ethics: Discourses and Cultural Traditions**: National Geographical Society of India, BHU, Varanasi.
11. Singh, S. N. (1993). **Elements of Environmental Geography and Ecology (in Hindi)**, Tara Book Agency, Varanasi
12. Singh, R. B. (ed.) (1990). **Environmental Geography**. Heritage Publication, New Delhi.
13. Singh, O., Kumra, V.K. and Singh, J. (1988). **India's Urban Environment. Pollution, Perception and Management**. Tara Book Agency, Varanasi.
14. Khoshoo, T. N. (1981). **Environmental Concerns and Strategies**. Ashish Publishing House, New Delhi.
15. Odum, E.P. (1975). **Ecology**. Rowman and Littlefield, Lanham USA.

Course No: GEC 2	Course Name: Natural Hazards and Disaster Management				Course Code: SBS GEO 1 1 02 GE 3104		
Batch:	**Programme:**	**Semester:**	**L**	**T**	**P**	**Credits**	**Contact Hrs per Week: 4**
2021-2023	M.Sc. Geography	I	3	1	0	4	**Total Hours: 60**
Total Evaluation Marks: 100 **CIE:** 30 Marks **TEE:** 70 Marks	**Examination Duration:** 3 hours						
	Pre-requisite of course: Basic knowledge of natural hazards and disaster management.						
Course Objective	*The course is intended to provide a general concept in the dimensions of disasters caused by nature beyond the human control as well as the disasters and environmental hazards induced by human activities with emphasis on disaster preparedness, response, recovery, planning and management.*						
Course Outcomes:	After completing this course, student is expected: **CO1:** To understand the basic concept of different types of natural hazards and disasters. **CO2:** To understand the disaster preparedness and response strategy and role of ICT in disaster management. **CO3:** To know the role of various stakeholders in planning policies. **CO4:** To learn the concept of recovery and rehabilitation. **CO5:** To understand the national disaster management policy. **CO6:** To know the role of geospatial technologies in disaster management.						

COURSE SYLLABUS

NOTE:
Eight questions will be set, two from each of the UNIT. The candidates are required to attempt any five questions in all selecting at least one question from each section. All questions carry equal marks. Unit IV and few topics from Unit II will be taught via online mode.

Unit No.	Content of Each Unit	Hours of Each Unit
I	**BASIC CONCEPTS** **[Course Outcome (s) No.: 1&2]** Concept of Hazards, Risk, Vulnerability, Disaster and Resilience; Types of disaster: Natural - Flood, Drought, Landslide, Earthquake, and Avalanche; Manmade Disaster – Nuclear, Chemical and Biological.	15
II	**DISASTER PLAN AND PROGRAMMES** **[Course Outcome (s) No.: 2 & 3]** Disaster Preparedness: Concept, Plan, Prediction, Early Warning System, Role of ICT, National and International Programmes and Policies, NGOs/Civil Societies; Disaster Responses: Role of Multiple Stockholders, Psychological and Medical Health Responses.	15

III	**POST DISASTER PLANNING** **[Course Outcome (s) No.: 4 & 5]** Reconstruction and Rehabilitation as a Means of Development**,** Damage Assessment, Long Term Recovery and Counter Disaster Planning.	15
IV	**DISASTER POLICY, MANAGEMENT AND GEOSPATIAL TECHNOLOGY** **[Course Outcome (s) No.: 6]** National Disaster Management Policy; Role of Remote Sensing, GIS and GNSS in Disaster Management.	15

Suggested Readings:

1. Kapur, A. (2010) **Vulnerable India: A Geographical Study of Disasters**, Sage Publication, New Delhi.
2. Modh, S. (2010) **Managing Natural Disaster: Hydrological, Marine and Geological Disasters**, Macmillan, Delhi.
3. Singh Jagbir (2007) "**Disaster Management Future Challenges and Oppurtunities"**, 2007. PublisherI.K. International Pvt. Ltd. S-25, Green Park Extension, Uphaar Cinema Market, New Delhi, India (www.ikbooks.com).
4. Srivastava, H. N. (2007). **Coastal Hazards, (Cyclone, Tsunami, and other Disasters).** National Book Trust of India, New Delhi.
5. Singh, R. B. (ed.), (2006) **Natural Hazards and Disaster Management: Vulnerability and Mitigation**, Rawat Publications, New Delhi.
6. Singh, R.B. (2005) **Risk Assessment and Vulnerability Analysis**, IGNOU, New Delhi. Chapter 1, 2 and 3
7. Stoltman, J.P. et al. (2004) **International Perspectives on Natural Disasters,** Kluwer Academic Publications. Dordrecht.
8. Sinha, A. (2001). **Disaster Management: Lessons Drawn and Strategies for Future,** New United Press, New Delhi.
9. Government of India. (1997) **Vulnerability Atlas of India**. New Delhi, Building Materials & Technology Promotion Council, Ministry of Urban Development, Government of India.
10. Hemmady, A. K.R. (1996). **Earthquake.** National Book Trust India, New Delhi.
11. Biswas, M.R. and Biswas, A.K. (1980). **Desertification Case Studies,** Pergamon, Oxford.
12. Sain, Kanwar. (1979). **The Flood Problem India.** Birla Institute of Scientific Research, New Delhi.
13. Zaruba, Q. and Menci, V. (1969). **Landslides and their Control.** Elsevier, Amsterdam.
14. Bhatia, B.M. (1967). **Famines in India,** Asia Publishing House, Delhi.
15. Mason, B.J. (1957). **The Physics of Clouds.** Clarendon Press, Oxford.

SEMESTER- II

Course No: CC 6	**Course Name:** Evolution of Geographical Thought				**Course Code:** SBS GEO 1 2 06 C 3104		
Batch:	**Programme:**	**Semester:**	**L**	**T**	**P**	**Credits**	**Contact Hrs per Week:4**
2021-2023	M.Sc. Geography	II	3	1	0	4	**Total Hours: 60**
Total Evaluation Marks: 100 **CIE:** 30 Marks **TEE:** 70 Marks		**Examination Duration:** 3 hours **Pre-requisite of course:** Foundation of Geography, Ancient Geography, Medieval Geography, Modern Geography					
Course Objective	*Introducing about geography as a field of study and the disciplinary developments of geography as science of synthesis; enabling to contextualize the approaches and concepts within geography; and understanding the emergence of modern geography, contemporary trends, relevance and future of geography.*						
Course Outcomes:	After completing this course, student is expected: **CO1:** To know about geography as a field of study and the evolution of geography as science of synthesis. **CO2:** To be acquainted with various schools of thoughts and their contributions along with the geographical concepts in Ancient India. **CO3:** To contextualize the approaches and concepts within geography. **CO4:** To know the emergence of modern geography and contemporary trends. **CO5:** To know the relevance of geography. **CO6:** To know the future of geography.						

COURSE SYLLABUS

NOTE:
Eight questions will be set, two from each of the UNIT. The candidates are required to attempt any five questions in all selecting at least one question from each section. All questions carry equal marks. Unit I will be taught via online mode.

Unit No.	Content of Each Unit	Hours of Each Unit
I	**GEOGRAPHY AS A FIELD OF STUDY** **[Course Outcome (s) No. :1]** Geography as a Field of Study; Place of Geography in the Classification of Knowledge; Relationship with Natural and Social Sciences; Geography as a Spatial Science; Geography as Science of Synthesis; Schools of Thoughts and their Contributions.	15
II	**APPROACHES AND CONCEPTS** **[Course Outcome (s) No.: 2& 3]** Human-Environment Interactions – Determinism, Possibilism and Neo-Determinism; Concepts and their	15

	Significance: Location, Space, Place and Region; Areal Differentiation and Spatial Organisation.	
III	**EMERGENCE OF MODERN GEOGRAPHY AND CONTEMPORARY TRENDS** **[Course Outcome (s) No. :4]** Positivism; Quantitative Revolution; Contemporary Trends: Behavioural Geography; Humanistic Geography; Marxist Geography; Gender Geography; Structuralism; Post-Structuralism and Post-Modernism.	15
IV	**RELEVANCE AND FUTURE OF GEOGRAPHY** **[Course Outcome (s) No. :5 & 6]** Relevance of Geography; Future of Geography - Changing Nature; Concepts, Approaches and Methodologies of Geography; Emerging Subfields; Geography and Public Policy; Evolution and Progress of Indian Geography.	15

Suggested Readings:

1. Cresswell, T. (2014). **Geographic Thought: A Critical Introduction**. Blackwell, New York.
2. Singh, Ravi S (ed.) 2009. **Indian Geography: Perspectives, Concerns and Issues**. Rawat Publications, Jaipur.
3. Johnston, R., Gregory D., Pratt G., Watts, M. and Whatmore, S. (2009). **The Dictionary of Human Geography**. Blackwell, New York.
4. Dikshit, R. D. (2008). **Bhaugolik Chintan Ka Vikas**. PHI Learning Pvt. Ltd.
5. Hussain, M. (2006). **Bhogolik Chintan Ka Itihas**. Rawat Publications.
6. Martin, G. (2005). **All Possible Worlds: A History of Geographical Ideas (**4th edition). Oxford University Press, New York.
7. Dikshit, R. D. (2004). **Geographical Thought. A Critical History of Ideas**. Prentice-Hall of India, New Delhi. (English and Hindi).
8. Clifford, N.J. (2002). T**he Future of Geography: when the whole is less than the sum of its parts**. Geoforum, Vol. 33, 431-436.
9. Kapur, A. (ed.) (2001). **Indian Geography – Voice of Concern**. Concept Publishing Company, New Delhi.
10. Holt-Jensen A. (1999). **Geography– History and Concepts**. Sage, London.
11. Peet, R. (1998). **Modern Geographical Thought.** Wiley-Blackwell, New York
12. Singh, R. L. and Singh, Rana P.B. (eds.) (1992). **The Roots of Indian Geography: Search and Research**. National Geographical Society of India, B.H.U. Publication number 39, Varanasi.
13. Buttimer, A. and Seamon, D. (ed.) (1980). **The Human Experience of Space and Place**. Croonhelm, London.
14. Harvey, D. (1969). **Explanation in Geography**. Arnold, London.
15. Hartshorne R. (1939). **The Nature of Geography**. AAG, New York.

Course No: CC 7	Course Name: Fundamentals of Photogrammetry and Remote Sensing				Course Code: SBS GEO 1 2 07 C 3104		
Batch:	**Programme:**	**Semester:**	**L**	**T**	**P**	**Credits**	**Contact Hrs per Week: 4**
2021-2023	M.Sc. Geography	II	3	1	0	4	**Total Hours: 60**
Total Evaluation Marks: 100 **CIE:** 30 Marks **TEE:** 70 Marks	**Examination Duration:** 3 hours						
	Pre-requisite of course: Basic knowledge of photogrammetry, EMR, satellite orbits and digital image concepts.						
Course Objective	*To understand the basics of photogrammetry and remote sensing technology and their potential applications and to develop basic skills to interpret aerial photographs and remote sensing images for various applications in geography.*						
Course Outcomes:	After completing this course, student is expected: **CO1:** To understand the basics of photogrammetry. **CO2:** To know the basic principles of remote sensing. **CO3:** To learn the basic principles of microwave and thermal remote sensing. **CO4:** To know the remote sensing platforms, sensors and resolution characteristics. **CO5:** To understand the various techniques of digital image classification. **CO6:** To understand the remote sensing data applications in various domains of geography.						

COURSE SYLLABUS

NOTE:
Eight questions will be set, two from each of the UNIT. The candidates are required to attempt any five questions in all selecting at least one question from each section. All questions carry equal marks. Unit IV and few topics from Unit III will be taught via online mode.

Unit No.	Content of Each Unit	Hours of Each Unit
I	**POHOTOGRAMMETRY** **[Course Outcome (s) No.: 1]** Photogrammetry: History and Development; Aerial Photographs: Types, Geometry, Methods of Determining Scale, Ground Coverage and Overlapping; Stereoscopes and Stereoscopic Vision.	15
II	**BASIC PRINCIPLES OF REMOTE SENSING** **[Course Outcome (s) No.: 2 & 3]** Remote Sensing: Meaning and Basic Principles/Concepts; Electromagnetic Radiations (EMR); Electromagnetic Spectrum; Interaction of EMR with Atmosphere and Earth's Surface Features; Basic Principles of Thermal and Microwave Remote Sensing.	15

III	**REMOTE SENSING PLATFORMS, SENSORS AND IMAGE CLASSIFICATION** **[Course Outcome (s) No.: 4]** Remote Sensing Platforms- Types and Characteristics; Satellite Orbits- Near Polar and Geostationary Orbits; Sensors- Types, Specifications and Resolutions (Landsat, LISS and Cartosat); Elements of Image Interpretation; Digital Image Processing: Supervised and Unsupervised Classification.	15
IV	**REMOTE SENSING PROGRAMS AND APPLICATIONS** **[Course Outcome (s) No.: 5 & 6]** Remote Sensing Set up and Programmes in India; Remote Sensing Data Applications.	15

Suggested Readings:

1. Kumar, D.; Singh, R.B. and Kaur, R. (2019). **Spatial Information Technology for Sustainable Development Goals**. Springer Nature, Switzerland.
2. Peter, J.G., Teunissen and Oliver, M. (Eds.) (2019). **Springer Handbook of Global Navigation Satellite Systems**. Springer Nature, Switzerland:
3. Gupta, R.P. (2018). **Remote Sensing Geology** (3rd Edition). Springer Nature, Switzerland.
4. Kron, G. (2017). **Global Navigation Satellite Systems: Signal, Theory & Applications**. Wilmington: Scitus Academics.
5. Chuveico, E. (2016). **Fundamentals of Satellite Remote Sensing — An Environmental Approach** (2 nd Edition). CRC Press, Roca Raton.
6. Chaunial, D.D. (2016). **Principles of Remote Sensing and Geographical Information System** (In Hindi), Sharda Pustak Bhawan, Allahabad.
7. Scott, M. (2015). **Global Navigation Satellite Systems and Their Applications**. Springer, New York.
8. Heywood, I.; Cornelius, S. and Carver, S. (2011). **An Introduction to Geographic Information Systems** (4 th Edition). Pearson Education, New Delhi.
9. Longley, P.A.; Goodchild, M.; Maguire, D.J. and Rhind, D.W. (2010). **Geographic Information Systems and Science** (3rd Edition). John Wiley, New Jersey:
10. DeMers, M. (2009). **Fundamentals of Geographic Information Systems** (4th Edition). John Wiley, New Jersey.
11. Sabins, F.F. (2007). **Remote Sensing: Principles and Interpretation** (3rd Edition). Waveland Press, Long Grove.
12. Chang, K-t. (2006). **Introduction to Geographic Information Systems**. Tata McGraw Hills, New Delhi.
13. Lillesand, T.M.; Kiefer, R.W. and Chipman, J.W. (2004). **Remote Sensing and Image Interpretation** (5th Edition). John Wiley India, New Delhi.
14. Joseph, George (2003). **Fundamental of Remote Sensing**, University's Press (India) Pvt. Ltd., Hyderabad.
15. Burrough, P.A. and McDonnell, R.A. (1998). **Principles of Geographic Information Systems**. Oxford University Press, Oxford.

