SCHEME AND SYLLABI

Page 01-60

Chaudhary Devi Lal University, Sirsa
(Established by the State Legislature Act 9 of 2003)

Scheme of Examination & Syllabi

(Includes Modification/changes in the scheme and syllabi of B.A./B.Sc. Geography (1st & 2nd Year) already implemented for Affiliated Colleges of CDLU, Sirsa as per NEP-2020 w.e.f. session 2024-25.)

For

B.A/B.Sc. Geography (01 Year under Graduate Certificate)
B.A/B.Sc. Geography (02 Years under Graduate Diploma)
B.A/B.Sc. Geography (03 Years under Graduate Degree)
B.A/B.Sc. (Honors) Geography (04 Years under Graduate Degree)
B.A/B.Sc. (Honors with Research) Geography (04 Years under Graduate Degree)

As per NEP 2020
with effect from the session 2025-26
UGC Credit Framework for Undergraduate Programmes (2024)

Department of Geography
Chaudhary Devi Lal University,
Sirsa - 125055

Approved by Board of Studies in its meeting held on 11th July, 2025.

1. Introduction to the Programme

In this recent era, it has become inevitable to prepare minds for future by providing quality higher education. Though quality may be viewed through different criteria however, B.A. (Honours/Research) Programme is designed to enable and give power to focus on the current socio-spatial problems, issues and challenges to make the students aware of the application of geography to sort out the societal upcoming problems. It is also essential to rejuvenate the ancestral geographical knowledge to address the current local and global problems. In the light of exponential changes in the field of arts, science and technology, it is to be studied from multifaceted angles. It is important for the policy makers to consider the geo-spatial aspects with references to the location and in context of the best utilization of public utilities. It is further expected that if the above said spatial aspects are considered, it will certainly develop the lagging regions and people living therein. This programme aims at infusing conceptual understanding and practical aspects to prepare students to deal with business realities of today and prepares them to drive and face the challenges of tomorrow. It also exposes the students to the world of technology and digitization in the relevant field as imagined by the entrepreneurs, economist, scholars and lawmakers. This course is designed to help and enlighten the students in different geographical approach, expert knowledge in different fields of geography and organization.

2. Learning Outcome-based Curriculum Framework in Programme Outcomes (POs) of B.A. (Honours/Research)- Four year:

The courses of this programme have been designed to promote understanding of the issues that are challenging the world geographical features and landscape in the world. The programme will help to understand various systems, policy frameworks and strategies desired to planner and administer the rapid changes in an organization's globally oriented environment like equipping students with an understanding of the ecosystem, environment, natural hazards and disaster, space technology etc.The principles on which it operates, interdependence and regulatory concerns apart from exposure of different functional domains. B.A. (Honours/Research) is a highly prominent course of modern times and prepares the participants for taking up middle and top-level challenging executive assignments in private and public sectors. Accordingly, they are imparted adequate conceptual knowledge and practical training in various functional areas of geography by taking GPS knowledge, surveying and data collection as a specialization. B.A. (Honours/Research) degree is structured to provide the students with the surveying and research skills in disciplines related to geography. Also, by the end of the programme students gain an in-depth knowledge on the core subjects like Geomorphology, Climatology, Geographical Thought, Statistics, GIS and Remote Sensing. B.A. (Honours/Research) programme is a four years graduate programme divided into eight semesters. The programme is aimed at following outcomes:

2.1 Objectives of the Programme:

After the students complete this program, they will be able to prepare a progressive mindset by developing the comparative thing, disciplinary knowledge, communication skills, team work, co-operation., management skills, multi-tasking, attributes, qualities and skills.

2.2. Programme Learning Outcomes for the Programme:

This programme brings out the following outcomes:

PO1: Deep Understanding/Knowledge of Geography

The aim of this programme is to make the learners understand the concepts of geography. The content of this program is so designed that it will help the students to capable of demonstrating comprehensive disciplinary knowledge gained during course of study.

PO2: Developing the Entrepreneurship skills

The aim of this program is to provide the students to start their own work and entrepreneurship skills. The knowledge of the different specialization in space technology, field surveying, mapping, scaling with the help of practical exposure will help the students to stand in an organization. The content is organized in such a way that the students would be able to think from various perspectives and suggest solutions according to their individual sensibilities.

PO3: Capability of the students to make decisions at the personal and professional level

In order to improve geographic education, a better understanding of student's decision making is required. The graduates of this programme will be trained to develop skills and attitudes needed for decisive thinking and adopting an inclusive problem-solving approach. They shall be exposed to the pedagogy that helps them understand real life situations through case-studies. It aims at building the basic ability to think critically, evaluate analytically and solve complex problems innovatively.

PO4: Communication Skill and Team work/cooperation

After the graduates the students communicate effectively on general and scientific topics with the scientific community and with society at large scale. The teaching learning pedagogies used in the programme make the students capable enough to deliver and communicate information effectively up to a mark. The curriculum also inculcates in the young minds the qualities of teamwork, cooperation and communication skill. The course includes the knowledge and understanding of group dynamics, recognize opportunities and contribute positively to collaborative research, demonstrate a capacity for self-management and teamwork, in order to achieve common goals and further the learning of themselves as well as others.

PO5: Information/Digital Literacy

This programme enables the students to be technologically updated as it has courses like computer applications and information technology etc. which not only make them work using software but also makes them independent enough in this world of digitization. In all the courses, wherever applicable and possible, components related to technological changes have been incorporated which not only makes them digitally literate but also makes them aware of various cyber-crimes and how to take precautionary measures.

PO6: Lifelong Learning

This course broadens the horizons of the students by making them understands the details of the world geography and their techniques and issues. This learning makes them probing to raise concerns and act accordingly. The curriculum is designed in such a way that the students are driven to develop an attitude of life-long learning. The lifelong learning will not only enhance the social inclusion and personal development but also the self-sustainability as well as competitiveness and employability.

2.3. Programme Specific Objectives:

PSO1: The learners will understand the human and physical environmental phenomena using specialized knowledge pertaining to various sub-fields of Geography. The students involve in teaching, Stock Agents and Government Employment etc. after the completion of graduate in Geography.

PSO2: The programme will help the learners to prove themselves in the different Competitive and Professional Examinations like CET, HTET, STET, CGL, UPSC, *etc.*

PSO3: The students can move on further towards the research work in the field of Geography.

PSO4: The vast syllabus covers various comprehensive fields and accountancy will helps the students to grasp the practical and theoretical knowledge.

3. Programme Structure

Bachelor of Art - Four year (Eight Semesters) Undergraduate Programme is of 180 credits consisting of Discipline Specific Courses (DSC), Minor(MIC)/Vocational (VOC) Courses, Skill Enhancement Courses (SEC), Ability Enhancement Courses (AEC), Multidisciplinary courses (MDC) and Value Added Courses (VAC).

Curriculum and Credit Framework for Bachelor of Art/Science - Four year (Eight Semesters)

Table 1: Curriculum and Credit Framework for Undergraduate Programmes (Single Major)

Semester	Discipline-Specific Courses (DSC)	Minor(MIC)/ Vocational (VOC)	Multidisciplinary courses(MDC)	Ability Enhancement courses(AEC)	Skill Enhancement Courses (SEC)/ Internship /Dissertation	Value-Added Courses (VAC)	Total Credits
I	DSC/101@ 4 credits DSC/102@ 4 credits	MIC/101@ 2 credits	MDC/101@ 3 credits	AEC/101 @ 2 credits	SEC/101@ 3 credits	VAC/101 @ 2 credits	22
II	DSC/103 @ 4 credits DSC/104 @ 4 credits	MIC/102@ 2 credits	MDC/102@ 3 credits	AEC/102 @ 2 credits	SEC/102@ 3 credits	VAC/102 @ 2 credits	22
Students exiting the programme after second semester and securing 48 credits including 4 credits of summer internship will be awarded UG Certificate in the relevant Discipline/Subject							
III	DSC/201 @ 4 credits DSC/202 @ 4 credits	MIC/201@ 4 credits	MDC/201 @ 3 credits	AEC/201 @ 2 credits	SEC/201@ 3 credits	VAC/201 @ 2 credits	22
IV	DSC/203 @ 4 credits DSC/204 @ 4 credits DSC/205 @ 4 credits DSC/206 @ 4 credits	MIC/202@ 4 credits	----------	AEC/202 @ 2 credits	----------	VAC/202@ 2 credits	24
Students exiting the programme after fourth semester and securing 94 credits including 4 credits of summer internship will be awarded UG Diploma in the relevant Discipline/Subject							
V	DSC/301 @ 4 credits DSC/302 @ 4 credits DSC/303 @ 4 credits DSC/304 @ 4 credits	MIC/301@ 4 credits	----------	----------	Internship @ 4 credits#	----------	24
VI	DSC/305 @ 4 credits DSC/306 @ 4 credits DSC/307 @ 4 credits DSC/308 @ 4 credits	MIC/302@ 4 credits	----------	----------	SEC/301@ 2 credits	----------	22
Students will be awarded 3-year UG Degree in relevant major Discipline/Subject upon securing 136 credits.							
VII*	DSC/401 @ 4 credits DSC/402 @ 4 credits DSC/403 @ 4 credits DSC/404 @ 4 credits DSC/405 @ 4 credits	MIC/401@ 4 credits	----------	----------	----------	----------	24
VIII* (4yr UG Hon.)	DSC/406 @ 4 credits DSC/407 @ 4 credits DSC/408 @ 4 credits DSC/409 @ 4 credits DSC/410 @	MIC/402@ 4 credits	----------	----------	----------	----------	24

	4 credits						
VIII* (4yr UG Hon. with Research)	DSC/406@ 4 credits DSC/407@ 4 credits	MIC/402@ 4 credits	----------	----------	Research project/ Dissertation@ 12 credits	----------	24
						TOTAL CREDITS	184

#Four credits of internship earned by a student during summer internship after 2nd semester or 4th semester will be counted in 5th semester of a student who pursue 3 year UG Programmes without taking exit option.

Table 2: Curriculum and Credit Framework for Undergraduate Programmes (Single Major)

(For students who choose to pursue single major after 2nd semester of multidisciplinary Programmes)

Semester	Discipline-Specific Courses (DSC)	Minor(MIC)/ Vocational (VOC)	Multidisciplinary courses(MDC)	Ability Enhancement courses(AEC)	Skill Enhancement Courses (SEC)/ Internship /Dissertation	Value-Added Courses (VAC)	Total Credits
I	DSC/101@ 4 credits DSC/102@ 4 credits DSC/103 @ 4 credits	MIC/101@ 2 credits	MDC/101@ 3 credits	AEC/101 @ 2 credits	SEC/101@ 3 credits	VAC/101 @ 2 credits	24
II	DSC/104 @ 4 credits DSC/105 @ 4 credits DSC/106 @ 4 credits	MIC/102@ 2 credits	MDC/102@ 3 credits	AEC/102 @ 2 credits	SEC/102@ 3 credits	VAC/102 @ 2 credits	24
Students exiting the programme after second semester and securing 52 credits including 4 credits of summer internship will be awarded UG Certificate in the relevant Discipline /Subject							
III	DSC/201 @ 4 credits DSC/202 @ 4 credits DSC/203 @ 4 credits	MIC/201@ 4 credits	MDC/201 @ 3 credits	AEC/201 @ 2 credits	SEC/201@ 3 credits	----------	24
IV	DSC/204 @ 4 credits DSC/205 @ 4 credits DSC/206 @ 4 credits DSC/207 @ 4 credits	MIC/202@ 4 credits	----------	AEC/202 @ 2 credits	----------	VAC/201 @ 2 credits	24
Students exiting the programme after fourth semester and securing 100 credits including 4 credits of summer internship will be awarded UG Diploma in the relevant Discipline/Subject							
V	DSC/301 @ 4 credits DSC/302 @ 4 credits	----------	----------	----------	Internship @ 4 credits#	----------	20

	DSC/303 @ 4 credits **DSC/304 @ 4 credits**						
VI	**DSC/305 @ 4 credits** **DSC/306 @ 4 credits** **DSC/307 @ 4 credits** **DSC/308 @ 4 credits**	**MIC/301@ 4 credits**	----------	----------	----------	----------	**20**
Students will be awarded 3-year UG Degree in relevant major Discipline/Subject upon securing 136 credits.							
VII*	**DSC/401 @ 4 credits** **DSC/402 @ 4 credits** **DSC/403 @ 4 credits** **DSC/404 @ 4 credits** **DSC/405 @ 4 credits**	**MIC/401@ 4 credits**	----------	----------	----------	----------	**24**
VIII* (4yr UG Hon.)	**DSC/406 @ 4 credits** **DSC/407 @ 4 credits** **DSC/408 @ 4 credits** **DSC/409 @ 4 credits** **DSC/410 @ 4 credits**	**MIC/402@ 4 credits**	----------	----------	----------	----------	**24**
VIII* (4yr UG Hon. with Research)	**DSC/406@ 4 credits** **DSC/407@ 4 credits**	**MIC/402@ 4 credits**	----------	----------	**Research project/ Dissertation@ 12 credits**	---------- **TOTAL CREDITS**	**24** **184**

#Four credits of internship earned by a student during summer internship after 2nd semester or 4th semester will be counted in 5th semester of a student who pursue 3 year UG Programmes without taking exit option.

