

Chaudhary Bansi Lal University

Hansi Road, Prem Nagar, Bhiwani

(A State University Established under Govt. of Haryana Act No 25 of 2014)

Scheme of Examination for Under-Graduate Programmes Subject: Geography

With Effect from the Academic Session: 2024-25
(As per NEP:2020)



Department of Geography

Chaudhary Bansi Lal University, Prem Nagar -127031,
Bhiwani, Haryana, India

Approved

UGBOS: 07 July 2026

Faculty Board: 13 July 2026

**Chaudhary Bansi Lal University, Bhiwani Scheme of
Examination for Undergraduate Programmes**

Subject: Geography

According to Curriculum Framework for Undergraduate Programmes as per NEP 2020

(Multiple Entry-Exit, Internships and Choice Based Credit System)

To be implemented w.e.f. Academic Session 2024-25 in Chaudhary Bansi Lal University and Its Affiliated Colleges

Sem.	Course Type	Applicable Scheme	Course Code	Nomenclature of paper	Credits	Contact hours	Internal marks	End term Marks	Total Marks	Duration of exam (Hrs.) T + P
Sem-1	CC-1 MCC-1	A, B, C, D	25UN-GEO-101	Physical Geography (Theory)	3	3	20	50	70	3
				Physical Geography (Practical)	1	2	10	20	30	3
	MCC-2	C	24UN-GEO-102	Fundamentals of Resource Geography (Theory)	3	3	20	50	70	3
				Fundamentals of Resource Geography (Practical)	1	2	10	20	30	3
	CC-M1	A, B, C, D	24UN-GEO- 103	General Geography of Haryana	2	2	15	35	50	3
	MDC-I	A, B, C, D	25UN-GEO-MDC-101	Physical Geography of India (Theory)	2	2	15	35	50	3
				Physical Geography of India (Practical)	1	2	5	15	20	3
	SEC-1	A, B, C, D	24UN-GEO- SEC101	Digital Cartography (Theory)	2	2	15	35	50	3
				Digital Cartography (Practical)	1	2	5	15	20	3
			24UN-GEO- SEC102	IT for Spatial Science (Theory)	2	2	15	35	50	3
				IT for Spatial Science (Practical)	1	2	5	15	20	3
			24UN-GEO- SEC103	Spatial Data Science and Application (Theory)	2	2	15	35	50	3
				Spatial Data Science and Application (Practical)	1	2	5	15	20	3
			24UN-GEO- SEC104	Web GIS (Theory)	2	2	15	35	50	3
				Web GIS (Practical)	1	2	5	15	20	3

Sem-2	CC-2 MCC-3	A, B, C, D	25UN-GEO-201	Human Geography (Theory)	3	3	20	50	70	3
				Human Geography (Practical)	1	2	10	20	30	3
	DSEC-1	C	24UN-GEO-202	Cartographic Techniques in Geography (Theory)	3	3	20	50	70	3
				Cartographic Techniques in Geography (Practical)	1	2	10	20	30	3
	CC-M2	A, B, C, D	24UN-GEO-203	General Geography of India	2	2	15	35	50	3
	MDC-II	A, B, C, D	25UN-GEO-MDC 201	General Geography of India (Theory)	2	2	15	35	50	3
				General Geography of India (Practical)	1	2	5	15	20	3
	SEC-2	A, B, C, D	24UN-GEO-SEC 201	Map Making Techniques (Theory)	2	2	15	35	50	3
				Map Making Techniques (Practical)	1	2	5	15	20	3
			24UN-GEO- SEC 202	Remote Sensing (Theory)	2	2	15	35	50	3
				Remote Sensing (Practical)	1	2	5	15	20	3
			24UN-GEO- SEC 203	Geospatial Technology and Resource Management (Theory)	2	2	15	35	50	3
				Geospatial Technology and Resource Management (Practical)	1	2	5	15	20	3
			24UN-GEO- SEC 204	GIS, Mapping and Spatial Analysis (Theory)	2	2	15	35	50	3
				GIS, Mapping and Spatial Analysis (Practical)	1	2	5	15	20	3
	CC-3 MCC-4 / CC- M3	A, B, C, D	25UN -GEO-301	Geography of India (Theory)	3	3	20	50	70	3
				Geography of India (Practical)	1	2	10	20	30	3
	MCC-5	B & C	25UN -GEO- 302	History and Philosophy of Geography (Theory)	3	3	20	50	70	3
				History and Philosophy of Geography (Practical)	1	2	10	20	30	3