Course No: CC 8	Course Name: Hydrology and Oceanography				Course Code: SBS GEO 1 2 08 C 3104		
Batch:	**Programme:**	**Semester:**	**L**	**T**	**P**	**Credits**	**Contact Hrs per Week: 4**
2021-2023	M.Sc. Geography	II	3	1	0	4	**Total Hours: 60**
Total Evaluation Marks: 100 **CIE:** 30 Marks **TEE:** 70 Marks			**Examination Duration:** 3 hours **Pre-requisite of course:** Concept of Hydrology, Ocean Reliefs, and Marine Ecosystem.				
Course Objective	Acquiring knowledge about meaning and various aspects of hydrology and oceanography. To understand the components of hydrological cycle and problems of water resources. Understanding the oceanic relief features, properties of water, oceanic circulation and resources.						
Course Outcomes:	After completing this course, student is expected: **CO 1:** To know the concepts of hydrology. **CO 2:** To know the concepts of oceanography. **CO 3:** To learn the mechanism and importance of different components of hydrological cycle. **CO 4:** To understand the concept of various oceanic properties and oceans dynamics. **CO 5:** To understand the nature and importance of oceanic ecosystem. **CO 6.** To recognize the mechanism of oceans and its linkages to atmosphere.						

COURSE SYLLABUS

NOTE:
Eight questions will be set, two from each of the UNIT. The candidates are required to attempt any five questions in all selecting at least one question from each section. All questions carry equal marks. Unit IV will be taught via online mode.

Unit No.	Content of Each Unit	Hours of Each Unit
I	**CONCEPTS OF HYDROLOGY:** **[Course Outcome (s) No.: 1 & 3]** Hydrology: Approach, Meaning and Scope; Precipitation and Interception; Evaporation; Evapotranspiration; Infiltration; Groundwater: Occurrence, Storage and Charge; Runoff: Sources, Components and Factors; River regimes; Hydrograph: Components and Separation; Water Resource Problems and Management.	15
II	**CONCEPTS OF OCEANOGRAPHY:** **[Course Outcome (s) No.: 2]** Definition and Scope of Oceanography; Historical Development of Oceanography; Distributional Patterns of Land and Oceans; Depth Zones and Hypsometric Curve; Bottom Relief of Oceans; Oceanic Deposits; Zonation of the Sea.	15

III	**OCEANIC PROPERTIES AND DYNAMICS:** **[Course Outcome (s) No.: 4]** Ocean Water Properties: Chemical Properties, Temperature, Salinity and Density; Sea Waves; Tides: Types and Origin; Oceanic Currents: Controlling Factors and General Circulation.	15
IV	**MARINE RESOURCES AND ECOSYSTEM:** **[Course Outcome (s) No.: 5 & 6]** Mangroves and Estuarine Ecology; Coral Reefs: Formation, Types and Distribution; Marine Pollution; Oceanic Resources: Mineral, Energy, Food Resource, Aquaculture; Oceanic Ecosystems: Marine Biota; Energy Flow: Food Chains and Food Webs; Marine Resources: Depletion, Conservation and Management.	15

Suggested Readings:

1. Singh, S. (2020). **Oceanography**. Pravalika Publication, Allahabad.
2. Singh, S. (2020). **Samudra Vigyan**. Pravalika Publication, Allahabad.
3. Novák, Viliam; Hlaváčiková, Hana (2019). **Applied Soil Hydrology**. Springer International Publishing, Switzerland.
4. Sharma, R.C. and Vatal, V. (2016). **Oceanography for Geographers**. Chatanaya Publishing, Allahabad.
5. Garrison, T. (2015). **Oceanography - An Introduction to Marine Science**. Cole Pacific Grove, USA.
6. Garrison, T. (2012). **Essentials of Oceanography**. Wards worth, London. (6th edition)
7. Davie, T. (2008). **Fundamentals of Hydrology**. Routledge, London.
8. Denny, M. (2008). **How the Ocean Works: An introduction to Oceanography**. Princeton University Press, New Jersey.
9. Brutsaert, W. (2005). **Hydrology: An Introduction**. Cambridge University Press.
10. Andrew. D.W. and Stanley, T. (2004). **Environmental Hydrology**. CRC Press, Allahabad.
11. Kerhsaw, S. (2004). **Oceanography: An Earth Science Perspective**. Routledge, London.
12. Ward, R.C. and Robinson, M. (2000). **Principles of Hydrology**. McGraw Hill, New York.
13. Duxbury, C.A and Duxbury, B. (1996). **An Introduction to the world's Oceans** (2nd Edition). C. Brown, Iowa.
14. Gross, M. Grant (1987). **Oceanography: A View of the Earth.** Prantice - Hall Inc, New Jersy.
15. Davis, R.J.A. (1986). **Oceanography - An Introduction to the Marine Environment**. C. Brown, Iowa.

Course No: CC 9	Course Name: Research Methodology, Field work and Report Writing (Socio-Economic Aspect)				Course Code: SBS GEO 1 2 09 C 3014		
Batch: 2021-2023	**Programme:** M.Sc. Geography	**Semester:** II	**L**	**T**	**P**	**Credits**	**Contact Hrs Per Week: 5**
			3	0	2	4	**Total Hours: 75**
Total Evaluation Marks: 100 **CIE:** **30** Marks **TEE:** **70** Marks		**Examination Duration:** 3 hours					
		Pre-requisite of course: Basic knowledge of computer, data and data analysis. Basic knowledge of field instruments.					
Course Objective	To introduce the students with research methodology. To expose the students to tools and techniques to do fieldwork and obtain data through practical experience in geographical field study. To make the students able to use software for data analysis and to learn the writing and preparation of field report.						
Course Outcomes:	After completing this course, student is expected: **CO1:** To understand the meaning and philosophy of research **CO2:** To know about the process of research. **CO3:** To understand the selection of research design, sampling, data collection methods. **CO4:** To collect and process data in the light of ethics in research. **CO5:** To handle tools and techniques including SPSS software. **CO6:** To develop the skills to conduct the socio-economic survey and report writing.						

COURSE SYLLABUS

NOTE:
Eight questions will be set, two from each of the unit. The candidates are required to attempt any five questions in all selecting at least one question from each section. All questions carry equal marks. Unit I will be taught via online mode.

Unit No.	Content of Each Unit	Hours of Each Unit
I	**INTRODUCTION TO RESEARCH AND RESEARCH PROBLEM** **[Course Outcome (s) No.: 1 & 2]** Meaning, Purpose, Types and Process of Research; Identification of Research Question; Research Problems and Literature Survey; Hypothesis.	15
II	**SELECTION OF RESEARCH DESIGN AND EHTICS** **[Course Outcome (s) No.: 3 & 4]** Selection of research design; Sampling design and determination of sample size; Methods of Data Collection; Qualitative Data Production: Interviews,	20

	Observation (Participant Observation and Ethnography); Process of Report Writing; Reference styles; Plagiarism and Ethics in Research.	
III	**USE OF SPSS SOFTWARE AND STATISTICS** **[Course Outcome (s) No.: 5]** SPSS (Statistical Package for Social Sciences): Introduction, managing Data, frequencies and cross tabulation, Graphs, Central Tendencies, Measures of Distribution, Measures of Asymmetry, Estimation and Hypothesis Testing, Correlation and Regression, Data Analysis and Interpretation.	20
IV	**CONDUCT A SOCIO-ECONOMIC SURVEY AND REPORT WRITING** **[Course Outcome (s) No.: 6]** Conduct a socio-economic survey using structured questionnaire/ schedule/Observation/Group Discussion/Field Diary; Prepare a Field Survey Report.	20

Suggested Readings:

1. Singh, J.P. (2021). **Samajik anusandhan ki vidhiyan**, Rawat Publication, Jaipur
2. Ahuja, R. (2019). **Research Methods**, Rawat Publication, New Delhi.
3. Ahuja, R. (2019). **Samajik Sarvekshan avam Anusandhan**. Rawat Publication, Jaipur
4. Kothari, C.R. (2019). **Research Methodology: Methods and Techniques**. New Age international Publishers, New Delhi
5. Healey, J.F. (2018). **Statistics: A Tool for Social Research**, Rawat Publication, Jaipur
6. Dikshit, R. D., (2003). **The Art and Science of Geography: Integrated Readings**, Prentice-Hall of India, New Delhi.
7. Mukherjee, Neela., (2002). **Participatory Learning and Action: with 100 Field Methods**. Concept Publs. Co., New Delhi
8. Kitchin, R. and Tate, N., (2001). **Conducting Research into Human Geography**. Theory, Methodology and Practice. Prentice-Hall, London.
9. Robinson, A., (1998). "**Thinking Straight and Writing That Way**", in Writing Empirical Research Reports: A Basic Guide for Students of the Social and Behavioural Sciences, eds. by F. Pryczak and R. Bruce Pryczak, Publishing: Los Angeles. Special Issue on "Doing Fieldwork" The Geographical Review 91:1-2 (2001).
10. Wolcott, H., (1995**). The Art of Fieldwork**, Alta Mira Press, Walnut Creek, CA.
11. Creswell, J., (1994). **Research Design: Qualitative and Quantitative Approaches**, Sage Publications.
12. Mukherjee, Neela., (1993). **Participatory Rural Appraisal: Methodology and Application**, Concept Publs. Co., New Delhi.
13. Mishra, R.P. (1989). **Research Methodology: A Handbook**, Concept Publishing House, New Delhi.
14. Evans, M., (1988). **"Participant Observation: The Researcher as Research Tool"** in Qualitative Methods in Human Geography, eds. J. Eylesand D. Smith, Polity.
15. Stoddard, R. H., (1982). **Field Techniques and Research Methods in Geography**, Kendall/Hunt.

Course No: CC 10	Course Name: Practical: Photogrammetry and Digital Image Processing				Course Code: SBS GEO 1 2 10 C 2024		
Batch:	**Programme:**	**Semester:**	**L**	**T**	**P**	**Credits**	**Contact Hrs per Week: 6**
2021-2023	M.Sc. Geography	II	2	0	4	4	**Total Hours: 90**
Total Evaluation Marks: 100 **CIE:** 30 Marks **TEE:** 70 Marks		**Examination Duration:** 3 hours **Pre-requisite of course:** Basic knowledge of aerial photographs, scale, satellite image and Bhuvan/USGS portal.					
Course Objective	*To make students acquainted with aerial photographs and standard digital image processing techniques through hands-on practical exercises and to develop basic skills to classify and interpret remote sensing images for various applications in geography.*						
Course Outcomes:	After completing this course, student is expected: **CO1:** To understand aerial photographs and elements of image interpretation. **CO2:** To known about various sources of remote sensing data acquisition. **CO3:** To understand the remote sensing data preparation methods. **CO4**: To learn the various techniques of image enhancement. **CO5:** To understand the image classification, accuracy and change detection techniques. **CO6:** To apply the knowledge of geospatial techniques in various domains of geography.						

COURSE SYLLABUS

NOTE:
Eight questions will be set, two from each of the UNIT. The candidates are required to attempt any five questions in all selecting at least one question from each section. All questions carry equal marks. Unit I and few topics from Unit II will be taught via online mode.

Unit No.	Content of Each Unit	Hours of Each Unit
I	**POHOTOGRAMMETRY AND IMAGE INTERPRETATION** **[Course Outcome (s) No.: 1]** Aerial Photograph: Stereo Vision Test; Orientation of Stereo Model under Mirror Stereoscope; Determination of Scale on Aerial Photograph; Annotation of Satellite Image; Visual Image Interpretation.	24
II	**DATA ACQUISITION AND PREPARATION:** **[Course Outcome (s) No.: 2 & 3]** Satellite Data Download from USGS and BHUVAN (ISRO) etc.; Layer Stack; Mosaic and Subset.	22
III	**IMAGE ENHANCEMENT** **[Course Outcome (s) No.: 4]** Image Enhancement: Linear Contrast Stretch and Non-Linear Contrast Stretch, Spatial Filtering.	22

IV	**DIGITAL IMAGE CLASSIFICATION** **[Course Outcome (s) No.: 5 & 6]** Digital Image Classification: Supervised and Unsupervised Classification; Accuracy Assessment; Digital Change Detection.	22

Suggested Readings:

1. Kumar, D.; Singh, R.B. and Kaur, R. (2019). **Spatial Information Technology for Sustainable Development Goals**. Springer Nature, Switzerland.
2. Peter, J.G., Teunissen and Oliver, M. (Eds.) (2019). **Springer Handbook of Global Navigation Satellite Systems**. Springer Nature, Switzerland:
3. Gupta, R.P. (2018). **Remote Sensing Geology** (3rd Edition). Springer Nature, Switzerland.
4. Kron, G. (2017). **Global Navigation Satellite Systems: Signal, Theory & Applications**. Wilmington: Scitus Academics.
5. Chuveico, E. (2016). **Fundamentals of Satellite Remote Sensing — An Environmental Approach** (2 nd Edition). CRC Press, Roca Raton.
6. Chaunial, D.D. (2016). **Principles of Remote Sensing and Geographical Information System** (In Hindi), Sharda Pustak Bhawan, Allahabad.
7. Scott, M. (2015). **Global Navigation Satellite Systems and Their Applications**. Springer, New York.
8. Heywood, I.; Cornelius, S. and Carver, S. (2011). **An Introduction to Geographic Information Systems** (4 th Edition). Pearson Education, New Delhi.
9. Longley, P.A.; Goodchild, M.; Maguire, D.J. and Rhind, D.W. (2010). **Geographic Information Systems and Science** (3rd Edition). John Wiley, New Jersey:
10. DeMers, M. (2009). **Fundamentals of Geographic Information Systems** (4th Edition). John Wiley, New Jersey.
11. Sabins, F.F. (2007). **Remote Sensing: Principles and Interpretation** (3rd Edition). Waveland Press, Long Grove.
12. Chang, K-t. (2006). **Introduction to Geographic Information Systems**. Tata McGraw Hills, New Delhi.
13. Lillesand, T.M.; Kiefer, R.W. and Chipman, J.W. (2004). **Remote Sensing and Image Interpretation** (5th Edition). John Wiley India, New Delhi.
14. Joseph, George (2003). **Fundamental of Remote Sensing**, University's Press (India) Pvt. Ltd., Hyderabad.
15. Burrough, P.A. and McDonnell, R.A. (1998). **Principles of Geographic Information Systems**. Oxford University Press, Oxford.

Course No: DCEC 1	**Course Name:** Economic Geography				**Course Code:** SBS GEO 1 2 01 DCEC 3104		
Batch:	**Programme:**	**Semester:**	**L**	**T**	**P**	**Credits**	**Contact Hrs per Week: 4**
2021-2023	M.Sc. Geography	II	3	1	0	4	**Total Hours: 60**
Total Evaluation Marks: 100 **CIE:** 30 Marks **TEE:** 70 Marks	**Examination Duration:** 3 hours **Pre-requisite of course:** Basic knowledge of economic activities, globalization, global trade and sectors of economy.						
Course Objective	*To introduce economic geography as a sub-discipline of geography, to comprehend key concepts, and to emphasise the importance of economic geography in analysing contemporary societies and their relationships with space.*						
Course Outcomes:	After completing this course, student is expected: **CO1:** To learn the key concepts and recent trends of economic geography. **CO2:** To know the classification of economic activities, Alfred Weber and Von Thunen's Theory. **CO3:** To know about the dynamics of world economy. **CO4:** To understand the concepts of old and new industrial space. **CO5:** To understand the concepts of feminism in economic geography. **CO6:** To develop the relationship between economic activities and geographical space.						