Sr. No.	Course Code	Course Title	Credits		
		Discipline Specific Courses (DSC)	**T**	**P**	**Total**
1.	BSC/BA/GEO/MD/1/DSC/101	Physical Geography	3	1	4
2.	BSC/BA/GEO/MD/2/DSC/151	Human Geography	3	1	4
3.	BSC/BA/GEO/MD/3/DSC/201	Geography of India	3	1	4
4.	BSC/BA/GEO/MD/4/DSC/251	Fundamentals of Economic Geography	3	1	4
5.	BSC/BA/GEO/MD/5/DSC/301	Quantitative Techniques in Geography	3	1	4
6.	BSC/BA/GEO/MD/6/DSC/351	Fundamentals of Aerial Photography and Remote Sensing	3	1	4
7.	BSC/BA/GEO/MD/7/DSC/401	Climatology	4		4
8.	BSC/BA/GEO/MD/7/DSC/402	Geography of India	4		4
9.	BSC/BA/GEO/MD/7/DSC/403	Economic Geography	4		4
10.	BSC/BA/GEO/MD/7/DSC/404	Statistical Methods in Geography	4		4
11.	BSC/BA/GEO/MD/7/DSC/405	Cartographic Methods in Geography (Practical)		4	4
12.	BSC/BA/GEO/MD/8/DSC/451	Geomorphology	4		4
13.	BSC/BA/GEO/MD/8/DSC/452	Population Geography	4		4
14.	BSC/BA/GEO/MD/8/DSC/453	Regional Development and Planning	4		4
15.	BSC/BA/GEO/MD/8/DSC/454	Agricultural Geography	4		4
16.	BSC/BA/GEO/MD/8/DSC/455	Morphometric Analysis (Practical)		4	4
17.	BSC/BA/GEO/H/MD/8/DSC/451	Geographical Thought	4		4
18.	BSC/BA/GEO/H/MD/8/DSC/452	Geography and Watershed Management	4		4
Sr. No.	**Course Code**	**Minor (MIC)/Vocational (VOC)**	**T**	**P**	**Total**
19.	BSC/BA/GEO/MD/1/MIC/101	General Geography of Haryana	2		2
20.	BSC/BA/GEO/MD/2/MIC/151	General Geography of India	2		2
21.	BSC/BA/GEO/MD/3/MIC/201	Resource Geography of India	3	1	4
22.	BSC/BA/GEO/MD/4/MIC/251	Introduction to Geographical Information System (GIS)	3	1	4
23.	BSC/BA/GEO/MD/5/MIC/301	Geography of Natural Hazards and Disasters	3	1	4
24.	BSC/BA/GEO/MD/6/MIC/351	Introduction to Remote Sensing	3	1	4

25.	BSC/BA/GEO/MD/7/MIC/401	Interpretation of Topographical Sheets (Practical)		4	4
26.	BSC/BA/GEO/MD/8/MIC/451	Geography of Haryana		4	4
27.	BSC/BA/GEO/H/MD/8/MIC/452	Morphometric Analysis of Landforms (Practical)		4	4
Sr. No.	**Course Code**	**Multidisciplinary Courses (MDC)**	**T**	**P**	**Total**
28.	BSC/BCOM/BA/GEO/MD/1/MDC/101	Geography in Everyday Life	2	1	3
29.	BSC/BCOM/BA/GEO/MD/2/MDC/151	Fundamentals of Climatology	2	1	3
30.	BSC/BCOM/BA/GEO/MD/3/MDC/201	Geographical Landscapes	2	1	3
Sr. No.	**Course Code**	**Ability Enhancement Course (AEC)**	**T**	**P**	**Total**
31.	Select from Central Pool	Select from Central Pool	2		2
32.	Select from Central Pool	Select from Central Pool	2		2
33.	Select from Central Pool	Select from Central Pool	2		2
34.	Select from Central Pool	Select from Central Pool	2		2
Sr. No.	**Course Code**	**Skill Enhancement Courses (SEC)**	**T**	**P**	**Total**
35.	BSC/BCOM/BA/GEO/MD/1/SEC/101	Maps and Scales (Practical)		3	3
36.	BSC/BCOM/BA/GEO/MD/2/SEC/151	Maps and Diagrams (Practical)		3	3
37.	BSC/BCOM/BA/GEO/MD/3/SEC/201	Representation of Climatic data (Practical)		3	3
38.	BSC/BCOM/BA/GEO/MD/5/SEC/301	Internship		4	4
39.	BSC/BCOM/BA/GEO/MD/8/SEC/451	Research Project		12	12
		Value Added Course (VAC)			
40.	Select from Central Pool	Select from Central Pool	2		2
41.	Select from Central Pool	Select from Central Pool	2		2
42.	Select from Central Pool	Select from Central Pool	2		2
43.	Select from Central Pool	Select from Central Pool	2		2

Table 2: Course code and Title along with the credit details (B.A./B.Sc.)

Semester	Course Code	Course Title	Credits		
			L	P	Total
1st	BSC/BA/GEO/MD/1/DSC/101	Physical Geography	3	1	4
2nd	BSC/BA/GEO/MD/2/DSC/151	Human Geography	3	1	4
3rd	BSC/BA/GEO/MD/3/DSC/201	Geography of India	3	1	4
4th	BSC/BA/GEO/MD/4/DSC/251	Fundamentals of Economic Geography	3	1	4
5th	BSC/BA/GEO/MD/5/DSC/301	Quantitative Techniques in Geography	3	1	4
6th	BSC/BA/GEO/MD/6/DSC/351	Fundamentals of Remote Sensing	3	1	4
7th and 8th Semesters only for Geography 4yr UG Hon. & 4yr UG Hon. with Research					
7th (4yr UG Hon. & 4yr UG Hon. with Research)	BSC/BA/GEO/MD/7/DSC/401	Climatology	4		4
	BSC/BA/GEO/MD/7/DSC/402	Geography of India	4		4
	BSC/BA/GEO/MD/7/DSC/403	Economic Geography	4		4
	BSC/BA/GEO/MD/7/DSC/404	Statistical Methods in Geography	4		4
	BSC/BA/GEO/MD/7/DSC/405	Cartographic Methods in Geography (Practical)		4	4
	BSC/BA/GEO/MD/7/MIC/401	Interpretation of Topographical Sheets (Practical)		4	4
	Total Credits		**16**	**08**	**24**
8th (4yr UG Hon.)	BSC/BA/GEO/MD/8/DSC/451	Geomorphology	4		4
	BSC/BA/GEO/MD/8/DSC/452	Population Geography	4		4
	BSC/BA/GEO/MD/8/DSC/453	Regional Development and Planning	4		4
	BSC/BA/GEO/MD/8/DSC/454	Agricultural Geography	4		4
	BSC/BA/GEO/MD/8/DSC/455	Morphometric Analysis (Practical)		4	4
	BSC/BA/GEO/MD/8/MIC/451	Geography of Haryana		4	4
	Total Credits		**16**	**08**	**24**
8th (4yr UG Hon. with Research)	BSC/BA/GEO/H/MD/8/DSC/451	Geographical Thought	4		4
	BSC/BA/GEO/H/MD/8/DSC/452	Geography and Watershed Management	4		4
	BSC/BA/GEO/H/MD/8/MIC/452	Morphometric Analysis of Landforms		4	4
	BSC/BA/GEO/H/MD/8/SEC/451	Research Project		12	12
	Total Credits		**08**	**16**	**24**

BSC/BA/GEO/MD/1/DSC/101: Physical Geography

Duration: 3 Hours **Credit 03, Maximum Marks: 75**
(External Evaluation: 50, Internal Assessment: 25)

Course Objective: The objective of this course is to enable the student to become familiar with Physical Geography.

After completing this course, the students would be developed their ability on given course objectives.

CO1: Understand about the agents and processes of change on the surface of earth.
CO2: Enrich knowledge about atmosphere and its climate.
CO3: Attain knowledge about ocean surface configuration and circulation in oceanic water.
CO4: Attain skills in solving practical problems associated with physical geography.

Unit	Topics
I	1. Interior of the earth, geological time scale, rocks and their types. 2. Theory of continental drift and plate tectonic; earthquakes and volcanoes.
II	3. Weather and climate: Atmosphere-composition and structure. 4. Insolation, heat budget and temperature distribution.
III	5. Degradational processes: weathering, work of river (fluvial landscapes) and wind (aeolian landscapes). 6. Oceanic salinity, temperature and current of the Pacific, Atlantic and Indian Ocean.

Note for the Paper- Setter

The question paper will consist of seven questions in all. The first question will be compulsory and will consist of four short questions of 2 marks each covering the whole syllabus. In addition, six more questions of 14 marks each will be set unit-wise comprising of two questions from each of the three units. The candidates are required to attempt one compulsory question and three more questions selecting at least one question from each unit.

Distribution of Marks for Practical Evaluation

Credit 01, Maximum Marks: 25 **Time: 03:00 Hours**
Experiment and Written Part = 15 **Viva-voce = 05** **Lab Records= 05**
Practical Record: A project file consisting of 8 exercises on the below mentioned themes: -

1. Identification of rock samples: granite, basalt, laterite, limestone, shale, sandstone, slate, quartzite. (1 exercise)
2. Extraction of physiographic information from Survey of India 1:50000 topographical maps of mountain, plateau and plain regions. (2 exercises)
3. Measurement of weather elements using analogue instruments: line graph, bar graph and polygraph. (3 exercises)
4. Interpretation of a daily weather map of India. (2 exercises)

Note for the Paper Setter: The question paper will consist of three questions in all. The first question will be compulsory consist of five short questions of 1 marks each covering the whole syllabus. In addition, two more questions of 10 marks each covering the whole syllabus. The candidates are required to attempt one compulsory question and one more question.

Suggested Readings:

1. Critchfield, H (2002) General Climatology, Prentice-Hall of India, New Delhi.
2. Kale, V and Gupta, A (2001) Element of Geomorphology, Oxford University Press, Calcutta.
3. Khullar, DR (2014) Physical Geography, Kalyani Publishers, New Delhi.
4. Monkhouse, FJ (1960) Principles of Physical Geography. Hodder and Stoughton, London.
5. Singh, S (1998) Geomorphology, Prayag Publication, Allahabad.
6. Singh, S (2012) Physical Geography, Prayag Publication, Allahabad.

BSC/BA/GEO/MD/1/MIC/101: General Geography of Haryana

Duration: 2 Hours **Credit 02, Maximum Marks: 50**
(External Evaluation: 35, Internal Assessment: 15)

Course Objective: The objective of this course is to help the students in understanding the geographical structure and resources.

After completing this course, the students would be developed their ability on given course objectives.

CO1: Acquaint with physiography and climate of state. Understand the agriculture and industrial status of the state.

CO2: Familiarize with population distribution and literacy of the state.

Unit	Topics
I	1. Physiography, relief and climate of Haryana. Drainage, soils and natural vegetation. 2. Agriculture: cropping pattern and challenges. Major industries and industrial centers of Haryana.
II	3. Population: distribution, density and growth. 4. Pattern of trade and transport. Cultural regions of Haryana.

Note for the Paper- Setter

The question paper will consist of five questions in all. The first question will be compulsory and will consist of seven short questions of 1 marks each covering the whole syllabus. In addition, four more questions of 14 marks each will be set unit-wise comprising of two questions from each of the two units. The candidates are required to attempt one compulsory question and two more questions selecting at least one question from each unit.

Suggested Readings:

1. Census of India (1981) Regional Division in Haryana.
2. Census of India (2001) Administrative Atlas of Haryana.
3. Deshpande CD (1992) India: A Regional Interpretation, ICSSR and Northern Book Centre.
4. FICCI (2007) State of Infrastructure in Haryana.
5. Singh, Jasbir (1976) Agricultural Geography of Haryana, Vishal Publishers, Kurukshetra.

BSC/BCOM/BA/GEO/MD/1/MDC/101: Geography in Everyday Life

Duration: 2 Hours **Credit 02, Maximum Marks: 50**
(External Evaluation: 35, Internal Assessment: 15)

Course Objective: The objective of this course is, the students get the knowledge of physical geography such as relief features and formation of day & night.

After completing this course, the students would be developed their ability on given course objectives.

CO1: Understand the geographical phenomenon observed in its surroundings.
CO2: Enrich skills about various elements that composed the surrounding environment.

Unit	Topics
I	1. Solar System: Location, shape, planets and uniqueness of earth. 2. Seasons and various movements of Earth.
II	3. Latitude, Longitude, Time Zones and International Date Line. 4. Explanation of Trade Winds and Planetary Winds.