Sem -3	MDC-3	A, B, C, D	25UN-GEO-MDC-301	Resource Geography of India (Theory)	2	2	15	35	50	3
				Resource Geography of India (Practical)	1	2	5	20	25	3
	SEC-3	A, B, C, D	25UN-GEO-SEC 301	Thematic Mapping (Theory)	2	2	15	35	50	3
				Thematic Mapping (Practical)	1	2	5	20	25	3
			25UN-GEO-SEC 302	Geographic Information System (Theory)	2	2	15	35	50	3
				Geographic Information System (Practical)	1	2	5	20	25	3
			25UN-GEO-SEC 303	Geospatial Technology for Disaster Mitigation & Management (Theory)	2	2	15	35	50	3
				Geospatial Technology for Disaster Mitigation & Management (Practical)	1	2	5	20	25	3
			25UN-GEO-SEC 304	Introduction to Python for Geographic Data Analysis (Theory)	2	2	15	35	50	3
				Introduction to Python for Geographic Data Analysis (Practical)	1	2	5	20	25	3
	CC-M3 (V)	B	25UN-GEO-VOC 301	GIS, Mapping and Spatial (Theory)	3	3	20	50	70	3
				GIS, Mapping and Spatial (Practical)	1	2	10	20	30	3
			25UN-GEO-VOC 302	Basic of QGIS (Theory)	3	3	20	50	70	3
				Basic of QGIS (Practical)	1	2	10	20	30	3
	VAC-3	C	25UN-GEO-VAC301	Mapping Our Neighborhood	2	2	15	35	50	3
			25UN-GEO-VAC302	Water Resource Management	2	2	15	35	50	3
			25UN-GEO-VAC303	Culture of India	2	2	15	35	50	3
	CC-4 MCC-6	A, B, C, D	25UN -GEO- 401	Fundamentals of Economic Geography (Theory)	3	3	20	50	70	3
				Fundamentals of Economic Geography (Practical)	1	2	10	20	30	3
	MCC-7	B & C	25UN -GEO- 402	Introduction to Social Geography (Theory)	3	3	20	50	70	3

Sem 4				Introduction to Social Geography (Practical)	1	2	10	20	30	3
	MCC-8	B & C	25UN -GEO- 403	Geography of Settlements (Theory)	3	3	20	50	70	3
				Geography of Settlements (Practical)	1	2	10	20	30	3
	DSE-1	B & C	25UN -GEO- DSE- 404	Fundamentals of Bio-Geography (Theory)	3	3	20	50	70	3
				Fundamentals of Bio-Geography (Practical)	1	2	10	20	30	3
			or							
			25UN -GEO-DSE- 405	Geography of Tourism (Theory)	3	3	20	50	70	3
				Geography of Tourism (Practical)	1	2	10	20	30	3
	CC-M4 (V)	A, B, C, D	25UN-GEO-VOC 401	Web GIS (Theory)	3	3	20	50	70	3
				Web GIS (Practical)	1	2	10	20	30	3
			25UN-GEO-VOC 402	Basic of Professional GIS (Theory)	3	3	20	50	70	3
				Basic of Professional GIS (Practical)	1	2	10	20	30	3
	VAC -3 VAC-4	A, B, D C	25UN-GEO-VAC401	Population, Environment and Ecology	2	2	15	35	50	3
			25UN-GEO-VAC402	Introduction to Climate Change	2	2	15	35	50	3
			25UN-GEO-VAC403	Environmental Ethics	2	2	15	35	50	3
	CC-5 MCC-9	A, B, C, D	25UN -GEO- 501	Statistical Methods in Geography (Theory)	3	3	20	50	70	3
				Statistical Methods in Geography (Practical)	1	2	10	20	30	3
	MCC-10	B & C	25UN -GEO- 502	Regional Development and Planning (Theory)	3	3	20	50	70	3
				Regional Development and Planning (Practical)	1	2	10	20	30	3
	DSE-2	B & C	25UN -GEO- DSE -503	Geography of Trade and Transport (Theory)	3	3	20	50	70	3