COURSE SYLLABUS

NOTE: Eight questions will be set, two from each of the UNIT. The candidates are required to attempt any five questions in all selecting at least one question from each section. All questions carry equal marks. Unit IV and few topics from Unit III will be taught via online mode.

Unit No.	Content of Each Unit	Hours of Each Unit
I	**KEY CONCEPTS AND RECENT TRENDS** **[Course Outcome (s) No.: 1]** Definition, Scope and Approaches of Economic Geography; Key Concepts of Economic Geography: Space, Place and Scale; Theoretical Perspectives in Economic Geography; Recent Trends in Economic Geography.	15
II	**ECONOMIC THEORIES AND ACTIVITIES** **[Course Outcome (s) No.: 2 & 3]** Economic Activities: Classification of Economic Activities; Sectors of Economy (Primary, Secondary and Tertiary); Classification of Industries; Resource Based and Footloose Industries, Alfred Weber's Theory of Least Cost Location; Von Thunen's Model and Its Modifications.	15
III	**ECONOMY AND DEVELOPMENT** **[Course Outcome (s) No.: 4]** The Changing World Economy: Studying the World Economy, Economic Organisation and Spatial Change, Technology and Economic Development, Spatial Division of Labour; Old Industrial Space; New Industrial Space.	15

IV	**GENDER, TRADE AND GLOBALISATION** **[Course Outcome (s) No.: 5 & 6]** Feminism and Economic Geography: The Emergence of Feminism in Economic Geography, Globalization of Gender and Work; The Economic Geography of Global Trade: Barriers and the Changing Sectoral Composition of Global Trade, High Technology Trade and E-Commerce.	15

Suggested Readings:

1. M. Neil, Kelly F. Philip and Yeung C.W. Henry (2019). **Economic Geography: A Contemporary Introduction**, Edition 3. John Wiley & Sons.
2. MacKinnon, D., & Cumbers, A. (2018). **An Introduction to Economic Geography**: **Globalisation, Uneven Development and Place**. Routledge.
3. Saxena, H.M. (2018). **Economic Geography** (2nd Edition). Rawat Publication, Jaipur.
4. Siddhartha, K. (2018). **Economic Geography**. Kitab Mahal, New Delhi.
5. Singh, J and Singh, K.N. (2018). **Elements of Economic Geography**. Radha Publications, Delhi.
6. Barnes J. Trevor and Christophers Brett (2017). **Economic Geography: A Critical Introduction**. John Wiley & Sons.
7. Knox, P., Agnew, J. A., & McCarthy, L. (2014). **The Geography of the World Economy**. Routledge.
8. Aoyama, Yuko et.al. (2011). **Key Concepts in Economic Geography.** Sage, London.
9. Leyshon, A., Lee, R., Mc Dowell, L and Sunley, P. (Eds.) (2011) The Sage Handbook of Economic Geography, London: Sage.
10. Polenske, K. (Ed.) (2007). **The Economic Geography of Innovation**, Cambridge University Press, Cambridge.
11. Bagchi-Sen, S., & Lawton-Smith, H. (2006). **Economic Geography**. Taylor & Francis.
12. Hudson, R. (2005). **Economic Geographies: Circuits, Flows and Spaces**, London: Sage.
13. Barnes, T., Peck, J., Sheppard, E. and Tickell, A. (Eds.) (2003). **Reading Economic Geography**, London: Wiley- Blackwell.
14. Clark, G., Gertler, M. and Feldman, M. (Eds.) (2003). **The Oxford Handbook of Economic Geography**, Oxford: Oxford University Press.
15. Sheppard, E. S., & Barnes, T. J. (Eds.). (2000). **A Companion to Economic Geography**. Oxford, Blackwell.

Course No: DCEC 2	**Course Name:** Social and Cultural Geography				**Course Code:** SBS GEO 1 2 02 DCEC 3104		
Batch: 2021-2023	**Programme:** M.Sc. Geography	**Semester:** II	**L**	**T**	**P**	**Credits**	**Contact Hrs per Week:4**
			3	1	0	4	**Total Hours: 60**
Total Evaluation Marks: 100 **CIE:** 30 Marks **TEE:** 70 Marks		**Examination Duration:** 3 hours					
		Pre-requisite of course: Emergence of Social and Cultural Geography, Indian Society					
Course Objective	*Introducing the basic concepts, and development of social geography and cultural geography; acquainting about the social identities and social issues in India; and familiarizing the processes in cultural geography.*						
Course Outcomes:	After completing this course, student is expected: **CO1:** To know about the basic concepts and development of Social Geography. **CO2:** To understand about the relationship of Social Geography with Social Sciences. **CO3:** To know about the Social Identities and Social Issues in India. **CO4:** To know about the evolution and development of Cultural Geography. **CO5:** To learn about the basic concepts in Cultural Geography. **CO6:** To understand the processes in Cultural Geography.						

COURSE SYLLABUS

NOTE:
Eight questions will be set, two from each of the UNIT. The candidates are required to attempt any five questions in all selecting at least one question from each section. All questions carry equal marks. Unit I will be taught via online mode.

Unit No.	**Content of Each Unit**	**Hours of Each Unit**
I	**NATURE AND SCOPE OF SOCIAL GEOGRAPHY** **[Course Outcome (s) No. :1&2]** Concepts, Nature and Scope; Development of Social Geography; Place of Social Geography in Social Sciences; Concepts of Social Space; Relevance of Social Geography	15
II	**SOCIAL IDENTITIES AND ISSUES IN INDIA** **[Course Outcome (s) No. :3]** Social Identities in India: Ethnicity, Tribes, Caste and Religion; Mother Tongues and Language Shifts in India; Social Issues in India: Gender and Space, Sex Ratio, Health and Education, Poverty.	15

III	**BASIC CONCEPTS IN CULTURAL GEOGRAPHY** **[Course Outcome (s) No. :4 & 5]** Definition, Evolution and Development of Cultural Geography; Place of Cultural Geography within Geography; Cultural Area; Cultural Region; Cultural Hearth; Cultural Realm; Landscape and Environment.	15
IV	**PROCESSES IN CULTURAL GEOGRAPHY** **[Course Outcome (s) No. :6]** Landscape Evolution; Cultural Diffusion; Adaptation; Acculturation; Assimilation; and Resistance/ Cultural Resilience.	15

Suggested Readings:

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

Course No: DCEC 3	Course Name: Geography of Health and Well Being				Course Code: SBS GEO 1 2 03 DCEC 3104		
Batch: 2021-2023	**Programme:** M.Sc. Geography	**Semester:** II	**L**	**T**	**P**	**Credits**	**Contact Hrs Per Week: 4**
			3	1	0	4	**Total Hours: 60**
Total Evaluation Marks: 100 **CIE:** 30 Marks **TEE:** 70 Marks		**Examination Duration:** 3 hours					
		Pre-requisite of course: Basic knowledge of diseases.					

Course Objective	To acquaint the students with the role of geographical factors, viz., physical, demographic, social and economic, influencing the spatial distribution of diseases. To highlight the relation of health with nutrition, environmental degradation and urbanization; and also, to decipher the causes of the changing disease pattern. To make the students abreast of existing health-care facilities, so as to train them with better health care planning for the country.
Course Outcomes:	After completing this course, student is expected: **CO1:** To understand the concept of geography of health. **CO2: To k**now about the geographical factors which affect human health. **CO3:** To understand the classification of diseases. **CO4: To u**nderstand about pattern of diseases. **CO5:** To understand the transmission and diffusion of diseases. **CO6:** To develop the skills for health care planning and policies for future.

COURSE SYLLABUS

NOTE:
There is total five questions in this question paper and all are compulsory. Each Question carries Fourteen Marks. Question no.1 has seven sub parts and students need to answer any four parts. Question number Two to Five have three sub parts and students need to answer any two-sub part of each question. Each sub part carries seven marks. Unit III will be taught via online mode.

Unit No.	Content of Each Unit	Hours of Each Unit
I	**INTRODUCTION: GEOGRAPHY OF HEALTH** **[Course Outcome (s) No.: 1 & 2]** Nature, scope and concept of geography of health, Development of this area of specialization; its distinction from medical science. Geographical factors affecting human health and diseases arising from them, viz. physical, Social, Economic and Environmental.	15
II	**CLASSIFICATION AND PATTERN OF DISEASES** **[Course Outcome (s) No.: 3 & 4]** Classification of diseases: genetic, communicable and non-communicable; occupational and deficiency	15

	diseases. WHO classification of diseases, Pattern of World distribution of major diseases.	
III	**TRANSMISSION AND DIFFUSION OF DISEASES** **[Course Outcome (s) No.: 5]** Ecology, Etiology, Causes, Diffusion and transmission of major diseases: Cholera, Malaria, Tuberculosis, Hepatitis, Cardiovascular, Cancer, STDs and COVID-19; Deficiency disorders and problems of mal-nutrition in India.	15
IV	**HEALTH CARE PLANNING AND POLICIES** **[Course Outcome (s) No.: 6]** Health-care planning and policies: WHO, UNICEF, Red Cross; Healthcare Planning, Programme and Services in India; Inequalities in Healthcare Services in India; Family Welfare; Immunization.	15

Suggested Readings:

1. Elahi, E. (2020). **Insights in Global Health**. Routledge, London
2. Hazen, H., Anthamatten, P. (2019). **An Introduction to the Geography of Health**. Routledge, London
3. Rais, A. and Learmonth, A.T.A. (2018). **Geographical Aspects of Health and Diseases in India**. Concept Publishing, New Delhi
4. Kanaroglou, P., Delmelle, E. (2018). **Spatial analysis in Health Geography**. Routledge, LDN
5. Emch, M., Root, E.D., Carrel, M. (2017). **Health and Medical Geography**, Routledge, LDN
6. Eyles,J.,Woods, K.J.(2016). **The Social Geography of Medicine and Health**. Routledge
7. Hazra, J. (ed.) (1997). **Health Care Planning in Developing Countries**. Uni. of Calcutta, Calcutta
8. Narayan, K.V. (1997). **Health and Development- Inter-Sectoral Linkages in India**. Rawat Pub., Jaipur
9. Phillps, D.R. (1990). **Health and Health Care in the Third world**. Longman, London
10. Cliff, A. and Haggett, P. (1989). **Atlas of Disease Distribution**. Basil Blackwell. Oxford
11. Pyle, G. (1979). **Applied Medical Geography**. Winston H. Press, Silver Springs, U.S.A.
12. Learmonth A.T.A. (1978). **Patterns of Disease and Hunger- A Study in Medical Geography**. David & Charles, Victoria
13. Mc. Glashan, N.D. (1972). **Medical Geography**, Methuen, London
14. May, J.M. (1970). **The World Atlas of Diseases**. Nat. Book Trust, New Delhi
15. Stamp, L.D. (1964). **The Geography of Life and Death**. Cornell University, Ithaca.

Course No: GEC 3	Course Name: Contemporary Environmental Issues				Course Code: SBS GEO 1 2 03 GE 3104		
Batch: 2021-2023	**Programme:** M.Sc. Geography	**Semester:** II	**L**	**T**	**P**	**Credits**	**Contact Hrs per Week:4**
			3	1	0	4	**Total Hours: 60**
Total Evaluation Marks: 100 **CIE:** 30 Marks **TEE:** 70 Marks		**Examination Duration:** 3 hours					
		Pre-requisite of course: Environment, Ecosystems, Sustainable Development					
Course Objective	*Introducing the current environmental issues, the concerns and impact of climate change confronting our present-day world; acquainting the global initiatives and measures adopted relating to climate change; and familiarizing the current environmental issues in India.*						
Course Outcomes:	After completing this course, student is expected: **CO1:** To know about the current environmental issues in relation to human activities. **CO2:** To understand the concerns and impacts of climate change in the current global context. **CO3:** To learn about the global initiatives and the measures. **CO4:** To know the issues of major roadblocks to global initiatives. **CO5:**To gain knowledge about the current environmental issues relating to the Indian context. **CO6:** To know the environmental movements in India.						

COURSE SYLLABUS

NOTE:
Eight questions will be set, two from each of the UNIT. The candidates are required to attempt any five questions in all selecting at least one question from each section. All questions carry equal marks. Unit I will be taught via online mode.

Unit No.	Content of Each Unit	Hours of Each Unit
I	**CONTEMPORARY ENVIRONMENTAL ISSUES** **[Course Outcome (s) No. :1]** Urbanisation and Environment; Environment and Health; Agriculture, Industries, Transport and Environment; Energy and Environment; Resources and Environment; Global Warming; Soil Erosion; Droughts; Biodiversity Loss.	15
II	**ENVIRONMENTAL CONCERNS AND IMPACT ASSESSMENT** **[Course Outcome (s) No.: 2& 3]** Key Concerns in the Climate Change; Scientific and Political Conflicts Concerning their Impacts on Natural Resources; Food Production and the Techno-Economic Measures for Reducing Greenhouse Emissions;	15

III	**GLOBAL INITIATIVES AND MEASURES** **[Course Outcome (s) No. :4]** Major Conferences and Conventions on Environment; International Agencies; Roadblocks to Global Initiatives; Environmental Laws in India; Legislative Measures and Interventions.	15
IV	**ENVIRONMENTAL MOVEMENTS AND ISSUES IN INDIA** **[Course Outcome (s) No. :5 & 6]** Environmental Movements in India; Chipko and Apikko Movement; Multipurpose projects: Narmada Dam, Tehri Dam; River Linking and Cleaning Initiatives; Ecological Conservation and Restoration; Desertification and its Control.	15

Suggested Readings:

1. Singh, P., Singh, R. P., and Srivastava, V. (2020). **Contemporary Environmental Issues and Challenges in Era of Climate Change**. Springer, Singapore.
2. Singh, S. (2020). **Paryaavaran Boogol Ka Svaroop**. Pravalika Publication, Allahabad.
3. Chasek, P.S. (2018). **Global Environmental Politics**. Routledge.
4. Gunster, S. (2017). **This changes everything: Capitalism vs the climate**.
5. Harper, C., Harper, C.L. and Snowden, M. (2017). **Environment and Society: Human Perspectives on Environmental Issues**. Routledge.
6. Singh, R. B. (2015). **Environmental Geography of South Asia, Contributions toward a future earth Initiative**. Springer, Tokyo.
7. Rangarajan, M. (2009). **Environmental Issues in India: A Reader**. Pearson Education India.
8. Singh, R.B. and Mal, S. (2009). **Environmental Change and Biodiversity**, Rawat Publication, Jaipur.
9. Susskind, L. et. al. (eds). (2002). **Trans-boundary Environmental Negotiation: New Approaches to Global Cooperation**.
10. Toman, M. (ed). (2002). **Climate change, Economics and Policy**. Cambridge University Press.
11. Mukund, R. (1997). **Global Environmental Politics: India and the North-South Politics of Global Environmental Issues**. O.U.P, Delhi
12. Reddy, V. R. (1997). **Environmental Movements in India: Some Reflections**. FIA.
13. Makofske, W.J. and Karlin, E.F. (1995). **Technology and Global Environmental issues**. Addison Wesley, Longman, Toronto.
14. Smith, P. and Warr, K. (1991). **Global Environmental issues**. Hodder and Stoughton, London.
15. Kemp, D.D. (1990). **Global Environmental issues: A climatologized approach**. Taylor and Francis, London.