Note for the Paper- Setter

The question paper will consist of five questions in all. The first question will be compulsory and will consist of seven short questions of 1 marks each covering the whole syllabus. In addition, four more questions of 14 marks each will be set unit-wise comprising of two questions from each of the two units. The candidates are required to attempt one compulsory question and two more questions selecting at least one question from each unit.

Distribution of Marks for Practical Evaluation

Credit 01, Maximum Marks: 25 **Time: 03:00 Hours**
Experiment and Written Part = 15 **Viva-voce = 05** **Lab Records= 05**
Practical Record: A project file consisting of 8 exercises on the below mentioned themes: -

1. Solar System. (1 exercise)
2. Solstices and Equinoxes. (1 exercises)
3. Antipodal arrangement of land and water. (1 exercise)
4. Drawing of latitudes and longitudes. (2 exercises)
5. Time Zones of World. (1 exercise)
6. Calculation of time in eastern and western hemisphere. (1 exercises)
7. International Date Line (advancement/reduction of day). (1 exercises)

Note for the Paper Setter: The question paper will consist of three questions in all. The first question will be compulsory and will consist of five short questions of 1 marks each covering the whole syllabus. In addition, two more questions of 10 marks each covering the whole syllabus. The candidates are required to attempt one compulsory question and one more question.

Suggested Readings:

1. Deshpande, C.D. (1992) India-A Regional Interpretation, Northern Book Depot, New Delhi.
2. Hussain Majid (2015) Geography of India, Mc Graw Hill Education.
3. Shafi, M. (2000) Geography of South Asia, McMillan and Company, Calcutta.
4. Singh, Gopal (2006) Geography of India, Atma Ram and Sons, New Delhi.
5. Singh, R.L. (1971) India: A Regional Geography, National Geographical Society, India, Varanasi.

BSC/BCOM/BA/GEO/MD/1/SEC/101: Maps and Scales (Practical)

Duration: 3 Hours **Credit 03, Maximum Marks: 75**

Course Objective: To impart basic knowledge of the maps and scales for geography practical.

After completing this course, the students would be developed their ability on given course objectives.

CO1: Knowledge about cartographic skills.
CO2: Provides understanding about map scales.
CO3: Measurement skills of distances and areas on maps.

Distribution of Marks for Practical Evaluation

Credit 03, Maximum Marks: 75 **Time: 03:00 Hours**

Experiment and Written Part = 50 **Viva-voce = 15** **Lab Records= 10**

Practical Record: A project file consisting of 12 exercises on the below mentioned themes: -

1. Introduction to Cartography.
2. Maps and their types.
3. Map Scales.
   - (i) Methods of Expressing a scale — 2 exercise
   - (ii) Conversion of Statement of Scale into R.F. and vice-versa. — 1 exercise
   - (iii) Plain Scale (km and mile) — 1 exercise
   - (iv) Comparative Scale — 2 exercise
   - (v) Diagonal Scale — 2 exercise
4. Measurement of Distances and Areas on Maps — 2 exercise
5. Enlargement and Reduction of Maps — 2 exercise

Note for Paper- Setter

The question paper will consist of seven questions in all. The first question will be compulsory consist of four short questions of 2 marks each covering the whole syllabus. In addition, six more questions of 14 marks each covering the whole syllabus. The candidates are required to attempt one compulsory question and three more questions.

Suggested Readings:

1. F.J. Monkhouse and H.R. Wilkinson (1972) Maps and Diagrams, Methuen and Co. Ltd., London
2. L.R. Singh and Raghuvander Singh (1973), Map Work and Practical Geography, Central Book Depot, Allahabad.
3. R.L. Singh and P.K. Dutt (1968), Elements of Practical Geography, Students Friends, Allahabad.
4. Singh Gopal (2004). Map Work and Practical Geography, Vikas Publication House.

BSC/BA/GEO/MD/2/DSC/151: Human Geography

Duration: 3 Hours **Credit 03, Maximum Marks: 75**
(External Evaluation: 50, Internal Assessment: 25)

Objective: The course aims to develop the knowledge of students about human aspects like density of population, sex composition, literacy rate etc.

After completing this course, the students would be developed their ability on given course objectives.

CO 1: gain knowledge about the fundamentals of human geography.
CO 2: enhance the knowledge of race.
CO 3: understand the organization of space.
CO4: gain knowledge of mapping socio – economic and demographic data.

Unit	Topics
I	1. Definition, nature and scope of human geography. 2. Development of human geography, approaches to study human geography, branches and relation with other social sciences.
II	3. Human adaptation to their environment: Eskimo, Bushmen, Gujjar Bakkarwal, Santhal. 4. World population: Distribution, density, growth and migration.
III	5. Organization of space: central place theory, agricultural location model and industrial location model. 6. Races: Meaning, nature and classification. Evolution and global distribution of major religions in the world.

Note for the Paper Setter: The question paper will consist of seven questions in all. The first question will be compulsory and will consist of four short questions of 2 marks each covering the whole syllabus. In addition, six more questions of 14 marks each will be set unit-wise comprising of two questions from each of the three units. The candidates are required to attempt one compulsory question and three more questions selecting at least one question from each unit.

Distribution of Marks for Practical Evaluation

Credit 01, Maximum Marks: 25 **Time: 03:00 Hours**

Experiment and Written Part = 15 **Viva-voce = 05** **Lab Records= 05**

Practical Record: A project file consisting of 8 exercises on the below mentioned themes: -

1. Composition of major races of the world. (1 exercise)
2. Methods of representing world population distribution and density. (2 exercises)
3. Flow diagram of migration streams of world population. (1 exercise)
4. Plotting of isotims and isodapane. (2 exercises)
5. Spatial and temporal growth of world population. (2 exercises)

Note for the Paper Setter: The question paper will consist of three questions in all. The first question will be compulsory and will consist of five short questions of 1 marks each covering the whole syllabus. In addition, two more questions of 10 marks each covering the whole syllabus. The candidates are required to attempt one compulsory question and one more question.

Suggested Readings:

1. Agarwal, A et al (1999) The Citizen's Fifth Citizen's Report, Centre for Science & Environment, New Delhi.
2. Alexander, John. W. (1988) Economic Geography, Prentice Hall of India Ltd., New Delhi.
3. Bergwan, Edward E. (1985) Human Geography: Culture Connections and Landscape, Prentice-Hall, New Jersey.
4. Carr, M. Patterns (1987) Process and Change in Human Geography, McMillan Education, London.
5. Carter, H. (1972) The study of Urban Geography, Edward Arnold, London.

BSC/BA/GEO/MD/2/MIC/151: General Geography of India

Duration: 2 Hours **Credit 02, Maximum Marks: 50**
(External Evaluation: 35, Internal Assessment: 15)

Course Objective: To give the basic knowledge of the India location, relief structure, climate, vegetation, population, industries etc.

After completing this course, the students would be developed their ability on given course objectives.

CO1: Understand the location, geographical expansion, and physiography.

CO2: Internalize the concept of unity in diversity of our nation.

Unit	Topics
I	1. India: Locational setting and neighbouring countries. Physiographic divisions of India. 2. Drainage system, climate, soil and natural vegetation.
II	3. Population distribution, density and growth. 4. Population composition: literacy, sex ratio, religion, language.

Note for the Paper- Setter

The question paper will consist of five questions in all. The first question will be compulsory and will consist of seven short questions of 1 marks each covering the whole syllabus. In addition, four more questions of 14 marks each will be set unit-wise comprising of two questions from each of the two units. The candidates are required to attempt one compulsory question and two more questions selecting at least one question from each unit.

Suggested Readings:

1. Bose, A. et. al. eds (2001) Population in India's Development, 1947-2000, Vikas, New Delhi.
2. Deshpande C. D. (1992) India: A Regional Interpretation, ICSSR, New Delhi.
3. Johnson, B. L. C., ed. (2001) Geographical Dictionary of India. Vision Books, New Delhi.
4. Sdyasuk Galina and P Sengupta (1967) Economic Regionalisation of India, Census of India
5. Sharma, T. C. (2003) India - Economic and Commercial Geography. Vikas Publ., New Delhi.

BSC/BCOM/BA/GEO/MD/2/MDC/151: Fundamentals of Climatology

Duration: 2 Hours **Credit 02, Maximum Marks: 50**
(External Evaluation: 35, Internal Assessment: 15)

Course Objective: The objective of this course is to help the students in understanding the weather phenomena and basics of climatology.

After completing this course, the students would be developed their ability on given course objectives.

CO1: Enrich skills about various elements that composed the surrounding environment
CO2: Understand the climate and its characteristics.

Unit	Topics
I	1. Weather & Climate: Elements and factors affecting climate. 2. Atmosphere: Composition and Structure.
II	3. Insolation: Its controlling factors and distribution. 4. Wind: types, characteristics and global pattern (planetary, Seasonal and Local).

Note for the Paper- Setter

The question paper will consist of five questions in all. The first question will be compulsory and will consist of seven short questions of 1 marks each covering the whole syllabus. In addition, four more questions of 14 marks each will be set unit-wise comprising of two questions from each of the two units. The candidates are required to attempt one compulsory question and two more questions selecting at least one question from each unit.

Distribution of Marks for Practical Evaluation

Credit 01, Maximum Marks: 25 **Time: 03:00 Hours**
Experiment and Written Part = 15 **Viva-voce = 05** **Lab Records= 05**
Practical Record: A project file consisting of 8 exercises on the below mentioned themes: -

1. Inventory of Symbols of Weather Map. (1 exercise)
2. Map showing Interpretation of Pressure phenomena- Jan & July. (2 exercises)
3. Map showing Winds- Prevailing, Seasonal & Local. (3 exercises)
4. Drawing Isobars showing Pressure System for Cyclones and Anti-cyclones. (1 exercise)
5. Map of India showing Temperature through Isotherms. (1 exercise)

Note for the Paper Setter: The question paper will consist of three questions in all. The first question will be compulsory and will consist of five short questions of 1 marks each covering the whole syllabus. In addition, two more questions of 10 marks each covering the whole syllabus. The candidates are required to attempt one compulsory question and one more question.

Suggested Readings:

1. Agarwal, A et al (1999) The Citizen's Fifth Citizen's Report, Centre for Science & Environment, New Delhi.
2. Alexander, John. W. (1988) Economic Geography, Prentice Hall of India Ltd., New Delhi.
3. Bergwan, Edward E (1985) Human Geography: Culture Connections and Landscape, Prentice-Hall, New Jersey.
4. Carr, M. Patterns (1987) Process and Change in Human Geography, McMillan Education, London.
5. Carter, H. (1972) The study of Urban Geography, Edward Arnold, London.
6. Chandna, R.C. (2016) A Geography of Population: Concepts, Determinants and Patterns, Kalyani Publishers, New Delhi.

BSC/BCOM/BA/GEO/MD/2/SEC/151: Maps and Diagrams (Practical)

Duration: 3 Hours **Credit 03, Maximum Marks: 75**

Course Objective: To impart basic knowledge of the geographical maps and diagrams.

After completing this course, the students would be developed their ability on given course objectives.

CO1: Knowledge about different types of thematic maps.
CO2: Skill acquisition for construction of qualitative distribution maps.
CO3: Ability to construct quantitative thematic maps.

Distribution of Marks for Practical Evaluation

Experiment and Written Part = 50 **Viva-voce = 15** **Lab Records= 10**

Practical Record: A project file consisting of 15 exercises on the below mentioned themes: -

1. Principal of map design and layout.
2. Symbolization: point, line and area symbol.
3. Lettering and toponomy.
4. Mechanics of map construction
5. Distribution maps
   (i) Qualitative distribution maps
   - Choro schematic maps (1 Exercise)
   - Choro chromatic maps (2 Exercise)

   (ii) Quantitative distribution Maps
   - Isopleth maps (2 Exercises)
   - Choropleth maps (2 Exercises)
   - Dot maps (3 Exercises)
   - Diagrammatic maps (3 Exercises)

   6. Chain and tape survey (2 Exercises)

Note for the Paper Setter: The question paper will consist of seven questions in all. The first question will be compulsory and will consist of four short questions of 2 marks each covering the whole syllabus. In addition, six more questions of 14 marks, the candidates are required to attempt one compulsory question and three more questions in all.

Suggested Readings:

1. Mishra RP and Ramesh A. 1999. Fundamentals of Cartography, Concept Publishing Company, New Delhi.
2. Monkhouse FJ and Wilkinson HR. 1972. Maps and Diagrams, Methuen Press, London
3. Singh Gopal. 2004. Map Work and Practical Geography, Vikas Publication House, New Delhi.
4. Singh RL. 1979. Elements of Practical Geography, Kalyani Publishers, New Delhi

BSC/BA/GEO/MD/3/DSC/201: Geography of India

Duration: 3 Hours **Credit 03, Maximum Marks: 75**
(External Evaluation: 50, Internal Assessment: 25)

Course Objective: To give the basic knowledge of the India location, relief structure, climate, vegetation, population, industries etc.

After completing this course, the students would be developed their ability on given course objectives.