Sem -5				Geography of Trade and Transport (Practical)	1	2	10	20	30	3
			or							
			25UN-GEO- DSE -504	Cultural Geography (Theory)	3	3	20	50	70	3
				Cultural Geography (Practical)	1	2	10	20	30	3
	DSE-3	B & C	25UN-GEO- DSE -505	Geography of Disaster Management (Theory)	3	3	20	50	70	3
				Geography of Disaster Management (Practical)	1	2	10	20	30	3
			or							
			25UN-GEO- DSE -506	Geography of Water Resources (Theory)	3	3	20	50	70	3
				Geography of Water Resources (Practical)	1	2	10	20	30	3
	CC-M5 (V)	A, C & D	25UN-GEO-VOC 501	Cyber GIS (Theory)	3	3	20	50	70	3
				Cyber GIS (Practical)	1	2	10	20	30	3
			25UN-GEO-VOC 502	Basic of GEE (Theory)	3	3	20	50	70	3
				Basic of GEE (Practical)	1	2	10	20	30	3
	CC-6 MCC-11 / CC-M6	A, B, C, D	25UN-GEO-601	Fundamentals of Remote Sensing (Theory)	3	3	20	50	70	3
				Fundamentals of Remote Sensing (Practical)	1	2	10	20	30	3
	MCC-12	B & C	25UN-GEO-602	Urban Geography (Theory)	3	3	20	50	70	3
				Urban Geography (Practical)	1	2	10	20	30	3
	DSE-4	B & C	25UN-GEO- DSE-603	Political Geography Theory)	3	3	20	50	70	3
				Political Geography (Practical)	1	2	10	20	30	3
			or							
			25UN-GEO- DSE-604	Agricultural Geography (Theory)	3	3	20	50	70	3

Sem -6				Agricultural Geography (Practical)	1	2	10	20	30	3
	DSE-5	B & C	25UN-GEO- DSE-605	Elementary Soil Geography (Theory)	3	3	20	50	70	3
				Elementary Soil Geography (Practical)	1	2	10	20	30	3
			or							
			25UN-GEO- DSE-606	Introduction to Population Geography (Theory)	3	3	20	50	70	3
				Introduction to Population Geography (Practical)	1	2	10	20	30	3
	SEC - 4	C	25UN-GEO-SEC 601	GNSS and Positioning Technologies	2	2	15	35	50	3
			25UN-GEO-SEC 602	Drone Technology and Applications	2	2	15	35	50	3
			25UN-GEO-SEC 603	Advanced GIS and Spatial Analysis	2	2	15	35	50	3
			25UN-GEO-SEC 604	Web GIS and Mapping Applications	2	2	15	35	50	3
	CC-M5 (V)*	B	25UN-GEO-VOC 601	Cyber GIS (Theory)	3	3	20	50	70	3
				Cyber GIS (Practical)	1	2	10	20	30	3
			25UN-GEO-VOC 602	Basic of GEE (Theory)	3	3	20	50	70	3
				Basic of GEE (Practical)	1	2	10	20	30	3
	CC-M6 (V)	C	25UN-GEO-VOC 603	3D Mapping (Theory)	3	3	20	50	70	3
				3D Mapping (Theory)	1	2	10	20	30	3
			25UN-GEO-VOC 604	Drone Technology (Theory)	3	3	20	50	70	3
				Drone Technology (Practical)	1	2	10	20	30	3
	CC-M7 (V)	A & D	25UN-GEO-VOC 605	Digital Photogrammetry (Theory)	3	3	20	50	70	3
				Digital Photogrammetry (Practical)	1	2	10	20	30	3
			25UN-GEO-VOC 606	AI in Geospatial Technology (Theory)	3	3	20	50	70	3
				AI in Geospatial Technology (Practical)	1	2	10	20	30	3