Course No: GEC 4	Course Name: Geography of India				Course Code: SBS GEO 1 2 04 GE 3104		
Batch:	**Programme:**	**Semester:**	**L**	**T**	**P**	**Credits**	**Contact Hrs per Week: 4**
2021-2023	M.Sc. Geography	II	3	1	0	4	**Total Hours: 60**
Total Evaluation Marks: 100 **CIE:** 30 Marks **TEE:** 70 Marks	**Examination Duration:** 3 hours **Pre-requisite of course:** Basic knowledge of Indian physiography, culture, demography, agriculture and transport.						
Course Objective	This course on the Geography of India assumes that the students are familiar with the basic landforms, climate, soil, vegetation and population characteristics of India. It is a course designed to enable students to broaden and deepen their understanding of India.						
Course Outcomes:	After completing this course, student is expected: **CO1:** To understand the basic concept of physiography of India. **CO2:** To know about natural vegetation and soil characteristics of India. **CO3:** To understand features of Indian agriculture. **CO4:** To learn about the new industrial policies and industrial regions. **CO5:** To know about demographic attributes and population policies. **CO6:** To learn about the development of transport network and foreign trade.						

COURSE SYLLABUS

NOTE:
Eight questions will be set, two from each of the UNIT. The candidates are required to attempt any five questions in all selecting at least one question from each section. All questions carry equal marks. Unit IV will be taught via online mode.

Unit No.	Content of Each Unit	Hours of Each Unit
I	**PHYSICAL SETUP** **[Course Outcome (s) No.: 1 & 2]** Introduction: Physiographic Regions; Drainage Systems; Indian Monsoon; Natural Vegetation and Soil.	15
II	**AGRICULTURE AND INDUSTRY** **[Course Outcome (s) No.: 3 & 4]** Agriculture: Salient Features, Problems and Solutions of Indian Agriculture; Green Revolution; Industries: New Industrial Policy and Industrial Regions.	15
III	**DEMOGRAPHY** **[Course Outcome (s) No.: 5]** Population Growth and Distribution; Sex-Ratio and Literacy Rate; Population Policy.	15

IV	**TRANSPORT AND TRADE** **[Course Outcome (s) No.: 6]** Development and Patterns of Transport Networks: Railways, Roadways and Waterways; Indian Foreign Trade.	15

Suggested Readings:

1. Bose Ashish. (2010). **India's Quest for Population Stabilisation,** National Book Trust, New Delhi.
2. Tiwari, R.C. (2010). **Geography of India**. Prayag Pustak Bhawan, Allahabad.
3. Gautam, A. (2009). **Advanced Geography of India (Second Edition)**. Sharada Pustak Bhawan, Allahabad.
4. Husain, M. (2008). **Geography of India**. Tata McGraw-Hill, New Delhi.
5. Bhalla, G. S. (2007). **Indian Agriculture Since Independence,** National Book Trust, New Delhi
6. Khullar, D.R. (2006**). India: A Comprehensive Geography**. Kalyani Pub., New Delhi.
7. Goh Cheng Leong and Gillian C. Morgan. (1999). **Human and Economic Geography.** Oxford University Press.
8. Dreze, J. & Sen A. (ed.) (1996). **India's Economic Development and Social Opportunity**. Oxford University Press, New Delhi.
9. Tirtha R., Krishan, G. (1996). **Emerging India**. Rawat, Jaipur.
10. Deshpande, C.D. (1992). **India: A Regional Interpretation, ICSSR.** Northern Book Centre, New Delhi.
11. Robinson, F. (1989). **The Cambridge Encyclopedia of India, Pakistan, Bangladesh, Sri Lanka, Nepal, Bhutan & Maldives**. Cambridge University Press, London.
12. Centre for Science & Environment (1988). **State of India's, Environment**. New Delhi.
13. Kundu A. and Raza, M. (1982). **Indian Economy: The Regional Dimension**. Spectrum Publishers, New Delhi.
14. Singh R.L. (ed.) (1971). **India-A Regional Geography, National Geographical Society of India.** Varanasi.
15. Spate, O.H.K., Learmonth, A.T.A. (1967). **India and Pakistan**. Methuen, London.

SEMESTER- III

Course No: CC 11	**Course Name:** Fundamentals of GIS and GNSS				**Course Code:** SBS GEO 1 3 11 C 3104		
Batch:	**Programme:**	**Semester:**	**L**	**T**	**P**	**Credits**	**Contact Hrs per Week: 4**
2021-2023	M.Sc. Geography	III	3	1	0	4	**Total Hours: 60**
Total Evaluation Marks: 100 **CIE:** 30 Marks **TEE:** 70 Marks	**Examination Duration:** 3 hours						
	Pre-requisite of course: Fundamentals of GIS and GNSS						
Course Objective	The course of GIS will make student understand basic data concept and its practical knowledge. The course will also aim to make students use GIS techniques effectively and efficiently.						
Course Outcomes:	After completing this course, student is expected: **CO1:** To understand the historical development of GIS **CO2:** To know the sources and data models of GIS **CO3:** To learn the database management system of GIS **CO4:** To understand the concept of GNSS **CO5:** To understand the principle, segment and error sources of GPS. **CO6:** To apply the knowledge of GIS and GPS in geographical studies.						

COURSE SYLLABUS

NOTE:
Eight questions will be set, two from each of the UNIT. The candidates are required to attempt any five questions in all selecting at least one question from each section. All questions carry equal marks. Unit IV will be taught via online mode.

Unit No.	Content of Each Unit	Hours of Each Unit
I	**BACKGROUND OF GIS** **[Course Outcome (s) No.: 1 & 2]** Definitions and Component of GIS: Historical Development of GIS; Sources of GIS Data: Spatial and Non-Spatial; GIS Data Models: Raster and Vector Data Model; Coordinate Systems: Datum and Map Projection.	15
II	**DATABASE MANAGEMENT SYSTEM** **[Course Outcome (s) No.: 3]** Attribute Data in GIS: Types of Attribute Tables, Database Management System; Database Model-Relational Model; Types and Methods of Overlay; Buffering.	15

III	**CONCEPT OF GNSS** **[Course Outcome (s) No.: 4 & 5]** Concept & Historical Background of Global Navigation Satellite System (GNSS); Principle; Operation; Segments; Sources of Errors.	15
IV	**APPLICATION OF GIS AND GNSS** **[Course Outcome (s) No.: 6]** Applications of GIS in Cadastral Mapping and *g*-Governance; Applications of GNSS in Aviation and Surveying	15

Suggested Readings:

1. Kumar, D., Singh, R.B. and Kaur, R. (2019). **Spatial Information Technology for Sustainable Development Goals**. Springer Nature, Switzerland.
2. Peter, J.G., Teunissen and Oliver, M. (Eds.) (2019). **Springer Handbook of Global Navigation Satellite Systems.** Springer Nature, Switzerland.
3. Gupta, R.P. (2018). **Remote Sensing Geology** (3rd Ed). Springer Nature, Switzerland.
4. Emery, W. and Camps, A. (2017). **Introduction to Satellite Remote Sensing**. Elsevier, Amsterdam.
5. Kron, G. (2017). **Global Navigation Satellite Systems: Signal, Theory & Applications**. Scitus Academics, Wilmington.
6. Chuveico, E. (2016). **Fundamentals of Satellite Remote Sensing — An Environmental Approach (2 nd Edition)**. CRC Press, Roca Raton.
7. Scott, M. (2015). **Global Navigation Satellite Systems and Their Applications.** Springe, New York.
8. Heywood, I.; Cornelius, S. and Carver, S. (2011). **An Introduction to Geographic Information Systems** (4 th Ed). Pearson Education, New Delhi.
9. Longley, P.A.; Goodchild, M.; Maguire, D.J. and Rhind, D.W. (2010). **Geographic Information Systems and Science** (3rd Edition)**.** John Wiley, New Jersey.
10. DeMers, M. (2009). **Fundamentals of Geographic Information Systems** (4th Edition). John Wiley, New Jersey
11. Sabins, F.F. (2007). **Remote Sensing: Principles and Interpretation** (3rd Edition). Waveland Press, Long Grove.
12. Chang, K-t. (2006). **Introduction to Geographic Information Systems**. Tata McGraw Hills, New Delhi.
13. Lillesand, T.M.; Kiefer, R.W. and Chipman, J.W. (2004). **Remote Sensing and Image Interpretation** (5th Edition). John Wiley India, New Delhi.
14. Joseph, George (2003). Fundamental of Remote Sensing, University's Press (India) Pvt. Ltd., Hyderabad.
15. Burrough, P.A. and McDonnell, R.A. (1998). **Principles of Geographic Information Systems**. Oxford University Press, Oxford.

Course No: CC 12	**Course Name:** Regional Development and Planning				**Course Code:** SBS GEO 1 3 12 C 3104		
Batch: 2021-2023	**Programme:** M.Sc. Geography	**Semester:** III	**L**	**T**	**P**	**Credits**	**Contact Hrs per Week:4**
			3	1	0	4	**Total Hours: 60**
Total Evaluation Marks: 100 **CIE:** 30 Marks **TEE:** 70 Marks		**Examination Duration:** 3 hours					
		Pre-requisite of course: Concept of Region, Growth and Development, Five-Year Plans in India					
Course Objective	*Understanding the concepts and theories of regional development; identifying the regional development strategies that have been taken up in planning processes in India; and acquainting about the region and regional issues of development involved in planning in Haryana.*						
Course Outcomes:	After completing this course, student is expected: **CO1:** To understand the regional development as a field of study and its association with geography. **CO2:** To understand the concepts of regional development. **CO3:** To understand the theories of regional development. **CO4:** To have the knowledge of planning agencies and their functions in India. **CO5:** To know the regional development strategies and planning in India. **CO6:** To know about the region and regional issues of development involved in planning in Haryana.						

COURSE SYLLABUS

NOTE:
Eight questions will be set, two from each of the UNIT. The candidates are required to attempt any five questions in all selecting at least one question from each section. All questions carry equal marks. Unit I will be taught via online mode.

Unit No.	Content of Each Unit	Hours of Each Unit
I	**BASIC CONCEPTS** **[Course Outcome (s) No. :1]** Concept and Types of Regions; Concept of Regional Development; Regional Planning as a Field of Study; Approaches and Techniques of Regional Planning.	15
II	**THEORIES OF REGIONAL DEVELOPMENT** **[Course Outcome (s) No.: 2& 3]** Growth Pole and Growth Centre, Core-Periphery, Cumulative Causation Theory, Trickle Down, Backwash Effect, Rostow's Theory, Convergence Divergence Theory, Theory of Balanced Regional Development, Spatial Integration (John Friedmann).	15

III	**REGIONAL DEVELOPMENT STRATEGIES IN INDIA** **[Course Outcome (s) No. :4]** Planning Agencies: NITI Aayog, State Planning Board; Evolution of Balanced Regional Development; Sectoral Planning; Target Area and Target Group Development Plans; Multi-Level Planning in India; Inclusive and Sustainable Development Planning.	15
IV	**REGIONAL DEVELOPMENT AND PLANNING IN HARYANA** **[Course Outcome (s) No. :5 & 6]** Regions and Regionalization – Agro-Climatic, Industrial and Urban-Metropolitan Regions; Plans and Strategies: Agricultural, Industrial and Urban Development.	15

Suggested Readings:

1. Singh, R.B., Chatterjee, Soumendu, Mishra, Mukund and Lucena, Andrews jose de. (2021). **Practices in Regional Science and Sustainable Regional Development**. Springer.
2. Nath, V. and Aggarwal, S.K. (2009). **Regional Development Planning in India.** Concept Publishing Company, New Delhi.
3. Planning Commission (2009). **Haryana Development Reports**. Government of India, New Delhi.
4. Mahapatra, A.C. and Pathak, C.R. (eds.) (2003). **Economic Liberalisation and Regional Disparities in India. Special Focus on the North Eastern Region.** Star Publishing House, Shillong.
5. Pathak, C.R. (2003). **Spatial Structure and Processes of Development in India.** Regional Science Association, Kolkata.
6. Chaudhuri, J.R. (2001). A**n Introduction to Development and Regional Planning with special reference to India.** Orient Longman, Hyderabad.
7. Chandna, R.C. (2000). **Regional Planning: A Comprehensive Text.** Kalyani Publishers, New Delhi.
8. Chandna, R.C. (2000). **Pradeshik Niyojan Tatha Vikas.** Kalyani Publication
9. Dreze, J. and Sen, A. (1996). **Indian Development: Select Regional Perspectives**, Oxford University Press.
10. Misra, R.P. (ed.) (1992). **Regional Planning: Concepts, Techniques, Policies and Case Studies** (2nd edition). Concept, New Delhi.
11. Chand, M. and Puri, V.K. (1985). **Regional Planning in India**. Allied Pub., New Delhi.
12. Gore, Charles (1984). **Regions in Question: Space, Development Theory and Regional Policy**. Methuen & Co. Ltd, London
13. Bhatt, L.S. et al. (ed.) (1982). **Regional Inequalities in India**. Society for the study of Regional Disparities, New Delhi.
14. Blunder. J. et al. (1973). **Regional Analysis and Development**. Harper & Row, London.
15. Friedmann, J. and Alonso, W. (ed.) (1973). **Regional Development and Planning.** MIT Press, Cambridge Massachesetts.

Course No: CC 13	Course Name: Population and Demographic Studies				Course Code: SBS GEO 1 3 13 C 3104		
Batch: 2021-2023	**Programme:** M.Sc. Geography	**Semester:** III	**L**	**T**	**P**	**Credits**	**Contact Hrs Per Week: 4**
			3	1	0	4	**Total Hours: 60**
Total Evaluation Marks: 100 **CIE:** 30 Marks **TEE:** 70 Marks		**Examination Duration:** 3 hours					
		Pre-requisite of course: Basic knowledge of demography, population and policies.					

Course Objective	To introduce the students with the fundamental concepts of population geography and demography with its core subject data base, methodologies, theories and measurement. To enable the students to understand population geography in relation to the study of the population growth, distribution and related policies. To familiarize the students about population, change and its related problems and their solutions.
Course Outcomes:	After completing this course, student is expected: **CO1: T**o know the fundamental difference between demography and population geography. **CO2: T**o understand the theories, dynamics and measures of population. **CO3:** To understand population profile at the global and India level. **CO4: To know about the** population policies and human development. **CO5:** To understand the challenging issues of ageing, disability and women. **CO6:** To develop an idea about the population in relation to physical environment, health, education and their problems.