CO1: provide knowledge about the physiography of our nation.
CO2: understand the agriculture and irrigation system.
CO3: understand the basic demographic structure and literacy.
CO4: acquire knowledge of socio-economic and demographic data

I	1. Physical divisions, drainage system. 2. Climate, soils and natural vegetation.
II	3. Agricultural crops: major crops and crop pattern, green revolution and its impacts. 4. Population: distribution, density and growth.
III	5. Resources: Production and distribution of iron ore, coal, petroleum. 6. Industries: iron and steel, sugar and cotton textile.

Note for the Paper- Setter

The question paper will consist of seven questions in all. The first question will be compulsory and will consist of four short questions of 2 marks each covering the whole syllabus. In addition, six more questions of 14 marks each will be set unit-wise comprising of two questions from each of the three units. The candidates are required to attempt one compulsory question and three more questions selecting at least one question from each unit.

Distribution of Marks for Practical Evaluation

Credit 01, Maximum Marks: 25 **Time: 03:00 Hours**

Experiment and Written Part = 15 **Viva-voce = 05** **Lab Records= 05**

Practical Record: A project file consisting of 8 exercises on the below mentioned themes: -

1. Land use pattern of India (Pie chart) (1 Exercises)
2. Occupational structure of India (Pie chart) (1 Exercises)
3. Distribution of population (Dot method) (1 Exercises)
4. Density of population (Choropleth) (1 Exercises)
5. Identification of the major industrial region of India by cartogram. (1 Exercises)
6. Rainfall deviation diagram of at least 20 years. (1 Exercises)
7. Production of various crops (Bar Graph) (2 Exercises)

Note for the Paper Setter: The question paper will consist of three questions in all. The first question will be compulsory and will consist of five short questions of 1 marks each covering the whole syllabus. In addition, two more questions of 10 marks each covering the whole syllabus. The candidates are required to attempt one compulsory question and one more question.

Suggested Readings:

1. Deshpande C. D. (1992) India: A Regional Interpretation, ICSSR, New Delhi.
2. Hussain M. (1992) Geography of India, Tata McGraw Hill Education
3. Johnson, B. L. C., ed. (2001) Geographical Dictionary of India. Vision Books, New Delhi.
4. Mamoria C. B. (1980) Economic and Commercial Geography of India, Shiva Lal Agarwala.
5. Mandal R. B. (ed.), (1990) Patterns of Regional Geography – An International Perspective. Vol. 3 – Indian Perspective.

BSC/BA/GEO/MD/3/MIC/201: Resource Geography of India

Duration: 3 Hours **Credit 03, Maximum Marks: 75**
(External Evaluation: 50, Internal Assessment: 25)

Course Objective: The objective of this course is to familiarize the students with natural resources and their management.

After completing this course, the students would be developed their ability on given course objectives.

CO1: understand regional diversity of India with respect to its agriculture, water, energy and mineral resources.

CO2: enhance knowledge about policies and problems of resource management in India.

CO3: to develop ideas on different aspects of resources, and the linkages with development issues that geographers usually address.

CO4: attain skills in plotting graphs, correlation and time series analysis of resource-based data.

I	1. Agriculture: Environmental, technological and institutional factors affecting Indian Agriculture and dry land agriculture. 2. Distribution and production major crops: Rice, wheat, cotton and tea.
II	3. Water resources: means of irrigation and its problems. 4. Major water projects: Bhakhra Nangal and Damodar Valley and its applications.
III	5. Minerals and energy resources: production, distribution and trade of iron ore, coal and petroleum. 6. Problems of mining industry and conservation of minerals.

Note for the Paper- Setter

The question paper will consist of seven questions in all. The first question will be compulsory and will consist of four short questions of 2 marks each covering the whole syllabus. In addition, six more questions of 14 marks each will be set unit-wise comprising of two questions from each of the three units. The candidates are required to attempt one compulsory question and three more questions selecting at least one question from each unit.

Distribution of Marks for Practical Evaluation

Credit 01, Maximum Marks: 25 **Time: 03:00 Hours**

Experiment and Written Part = 15 **Viva-voce = 05** **Lab Records= 05**

Practical Record: A project file consisting of 8 exercises on the below mentioned themes: -

1. Distribution of net sown area in India. (1 exercises)
2. Shows the irrigated area in India using choropleth method. (1 exercise)
3. Trend of food grains production (rice, wheat, maize) and pulses production (gram and Tur or arhar) in India by line and polygraph. (2 exercises)
4. Time series analysis of the trend of coal/crude oil/natural gas production in India since 1950-51 using 5/10-year with suitable method. (3 exercises)
5. Distribution of energy and minerals resources using suitable method. (1exercise)

Note for the Paper Setter: The question paper will consist of three questions in all. The first question will be compulsory and will consist of five short questions of 1 marks each covering the whole syllabus. In addition, two more questions of 10 marks each covering the whole syllabus. The candidates are required to attempt one compulsory question and one more question.

Suggested Readings:

1. Deshpande, CD (1992) India: A Regional Interpretation, ICSSR, New Delhi.
2. Husain, M (2020) Geography of India, McGraw Hill, Chennai.
3. Iyer, RR (2003) Water Perspective, Issues and Concerns, SAGE Publications, New Delhi.
1. Johnson, BLC (2001) Geographical Dictionary of India, Vision Books, New Delhi.
2. Khullar, DR (2011) India-A Comprehensive Geography, Kalyani Publishers, New Delhi.
3. Misra, R (2002) Fresh Water Environment, Anmol Publications, New Delhi.
4. Misra, RP and Sundaram, KV (1979) Rural Area Development: Perspectives and Approaches, Sterling Publications, New Delhi.
5. Pathak, CR (2003) Spatial Structure and Processes of Development in India. Regional Science Association, Kolkata.

BSC/BCOM/BA/GEO/MD/3/MDC/201: Geographical Landscapes

Duration: 2 Hours **Credit 02, Maximum Marks: 50**
(External Evaluation: 35, Internal Assessment: 15)

Course Objective: The objective of this course is to help the students in understanding the geographical structure and resources

After completing this course, the students would be developed their ability on given course objectives.

CO1: understand the nature of physical and cultural landscapes

CO2: internalize the processes shaping natural and cultural landscapes

CO3: enhance students' observational, analytical, and critical thinking about their surrounding environment.

I	1. Natural landscapes: concept, characteristics, types (mountains, plains and plateaus) and their significance. 2. Major land surface features: Africa and North America continents and their characteristics.
II	3. Weathering and mass movement. 4. Fluvial and Aeolian landscapes.

Note for the Paper- Setter

The question paper will consist of seven questions in all. The first question will be compulsory and will consist of four short questions of 2 marks each covering the whole syllabus. In addition, six more questions of 14 marks each will be set unit-wise comprising of two questions from each of the three units. The candidates are required to attempt one compulsory question and three more questions selecting at least one question from each unit.

Distribution of Marks for Practical Evaluation

Credit 01, Maximum Marks: 25 **Time: 03:00 Hours**

Experiment and Written Part = 15 **Viva-voce = 05** **Lab Records= 05**

Practical Record: A project file consisting of 8 exercises on the below mentioned themes: -

1. Representation of topographical features by counter lines (valleys, slopes and plateau). (3 exercises)
2. River profiles: Longitudinal and Serial. (2 exercises)
3. Shows the physical features of North America and Africa on map. (2 exercises)
4. Shows the Fluvial and Aeolian landforms. (2 exercises)

Note for the Paper Setter: The question paper will consist of three questions in all. The first question will be compulsory and will consist of five short questions of 1 marks each covering the whole syllabus. In addition, two more questions of 10 marks each covering the whole syllabus. The candidates are required to attempt one compulsory question and one more question.

Suggested Readings:

1. Alanen, A.R. and Melnick, R.Z. (2000) Preserving cultural landscape in America.
2. Hayden, D (1995) The power of place: Urban landscape as public history, The MIT press.
3. Hess, D. (2013) Physical Geography: A landscape appreciation, Pearson.
4. Hoss, T.A. (2016) Appreciating physical landscape: Three hundred years of geo-tourism.
5. Johnson, L.M. and Hunn, E.S. (2010) Landscape ethno ecology (concepts of biotic and physical space)

BSC/BCOM/BA/GEO/MD/3/SEC/201: Representation of Climatic Data (Practical)

Duration: 3 Hours **Credit 03, Maximum Marks: 75**

Course Objective: To impart basic knowledge of the practical measurements and graphs.

After completing this course, the students would be developed their ability on given course objectives.

CO1: Capability of measurement of climatic data.

CO2: Ability to represent the temperature and rainfall data.

CO3: Development of skill to read and interpret the weather maps.

Distribution of Marks for Practical Evaluation

Experiment and Written Part = 50 **Viva-voce = 15** **Lab Records= 10**

Practical Record: A project file consisting of 15 exercises on the below mentioned themes: -

1. Elements of Climate.
2. Representation of temperature and rainfall.
   - (i) Line and Bar Graph (1 exercise)
   - (ii) Distribution of temperature (1 exercise)
   - (iii) Distribution of rainfall (1 Exercise)
   - (iv) Hythergraph (2 exercise)
   - (v) Rainfall deviation diagram (2 exercise)
3. Climograph (wet and dry places) (2 exercise)
4. Distribution of Air pressure (2 Exercise)
5. Weather map Interpretation (January & July) (2 exercise)
6. Interpolation of Isotherm and Isobars (2 exercise)

Note for the Paper Setter: The question paper will consist of seven questions in all. The first question will be compulsory and will consist of four short questions of 2 marks each covering the whole syllabus. In addition, six more questions of 14 marks each covering the whole syllabus, the candidates are required to attempt one compulsory question and three more questions in all.

Suggested Readings:

1. Khan, A.A. 1996. Text Book of Practical Geography, Concept, New Delhi.
2. Lawrence, GRP. 1968. Cartographic Methods, Methuen, London.
3. Monkhouse, F.J. and Wilkinson, H.R1994. Maps and Diagrams, Methuen, London.
4. Mishra R.P. and Ramesh A. 1999. Fundamentals of Cartography, Concept Publishing Company, New Delhi.
5. Singh, R.L., 1979. Elements of Practical Geography, Kalyani Publisher, New Delhi.
6. Sarkar, A.K 1997: Practical Geography-A Systematic Approach, Orient Longman, Calcutta

BSC/BA/GEO/MD/4/DSC/251: Fundamentals of Economic Geography

Duration: 3 Hours **Credit 03, Maximum Marks: 75**
(External Evaluation: 50, Internal Assessment: 25)

Course Objective: The objective of this course is to provide the student basic knowledge of world economy and various processes of globalization.

After completing this course, the students would be developed their ability on given course objectives.

CO1: Provides knowledge about the fundamental concepts of economic geography.
CO2: Acquisition of knowledge about resources and their conservation.
CO3: Enrichment of knowledge about distribution of crops, minerals and energy resources.
CO4: Attain skills in solving practical problems associated with economic geography.

Unit	Topics
I	1. Nature and scope of economic geography and its relationship with economics. 2. Classification of economic activities.
II	3. Natural resources: types, bases of classification. Utilization and conservation of natural resources. 4. World distribution of food crops (rice and wheat), commercial crops (cotton and sugarcane) and plantation crops (tea and coffee).
III	5. International trade and transport and major oceanic trade routes. 6. World distribution and production of iron and steel industry, textile industry, sugar industry and automobile industry.

Note for the Paper- Setter

The question paper will consist of seven questions in all. The first question will be compulsory and will consist of four short questions of 2 marks each covering the whole syllabus. In addition, six more questions of 14 marks each will be set unit-wise comprising of two questions from each of the three units. The candidates are required to attempt one compulsory question and three more questions selecting at least one question from each unit.

Distribution of Marks for Practical Evaluation

Credit 01, Maximum Marks: 25 **Time: 03:00 Hours**
Experiment and Written Part = 15 **Viva-voce = 05** **Lab Records= 05**
Practical Record: A project file consisting of 8 exercises on the below mentioned themes:

1. Draw Choropleth map of state-wise production of crops. (2 exercises)
2. Draw the rail and road transport network by flow chart. (2 exercises)
3. Time series analysis of world food, commercial and plantation crops production and trade using polygraph method. (2 exercises)
4. Representation of coal and sugar production of major countries of the world using compound bar diagram. (1 exercise)
5. Representation of decadal production of major petroleum, iron & steel producing countries using multiple bar diagram. (1 exercise)

Note for the Paper Setter: The question paper will consist of three questions in all. The first question will be compulsory and will consist of five short questions of 1 marks each covering the whole syllabus. In addition, two more questions of 10 marks each covering the whole syllabus. The candidates are required to attempt one compulsory question and one more question.