** Applicable only to B-Scheme (Single Major) students and to be opted for in the VI Semester as per the prescribed Scheme of Studies.*

Important Note: Four credits of internship, earned by a student during summer internship after 2nd semester or 4th semester, will be taken into account in 5th semester of a student who pursue 3 year UG Programme without taking exit option.

Chaudhary Bansi Lal University Bhiwani
Syllabus for Under Graduate Programmes as per NEP- 2020
(Multiple Entry – Exit, Internships and Choice Based Credit System)
w.e.f. 2024-25

CC-I/MCC-I			
Session: 2024-25			
Part A - Introduction			
Subject	Geography		
Semester	I		
Name of the Course	Physical Geography		
Course Code	25UN-GEO-101		
Course Type: (CC/MCC/MDC/CCM/DSEC/VOC/ DSE/PC/AEC/VAC)	CC/MCC		
Level of the course (As per Annexure-I)	100-199		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLOs):	After completing this course, the learner will be able to: 1. acquire the knowledge about basic concepts of geo-tectonics. 2. understand about the agents and processes of change on the surface of earth. 3. enrich knowledge about atmosphere and its climate. 4. attain knowledge about ocean surface configuration and circulation in oceanic water. 5* attain skills in solving practical problems associated with physical geography.		
Credits	Theory	Practical	Total
	3	1	4
Contact Hours	3	2	5
Max. Marks: 100 Internal Assessment Marks: 20+10 = 30 End Term Exam Marks: 50+20 = 70		Time: 03 Hours	

Part B- Contents of the Course		
<u>Instructions for Paper- Setter</u>		
Question 1 is compulsory comprising of five sub parts spread over entire syllabus (two marks for each sub part). There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.		
Unit	Topics	Contact Hours
I	1. Interior of the earth, introduction to geological time scale, rocks and their types. 2. Theory of isostasy, continental drift and plate tectonic;	11
II	3. Degradational processes: weathering, mass wasting. 4. Landforms generated by following geomorphic agents: river, wind and glacier.	11
III	5. Weather and climate: Atmosphere-composition and structure. 6. Atmospheric temperature, pressure and moisture and their distribution.	11
IV	7. Surface configuration of ocean floors: Pacific, Atlantic and Indian Ocean. 8. Circulation of oceanic waters: current of the Pacific, Atlantic and Indian Ocean.	12
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks Practical Record: A project file consisting of 8 exercises on the below mentioned themes: - 1. Identification and collection of rock samples: granite, basalt, laterite, limestone, shale, sandstone, conglomerate, slate, phyllite, schist, gneiss, quartzite (1 exercise). 2. Identification of physiographic information from Survey of India 1:50000 topographical maps of mountain, plateau	30