COURSE SYLLABUS

NOTE:
There is total five questions in this question paper and all are compulsory. Each Question carries Fourteen Marks. Question no.1 has seven sub parts and students need to answer any four parts. Question number Two to Five have three sub parts and students need to answer any two-sub part of each question. Each sub part carries seven marks. Unit I will be taught via online mode.

Unit No.	Content of Each Unit	Hours of Each Unit
I	**DEMOGRAPHY AND POPULATION, DATA SOURCES** **[Course Outcome (s) No.: 1]** Concepts, Scope and Methodology of Population Geography; Demography and Population Geography, Sources of Population Data with Particular Reference to India- United Nation, Census of India, Vital Registration System, SRS, NSS, NFHS.	15
II	**THEORIES, DYNAMICS AND MEASUREMENTS** **[Course Outcome (s) No.: 2]** Theories and Dynamics of Population: Pre-Malthus, Malthusian and Modern Theories; Demographic Transition Theory and Spatial Pattern in India; Theory,	15

	Measurement, Trend and Pattern of Fertility, Mortality, Migration and Nuptiality (special reference to India).	
III	**POPULATION PLANNING AND POLICIES** **[Course Outcome (s) No.: 3 & 4]** Population Planning: Population Distribution and Characteristic; Population Policy: Developed and Developing Countries, India's Population Policy; Demographic Dividends, Concept of Human Development.	15
IV	**POPULATION AND RELATED ISSUES** **[Course Outcome (s) No.: 5 & 6]** Population Issues- Ageing, Disability and Women; Population and Resource; Digital Divide and Inequality, Population, Health and Education; Urbanisation and Urban Issues; Globalisation, Population, Environment and Sustainability.	15

Suggested Readings:

1. Hassan, M.I. (2020). **Population Geography: A Systematic Exposition**. Routledge India, London.
2. Bhende, A. and Kanitkar, T. (2019). **Principles of Population Studies**. Himalaya Publishing House, Mumbai.
3. Chandna, R.C. (2015). **Geography of Population: Concepts, Determination and Patterns**. Kalyani Publishers, New Delhi.
4. Chandna, R.C. (2015). **Jansankhya Bhogol**. Kalyani Publishers. New Delhi
5. Dyson, Tim (2011). **Population and Development: Demographic transition**. Rawat Publication, Jaipur
6. Siegel, J.S., Swanson D.A. (2004). **The Methods and Materials of Demography**. Emerald Group Publishing Limited. (First edition by Siegel, J.S. and Shryock, H., 1976)
7. Daugherty, H.G., Kenneth C.W.K. (1998). **An Introduction to Population** (Second Edition). The Guilford Press, New York, London.
8. Crook, N. (1997). **Principles of Population and Development**. Pergamon, New York.
9. Srinivasan, K. (1997): **Basic demographic techniques and applications**, Sage Publications, New Delhi
10. Clarke, J.I. (1992). **Population Geography** (Second Edition). Pergamon Press, Oxford England.
11. Premi M.K. (1991). **India's Population: Heading Towards a Billion**. B.R. Publishing, New Delhi.
12. Mitra, A. (1978). **India's Population: Aspects of Quality and Control** (Vol. I & II). Abhinav Publications, New Delhi.
13. Bose, A. et al. (1974). **Population in India's Development (1947-2000).** Vikas Publishing House, New Delhi.
14. Garnier, B.J. (1970). **Geography of Population**, Longman, London.
15. Bogue, D.J. (1969). **Principles in Demography**. John Wiley, New York.

Course No: CC 14	Course Name: Practical: GIS and GNSS				Course Code: SBS GEO 1 3 14 C 2024		
Batch: 2021-2023	**Programme:** M.Sc. Geography	**Semester:** III	**L**	**T**	**P**	**Credits**	**Contact Hrs. per Week: 6**
			2	0	4	4	**Total Hours: 90**
Total Evaluation Marks: 100 **CIE:** 30 Marks **TEE:** 70 Marks		**Examination Duration:** 3 hours					
		Pre-requisite of course: Basic knowledge of GIS software and GNSS.					
Course Objective	*To Develop an understanding of GIS and GPS technologies and to develop basic skills to create the database in GIS environment for various applications in geography.*						
Course Outcomes:	After completing this course, student is expected: **CO1:** To familiarizes with GIS software. **CO2:** To learn to create GIS database in software. **CO3:** To perform query analysis in GIS software. **CO4**: To create map in GIS software. **CO5:** To know about the potential of GIS. **CO6:** To know the application of GIS and GNSS.						

COURSE SYLLABUS

NOTE:
Eight questions will be set, two from each of the UNIT. The candidates are required to attempt any five questions in all selecting at least one question from each section. All questions carry equal marks. Unit IV and few topics from Unit II will be taught via online mode.

Unit No.	Content of Each Unit	Hours of Each Unit
I	**INTRODUCTION TO GIS SOFTWARE** **[Course Outcome (s) No.: 1]** Familiarization with ArcGIS and QGIS; Data Input; Geo-Referencing; Database Creation: Digitisation of Point, Line and Polygon/Area; Spatial Data Editing.	22
II	**MAPPING AND QUERY ANALYSIS** **[Course Outcome (s) No.: 2 & 3]** Attribute Data Joining; Query Analysis; Thematic Mapping; Map Layout.	22
III	**SPATIAL ANALYSIS IN GIS** **[Course Outcome (s) No.: 4]** Spatial Analysis: Area/Length Calculation; Buffer/Proximity Analysis; Overlay Analysis.	22
IV	**GPS MAPPING** **[Course Outcome (s) No.: 5 & 6]** Collection of Waypoints, data import; Routes and Area Mapping with GNSS; Creation of Maps.	24

Suggested Readings:

1. Kumar, D.; Singh, R.B. and Kaur, R. (2019). **Spatial Information Technology for Sustainable Development Goals**. Springer Nature, Switzerland.
2. Peter, J.G., Teunissen and Oliver, M. (Eds.) (2019). **Springer Handbook of Global Navigation Satellite Systems**. Springer Nature, Switzerland:
3. Gupta, R.P. (2018). **Remote Sensing Geology** (3rd Edition). Springer Nature, Switzerland.
4. Kron, G. (2017). **Global Navigation Satellite Systems: Signal, Theory & Applications**. Wilmington: Scitus Academics.
5. Chuveico, E. (2016). **Fundamentals of Satellite Remote Sensing — An Environmental Approach** (2 nd Edition). CRC Press, Roca Raton.
6. Chaunial, D.D. (2016). **Principles of Remote Sensing and Geographical Information System** (In Hindi), Sharda Pustak Bhawan, Allahabad.
7. Scott, M. (2015). **Global Navigation Satellite Systems and Their Applications**. Springer, New York.
8. Heywood, I.; Cornelius, S. and Carver, S. (2011). **An Introduction to Geographic Information Systems** (4 th Edition). Pearson Education, New Delhi.
9. Longley, P.A.; Goodchild, M.; Maguire, D.J. and Rhind, D.W. (2010). **Geographic Information Systems and Science** (3rd Edition). John Wiley, New Jersey:
10. DeMers, M. (2009). **Fundamentals of Geographic Information Systems** (4th Edition). John Wiley, New Jersey.
11. Sabins, F.F. (2007). **Remote Sensing: Principles and Interpretation** (3rd Edition). Waveland Press, Long Grove.
12. Chang, K-t. (2006). **Introduction to Geographic Information Systems**. Tata McGraw Hills, New Delhi.
13. Lillesand, T.M.; Kiefer, R.W. and Chipman, J.W. (2004). **Remote Sensing and Image Interpretation** (5th Edition). John Wiley India, New Delhi.
14. Joseph, George (2003). **Fundamental of Remote Sensing**, University's Press (India) Pvt. Ltd., Hyderabad.
15. Burrough, P.A. and McDonnell, R.A. (1998). **Principles of Geographic Information Systems**. Oxford University Press, Oxford.

Course No: DCEC 4	Course Name: Field Work: Natural Hazards and Disaster Based Project Work				Course Code: SBS GEO 1 3 04 DCEC 3014		
Batch:	**Programme:**	**Semester:**	**L**	**T**	**P**	**Credits**	**Contact Hrs per Week: 5**
2021-2023	M.Sc. Geography	III	3	0	2	4	**Total Hours: 75**
Total Evaluation Marks: 100 **CIE:** 30 Marks **TEE:** 70 Marks	**Examination Duration:** 3 hours **Pre-requisite of course:** Basic Knowledge of Hazards and Disaster; Team work skill; Critical understanding of the surroundings.						

Course Objective	*To develop basic knowledge of disaster and hazards. Develop an approach to face such havoc situations. Thorough understanding of the causes, impacts distribution and mapping of various hazards in India. Comprehensive understanding of the management strategies to face Disaster. Develop the skill to understand the risk and vulnerabilities by visiting the field and report writing.*
Course Outcomes:	After completing this course, student is expected: **CO 1:** To understand the basic knowledge of natural hazards and disasters. **CO 2:** To understand the risk and vulnerability to disaster. **CO 3:** To understand the various hazards and their causes, impacts, distribution and mapping in India. **CO 4:** To learn the comprehensive disaster preparedness plan to reduce the adverse impacts of disasters and hazards. **CO 5:** To develop a team work approach and ethical thinking to understand the risks, vulnerabilities and mitigation during field excursion. **CO 6:** To learn report writing skills.

COURSE SYLLABUS

NOTE:
Eight questions will be set, two from each of the UNIT. The candidates are required to attempt any five questions in all selecting at least one question from each section. All questions carry equal marks. Unit IV will be taught via online mode.

Unit No.	Content of Each Unit	Hours of Each Unit
I	**CONCEPTS AND DEFINITIONS:** **[Course Outcome (s) No.: 1 and 2]** Definition and Concepts of Hazards and Disaster; Understanding of Risks and Vulnerabilities; Classification of Disasters.	15
II	**DISASTERS IN INDIA:** **[Course Outcome (s) No.: 3]** Causes, Impacts, Distribution and Mapping of Disasters in India: Floods, Droughts, Cyclone, Landslide, Earthquake, Tsunami and Human Induced Disasters: Fire Hazards, Chemical, Industrial accidents.	15

III	**RESPONSES AND MITIGATION:** **[Course Outcome (s) No.: 4]** Mitigation and Preparedness; NDMA and NIDM; Indigenous Knowledge and Community based Disaster Management; Do's and Don'ts during disaster.	15
IV	**FIELD EXCURSION AND PROJECT REPORT WRITING:** **[Course Outcome (s) No.: 5,6]** The Project Report will be based on any one of the following: 1. Flood 2. Drought 3. Cyclone 4. Earthquake 5. Landslides 6. Human Induced Disasters: Fire Hazards, Chemical, Industrial accidents	30

Suggested Readings:

16. Kapur, A. (2010) **Vulnerable India: A Geographical Study of Disasters**, Sage Publication, New Delhi.
17. Modh, S. (2010) **Managing Natural Disaster: Hydrological, Marine and Geological Disasters**, Macmillan, Delhi.
18. Singh Jagbir (2007) "**Disaster Management Future Challenges and Oppurtunities"**, 2007. PublisherI.K. International Pvt. Ltd. S-25, Green Park Extension, Uphaar Cinema Market, New Delhi, India (www.ikbooks.com).
19. Srivastava, H. N. (2007). **Coastal Hazards, (Cyclone, Tsunami, and other Disasters).** National Book Trust of India, New Delhi.
20. Singh, R. B. (ed.), (2006) **Natural Hazards and Disaster Management: Vulnerability and Mitigation**, Rawat Publications, New Delhi.
21. Singh, R.B. (2005) **Risk Assessment and Vulnerability Analysis**, IGNOU, New Delhi. Chapter 1, 2 and 3
22. Stoltman, J.P. et al. (2004) **International Perspectives on Natural Disasters,** Kluwer Academic Publications. Dordrecht.
23. Sinha, A. (2001). **Disaster Management: Lessons Drawn and Strategies for Future,** New United Press, New Delhi.
24. Government of India. (1997) **Vulnerability Atlas of India**. New Delhi, Building Materials & Technology Promotion Council, Ministry of Urban Development, Government of India.
25. Hemmady, A. K.R. (1996). **Earthquake.** National Book Trust India, New Delhi.
26. Biswas, M.R. and Biswas, A.K. (1980). **Desertification Case Studies,** Pergamon, Oxford.
27. Sain, Kanwar. (1979). **The Flood Problem India.** Birla Institute of Scientific Research, New Delhi.
28. Zaruba, Q. and Menci, V. (1969). **Landslides and their Control.** Elsevier, Amsterdam.
29. Bhatia, B.M. (1967). **Famines in India,** Asia Publishing House, Delhi.
30. Mason, B.J. (1957). **The Physics of Clouds.** Clarendon Press, Oxford.

Course No: DCEC 5	Course Name: Research Methodology, Field Work and Report Writing (Physical Aspect)				Course Code: SBS GEO 1 3 05 DCEC 3104		
Batch:	**Programme:**	**Semester:**	**L**	**T**	**P**	**Credits**	**Contact Hrs Per Week: 5**
2021-2023	M.Sc. Geography	III	3	0	2	4	**Total Hours: 75**
Total Evaluation Marks: 100 **CIE:** 30 Marks **TEE:** 70 Marks	**Examination Duration:** 3 hours **Pre-requisite of course:** Basic knowledge of computer, data and data analysis. Basic knowledge of field instruments.						

Course Objective	To understand the basic concept of geomorphology-form, material and process and their identification at field. To understand the scientific methods which open the way to understand the evolution of different feature of the field. To understand the process and relation of climatic and biological factors to the field features. To develop the skill in writing a research report.
Course Outcomes:	After completing this course, student is expected: **CO1:** To understand the methods of geomorphological investigations. **CO2:** To know about the identification and interpretation of physical and chemical properties of materials. **CO3:** To understand practically the geomorphological processes. **CO4:** To learn the skills to identify landform. **CO5:** To understand the applications of Geomorphic, climatic and bio-geographical processes and their activities in relation to society. **CO6:** To learn report writing skills.

COURSE SYLLABUS

NOTE:
Eight questions will be set, two from each of the unit. The candidates are required to attempt any five questions in all selecting at least one question from each section. All questions carry equal marks. Field report will be of 10 marks and Term End examination viva-voce will be of 10 marks. Unit I will be taught via online mode.