Suggested Readings:

1. Gautam, A. 2010. Advanced Economic Geography. Sharda Pustak Bhawan, Allahabad.
2. Hartshorne, T. A. and Alexander, J. W. 2001. Economic Geography. Prentice Hall of India. New Delhi.
3. Hudson, R. 2005. Economic Geography. Sage Publication, New Delhi.
4. Jones, C. F. and Drakenwarld, G. G. Economic Geography. The Macmillan and Company. New York.
5. Knox, P. 2003. The Geography of World Economy. Arnold, London.
6. Saxena, H.M. 2013. Economic Geography. Rawat Publications, Jaipur.

BSC/BA/GEO/MD/4/MIC/251: Introduction to Geographical Information System (GIS)

Duration: 3 Hours **Credit 03, Maximum Marks: 75**
(External Evaluation: 50, Internal Assessment: 25)

Course Objective: The purpose of this course is to acquaint the students with the fundamentals knowledge of GIS.

After completing this course, the students would be developed their ability on given course objectives.

CO1: Understand what is GIS.
CO2: The spatial and non-spatial data.
CO3: The principle of making maps.
CO4: Develop skills of computer map making.

Unit	Topics
I	1. Geographical Information System (GIS): Definition, historical development and significance. 2. Components of GIS- Hardware, software, data and sources of data.
II	3. GIS data type (spatial and non-spatial). 4. Data models: vector and raster.
III	5. Application of GIS in urban planning and transportation. 6. Application of GIS in natural resource management.

Note for the Paper- Setter

The question paper will consist of seven questions in all. The first question will be compulsory and will consist of four short questions of 2 marks each covering the whole syllabus. In addition, six more questions of 14 marks each will be set unit-wise comprising of two questions from each of the three units. The candidates are required to attempt one compulsory question and three more questions selecting at least one question from each unit.

Distribution of Marks for Practical Evaluation

Credit 01, Maximum Marks: 25 **Time: 03:00 Hours**
Experiment and Written Part = 15 **Viva-voce = 05** **Lab Records= 05**
Practical Record: A project file consisting of 8 exercises on the below mentioned themes:

1. Spatial data input in GIS format- Scanning and Geo-referencing. (1 exercise)
2. Prepare point shape file. (1 exercise)
3. Prepare line shape file (1 exercise)
4. Prepare polygon shape file (1 exercise)
5. Prepare a landuse map using satellite data. (2 exercises)
6. Prepare a landcover map using satellite data. (2 exercises)

Note for the Paper Setter: The question paper will consist of three questions in all. The first question will be compulsory and will consist of five short questions of 1 marks each covering the whole syllabus. In addition, two more questions of 10 marks each covering the whole syllabus. The candidates are required to attempt one compulsory question and one more question.

Recommended Books/e-resources/LMS:

1. Bhatta, B. (2010) Remote Sensing and GIS, Oxford University Publications.
2. Burrough, P.A., and McDonnell, R.A. (2000) Principles of Geographical Information System-Spatial Information System and Geo-statistics. Oxford University Press
3. Chauniyal, D.D. (2010) Sudur Samvedan evam Bhogolik Suchana Pranali, Sharda Pustak Bhawan, Allahabad
4. Heywoods, I., Cornelius, S and Carver, S. (2006) An Introduction to Geographical Infromation system. Prentice Hall.
5. Jha, M.M. and Singh, R.B. (2008) Land Use: Reflection on Spatial Informatics Agriculture and Development, New Delhi: Concept.
6. Nag, P. (2008) Introduction to GIS, Concept India, New Delhi.

BSC/BA/GEO/MD/5/DSC/301: Quantitative Techniques in Geography

Duration: 3 Hours **Credit 03, Maximum Marks: 75**
(External Evaluation: 50, Internal Assessment: 25)

Course Objective: The objective of this course is to enable the student to become familiar with Statistical Geography.

After completing this course, the students would be developed their ability on given course objectives.

CO1: Development of capability to understand the basics of statistics.
CO2: Capability to comprehend the methods of central tendencies and dispersion.
CO3: Awareness about various tools of inequality analysis.
CO4: Understanding the use of bivariate analysis in geography.

Unit	Topics
I	1. Levels of scale: Nominal, ordinal, interval and ratio. Measures of central tendency (Mean, Median and Mode). 2. Partition values in statistics.
II	3. Distribution and normal curve. 4. Measures of dispersion: range, quartile deviation, mean deviation and standard deviation.
III	5. Sampling: types and its applications in geographical studies. 6. Bivariate analysis: Correlation (Karl and Spearman).

Note for the Paper- Setter

The question paper will consist of seven questions in all. The first question will be compulsory and will consist of four short questions of 2 marks each covering the whole syllabus. In addition, six more questions of 14 marks each will be set unit-wise comprising of two questions from each of the three units. The candidates are required to attempt one compulsory question and three more questions selecting at least one question from each unit.

Distribution of Marks for Practical Evaluation

Credit 01, Maximum Marks: 25 **Time: 03:00 Hours**
Experiment and Written Part = 15 **Viva-voce = 05** **Lab Records= 05**
Practical Record: A project file consisting of 8 exercises on the below mentioned themes: -

1. Measures of central tendency. (3 exercise)
2. Prepare some statistical curve, such as Lorenz curve, Histogram Curve. (3 exercises)
3. Find out the correlation using Spearman and Karl Pearson methods. (2 exercises)

Note for the Paper Setter: The question paper will consist of three questions in all. The first question will be compulsory consist of five short questions of 1 marks each covering the whole syllabus. In addition, two more questions of 10 marks each covering the whole syllabus. The candidates are required to attempt one compulsory question and one more question.

Suggested Readings:

7. Sarkar Ashish (2013), Quantitative Geography: Techniques and Presentations.
8. Gregory S. (1963), Statistical Methods and the Geography, Longman, London.
9. Mahmood. A. (1993), Statistical Methods in Geographical Studies, Rajesh Publications, New Delhi.
10. Rogerson. P.A. (2010), Statistical Methods for Geography, Sage Publication, New Delhi
11. Paul. S.K. (1998), Statistics for Geoscientists: Techniques and Applications, Concept Publishing Company, New Delhi.
12. Jain. T. R. (2012), Basics Statistical Methods for Economics, VK Global Publication, New Delhi.

BSC/BA/GEO/MD/5/MIC/301: Geography of Natural Hazards and Disasters

Duration: 3 Hours **Credit 03, Maximum Marks: 75**
(External Evaluation: 50, Internal Assessment: 25)

Course Objective: The objective of this course is to help the students in understanding the Disaster Management.
After completing this course, the students would be developed their ability on given course objectives.
CO1: Learn about Climatic variations, Climatic fluctuations and change.
CO2: Know the importance of Earth's Greenhouse effect and global warming.
CO3: Learn the Regional extreme events in India.
CO4: Study the disaster management plans.

Unit	Topics
I	1. Disaster: Concept, Definition and Classification. 2. Concept of Hazards, Risk, Vulnerability and Disaster.
II	3. Earth's Greenhouse effect and global warming. 4. Distribution of floods & landscapes. Levels of deforestation and reforestation.
III	5. Understanding manmade disasters and forest fires, nuclear, biological. 6. Mitigation and Management: Plans and Policies in Disaster Management and awareness among people.

Instructions for Paper- Setter
The question paper will consist of seven questions in all. The first question will be compulsory and will consist of four short questions of 2 marks each covering the whole syllabus. In addition, six more questions of 14 marks each will be set unit-wise comprising of two questions from each of the three units. The candidates are required to attempt one compulsory question and three more questions selecting at least one question from each unit.

Distribution of Marks for Practical Evaluation
Credit 01, Maximum Marks: 25 **Time: 03:00 Hours**
Experiment and Written Part = 15 **Viva-voce = 05** **Lab Records= 05**
Practical Record: A project file consisting of 8 exercises on the below mentioned themes: -

1. Spatio-Temporal detection of Disaster using photographs. (2 exercise)
2. Spatio-Temporal measurement of deforestation and Reforestation in India. (3 exercises)
3. Spatio-Temporal measurement of Floods and Landslides in India. (3 exercises)

Note for the Paper Setter: The question paper will consist of three questions in all. The first question will be compulsory consist of five short questions of 1 marks each covering the whole syllabus. In addition, two more questions of 10 marks each covering the whole syllabus. The candidates are required to attempt one compulsory question and one more question.

Suggested Readings:

1. Andrew Dessler, 2011. Introduction to Modern Climate Change, Cambridge University Press.
2. Andrew Dessler, 2012. The Science and Politics of Global Climate Change, Cambridge University Press.
3. Anthony Giddens, 2013. The Politics of Climate Change, Wiley.
4. David Wallace-Wells, 2019. The Uninhabitable Earth, Penguin Books.
5. John Houghton, 2009. Global Warming: The Complete Briefing, Cambridge University Press.
6. Jefferey Bennet, 2016. Global Warming Premier, https://www.globalwarmingprimer.com/.
7. Intergovernmental Panel on Climate Change, UNEP and WMO. IPCC Assessment Reports 1-5.
8. Trewartha G. T., 1980. An Introduction to Climate, McGraw Hill Company, New York.

BSC/BA/GEO/MD/6/DSC/351: Fundamentals of Aerial Photography and Remote Sensing

Duration: 3 Hours **Credit 03, Maximum Marks: 75**
(External Evaluation: 50, Internal Assessment: 25)

Course Objective: The objective of this course is to provide the student basic knowledge of world economy and various processes of globalization.

After completing this course, the students would be developed their ability on given course objectives.

CO1: Acquaintance with fundamentals of remote sensing.
CO2: Development of capability to interpret the aerial photographs.
CO3: Enrichment of skills to extract information from resource satellite imageries.
CO4: Awareness about digital image processing and its applications in resource monitoring and mapping.

Unit	Topics
I	1. Aerial Photographs: definition, history, advantages and types. 2. Key elements for interpretation of aerial photographs.
II	3. Remote Sensing: meaning, definition and their applications. 4. Remote sensing platforms and resolution.
III	5. Remote Sensing Sensors and satellite series. 6. EMR and spectrum. Energy interaction with atmosphere and earth surface.

Instructions for Paper- Setter

The question paper will consist of seven questions in all. The first question will be compulsory and will consist of four short questions of 2 marks each covering the whole syllabus. In addition, six more questions of 14 marks each will be set unit-wise comprising of two questions from each of the three units. The candidates are required to attempt one compulsory question and three more questions selecting at least one question from each unit.

Distribution of Marks for Evaluation

Credit 01, Maximum Marks: 25 **Time: 03:00 Hours**
Experiment and Written Part = 15 **Viva-voce = 05** **Lab Records = 05**
Practical Record: A project file consisting of 8 exercises on the below mentioned themes:

1. Familiarization with aerial photographs. (1 exercise)
2. Geometry of aerial photographs. (1 exercise)
3. Principal point and conjugate principal points. (2 exercises)
4. Fiducial Marks in Aerial Photographs. (1 exercise)
5. Flight Line in Aerial Photography. (1 exercise)
6. Measurement of scale of aerial photograph using different types of methods. (1 exercise)
7. Identification of physical and cultural features using satellite imageries. (1 exercise)

Note for the Paper Setter: The question paper will consist of three questions in all. The first question will be compulsory and will consist of five short questions of 1 marks each covering the whole syllabus. In addition, two more questions of 10 marks each. The candidates are required to attempt one compulsory question and one more question.

Suggested Readings:

1. Avery T.E., and G.L. Berlin (1992): Fundamentals of Remote Sensing and Air Photo Interpretation, Macmillan, New York, USA.
2. Aggarwal C.S. and P.K. Garg (2000). Remote Sensing, A.H. Wheeler & Co. Ltd, New Delhi.
3. Campbell, J.B. (2002) Introduction to Remote Sensing, Taylor & Francis, New York, USA.
4. Jensen, J.R. (2000), Remote Sensing of the Environment: An Earth Resource Perspectives, Pearson Education.
5. Lillesand, T.M. and Keffer R. (1994) Remote Sensing and Image Interpretation, John Willy & Sons, New York.
6. Meenakshi Kumar (2000), Text book on Remote Sensing; NCERT, New Delhi.
7. Nag and Kudrat (2002), Remote Sensing and Image Interpretation, Concept Publishers, Delhi.
8. Reddy, A. (2000) Remote Sensing and Geographical Information System (An Introduction), Hyderabad.

BSC/BA/GEO/MD/6/MIC/351: Introduction to Remote Sensing

Duration: 3 Hours **Credit 03, Maximum Marks: 75**
(External Evaluation: 50, Internal Assessment: 25)

Course Objective: The course aims to enrichment of knowledge about social aspects of tribes, caste and religion.

After completing this course, the students would be developed their ability on given course objectives.

CO1: Acquisition of skills of measurements on aerial photographs.

CO2: Capability of reading and interpreting physical and socio-economic features on photographs.

Unit	Topics
I	1. History and development of remote sensing. 2. Indian space programmes.
II	3. Platforms in Remote Sensing. 4. Resolution and sensors in Remote sensing.
III	5. Types of satellites and their application. 6. Remote sensing programmes (world) and their development.