	and plain regions (2 exercises). 3. Measurement of weather elements using analogue instruments: temperature (maximum, minimum and mean) relative humidity, rainfall and preparation of climograph, hythergraph and hyetograph (3 exercises). 4. Interpretation of a daily weather map of India: Pre-Monsoon, Monsoon and Post-Monsoon (2 exercises).	
Suggested Evaluation Methods		
Internal Assessment: ➤ Theory • Class Participation: 05 Marks • Seminar/presentation/assignment/quiz/class test etc.: 05 Marks • Mid-Term Exam: 10 Marks ➤ Practicum • Class Participation: NIL • Seminar/Demonstration/Viva-voce/Lab records etc.: 10 Marks • Mid-Term Exam: NIL		End Term Examination: 50 Marks 20 Marks
Part C-Learning Resources		
Recommended Books/e-resources/LMS: 1. Barry, RG and Chorley, RJ (1998) Atmosphere, Weather and Climate, Routledge, London. 2. Bunnett, RB (1987) Physical Geography in Diagrams, Pearson Education, New Delhi. 3. Critchfield, H (2002) General Climatology, Prentice-Hall of India, New Delhi. 4. Kale, V and Gupta, A (2001) Element of Geomorphology, Oxford University Press, Calcutta. 5. Khullar, DR (2014) Physical Geography, Kalyani Publishers, New Delhi. 6. Monkhouse, FJ (1960) Principles of Physical Geography. Hodder and Stoughton, London. 7. Singh, S (1998) Geomorphology, Prayag Publication, Allahabad. 8. Singh, S (2012) Physical Geography, Prayag Publication, Allahabad. 9. Thornbury, WD (1969) Principles of Geomorphology, John Wiley and Sons, New York. 10. Trewartha, GT (1981) An Introduction to Climate, Mc-Graw Hill, New York.		

*Applicable for courses having practical component.

MCC-2			
Session: 2024-25			
Part A – Introduction			
Subject	Geography		
Semester	I		
Name of the Course	Fundamentals of Resource Geography		
Course Code	24UN-GEO-102		
Course Type: (CC/MCC/MDC/CCM/DSEC/VOC/ DSE/PC/AEC/VAC)	MCC		
Level of the course (As per Annexure-I)	100-199		
Pre-requisite for the course (if any)	NA		
Course Learning Outcomes (CLOs):	After completing this course, the learner will be able to: 1. acquaint with nature, techniques and field of resource geography. 2. enhance knowledge about classification and development process of natural resources. 3. provide knowledge on location, conservation and management methods of resources for sustainable development. 4. provide knowledge about concepts, policies, problems and models of natural resource utilization. 5* attain skills in mapping and monitoring of land, water, forest and mineral resources.		
Credits	Theory	Practical	Total
	3	1	4
Contact Hours	3	2	5
Max. Marks: 100 Internal Assessment Marks: 20+10 = 30 End Term Exam Marks: 50+20 = 70		Time: 03 Hours	

Part B- Contents of the Course**Instructions for Paper- Setter**

Question 1 is compulsory comprising of five sub parts spread over entire syllabus (two marks for each sub part), to be answered in brief. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.

Unit	Topics	Contact Hours
I	1. Nature, scope, techniques and importance of resource geography. 2. Concepts of resource: exploitation, accumulation, poverty and resource degradation.	11
II	3. Classification of resources: renewable and non-renewable, biotic and abiotic resources. 4. Relationship between natural resources and development process. Role of technology in natural resource development.	11
III	5. Distribution, utilization, problems and management of land and water resources. 6. Distribution, utilization, problems and management of forest and mineral resources.	12
IV	7. Models of natural resources process: Zimmermann's primitive and Kirk's decision models. 8. Sustainable resource development; Policies and challenges of natural resource management.	11
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks	30
	Practical Record: A project file consisting of 8 exercises on the below mentioned themes: -	

	1. Preparation of land use/land cover map of an area from topographical sheets and aerial photographs (2 exercises). 2. Mapping of forest cover of an area from topographical sheets and aerial photographs (2 exercises). 3. Mapping of water bodies of an area from topographical sheets and aerial photographs (2 exercises). 4. Decadal changes in country-wise production of coal and iron ore with comparative decadal changes (2 exercises).	
Suggested Evaluation Methods		
Internal Assessment: ➤ Theory • Class Participation: 05 Marks • Seminar/presentation/assignment/quiz/class test etc.: 05 Marks • Mid-Term Exam: 10 Marks ➤ Practicum • Class Participation: NIL • Seminar/Demonstration/Viva-voce/Lab records etc.: 10 Marks • Mid-Term Exam: NIL	End Term Examination: 50 Marks 20 Marks	
Part C-Learning Resources		