Unit No.	Content of Each Unit	Hours of Each Unit
I	**METHODS OF INVESTIGATION OF CLIMATE GENETIC LANDSCAPE** **[Course Outcome (s) No.: 1]** Methods of Geomorphology investigation; Models and Process determination in time and space; Form: Morphometry- Introduction, General problem, General and Specific Geomorphometry, Geochronology, Palaeoclimatic reconstruction	20
II	**IDENTIFICATION AND INTERPRETATION OF MATERIAL AND PROCESS** **[Course Outcome (s) No.: 2 & 3]**	20

	Identification and Interpretation of Material Property: Physical and Chemical; Identification and Interpretation of Process: Denudation, River, Glacial, Aeolian, Coastal, Slope, Biological and Neo tectonic.	
III	**RESEARCH METHODOLOGY AND INTERPRETATION OF PALAEOCLIMATIC LANDSCAPE** **[Course Outcome (s) No.: 4]** Radiocarbon and Uranium dating methods, Application of Isotopes, Tree-ring dating, Lichenometry, Peat and Lake sediment (stratigraphy)	15
IV	**SPATIO-TEMPORAL INTERACTION AMONG LANDSCAPE, CLIMATE AND BIOSPHERIC PROCESSES** **[Course Outcome (s) No.: 5 & 6]** Interpretation of interaction of wind, humidity, clouds and biodiversity; Observation of the relationship of various landforms, flora and fauna with land-use, settlement structure and life style of people; Prepare a field survey report.	20

Suggested Readings:

1. Kothari, C.R. (2019). **Research Methodology, Methods and Techniques**. New Age international publishers, New Delhi
2. Qian, Weihong (**2017**). **Temporal Climatology and Anomalous Weather Analysis**. Springer Singapore, Singapore
3. Gomez, B. and Jones, J. P. III (2010). **Research Methods in Geography: A Critical Introduction**. John Wiley, New York.
4. Strahler, A.H. and Strahler, A.N. (2006). **Modern Physical Geography**. Fourth Edition, Willey-India, New Delhi.
5. Thornbury, W.D. (2005). **Principles of Geomorphology**. John Wiley and Sons, New York.
6. Goudie, A. (ed.) (2004). **Encyclopedia of Geomorphology**. Routledge, London.
7. Morris, D., Freeland, J., Hinchliff, S., Smith, S. (ed.) (2003). **Changing Environments**. Pd. John Wiley and Sons Ltd., The Open University, U.K.
8. Limb, M. (2001). **Qualitative Methodologies for Geographers: Issue and Debates**. Edward Arnold, London.
9. Thompson, R.D. and Perry, A. (ed.) (1997). **Applied Climatology: Principles and Practice**. Routledge, London.
10. Blaxter, L., Hughes, C. and Tight, M. (1996). **How to Research**. Open University Press, Buckingham.
11. Stoddart, D.R. (ed.) (1996). ***Process and Form in Geomorphology***. Routledge, New York.
12. Critchfield, H.J. (1987). **Climatology**. Prentice Hall, New Delhi.
13. Griffith, J.F. and Driscell, D.M. (1982). **Survey of Climatology**. Charles Merril, New York.
14. Chorley, R.J. (1972). ***Spatial Analysis in Geomorphology***. Methuen, London.
15. King, C.A.M. (1966). **Techniques in Geomorphology**. Edward Arnold, London.

Course No: DCEC 6	Course Name: Environmental Geography				Course Code: SBS GEO 1 3 06 DCEC 3104		
Batch:	**Programme:**	**Semester:**	**L**	**T**	**P**	**Credits**	**Contact Hrs per Week: 4**
2021-2023	M.Sc. Geography	III	3	1	0	4	**Total Hours: 60**
Total Evaluation Marks: 100 **CIE:** 30 Marks **TEE:** 70 Marks	**Examination Duration:** 3 hours **Pre-requisite of course:** Basic knowledge about Environment, Man-Environment relationship and Environment Degradation.						
Course Objective	The main objectives of the course are to educate students about our climate and to understand its connections to man and other species that vary in various biomes. Learn about ecosystems and how energy is transferred, as well as the concept of productivity and stability of ecosystems. To understand various environmental problems and their management strategies.						
Course Outcomes:	After completing this course, student is expected: **CO 1:** To comprehend the fundamental concepts, structure and components of the environment. **CO 2:** To understand the value of ecosystems in ensuring the sustainability of life. **CO 3:** To establish the man-environment relationship. **CO 4:** To know about the environmental degradation and various environmental problems. **CO 5:** To know the role of important organizations to mitigate environmental issue. **CO 6:** To draw attention to the environmental issues and follow appropriate majors for environmental protection.						

COURSE SYLLABUS

NOTE:
Eight questions will be set, two from each of the UNIT. The candidates are required to attempt any five questions in all selecting at least one question from each section. All questions carry equal marks. Unit IV will be taught via online mode.

Unit No.	Content of Each Unit	Hours of Each Unit
I	**BASICS OF ENVIRONMENTAL GEOGRAPHY:** **[Course Outcome (s) No.: 1,3]** Meaning, Scope, Approaches and Methods of Environmental Geography; Composition and Types of Environments; Human-Environment Relationships; Environment and Ecology: Meaning, Structure and Type of Environment; Ecology - Meaning, Scope and Concepts.	15
II	**ECOSYSTEM AND BIOGEOCHEMICAL CYCLE:** **[Course Outcome (s) No.: 2]** Ecosystem: Meaning and Concepts of Ecosystem; Trophic Levels; Food Chains and Food Webs; Energy Flow in the Ecosystem; Circulation of Matter in the Ecosystem and Biogeochemical Cycle; Ecosystem	15

	Productivity; Ecosystem Stability.	
III	**ENVIRONMENTAL DEGRADATION AND PROBLEMS:** **[Course Outcome (s) No.: 4]** Environmental Degradation; Extreme Weather Events, Hazards and Disasters; Environmental Pollution (Air, Water, Solid Waste, Soil and Noise Pollution); Environmental Problems: Global Warming, Ozone Depletion, Urban Heat Island, Land Degradation, Reduction in Biodiversity.	15
IV	**ENVIRONMEMTAL MANAGEMENT AND MITIGATION:** **[Course Outcome (s) No.: 5 & 6]** Environmental Management: Concept and Approaches; Management of Soil, Forest and mineral Resources; Conservation of Natural Resources; Environmental Policies and Organizations	15

Suggested Readings:

1. Kumar, Dilip, Singh, R.B. and Kaur, Ranjeet (2019). **Spatial Information Technology for Sustainable Development Goals**, Springer.
2. Gautam, A. (2007). **Environmental Geography**. Sharda Pustak Bhawan, Allahabad.
3. Singh, S. (2007). **Paryavaran Bhugol**. Prayag Pustak Bhawan, Allahabad.
4. Singh, S. (2006). **Environmental Geography**. Prayag Pustak Bhawan, Allahabad.
5. Rajagopalan, R. (2005). **Environmental Studies: From Crisis to Cure**. Oxford University Press, New Delhi.
6. Anjuneyulu, Y. (2004). **Introduction to Environmental Science**. B. S. Publications, Hyderabad.
7. Blaikie, P., Cannon, T. and Davis, I. (eds.) (2004). **At Risk: Natural Hazards, Peoples Vulnerability and Disasters.** Routledge, London
8. Saxena, K.K. (2004). **Environmental Studies**. University Book House Private Ltd., Jaipur
9. Athavale, R. N. (2003). **Water Harvesting and Sustainable Supply in India**. Rawat Publications, Jaipur.
10. Mathur, H. S. (2003). **Essentials of Biogeography**. Pointer Publication, Jaipur.
11. Singh, D.N., Singh, J. and Raju, K.N.P. (eds.) (2003). **Water Crisis and Sustainable Management**, Tara Book Agency, Varanasi
12. Anjuneyulu, Y. (2002). **Environmental Impact Assessment Methodologies**. B. S. Publications, Hyderabad.
13. Singh, J. (2001). **Paryavaran Evam Samvikas**. Gyanodaya Prakashan, Gorakhpur.
14. Saxena, H. M. (2000). **Environmental Management**. Rawat Publications, Jaipur and New Delhi.
15. Singh, R. B. (ed.) (1995). **Studies in Environment and Development**. Rakesh Prakashan, Varanasi.

SEMESTER- IV

Course No: DCEC 7	Course Name: Geography of India						Course Code: SBS GEO 1 4 07 DCEC 3104
Batch:	**Programme:**	**Semester:**	**L**	**T**	**P**	**Credits**	**Contact Hrs per Week: 4**
2021-2023	M.Sc. Geography	IV	3	1	0	4	**Total Hours: 60**
Total Evaluation Marks: 100 **CIE:** 30 Marks **TEE:** 70 Marks	**Examination Duration:** 3 hours **Pre-requisite of course:** Basic knowledge of Indian physiography, culture, demography, agriculture and transport.						

Course Objective	This course on the Geography of India assumes that the students are familiar with the basic landforms, climate, soil, vegetation and population characteristics of India. It is a course designed to enable students to broaden and deepen their understanding of India.
Course Outcomes:	After completing this course, student is expected: **CO1:** To understand the basic concept of physiography of India. **CO2:** To know about natural vegetation and soil characteristics of India. **CO3:** To understand features of Indian agriculture. **CO4:** To learn about the new industrial policies and industrial regions. **CO5:** To know about demographic attributes and population policies. **CO6:** To learn about the development of transport network and foreign trade.

COURSE SYLLABUS

NOTE:
Eight questions will be set, two from each of the UNIT. The candidates are required to attempt any five questions in all selecting at least one question from each section. All questions carry equal marks. Unit IV and few topics from Unit III will be taught via online mode.

Unit No.	Content of Each Unit	Hours of Each Unit
I	**PHYSICAL SETUP** **[Course Outcome (s) No.: 1 & 2]** Physiography; Drainage Systems; Climate; Natural Vegetation and Soils.	15
II	**AGRICULTURE AND INDUSTRY** **[Course Outcome (s) No.: 3 & 4]** Agriculture: Salient Features, Problems and Solutions of Indian Agriculture; Green Revolution: Components, Impact, Problems and Ecological Implications of Green Revolution; Industries: Factors Influencing Location of Industries, New Industrial Policy and Industrial Regions.	15

III	**DEMOGRAPHY** **[Course Outcome (s) No.: 5]** Population Growth and Distribution; Demographic Attributes: Sex-Ratio, Literacy, Workforce and Migration; Population Policy.	15
IV	**TRANSPORT AND TRADE** **[Course Outcome (s) No.: 6]** Development and Patterns of Transport Networks: Railways, Roadways and Waterways; Indian and Foreign Trade with Special Reference to ASEAN and SAARC Countries.	15

Suggested Readings:

1. Tiwari, R.C. (2010). **Geography of India**. Prayag Pustak Bhawan, Allahabad.
2. Bose Ashish. (2010). **India's Quest for Population Stabilisation,** National Book Trust, New Delhi.
3. Gautam, A. (2009). **Advanced Geography of India (Second Edition)**. Sharada Pustak Bhawan, Allahabad.
4. Husain, M. (2008). **Geography of India**. Tata McGraw-Hill, New Delhi.
5. Bhalla, G. S. (2007). **Indian Agriculture Since Independence,** National Book Trust, New Delhi
6. Khullar, D.R. (2006**). India: A Comprehensive Geography**. Kalyani Pub., New Delhi.
7. Goh Cheng Leong and Gillian C. Morgan. (1999). **Human and Economic Geography.** Oxford University Press.
8. Dreze, J. & Sen A. (ed.) (1996). **India's Economic Development and Social Opportunity**. Oxford University Press, New Delhi.
9. Tirtha R., Krishan, G. (1996). **Emerging India**. Rawat, Jaipur.
10. Deshpande, C.D. (1992). **India: A Regional Interpretation, ICSSR.** Northern Book Centre, New Delhi.
11. Robinson, F. (1989). **The Cambridge Encyclopedia of India, Pakistan, Bangladesh, Sri Lanka, Nepal, Bhutan & Maldives**. Cambridge University Press, London.
12. Centre for Science & Environment (1988). **State of India's, Environment**. New Delhi.
13. Kundu A. and Raza, M. (1982). **Indian Economy: The Regional Dimension**. Spectrum Publishers, New Delhi.
14. Singh R.L. (ed.) (1971). **India-A Regional Geography, National Geographical Society of India.** Varanasi.
15. Spate, O.H.K., Learmonth, A.T.A. (1967). **India and Pakistan**. Methuen, London.

Course No: DCEC 8	Course Name: Agricultural Geography				Course Code: SBS GEO 1 4 08 DCEC 3104		
Batch:	**Programme:**	**Semester:**	**L**	**T**	**P**	**Credits**	**Contact Hrs per Week: 4**
2021-2023	M.Sc. Geography	IV	3	1	0	4	**Total Hours: 60**
Total Evaluation Marks: 100 **CIE:** 30 Marks **TEE:** 70 Marks	**Examination Duration:** 3 hours **Pre-requisite of course:** Basic knowledge of agriculture, problems facing by agriculture and policies.						
Course Objective	This course will introduce students to the nature and origins of agriculture, as well as the different regions in which it is practiced. Knowledge about the spatial distribution of crops, livestock and other agricultural activities. Understanding how we examines the environmental consequences, as well as new perspectives, methods and interventions for sustainable agricultural production in the long term.						
Course Outcomes:	After completing this course, student is expected: **CO 1:** To understand about the development of agricultural geography. **CO 2:** To highlight various agricultural determinant. **CO 3:**To analyse the development and productivity of agriculture and its impacts on different sectors. **CO 4:** To understand the appropriate place to locate agriculture to avail optimum production. **CO 5:** To know about the recent trends in agriculture. **CO 6:** To know about the problems and policies of Indian agriculture.						

COURSE SYLLABUS

NOTE:
Eight questions will be set, two from each of the UNIT. The candidates are required to attempt any five questions in all selecting at least one question from each section. All questions carry equal marks. Unit IV will be taught via online mode.