Instructions for Paper- Setter

The question paper will consist of seven questions in all. The first question will be compulsory and will consist of four short questions of 2 marks each covering the whole syllabus. In addition, six more questions of 14 marks each will be set unit-wise comprising of two questions from each of the three units. The candidates are required to attempt one compulsory question and three more questions selecting at least one question from each unit.

Distribution of Marks for Evaluation

Credit 01, Maximum Marks: 25 **Time: 03:00 Hours**

Experiment and Written Part = 15 **Viva-voce = 05** **Lab Records = 05**

Practical Record: A project file consisting of 8 exercises on the below mentioned themes:

1. Draw a flow chart for Indian Sattelites. (1 exercise)
2. Familiriazation to satellite imageries. (1 exercises)
3. Interpretation of Physical features. (1 exercise)
4. Interpretation of Cultural features. (1 exercise)
5. Georefrencing. (1 exercise)
6. Image to image Rectification. (1 exercise)
7. Familiriazation to Remote sensing equipments. (2 exercises)

Note for the Paper Setter: The question paper will consist of three questions in all. The first question will be compulsory consist of five short questions of 1 marks each covering the whole syllabus. In addition, two more questions of 10 marks each covering the whole syllabus. The candidates are required to attempt one compulsory question and one more question.

Suggested Readings:

1. Aggarwal C.S. and P.K. Garg (2000). Remote Sensing, A.H. Wheeler & Co. Ltd, New Delhi.
2. Campbell, J.B. (2002) Introduction to Remote Sensing, Taylor & Francis, New York, USA.
3. Jensen, J.R. (2000), Remote Sensing of the Environment: An Earth Resource Perspectives, Pearson Education.
4. Lillesand, TM. and Keffer R. (1994) Remote Sensing and Image Interpretation, John Willy & Sons, New York.
5. Meenakshi Kumar (2000), Text book on Remote Sensing; NCERT, New Delhi.
6. Nag and Kudrat (2002), Remote Sensing and Image Interpretation, Concept Publishers, Delhi.

BSC/BA/GEO/MD/7/DSC/401: Climatology

Duration: 3 Hours **Credit 04, Maximum Marks: 100**
(External Evaluation: 70, Internal Assessment: 30)

Objectives: The main objectives of the course are that the students get knowledge about climatology, green house effect, planetary winds weather systems, global warming and its impact.

Course Outcomes (COs):

CO1: enhance the knowledge about atmospheric constituents and structure.
CO2: development of scientific understanding about climatic elements and their characteristics.
CO3: Sharpens the understanding about atmospheric moisture, stability, and instability and weather systems.
CO4: **e**nrichment of knowledge about climatic classification, climate change and global warming.

Unit	Topics
I	1. Definition of weather and climate; Climatology and Meteorology. Origin, composition and structure of atmosphere. 2. Insolation, heat budget and temperature distribution.
II	3. Atmospheric pressure and its distribution pattern. Theories of general circulation and planetary winds. 4. Walker circulation- ENSO and La Nina, origin of monsoons and jet streams.
III	5. Atmospheric Moisture: humidity, evaporation, condensation; precipitation formation theories and types of precipitation, acid rain. 6. Stability and instability of atmosphere, air masses and fronts. Weather systems: Origin and characteristics of extra tropical and tropical cyclones.
IV	7. Climatic classification: Bases of climatic classification by Koeppen, Trewartha and Thornthwaite. 8. Climatic change: pattern, evidences and theories of climate change. Global warming and its impacts on earth systems.

Note for the Paper Setter:
The question paper will consist of nine questions in all. The first question will be compulsory and will consist of seven short questions of 2 marks each covering the whole syllabus. In addition, eight more questions of 14 marks each will be set unit-wise comprising of two questions from each of the four units. The candidates are required to attempt one compulsory question and four more questions selecting at least one question from each unit.

Suggested Readings:

1. Athrens, C. D. Meteorology Today: An Introduction to Weather, Climate and Environment, West Publishing Co., 1994
2. Barry, R. G. and Chorley, R. J. Atmosphere, Weather and Climate, Marth Ren, 2010.
3. Critchfield, H. J. General Climatology, Prentice Hall of India, New Delhi, 1987.
4. Collins, J.M. Climatology, Oxford, 2014.
5. Das, P.K. The Monsoons, National Book Trust, New Delhi, 1984.
6. Lal, D.S. Climatology, Chaitanya Publishing House, Allahabad, 1966.
7. Lutgens, F.K. and Tarbuck, E.J. The Atmosphere: An Introduction to Meteorology, Prentice Hall of India, New Delhi, 2010.
8. Miller, A.A. Climatology, Methuen and Co., London, 1979.
9. Oliver, J.E. and Hidore, J.J. Climatology: An Atmospheric Science, Pearson Education Inc. New Delhi, 2003.
10. Ram Sastry, A.A, Weather and Weather Forecasting, Publication Division, New Delhi.
11. Trewartha G. T., An Introduction to Climate, McGraw Hill Company, New York, 1980.

BSC/BA/GEO/MD/7/DSC/402: Geography of India

Duration: 3 Hours **Credit 04, Maximum Marks: 100**
(External Evaluation: 70, Internal Assessment: 30)

Objective: The main objective of the course is that the students gain knowledge about Indian physiography.

Course Outcomes (COs):
CO1: Provides understanding about the physical structure of India.
CO2: Enrichment of understanding about spatial organization of agriculture and irrigation systems.
CO3: Acquaintance with geographical distribution and production of major resources.
CO4: Enhancement of knowledge about spatial distribution of industries and international trade of India.

Unit	Topics
I	1. Physiography: relief characteristics and physiographical divisions. Drainage systems and their functional significance. 2. Climate: characteristics, seasons and climatic regions of India. Soil and vegetation types: their distribution, characteristics and conservation.
II	3. Agriculture: major characteristics, agricultural development. Problems of Indian agriculture. 4. Irrigation: types, major projects with reference to Bhakra Nangal, Narmada and Damodar Valley Projects.
III	5. Production, distribution, status of use and conservation of metallic minerals: iron ore and bauxite. Production, distribution, status of use and conservation of non-metallic minerals: mica and manganese. 6. Production, distribution, status of use and conservation of following power resources: coal, petroleum and hydropower.
IV	7. Production and distribution of (a) iron and steel (b) cotton textile (c) sugar and (d) automobile industry. 8. Major industrial regions and their characteristics. International trade: major exports and imports.

Note for the Paper Setter:
The question paper will consist of nine questions in all. The first question will be compulsory and will consist of seven short questions of 2 marks each covering the whole syllabus. In addition, eight more questions of 14 marks each will be set unit-wise comprising of two questions from each of the four units. The candidates are required to attempt one compulsory question and four more questions selecting at least one question from each unit.

Suggested Readings:

1. Dubey, R. N.,1974: Economic Geography of India, Kitab Mahal, Allahabad
2. Hussain Majid (2015): Geography of India, Mc Graw Hill Education.
3. Joshi, H. L.,1990: Industrial Geography of India, Rawat Publications, Jaipur
4. Nag, P. and Sengupta, S., 1992: Geography of India, Concept publications. Co., New

Delhi.
5. Singh, R. L.: India: A Regional Geography, N.G.S.I., Varanasi, 1971
6. Sharma, T. C. and Coutinho, O. 1988: Economic and Commercial Geography of India. Vikas Publishing House Pvt. Ltd, New Delhi.
7. Singh, S. and Saroha, J. 2019. Geography of India, Mc Graw Hill Education.
8. Tiwari, R. C.: Geography of India, PrayagPustak Bhawan, Allahabad.

BSC/BA/GEO/MD/7/DSC/403: Economic Geography

Duration: 3 Hours **Credit 04, Maximum Marks: 100**
(External Evaluation: 70, Internal Assessment: 30)

Objective: The main objective of the course is that the students gain knowledge about Indian economy and economic activities.

Course Outcomes (COs):
CO1: Provides understanding about the location and distribution of economic activities.
CO2: Familiarization with location theories of economic activities.
CO3: Acquaintance with the spatial organization of world economies.
CO4: Knowledge about trade blocs, trends in trade and various processes of globalization.

Unit	Topics
I	1. Definition, nature, scope, importance, recent trends and approaches in economic geography. 2. Relationship of economic geography with economics. Economic activities and their classification.
II	3. Network structure and economic activities, impact of transport on economic activities, spatial variation in production and transport cost. 4. Location theories of Weber, Losch, Christaller, Ullman.
III	5. World Economies: bases of classification, patterns and characteristics of developed and developing economies of the world. 6. Economic development: meaning, evolution, goals, measures, pattern, problems and stages of economic development (Rostow's model).
IV	7. Globalization and recent trends in pattern of international trade. Major regional trade blocks of the world and their functions and relevance: GATT, WTO and EU. 8. Functions and relevance of OPEC regarding energy crises in developed and developing countries of the world.

Note for the Paper Setter:
The question paper will consist of nine questions in all. The first question will be compulsory and will consist of seven short questions of 2 marks each covering the whole syllabus. In addition, eight more questions of 14 marks each will be set unit-wise comprising of two questions from each of the four units. The candidates are required to attempt one compulsory question and four more questions selecting at least one question from each unit.

Suggested Readings:

1. Gautam, A. 2010. Advanced Economic Geography. Sharda Pustak Bhawan, Allhabad.
2. Hartshorne, T. A. and Alexander, J. W. 2001. Economic Geography. Prentice Hall of India. New Delhi.
3. Hudson, R. 2005. Economic Geography. Sage Publication, New Delhi.
4. Jones, C. F. and Darkenwarld, G. G. Economic Geography. The Macmillan and Company. New York.
5. Knox, P. 2003. The Geography of World Economy. Arnold, London.
6. Saxena, H.M. 2013. Economic Geography. Rawat Publications, Jaipur.

BSC/BA/GEO/MD/7/DSC/404: Statistical Methods in Geography

Duration: 3 Hours **Credit 04, Maximum Marks: 100**
(External Evaluation: 70, Internal Assessment: 30)

Objective: The main objective of the course is that the students are able for the using of statistical formulas and techniques for their work.

Course Outcomes (COs):-
CO1: Introduction to tools of quantitative information and data.
CO2: Enhancement of knowledge about statistical analysis of spatial pattern from geographical data.
CO3: Enrichment of knowledge about inferential data analysis and errors associated with it.
CO4: Acquaintance with bivariate and multivariate analytical techniques.

Unit	Topics
I	1. Descriptive statistics: measures of central tendency: mean, median, mode, Partitioned values: quartiles and deciles. 2. Measures of dispersion: absolute measures: range, quartile deviation, mean deviation, standard deviation, relative measure of dispersion: coefficient of variation.
II	3. Normal curve as a probability distribution, characteristics. 4. Measure of inequality: location quotient and Lorenz curve. Sampling: types, distribution and chance errors.
III	5. Bivariate analysis: scatter diagram, correlation analysis, Spearman's rank correlation and Karl Pearson's correlation coefficient, test of significance. 6. Simple linear regression model.
IV	7. Residuals and their mapping. 8. Basics of multivariate analysis: correlation matrix, partial and multiple correlation.

Note for the Paper Setter:
The question paper will consist of nine questions in all. The first question will be compulsory and will consist of seven short questions of 2 marks each covering the whole syllabus. In addition, eight more questions of 14 marks each will be set unit-wise comprising of two questions from each of the four units. The candidates are required to attempt one compulsory question and four more questions selecting at least one question from each unit.

Suggested Readings:

1. Gregory, S. Statistical Methods and the Geographers, Longman, London, 1964.
2. Gupta, C. B. An Introduction to Statistical Methods, Vikas Publishing House, Delhi, 1974.
3. Johnston, R.J. Multivariate Statistical Analysis in Geography, Longman Scientific and Technical, John Wiley & Sons, 1989.
4. Mahmood, A. Statistical Methods in Geographical Studies, Rajesh Publications, New Delhi, 1993.
5. Paul, S.K. Statistics for Geoscientists: Techniques and Applications, Concept Publishing Company, NewDelhi, 1998.

BSC/BA/GEO/MD/7/DSC/405: Cartographic Methods in Geography (Practical)

Duration: 3 Hours **Credit 04, Maximum Marks: 100**

Objective: The main objective of the course is that the students are able for the using of cartographical techniques for mapping.

Course Outcomes (COs):-
CO1: Awareness about various types of cartographic diagrams.
CO2: Enrichment of skills to prepare the thematic maps and diagrams.
CO3: Acquisition of skills to represent the statistical data.
CO4: Capability to understand and interpret the graphs/diagrams/maps.