Unit No.	Content of Each Unit	Hours of Each Unit
I	**BASIC CONCEPTS:** **[Course Outcome (s) No.: 1]** Meaning, Scope and Development of Agricultural Geography; Approaches of Study: Commodity, Systematic, Regional and Systems; Origin and Dispersal of Agriculture: Major Agricultural Hearths; Diffusion of Agricultural Innovations.	15
II	**DETERMINANTS OF AGRICULTURE:** **[Course Outcome (s) No.: 2 & 3]** Determinants of Agriculture: Physical, Economic, Political, Technological, Socio-cultural; Land Reforms; Land Use Survey; Agricultural Concepts and their Measurements: Cropping Pattern, Crop Concentration, Cropping Intensity, Degree of	15

	Commercialisation, Diversification and Specialization, Efficiency and Productivity; Crop Combination Regions.	
III	**THEORIES OF AGRICULTURAL LOCATION AND DELINEATION:** **[Course Outcome (s) No.: 4]** Theories of Agricultural Location: Von Thunen's Model and its Modification – Sinclair's Approach; Concept of Agricultural Region: Whittlesey's Classification of Agricultural Regions; Agricultural Typology; Agro-Climatic Regions of India; Land use and Land Capability Classification.	15
IV	**POLICIES & RECENT TRENDS OF AGRICULTURE** **[Course Outcome (s) No.: 5 & 6]** Land Use and Shifting Cropping Pattern; New Trends in Indian Agriculture: Green Revolution, White Revolution; Food Deficit and Food Surplus Regions; Nutritional Index; Problems & Policies of Indian agriculture; Agriculture and Environmental Degradation.	15

Suggested Readings:

1. Mohammad, N. and Rai, S.C. (2014). **Agricultural Diversification and Food Security in the Mountain Ecosystem**, Concept Publishing Company, New Delhi.
2. Ferroni, Marco, 2013. **Transforming Indian agriculture- India 2040: Productivity, Markets and Institutions**, Sage Publications, New Delhi.
3. Cakmak, I. and Welch, R. M. (eds), 2009. **Impacts of agriculture on Human Health and Nutrition**, EOLSS Publications, UK.
4. Wright J. 2009. **Sustainable agriculture and food security in an era of oil scarcity**, Earthscan, London.
5. White P. 2007. **Emergence of agriculture: A global view, Routledge**, London.
6. Shafi, M. 2006. **Agricultural Geography**. Pearson Education, Delhi.
7. Singh, R. B. 2000. **Environmental Consequences of Agricultural Development: A Case Study from the Green Revolution state of Haryana, India**, Agriculture, Ecosystems and Environment 82, 97–103.
8. Burch, D., Gross, J. and Lawrence, G. (eds.), 1999. **Restructuring Global and Regional Agriculture**, Ashgate Publishing Company, Burlington.
9. Roling, N.G., and Wageruters, M.A.E. (eds.) 1998. **Facilitating Sustainable Agriculture**, Cambridge University Press, Cambridge.
10. Young, A. 1998. **Landuse Resources: Now and for the Future**, Cambridge University Press, Cambridge.
11. Singh, J., and Dhillon, S.S. 1994. **Agricultural Geography**, Tata McGraw Hill, New Delhi.
12. Tiwari, R. and Singh, B. 1994. **Krishi Bhoogol**, Prayag Pustak Bhandar, Allahabad. (Hindi).
13. Bryant, C.R., Johnston, T.R. 1992. **Agriculture in the City Countryside**, Belhaven Press, London.
14. Mohammad, N. 1992. **New Dimension in Agriculture Geography**, Vol. I to VIII, Concept Publishing Company, New Delhi.
15. Grigg, D.B. 1984. **Introduction to Agricultural Geography**, Hutchinson, London.

Course No: DCEC 9	Course Name: Geography of Central Places				Course Code: SBS GEO 1 4 09 DCEC 3104		
Batch: 2021-2023	**Programme:** M.Sc. Geography	**Semester:** IV	**L**	**T**	**P**	**Credits**	**Contact Hrs Per Week: 4**
			3	1	0	4	**Total Hours: 60**
Total Evaluation Marks: 100 **CIE:** 30 Marks **TEE:** 70 Marks		**Examination Duration:** 3 hours					
		Pre-requisite of course: Basic knowledge of central place theory and other location theories.					

Course Objective	To understand the genesis and geographical foundation of central places. To understand the nature of central place function and its pattern, hierarchy. To know the measurement of centrality and hierarchy central places along with its relation to region, periphery and other location and regional development theories to central places.
Course Outcomes:	After completing this course, student is expected: **CO1:** To understand the genesis and geographical foundation of central places. **CO2:** To know about the behavioural and normative theory of settlement and nature of central function of a place. **CO3:** To understand the measurement of centrality and hierarchy. **CO4:** To learn the inter-linkages of central place and region. **CO5:** To understand the relation between central place theory and other locational theories. **CO6:** To develop the skills to use central place theory in development and planning for future.

COURSE SYLLABUS

NOTE:
There is total five questions in this question paper and all are compulsory. Each Question carries Fourteen Marks. Question no.1 has seven sub parts and students need to answer any four parts. Question number Two to Five have three sub parts and students need to answer any two-sub part of each question. Each sub part carries seven marks. Unit I will be taught via online mode.

Unit No.	Content of Each Unit	Hours of Each Unit
I	**GENESIS AND FOUNDATION OF CENTRAL PLACES** **[Course Outcome (s) No.: 1]** Genesis: Concept of Central Places, attributes; and principles of central places, process of formation of central places. Geographical foundations of Central Places: Locational arrangement of nodes, spacing, dispersion and localisation, clustering and competition, Economies of agglomeration.	15
II	**THEORY AND FUNCTIONS** **[Course Outcome (s) No.: 2]** Behavioural and Normative Settlement theory; Nature	15

	of central functions, locational pattern of functions within a central place region; hierarchy of nodal centers based on functions and size.	
III	**CENTRALITY, HIERARCHY AND REGIONS** **[Course Outcome (s) No.: 3 & 4]** Methods of measurement of centrality and hierarchy (like central score, central tendency, population threshold and graph theory); hierarchy of settlements based on hierarchy of functions; Central Place and Region: Factors affecting delimitation of central place region (like commutation, communication, flow of goods and services etc.), forms of interaction and analysis of gradient; Centre-periphery contrast.	15
IV	**LOCATIONAL THEORIES AND DEVELOPMENT PERSPECTIVES** **[Course Outcome (s) No.: 5 & 6]** Central Place theory in relation to other locational theories and regional development and Planning; Central Place system in India; Case studies of metropolitan city; Rural service Centers and Market; Centrality, Perception and Future of Central Place.	15

Suggested Readings:

1. Sengar, B., Hovell, L., McMillin (2020). **Space and Places in Western India**. Routledge
2. Bansal, S.C. (2018). **Nagariya Bhugol.** Meenakshi Prakashan. Meerut
3. Bird, J. (2013). **Centrality and Cities**. Routledge, Oxford
4. Hough, M. (2004). **City Form and Natural Process**. Routledge, Oxford
5. Mishra, R.P. and K. Mishra (1998). **Million Cities of India; Growth Dynamics, Internal Structure, Quality of Life and Planning Perspectives**. Sustainable Development Foundation, India Vol I and II
6. Lefebvre, H. (1996). **Writings on Cities**. translated and edited by Eleonore Kofman and Elizabeth Lebas, Blackwell Publishers, U.K
7. Ramachandran, R. (1992). **Urbanisation and Urban Systems in India**. Oxford University Press, New Delhi
8. Dogan, M. and John D. K (ed.) (1988). **The Metropolis Era**. Vol 2 Mega Cities, Sage Publications, New Delhi
9. King, L. J. (1986). **Central Place Theory**. Saga Publications, New Delhi
10. Prakasa, Rao, V.L.S. (1983). **Urbanisation in India; Spatial Dimensions**. Concept Publishing Co., New Delhi
11. Mitra, A., Mukherjee S and Bose R. (1980). **Indian Cities**. Abhinav Publication's, New Delhi
12. Haggett, P, Andrew D. et.al. (eds) (1979). **Locational Models.** Arnold Heinemann
13. Nangia, S. (1976): **Delhi Metropolitan Region**, K.B. Publications, New Delhi
14. Baskin, C.W, (Translator) (1966). **Central Places in Southern Germany**. Prentice-Hall Inc. Englewood Cliffs New Jersey. (Originally written by C.W. Christaller in German with title Die Zentralen Orte Suddevtsch Land in 1933).
15. Qazi, Ahmad (1965). **Indian Cities, Characteristics and Correlates**. University of Chicago, U.S.A.

Course No: DCEC 10	Course Name: Political Geography				Course Code: SBS GEO 1 4 10 DCEC 3104		
Batch: 2021-2023	**Programme:** M.Sc. Geography	**Semester:** IV	**L**	**T**	**P**	**Credits**	**Contact Hrs per Week: 4**
			3	1	0	4	**Total Hours: 60**
Total Evaluation Marks: 100 **CIE:** 30 Marks **TEE:** 70 Marks		**Examination Duration:** 3 hours **Pre-requisite of course:** Basic knowledge of geopolitics, globalisation, nation, nation-state and political parties of India.					
Course Objective	*Understand the key concepts in contemporary political geography, such as the state, nation, nation-state, and nation-building. They also understand geopolitics and geostrategic views from a global perspective, as well as the current challenges of politics at various scales.*						
Course Outcomes:	After completing this course, student is expected: **CO1:** To understand the nature and scope of political geography, forms of governance and globalisation. **CO2:** To know the key concepts of state, nation, nation-state and nation building. **CO3:** To understand the challenges and changing nature of modern state and politics of differences. **CO4:** To know the concept of geopolitics and global geostrategic views. **CO5:** To understand the India as a regional power in South Asia. **CO6:** To learn the linkages of space and politics at local level.						

COURSE SYLLABUS

NOTE:
Eight questions will be set, two from each of the UNIT. The candidates are required to attempt any five questions in all selecting at least one question from each section. All questions carry equal marks. Unit IV and few topics from Unit II will be taught via online mode.

Unit No.	Content of Each Unit	Hours of Each Unit
I	**SCOPE AND DEVELOPMENT** **[Course Outcome (s) No.: 1]** Nature, Scope and Development of Political Geography; Perspective: World Systems, Place, and Globalisation; Forms of Governance: Unitary and Federal	15
II	**CONCEPT OF NATION, STATE AND NATION BUILDING** **[Course Outcome (s) No.: 2 & 3]** Frontiers and Boundaries: Concepts and Classification; Concepts of Nation, State, Nation-State and Nation Building; The politics of differences: Language, Religion, Ethnicity and Culture	15

III	**GEOPOLITICS AND GLOBAL STRATEGIC SCENARIOS** **[Course Outcome (s) No.: 4 & 5]** Rise and Demise of German Geopolitics; Global Strategic Views of Mackinder and Spykman; Regional organisation of Cooperation: SAARC, ASEAN, OPEC & EU	15
IV	**REGIONAL AND LOCAL LEVEL PERSPECTIVES IN INDIA** **[Course Outcome (s) No.: 6]** India as a regional power in South Asia; Geopolitical Significance of Indian Ocean; National and Regional political parties in India; Inter-state water disputes.	15

Suggested Readings:

1. S, Adhikari and R. Adhikari. (2020). **Rajnitik Bhugol.** Sharda Pustak Bhawan, Uttar Pradesh
2. Flint, Collin and Taylor, P.J. (2011). **Political Geography**. Pearson, New Delhi.
3. Gallaher, Carolyn et.al. (2009). **Key Concepts in Political Geography**. Sage, New Delhi.
4. Cox, Kevin R. (2008). **The Sage Handbook of Political Geograph**. Sage, New Delhi.
5. Dodds, Klaus (2007). **Geopolitics**. Oxford University Press, New York.
6. Blacksell, Mark (2003). **Political Geography**. Routledge, London.
7. Dicken, Peter (2003). **Global Shift**. Sage, New Delhi.
8. Jones, Martin, Rhys Jones and Michael Woods (2003). **An Introduction to Political Geography**. Routledge, London.
9. Khor, Martin (2001). **Rethinking Globalization**. Zed Books, London.
10. Dikshit, R.D. (2000). **Political Geography: The Spatiality of Politics**. Tata McGraw Hill, New Delhi.
11. Nash, Kate (2000). **Readings in Contemporary Political Sociology**. Blackwell, Oxford.
12. Agnew, J.A. (1998). **Geopolitics**. Routledge, London.
13. Painter, J. (1995). **Politics, Geography and Political Geography**. Arnold, London.
14. Agnew, J.A. (1987). **Place and Politics**. Allen and Unwin, Boston.
15. Short, J.R. (1982). **An Introduction to Political Geography**. Routledge and Kegan Paul, London.

Course No: DCEC 11	**Course Name:** Rural Geography				**Course Code:** SBS GEO 1 4 11 DCEC 3104		
Batch: 2021-2023	**Programme:** M.Sc. Geography	**Semester:** IV	**L**	**T**	**P**	**Credits**	**Contact Hrs per Week:4**
			3	1	0	4	**Total Hours: 60**
Total Evaluation Marks: 100 **CIE:** 30 Marks **TEE:** 70 Marks		**Examination Duration:** 3 hours					
		Pre-requisite of course: Rural Settlement, Rural factors of underdevelopment					

Course Objective	*Introducing the idea of rural development, historical perspective and philosophy of rural development; familiarizing about the rural society, social morphology, rural development plans and strategies in India; and learning about the rural development and sustainable environment in India.*
Course Outcomes:	After completing this course, student is expected: **CO1:** To understand the concepts, historical perspective and philosophy of rural development. **CO2:** To learn the aspects of rural society in India. **CO3:** To understand social morphology of rural India. **CO4:** To know the rural development plans and strategies in India. **CO5:** To review the different components of rural development. **CO6:**To develop an idea about rural development and sustainable environment in India.

COURSE SYLLABUS

NOTE:
Eight questions will be set, two from each of the UNIT. The candidates are required to attempt any five questions in all selecting at least one question from each section. All questions carry equal marks. Unit I will be taught via online mode.

Unit No.	**Content of Each Unit**	**Hours of Each Unit**
I	**CONCEPTS** **[Course Outcome (s) No. :1]** Idea of Rural Development; Historical Perspective of Gram Swarajya: Pre-Independence and Post-Independence; Gandhian Philosophy of Rural Development.	15
II	**RURAL SOCIETY AND SOCIAL MORPHOLOGY** **[Course Outcome (s) No.: 2& 3]** Aspects of Rural Society, Culture and Practices; Social Morphology of Rural India; Territoriality of Rural Society; Traditional Wisdom and Rural Development.	15

III	**RURAL DEVELOPMENT PLAN AND STRATEGIES IN INDIA** **[Course Outcome (s) No. :4]** Community Development, Target Area Development, Target Group Development, Integrated Development, Panchayati Raj Institutions and Bottom-Up Approach, Watershed Development Approach; Local Resource Based Development Strategies.	15
IV	**RURAL DEVELOPMENT AND SUSTAINABLE ENVIRONMENT** **[Course Outcome (s) No. :5 & 6]** Rural Health, Education, Employment, Infrastructure and Amenities; Food Security; SDGs; Well-Being and Happiness; Sustainable Environment.	15

Suggested Readings:

1. Anand, S. (2013). **Dynamics of Rural Development**. Research India Press, Delhi.
2. Singh, K. (2011). **Gramin Vikas**. Rawat Publications.
3. Nath, V. (2010). **Rural Development and Planning in India**. Concept, New Delhi
4. Madan, G.R. (2010). **Indian Rural Problems**. Radha Publications, New Delhi.
5. Singh, K. (2007). **Rural Development- Principles, Policies and Management**. Sage, New Delhi.
6. Krishnamurthy, J. (2000). **Rural Development - Problems and Prospects**. Rawat Publs, Jaipur.
7. Ramachandran, H. and Guimaraes, J.P.C. (1991). **Integrated Rural Development in Asia–Leaning from Recent Experience**. Concept Publishing, New Delhi, India
8. Desai, V. (1986). **Rural Development** (Vol-1-6). Himalayan Publishing, House New Delhi.
9. Rao R.N (1986). **Strategy for Integrated Rural Development**. B.R Publication, New Delhi.
10. UNAPDI. (1986). **Local Level Planning and Rural Development: Alternative Strategies**. Concept Publs. Co, New Delhi. (United Nations Asian & Pacific Development Institute, Bangkok)
11. Singh, R.B. (1985). **Geography of Rural Development**. Inter India, New Delhi.
12. Misra, R. P. (ed.) (1985). **Rural Development: Capitalist and Socialist Paths** (Vol. 1). Concept, New Delhi.
13. Hugh D. Clout (1972). **Rural Geography- An Introduction Survey**. Pergamon Press, New York.
14. Srinivas. M.N (1968). **Village India**. Asia Publication House, Bombay.
15. Sinha, R.N.P., **Geography and Rural Development**. Manohar Publishers and Distributors, New Delhi.