Distribution of Marks for Evaluation
Experiment and Written Part = 70 **Viva-voce = 20** **Lab Records = 10**
Practical Record: A project file consisting of 20 exercises on the below mentioned themes:

1. Simple Diagrams: Line and bar graph, Poly graph, Rainfall deviation diagram. (3 Exercise)
2. One dimensional diagrams: Comparative bar, Compound bar, Trend graph. (3 Exercise)
3. Two dimensional diagrams: Pie diagram. (1 Exercise)
4. Three dimensional diagrams: Sphere. (1 Exercise)
5. Weather Diagrams: Climograph (Taylor and Foster), Hythergraph, Ergograph, Isopleth. (5 Exercise)
6. Distribution maps: Dot method, Choropleth, Wind rose diagram. (4 Exercise)
7. Diagrams: Age and Sex pyramid, Snail Diagram, Cartogram (traffic flow). (3 Exercise)

Note for the Paper Setter:
The question paper will consist of nine questions in all. The first question will be compulsory and will consist of seven short questions of 2 marks each covering the whole syllabus. In addition, eight more questions of 14 marks each will be set unit-wise comprising of two questions from each of the four units. The candidates are required to attempt one compulsory question and four more questions selecting at least one question from each unit.

Suggested Readings:

1. Misra, R.P. and Ramesh, A. 1999. Fundamentals of Cartography, Concept Publishing Company, New Delhi
2. Monkhouse, F.J. and Wilkinson, H.R. 1980. Maps and Diagrams. B. I. Publications, New Delhi.
3. Singh, R. L. 1986. Elements of Practical Geography. Kalyani Publishers, New Delhi.

BSC/BA/GEO/MD/7/MIC/401: Interpretation of Topographical Sheets (Practical)

Duration: 3 Hours **Credit 04, Maximum Marks: 100**

Objective: The main objective of the course is that improve the knowledge of students for topographical sheets.

Course Outcomes (COs):-

CO1: Introduction to nomenclature of toposheet in India.
CO2: Enhancement of knowledge about availability and acquisition of toposheet in India.
CO3: Enrichment of knowledge about basic information on topographical sheet.
CO4: Improve the skill in the map preparation using toposheet.

Distribution of Marks for Evaluation

Experiment and Written Part = 70 **Viva-voce = 20** **Lab Records = 10**

Practical Record: A project file consisting of 15 exercises on the below mentioned themes:

1. Introduction, history and types of Toposheet.
2. Toposheet numbering and nomenclature of Toposheet in India. (2 Exercise)
3. Availability and acquisition of Toposheet in India. (2 Exercise)
4. Topographical sheet interpretation, Basic information on Topographical sheet, Preliminary information, Conventional Signs. (2 Exercise)
5. Interpretation of Relief, Drainage, Settlements, land-use and land cover, vegetation and transport network on Toposheet. (6 Exercise)
6. Map preparation using Toposheet, use of Toposheet in remote sensing and GIS, application of Toposheet. (3 Exercise)
7. Toposheet as a tool for measurement. (1 Exercise)

Note for the Paper Setter:

The question paper will consist of nine questions in all. The first question will be compulsory and will consist of seven short questions of 2 marks each covering the whole syllabus. In addition, eight more questions of 14 marks each covering the whole syllabus. The candidates are required to attempt one compulsory question and four more questions.

Suggested Readings:

1. Panmia, B.C. (1981), Surveying, Standard Book House, New Delhi.
2. Sharma, J.P. (1996), Prayogik Bhoogol, Restogi Publications, Meerut.
3. Singh, R.L. (1979), Elements of Practical Geography, Kalyani Publishers, New Delhi
4. Yadav, H.L., (2000), Prayogik Bhoogol Ke Ke Aadhar (Fundamentals of Practical Geography), Radha Publication, New Delhi.

BSC/BA/GEO/MD/8/DSC/451: Geomorphology

Duration: 3 Hours **Credit 04, Maximum Marks: 100**
(External Evaluation: 70, Internal Assessment: 30)

Objective: The main objective of the course is that the students gain knowledge about fundamental concept of geomorphology.

Course Outcomes (COs):-
CO1: Development of understanding about the fundamental concepts of geomorphology.
CO2: Enrichment of knowledge about tectonic activities and hill slope relationship.
CO3: Familiarization with the processes and patterns shaping the landforms.
CO4: Understanding of environmental management using principles of applied geomorphology.

Unit	Topics
I	1. Introduction to geomorphology as a science: definition, nature, scope and recent developments. 2. Fundamental concepts: Geological structure and landforms, uniformitarianism, multi-cycle and polygenetic evolution of landscape, frequency concept of geomorphic processes, climatogenetic geomorphology and peneplain and pediplain.
II	3. Continental drift theory and its basic considerations; Plate tectonics-meaning and concept, margins and boundaries, plate motion and cycle; Tectonic activities along boundaries and distribution of plates. 4. Hill slope-definition and forms of slope, geomorphic processes and slope forms, theories of slope evolution by Davis, Penck, Strahler, Young, Woodand King.
III	5. Weathering: Causes; types of weathering: physical, chemical and biological. 6. Mass movement, causes, classifications and types of mass movements- slow and rapid mass movements.
IV	7. Geomorphic processes and resulting land forms: Fluvial, Glacial, Periglacial, Aeolian and Karst. 8. Applied geomorphology: meaning and concept, role of geomorphology in environmental management of the following: (i) accelerated erosion and sedimentation, (ii) construction of large dams (iii) urban floods.

Note for the Paper Setter:
The question paper will consist of nine questions in all. The first question will be compulsory and will consist of seven short questions of 2 marks each covering the whole syllabus. In addition, eight more questions of 14 marks each will be set unit-wise comprising of two questions from each of the four units. The candidates are required to attempt one compulsory question and four more questions selecting at least one question from each unit.

Suggested Readings:

1. Bloom AL. 2002. Geomorphology: A systematic Analysis of late Cenozoic landforms.Prentice-Hall Private Limited, New Delhi.
2. Embleton, C and Thormne. J.1979. Process in Geomorphology. London, Edward Arnold.
3. Kale VS and Gupta A.2001. Introduction to Geomorphology.OrientLongman, Hyderabad.
4. RitterDF., KochelRC. and Miller JR.1995. Process Geomorphology. Dubuque, WinC. Brown Publishers.
5. Sharma HS and Kale VS2009. Geomorphology in India, PrayagPustak Bhawan,Allahabad.
6. Sharma, VK.2010. Introduction to Process Geomorphology. Tayler and Francis's, London.
7. Sharma, VK. 1992. Earth's Surface Processes and Forms. Tata McGraw Hill Publications,New Delhi.

BSC/BA/GEO/MD/8/DSC/452: Population Geography

Duration: 3 Hours **Credit 04, Maximum Marks: 100**
(External Evaluation: 70, Internal Assessment: 30)

Objective: The main objective of the course is that the students gain knowledge about main population aspects.

Course Outcomes (COs):-
CO1: Knowledge about population data base, methodological issues and mapping.
CO2: Familiarization with the dynamics of population and demographic dividends.
CO3: Enrichment of knowledge about population theories and models.
CO4: Awareness about population policies of different countries and relation between population and environment.

Unit	Topics
I	1. Nature and scope of population geography. Methodological problems in population geography. 2. Sources of population data, quality and reliability of data. Problems of mapping population data.
II	3. Concepts, determinants and world patterns of the following attributes of population: Dynamics of population: fertility, mortality, migration and growth. 4. Composition of population: age and sex composition, ageing of population, occupational structure and workforce. Demographic dividend: linkages between population and economic development.
III	5. Concepts of over population, under population and optimum population. Demographic transition model. 6. Population resource regions. Theories of population: Malthus, Ricardo and Marx. Limits to growth: concept and application.
IV	7. Comparative study of population problems and policies of developed countries (U.S.A., Japan and Canada) and less developed countries (India, China and Brazil). 8. Population problems and environmental implications.

Note for the Paper Setter:
The question paper will consist of nine questions in all. The first question will be compulsory consist of seven short questions of 2 marks each covering the whole syllabus. In addition, eight more questions of 14 marks each will be set unit-wise comprising of two questions from each of the four units. The candidates are required to attempt one compulsory question and four more questions selecting at least one question from each unit.

Suggested Readings:

1. Bhende, A. A. and Kanitkar, T. (2011): Principles of Population Studies, Himalaya Publishing House, Mumbai.
2. Cassen, Robert & Bates, Lisa M. (1994): Population Policy: A New Consensus Overseas Development Council, Washington, D.C.
3. Chandna, R. C. (2016): Population Geography: Concepts, Determinants and Patterns, Kalyani Publishers, New Delhi.

4. Demko, G. J. and others (Eds.) (1971): Population Geography, Reader, McGraw- Hill Books Co., New York
5. Graff, M., and Bremner, J. (2014):A Practical Guide to Population and Development, Washington DC: Population Reference Bureau.
6. Hassan, I. (2020) Population Geography: ASystematic Exposition, Routledge, London.
7. May, J.F. (2012) World population policies: their origin, evolution, and impact, Washington DC: Springer.
8. Mahajan,N(2014) Population Geography, R.K. publishers, Delhi.

BSC/BA/GEO/MD/8/DSC/453: Regional Development and Planning

Duration: 3 Hours **Credit 04, Maximum Marks: 100**
(External Evaluation: 70, Internal Assessment: 30)

Objective: The main objective of the course is that the students improve their awareness about developmental plans and strategies for regions.

Course Outcomes (COs):-
CO1: Understanding of basic concepts of regional planning and development.
CO2: Acquaintance with models of regional development.
CO3: Enrichment of knowledge about regional disparities and challenges in India.
CO4: Awareness about developmental plans and strategies in India.

Unit	Topics
I	1. Introduction to Regional Planning: definition and scope of regional planning, importance of regional planning in geography. 2. Concepts of Region and Regionalism: Characteristics and classification of regions, Regionalism vs. regional imbalance, Theories of regional development: Myrdal's cumulative causation, Hirschman's linkage theory, Rostow's stages of growth, Friedmann's core-periphery model
II	3. Approaches to Regional Planning: Sectoral vs. spatial planning, Multi-level planning: District, state, national levels. 4. Regional Development: Indicators of regional development (economic, social, infrastructure, human development), Spatial disparities in development: Causes and consequences
III	5. Planning Models and Strategies: Growth pole and growth center theories, Regional development strategies: Balanced vs. unbalanced growth, Area development planning, Backward area development. 6. Regional Planning in India: Evolution of regional planning in India: Five-Year Plans, NITI Aayog.
IV	7. Policies and Institutional Framework: Role of government in regional planning, Regional development programs in India: Drought Prone Areas Programme (DPAP), Hill Area Development Programme (HADP), Integrated Watershed Programme. 8. Contemporary Issues in Regional Development: Sustainable regional development, Urbanization and peri-urban challenges, Impact of globalization and liberalization on regions.

Note for the Paper Setter:
The question paper will consist of nine questions in all. The first question will be compulsory and will consist of seven short questions of 2 marks each covering the whole syllabus. In addition, eight more questions of 14 marks each will be set unit-wise comprising of two questions from each of the four units. The candidates are required to attempt one compulsory question and four more questions selecting at least one question from each unit.

Suggested Readings:

1. Chandna, R.C. (2000): Regional Planning: A Comprehensive Text. Kalyani Publishers, New Delhi.
2. Chaudhuri, J.R. (2001): An Introduction to Development and Regional Planning with special reference to India. Orient Longman, Hyderabad.
3. Friedmann, J. and Alonso, W.(1973): Regional Development and Planning. The MIT Press, Mass.
4. Hettne, B., Inotai, A. and Sunkel, O. (2000): Studies in the New Regionalism. Vol. I-V. Macmillan Press, London.
5. Kuklinski, A.R. (1972): Growth Poles and Growth Centres in Regional Planning. Mouton and Co., Paris.
6. Leys, C. (1996): The Rise and Fall of Development Theory. Indian University Press, Bloomington.
7. Mahapatra, A.C. and Pathak, C.R.(2003): Economic Liberalization and Regional Disparities in India.Star Publishing House, Shillong.
8. Chand, M andPuri, V.K. (1983): Regional Planning in India, Allied Publishers, NewDelhi.
9. Misra, R.P.(1992): Regional Planning: Concepts, Techniques, Policies and Case Studies.Concept Publishing Company, New Delhi.
10. Misra, R.P. and Natraj, V.K. (1978): Regional Planning and National Development. Vikas Publication, New Delhi.

BSC/BA/GEO/MD/8/DSC/454: Agricultural Geography

Duration: 3 Hours **Credit 04, Maximum Marks: 100**
(External Evaluation: 70, Internal Assessment: 30)

Objective: The main objective of the course is that the students improve their knowledge about food production, food security and economic liberalization on agriculture.

Course Outcomes (COs):-
CO1: Enrichment of knowledge about origin, location and distribution of agricultural activities.
CO2: Enhancement of knowledge about changing land use and cropping pattern.
CO3: Acquaintance with agricultural systems, efficiency and productivity.
CO4: Awareness about impacts of climate change and economic liberalization on agriculture.