Course No: DCEC 12	**Course Name:** Natural Hazards and Disaster Management				**Course Code:** SBS GEO 1 4 12 DCEC 3104		
Batch: 2021-2023	**Programme:** M.Sc. Geography	**Semester:** IV	**L**	**T**	**P**	**Credits**	**Contact Hrs per Week: 4**
			3	1	0	4	**Total Hours: 60**
Total Evaluation Marks: 100 **CIE:** 30 Marks **TEE:** 70 Marks		**Examination Duration:** 3 hours					
		Pre-requisite of course: Basic knowledge of hazards, disaster, and National Disaster Management Policy.					
Course Objective	*The course is intended to provide a general concept in the dimensions of disasters caused by nature beyond the human control as well as the disasters and environmental hazards induced by human activities with emphasis on disaster preparedness, response, recovery, planning and management.*						
Course Outcomes:	After completing this course, student is expected: **CO1:** To understand the basic concept of different types of natural hazards and disasters. **CO2:** To understand the disaster preparedness and response strategy and role of ICT in disaster management. **CO3:** To know the role of various stakeholders in planning policies. **CO4:** To learn the concept of recovery and rehabilitation. **CO5:** To understand the national disaster management policy. **CO6:** To know the role of geospatial technologies in disaster management.						

COURSE SYLLABUS

NOTE:
Eight questions will be set, two from each of the UNIT. The candidates are required to attempt any five questions in all selecting at least one question from each section. All questions carry equal marks. Unit IV and few topics from Unit II will be taught via online mode.

Unit No.	Content of Each Unit	Hours of Each Unit
I	**CONCEPTS OF HAZARDS AND DISASTER** **[Course Outcome (s) No.: 1&2]** Concept of Hazards, Risk, Vulnerability, Disaster and Resilience; Types of disaster: Natural - Flood, Drought, Landslide, Earthquake, and Avalanche; Manmade Disaster – Nuclear, Chemical and Biological.	15
II	**DISASTER PLAN AND PROGRAMMES** **[Course Outcome (s) No.: 2 & 3]** Disaster Preparedness: Concept, Plan, Prediction, Early Warning System, Role of ICT, National and International Programmes and Policies, NGOs/Civil Societies; Disaster Responses: Role of Multiple Stockholders, Psychological and Medical Health Responses.	15

III	**POST DISASTER PLANNING** **[Course Outcome (s) No.: 4 & 5]** Reconstruction and Rehabilitation as a Means of Development**,** Damage Assessment, Long Term Recovery and Counter Disaster Planning.	15
IV	**DISASTER POLICY, MANAGEMENT AND GEOSPATIAL TECHNOLOGY** **[Course Outcome (s) No.: 6]** National Disaster Management Policy; Role of Remote Sensing, GIS and GNSS in Disaster Management.	15

Suggested Readings:

1. Kapur, A. (2010) **Vulnerable India: A Geographical Study of Disasters**, Sage Publication, New Delhi.
2. Modh, S. (2010) **Managing Natural Disaster: Hydrological, Marine and Geological Disasters**, Macmillan, Delhi.
3. Singh Jagbir (2007) "**Disaster Management Future Challenges and Oppurtunities"**, 2007. PublisherI.K. International Pvt. Ltd. S-25, Green Park Extension, Uphaar Cinema Market, New Delhi, India (www.ikbooks.com).
4. Srivastava, H. N. (2007). **Coastal Hazards, (Cyclone, Tsunami, and other Disasters).** National Book Trust of India, New Delhi.
5. Singh, R. B. (ed.), (2006) **Natural Hazards and Disaster Management: Vulnerability and Mitigation**, Rawat Publications, New Delhi.
6. Singh, R.B. (2005) **Risk Assessment and Vulnerability Analysis**, IGNOU, New Delhi. Chapter 1, 2 and 3
7. Stoltman, J.P. et al. (2004) **International Perspectives on Natural Disasters,** Kluwer Academic Publications. Dordrecht.
8. Sinha, A. (2001). **Disaster Management: Lessons Drawn and Strategies for Future,** New United Press, New Delhi.
9. Government of India. (1997) **Vulnerability Atlas of India**. New Delhi, Building Materials & Technology Promotion Council, Ministry of Urban Development, Government of India.
10. Hemmady, A. K.R. (1996). **Earthquake.** National Book Trust India, New Delhi.
11. Biswas, M.R. and Biswas, A.K. (1980). **Desertification Case Studies,** Pergamon, Oxford.
12. Sain, Kanwar. (1979). **The Flood Problem India.** Birla Institute of Scientific Research, New Delhi.
13. Zaruba, Q. and Menci, V. (1969). **Landslides and their Control.** Elsevier, Amsterdam.
14. Bhatia, B.M. (1967). **Famines in India,** Asia Publishing House, Delhi.
15. Mason, B.J. (1957). **The Physics of Clouds.** Clarendon Press, Oxford.

Course No: DCEC 13	Course Name: Practical: Advanced Spatial Information Technology				Course Code: SBS GEO 1 4 13 DCEC 3104		
Batch: 2021-2023	**Programme:** M.Sc. Geography	**Semester:** IV	**L**	**T**	**P**	**Credits**	**Contact Hrs per Week: 6**
			2	0	4	4	**Total Hours: 90**
Total Evaluation Marks: 100 **CIE:** 30 Marks **TEE:** 70 Marks		**Examination Duration:** 3 hours					
		Pre-requisite of course: Basic understanding of Geospatial Technology					
Course Objective	*The course is intended to provide a concept of Spatial Information Technology such as Terrain Mapping, Digital Elevation Model, Spatial interpolation, Multicriteria Analysis, and Google Earth Applications.*						
Course Outcomes:	After completing this course, student is expected: **CO1:** To understand the basics concept of Spatial Information Technology. **CO2:** To learn about Digital Elevation Model (DEM). **CO3:** To understand the concept of spatial interpolation techniques. **CO4:** To understand the concept of Multicriteria Analysis. **CO5:** To learn the applications of Multicriteria Analysis. **CO6:** To learn the google earth different functions and applications.						

COURSE SYLLABUS

NOTE:
Eight questions will be set, two from each of the UNIT. The candidates are required to attempt any five questions in all selecting at least one question from each section. All questions carry equal marks. Unit I will be taught via online mode.

Unit No.	Content of Each Unit	Hours of Each Unit
I	**BASIC CONCEPTS AND TERRAIN ANALYSIS** **[Course Outcome (s) No.: 1&2]** Concept and Applications of Spatial Information Technology; Digital Elevation Model (DEM) ; Slope; Aspect; Watershed Delineation	22
II	**SPATIAL ANALYSIS – 1 : INTERPOLATION TECHNIQUE** **[Course Outcome (s) No.: 3]** Inverse Distance Weighted Interpolation (IDW); Kriging; Spline	22
III	**SPATIAL ANALYSIS – 2 : MULTICRITERIA ANALYSIS** **[Course Outcome (s) No.: 4 & 5]** Suitable site for Solid Waste Disposable Site; Suitable site for School: Suitable site for Hospital	22
IV	**WORKING WITH GOOGLE EARTH** **[Course Outcome (s) No.: 6]** Familiarize with Google Earth; Downloading and Mosacking Satellite Imagery; 3D Views; Online digitization on Google Earth; Conversion of kml/kmz file into	24

	Shapefile.	

Suggested Readings:

1. Kumar, D.; Singh, R.B. and Kaur, R. (2019). **Spatial Information Technology for Sustainable Development Goals**. Springer Nature, Switzerland.
2. Peter, J.G., Teunissen and Oliver, M. (Eds.) (2019). **Springer Handbook of Global Navigation Satellite Systems**. Springer Nature, Switzerland:
3. Gupta, R.P. (2018). **Remote Sensing Geology** (3rd Edition). Springer Nature, Switzerland.
4. Kron, G. (2017). **Global Navigation Satellite Systems: Signal, Theory & Applications**. Wilmington: Scitus Academics.
5. Chuveico, E. (2016). **Fundamentals of Satellite Remote Sensing — An Environmental Approach** (2 nd Edition). CRC Press, Roca Raton.
6. Chaunial, D.D. (2016). **Principles of Remote Sensing and Geographical Information System (In Hindi),** Sharda Pustak Bhawan, Allahabad.
7. Scott, M. (2015). **Global Navigation Satellite Systems and Their Applications**. Springer, New York.
8. Heywood, I.; Cornelius, S. and Carver, S. (2011). **An Introduction to Geographic Information Systems** (4 th Edition). Pearson Education, New Delhi.
9. Longley, P.A.; Goodchild, M.; Maguire, D.J. and Rhind, D.W. (2010). **Geographic Information Systems and Science** (3rd Edition). John Wiley, New Jersey:
10. DeMers, M. (2009). **Fundamentals of Geographic Information Systems** (4th Edition). John Wiley, New Jersey.
11. Sabins, F.F. (2007). **Remote Sensing: Principles and Interpretation** (3rd Edition). Waveland Press, Long Grove.
12. Chang, K-t. (2006). **Introduction to Geographic Information Systems**. Tata McGraw Hills, New Delhi.
13. Lillesand, T.M.; Kiefer, R.W. and Chipman, J.W. (2004). **Remote Sensing and Image Interpretation** (5th Edition). John Wiley India, New Delhi.
14. Joseph, George (2003). **Fundamental of Remote Sensing**, University's Press (India) Pvt. Ltd., Hyderabad.
15. Burrough, P.A. and McDonnell, R.A. (1998). **Principles of Geographic Information Systems**. Oxford University Press, Oxford.

9. TEACHING-LEARNING PROCESS

Teaching - learning process is aimed at capacitating learners to achieve the determined learning results corresponding to the courses of programmes. This may include lectures followed by Q&A session or group discussion, practical work, use of prescribed textbooks, electronic resources and other self-study materials, project work, which may be individual or team-based, activities devoted to subject-specific and interdisciplinary skills development, internship and visits to industrial or other research facilities etc.

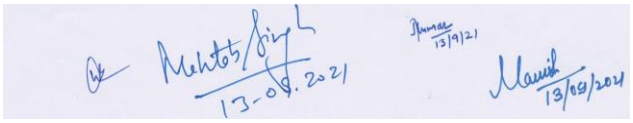
The result-based method, especially in the frame of Master's programme in geography, expects an important change from teacher-centric to learner-centric education and from passive to participatory instructions. Preparation for teaching comes to be crucial. Practical abilities, together with realization of interconnection between theory and experimentation, make up a significant phase of the teaching-learning method. Teaching plans, directed by such a framework, consist of lectures assisted by tutorials; field-based education; use of prescribed reading materials and other self-study materials; project work, some of which may be team-based; activities conceived to serve the development of subject related abilities; internship and visits to field sites, and other research means.

The faculty should promote learning on a proportionate scale of including lectures (listening/hearing), laboratory (scientific analysis and experiments) and field-based (collecting/participating). In order to achieve its objective of focused process based learning and holistic development, a variety of knowledge delivery methods will be used like:

- Lectures
- Discussions
- Simulations
- Role Playing
- Participative Learning
- Interactive Sessions
- Seminars
- Research-based Learning/Dissertation or Project Work
- Technology-embedded Learning

10. IMPLEMENTATION OF BLENDED LEARNING

Blended Learning is a pedagogical approach that combines face to-face classroom methods with computer-mediated activities in the process of teaching and learning. It implies nice



blend of face-to-face and online activities to make the learning processes more interesting and engaging. It focuses on integration of traditional classroom activities and innovative ICT-enabled strategies. It emphasises student-centric learning environment where the teacher is the facilitator for productive and measurable learning outcomes. It optimises and compliments the face-to-face learning, giving ample freedom and flexibility to the students and teachers to access and explore the wide range of open-access sources such as video lectures, podcasts, recordings and articles through digital platforms. It gives freedom and autonomy to the teachers in selection of appropriate digital platforms, resources and time-slots to complement and supplement face to face learning. The Blended Learning doesn't undermine the role of the teacher, rather it gives him/her an opportunity to explore the unexplored in accordance with the requirements of the curriculum.

Key features of Blended Learning

- **Student-Centric Pedagogical Approach** focusing on flexibility in timing, quality content, needs and interests of students and freedom to study through the mode of his/her choice;
- Freedom to Select variety of mediums and techniques;
- Increased student engagement in learning;
- Enhanced teacher and student interaction;
- Improved student learning outcomes;
- More flexible teaching and learning environment;
- More responsive for self and continuous learning;
- Better opportunities for experiential learning;
- Increased learning skills;
- Greater access to information, improved satisfaction and learning outcomes.

Note: Resolution no (c) as per minutes circulated by VC office**:** It was resolved that Blended Learning with 40% component of online teaching and 60% face to face classes for each programme, be adopted

11. ASSESSMENT AND EVALUATION

A variety of assessment methods that are appropriate within a given disciplinary area and a programme of study will be used. Priority will be accorded to formative assessment. Learning outcomes will be assessed using techniques such as the following: time-constrained examinations, closed-book and open-book tests, problem-based assignments, practical assignments, laboratory reports, observation of practical skills, individual project reports (case study reports), team project reports, oral presentations, seminar presentation, viva voce interviews, computerized adaptive testing, peer and self-assessment, etc. For Geography course the methods of assessment shall include the following:

- Continuous Comprehensive Evaluation at regular after achievement of each Course-level learning outcome
- Formative Assessment on the basis of activities of a learner throughout the programme instead of one-time assessment
- Oral Examinations to test presentation and communication skills
- Open Book Examination for better understanding and application of the knowledge acquired
- Group Examinations on Problem solving exercises
- Seminar Presentations
- Review of Literature
- Collaborative Assignments

12. KEYWORDS

- LOCF
- NEP-2020
- Blended Learning
- Face to face (F to F) Learning
- Programme Outcomes
- Programme Specific Outcomes
- Course-level Learning Outcomes
- Postgraduate Attributes
- Learning Outcome Index
- Formative Assessment and Evaluation
- Comprehensive and Continuous Evaluation

13. REFERENCES

- National Education Policy-2020. https://www.education.gov.in/sites/upload_files/mhrd/files/NEP_Final_English_0.pdf
- The draft subject specific LOCF templates available on UGC website. https://www.ugc.ac.in/ugc_notices.aspx?id=MjY5OQ==
- Draft Blended Mode of Teaching and Learning: Concept Note available on UGC website. https://www.ugc.ac.in/pdfnews/6100340_Concept-Note-Blended-Mode-of-Teaching-and-Learning.pdf
- https://www.du.ac.in/du/uploads/Revi_syll_19082019/19082019_Geography%20BA%20Hons%20&%20Prog%20_CBCS%20Str.pdf
- http://du.ac.in/du/uploads/RevisedSyllabi1/24072019_DU%20MA%20Geography%20CBCS%20Syllabus%20PDF%2018072019.pdf
- https://www.bhu.ac.in/syllabus/M.Sc_Syllabi.pdf
- https://www.allduniv.ac.in/curtailed-syllabus-and-timetable.php
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- https://cutn.ac.in/geography/