Unit	Topics
I	1. Nature, scope and significance of agricultural geography. Origin and dispersal of agriculture in the World. 2. Determinants of agricultural patterns: physical, technological and cultural factors.
II	3. Concepts of land capability survey, land use and cropping pattern. Agricultural Concepts: intensity of cropping, Degree of commercialization, Crop diversification, concentration, combination, Contract framing and agri-business. 4. Approaches in agricultural regionalization: Von Thunen's Model of agricultural land use. Agro-climatic zonation: Concept and Indian experience.
III	5. Bases of identification of agricultural systems by Whitllesey and agricultural typology by Kostrowiki. 6. Measurements of agricultural efficiency and productivity. Green revolution: Its impacts and consequences in India.
IV	7. Food production and security in India. Neo-liberalization and Indian agriculture. 8. Agriculture and climate change: impacts and adaptation.

Note for the Paper Setter:
The question paper will consist of nine questions in all. The first question will be compulsory and will consist of seven short questions of 2 marks each covering the whole syllabus. In addition, eight more questions of 14 marks each will be set unit-wise comprising of two questions from each of the four units. The candidates are required to attempt one compulsory question and four more questions selecting at least one question from each unit.

Suggested Readings:

1. Bowler TR (1992) The Geography of Agriculture in Developed Market Economics. Longman.
2. Geoffrey, H.F.(1970) Geography of Agriculture: Themes in Research. Practice Hall, N.J.
3. Grigg D (1995) Introduction to Agricultural Geography. Routledge, London.
4. Husain, Majid (1996)Systematic Agricultural Geography. Rawat Publications, Jaipur.
5. Morgon, W.B. and Munton, R.J.C.(1971) Agricultural Geography. Methuen, London.
6. Singh Jasbir and Dhillon S.S. (1994) Agricultural Geography. Tata Mc Graw Hill, New Delhi.

BSC/BA/GEO/MD/8/DSC/455: Morphometric Analysis (Practical)

Duration: 3 Hours **Credit 04, Maximum Marks: 100**

Objective: The main objective of the course is that the students improve their knowledge about morphometric analysis techniques.

Course Outcomes (COs):-

CO1: Acquisition of skills to extract physical and cultural information from topographical maps.
CO2: Knowledge of drawing of transverse and longitudinal profiles.
CO3: Ability to represent the linear, areal and relief aspects of drainage basin.
CO4: Capability to prepare the slope and relative relief maps of drainage basin.

Distribution of Marks for Evaluation

Experiment and Written Part = 15 **Viva-voce = 05** **Lab Records = 05**

Practical Record: A project file consisting of 20 exercises on the below mentioned themes:

1. Representation of physical features and cultural features, Delineation of watershed (All exercises shall be based on it). (3 exercises)
2. Profile analysis: transverse and longitudinal. Serial profiles, Superimposed profiles, Composite profiles, Projected profiles, Longitudinal profile. (5 exercises)
3. Linear Aspects: Relationship between stream order and stream Number, Relationship between stream order and average stream length, Bifurcation ratio. (3 exercises)
4. Areal Aspects: Drainage frequency, Drainage Density. (2 exercises)
5. Relief Aspect: Area height Curve, Altimetric frequency curve. (2 exercises)
6. Hypsographic curve, Hypsometric integral curve, Clinographic curve. (3 exercises)
7. Slope Analysis: Wentworth's method of average slope, G. H. Smith's method of relative relief. (2 exercises)

Note for the Paper Setter:

The question paper will consist of nine questions in all. The first question will be compulsory and will consist of seven short questions of 2 marks each covering the whole syllabus. In addition, eight more questions of 14 marks each will be set unit-wise comprising of two questions from each of the four units. The candidates are required to attempt one compulsory question and four more questions selecting at least one question from each unit.

Suggested Readings:

1. 1. Dury, G.H. 1966. Essays in Geomorphology. Heinmann, London.
2. Misra, R.P. and Ramesh, A. 1999. Fundamentals of Cartography, Concept Publishing Company, New Delhi.
3. Miller, A. 1964. The Skin of the Earth. Methuen, London
4. Monkhouse, F. J. and Wilkinson, H.R. 1980. Maps and Diagrams. B.I. Publications, New Delhi.
5. Singh, R. L. 1986. Elements of Practical Geography, Kalyani Publications, New Delhi.

BSC/BA/GEO/MD/8/MIC/451: Geography of Haryana

Duration: 3 Hours **Credit 04, Maximum Marks: 100**

Objective: The main objective of the course is that the students are able for the using of cartographical techniques for mapping.

Course Outcomes (COs):-

CO1: Awareness about various aspects of physiography of Haryana.
CO2: To enhance the knowledge of students about crops.
CO3: To gain the knowledge about urbanization of Haryana.
CO4: To improve the knowledge of students about industries of Haryana.

Unit	Topics
I	1. Haryana: Physiography; Climate (koppen's classification); and Drainage system. 2. 2.Vegetation, Soils; Soil degradation and conservation.
II	3. Agriculture and its problems; Irrigation and its modes. 4. Distribution crops - Wheat, Rice, Sugarcane, Cotton. Animal Husbandry, Dairying.
III	5. Density, Distribution & Growth of population. Sex Ratio; Literacy. Trend, Pattern 6. Characteristics of Urbanization in Haryana.
IV	7. Emerging Pattern of Industrial Development; Industrial, Distribution and Concentration of major industries 8. Rural Development and Poverty alleviation.

Note for the Paper Setter:

The question paper will consist of nine questions in all. The first question will be compulsory consist of seven short questions of 2 marks each covering the whole syllabus. In addition, eight more questions of 14 marks each covering the whole syllabus. The candidates are required to attempt one compulsory question and four more questions.

Suggested Readings:

1. 1. Robinsin, A., Morrison,J.L.,Muehrcke.P.C. and Guptil,S.C.(2002) Elements of Cartography, John Willey.
2. Taylor, D.R.F.(1985) Education and Training in Contemporary Cartography, John Willey.
3. Jil D., Charles W., Mohsen,M. (2016)Cartographic Grounds: Projecting the Landscape Imaginary, Prinston Press, New York.

BSC/BA/GEO/H/MD/8/DSC/451: Geographical Thought

Duration: 3 Hours **Credit 04, Maximum Marks: 100**
(External Evaluation: 70, Internal Assessment: 30)

Course Objective: The objective of this course is to provide basic knowledge of Geographical history and Geographers.

After completing this course, the students would be developed their ability on given course objectives.

CO1: Cognizance of nature and philosophy of geography.
CO2: Contextualization of development of geographic knowledge in ancient and medieval period.
CO3: Awareness about philosophy and concepts of modern geography.
CO4: Acquaintance with positivist and alternative explanations in geography.

Unit	Topics
I	1. Nature of geographic knowledge during ancient (Greek, Roman and Indian) periods, Foundation of modern geography-contributions of Varenius, Kant, Humboldt and Ritter.
II	2. Concepts in geography: environmental determinism and possibilism, areal differentiation. 3. Dichotomy and dualism in Geography: Physical vs Human Geography and Systematic vs Regional Geography.
III	4. Quantitative revolution-emergence of geography as spatial science. 5. Positivist explanations in geography- laws, theories, models in geographic explanations.
IV	6. Behavioral and humanistic perspectives in geography. 7. Social relevance in geography-Welfare, Radical and Feminist Perspectives, Postmodernism and Geography.

Note for the Paper Setter:
The question paper will consist of nine questions in all. The first question will be compulsory and will consist of seven short questions of 2 marks each covering the whole syllabus. In addition, eight more questions of 14 marks each will be set unit-wise comprising of two questions from each of the four units. The candidates are required to attempt one compulsory question and four more questions selecting at least one question from each unit.

Suggested Readings:

1. Creswell Tim (2013), Geographic Thought: A critical introduction, Wiley- Blackwell.
2. Dickinson, R.E. (1969), The Makers of Modern Geography, London.
3. Dikshit, R.D. (1997), Geographical Thought-A Contextual History of Ideas, Prentice Hall of India, New Delhi.
4. Johnston, R.J. (1983), Geography and Geographers, Edward Heinemann, London.
5. Peet, Richard (1998), Modern Geographical Thought, Oxford, Blackwell Publishers.

BSC/BA/GEO/H/MD/8/DSC/452: Geography and Water Resource Management

Duration: 3 Hours **Credit 04, Maximum Marks: 100**
(External Evaluation: 70, Internal Assessment: 30)

Course Objective: The objective of this course is to provide basic knowledge of water related aspects such as water related problems, uses, conservation etc.

After completing this course, the students would be developed their ability on given course objectives.

CO1: Study about inventory, distribution of water resources on earth, hydrological and its component.

CO2: Learn about methods of estimation of Water demand, problems related irrigation and Water quality parameters.

CO3: Know the Industrial use of water and Municipal use of water.

CO4: Understanding the Problems of water resource management, river water disputes, Conservation and planning for the development of water resources.

Unit	Topics
I	1. Water as a focus of geographical interest, inventory and distribution of world's water resources (surface and subsurface). 2. Basic hydrological cycle and its components- precipitation, potential evapotranspiration, runoff.
II	3. Water demand and use: methods of estimation — agricultural, industrial and municipal uses of water. Water balance and drought; major and minor irrigation: methods of distribution of water to farms; water harvesting techniques. 4. Irrigation - water logging; salinity and alkalinity of soil - over exploitation of groundwater; land subsidence; saline water intrusion into the coastal aquifers; Water quality parameters; water pollution-river and ground water.
III	5. Industrial use of water: methods of estimation; demand for water in the industrial sector of India. 6. Municipal use of water: general trends in water supply to the urban and rural communities in India, Internal navigation, hydel power and recreation.
IV	7. Problems of water resource management; Floods - magnitude/frequency, structural and non-structural adjustment of flood hazards. 8. Case studies of major floods. Conservation and planning for the development of water resources-social and institutional considerations; international and inter-state river water disputes.

Note for the Paper Setter:

The question paper will consist of nine questions in all. The first question will be compulsory and will consist of seven short questions of 2 marks each covering the whole syllabus. In addition, eight more questions of 14 marks each will be set unit-wise comprising of two questions from each of the four units. The candidates are required to attempt one compulsory question and four more questions selecting at least one question from each unit.

Suggested Readings:

1. Singh, R.A. and Singh, S.R. (1979),Water Management: Principles and Practices,Tara Publication, Varanasi.
2. Smith, K. (1972), Water in Britain : A Study in Applied Hydrology and Resource Geography, McMillan, London.
3. Tebbutt, T.H.Y. (ed.) (1985),Advances in Water Engineering, Elsevier Applied Science Pub.,London. Agarwal, Anil and Narain,Sunita(1997),***Dying Wisdom: Rise, Fall and Potential of India'sTraditional Water Harvesting System.*** Centre for Science and Environment, New Delhi.
4. Andrew A. Dzurik, (2002),***Water Resources Planning***, Rowman& Littlefield Publishers,Inc., Savage, Maryland.
5. Cech,T.V. (2005), ***Principles of Water Resources : History, Development, Management and Policy***, John Wiley & Sons, Hoboken.
6. Chorley, R.J. (1979), ***Water, Earth and Man***, Methuen, London.

BSC/BA/GEO/H/MD/8/MIC/451: Morphometric Analysis of Landforms (Practical)

Duration: 3 Hours **Credit 04, Maximum Marks: 100**

Course Objective: The objective of the course is to enable the students to be familiar about the topographical sheets of India and geographical significance of drainage basin and development of slopes Course Outcomes.

After completing this course, the students would be developed their ability on given course objectives.

CO1: Understand the arrangement, identification and interpretation of topographical sheets.
CO2: Drainage basin and its linear and areal properties.
CO3: Know about relief aspects of drainage basin and their development.
CO4: Understanding about slope and various methods of its analysis.

Credit 04, Maximum Marks: 100 **Time: 03:00 Hours**
Experiment and Written Part = 70 **Viva-voce = 20** **Lab Records = 10**

Practical Record: A project file consisting of 12 exercises on the below mentioned themes:

1. Cultural and Physical features of topographical sheets. (2 exercises)
2. Profiles: Transverse and longitudinal (2 exercises)
3. Drainage Basin (1 exercise)
4. Stream Ordering (1 exercise)
5. Measurement of length of Drainage (2 exercises)
6. Relief aspect of drainage basin:
   a) Area-height curve (1 exercise)
   b) Altimetric frequency curve (1 exercise)
   c) Hypsographic curve (1 exercise)
   d) Hypsometric integral curve (1 exercise)

Note for the Paper Setter:
The question paper will consist of nine questions in all. The first question will be compulsory consist of seven short questions of 2 marks each covering the whole syllabus. In addition, eight more questions of 14 marks each covering the whole syllabus. The candidates are required to attempt one compulsory question and four more questions.

Suggested Readings:

1. Dury, G.H. (1966). Essays in Geomorphology. Heinmann, London.
2. Misra, R.P. and Ramesh, A. 1999. Fundamentals of Cartography, Concept Publishing Company, New Delhi.
3. Miller, A. (1964). The Skin of the Earth. Methuen, London
4. Monkhouse, F. J. and Wilkinson, H.R. (1980). Maps and Diagrams. B.I. Publications, New Delhi.
5. Singh, R. L. (1986). Elements of Practical Geography, Kalyani Publications, New Delhi.