Recommended Books/e-resources/LMS:

1. Barbier, EB (2005) Natural Resources and Economic Development, Cambridge University Press, Cambridge.
2. Bhatta, B (2011) Remote Sensing and GIS, Oxford University Press, New Delhi.
3. Borton, I and Kates, RW (1984) Readings in Resource Management and Conservation, University of Chicago Press, Chicago.
4. Bruce, M (1989) Geography and Resource Analysis, John Wiley and Son, New York.
5. Chiras, DD and Reganold, JP (2009) Natural Resource Conservation: Management for a Sustainable Future, Pearson, New Delhi.
6. Cutter SN, Renwick HL and Renwick W (1991) Exploitation, Conservation, Preservation: A Geographical Perspective on Natural Resources Use, John Wiley and Sons, New York.
7. Gadgil M and Guha R (2005) The Use and Abuse of Nature: Incorporating This Fissured Land: An Ecological History of India and Ecology and Equity, Oxford University Press, USA.
8. Gautam, A (2013) Geography of Resources: Exploitation, Conservation and Management. Sharda Pustak Bhawan, Allahabad.
9. Guha, JL and PR Chattroj (1994) Economic Geography-A Study of Resources, The World Press, Calcutta.
10. Holechek JLC, Richard A, Fisher JT and Valdez R (2003) Natural Resources: Ecology, Economics and Policy, Prentice Hall, New Jersey.
11. Jones G and Hollier G (1997) Resources, Society and Environmental Management, Paul Chapman, London.
12. Klee G (1991) Conservation of Natural Resources, Prentice Hall, Englewood.
13. Lillesand, TM, Kiefer, RW and Chipman, JW (2015) Remote Sensing and Image Interpretation, John Wiley and Sons, New York.
14. Martino, RL (1969) Resource Management. Mc Graw Hill Book Company, London.
15. Mather AS and Chapman K (1995) Environmental Resources, John Wiley and Sons, New York.
16. Mitchell B (1997) Resource and Environmental Management, Longman Harlow, England.

17. Negi, BS (2000) Geography of Resources, Kedar Nath and Ram Nath Publications, Meerut.
18. Owen, OS (1971) Natural Resource Conservation: An Ecological Approach, McMillan, New Delhi.
19. Owen S and Owen PL (1991) Environment, Resources and Conservation, Cambridge University Press, New York.
20. Raja, M (1989) Renewable Resources, Development, Concept Publication, New Delhi.
21. Rees J (1990) Natural Resources: Allocation, Economics and Policy, Routledge, London.
22. Roy, PK (2006) Resource Studies, New Central Book Agency, Calcutta.
23. Shetty, R (2009) An Analysis of World Resources with reference to India, Sarala Raj Ria Publishers, Mysore.
24. Zimmermann, EW (1951) World Resources and Industries, Harper and Brothers, New Delhi.

*Applicable for courses having practical component.

CC-M1			
Session: 2024-25			
Part A - Introduction			
Subject	Geography		
Semester	I		
Name of the Course	General Geography of Haryana		
Course Code	24UN-GEO-103		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC)	CC-M		
Level of the course (As per Annexure-I)	100-199		
Pre-requisite for the course (if any)	NA		
Course Learning Outcomes (CLO):	After completing this course, the learner will be able to: 1. acquaint with physiography and climate of state. 2. understand the agriculture and industrial status of the state. 3. familiarize with population distribution and literacy of the state. 4. gain knowledge of trade and transport of Haryana. 5*. NA		
Credits	Theory	Practical	Total
	02	00	02
Contact Hours	2	-	2
Max. Marks:50 Internal Assessment Marks:15 End-Term Exam Marks: 35		Time:3 hours	

Part B- Contents of the Course**Instructions for Paper-Setter**

Question 1 is compulsory comprising seven sub-parts spread over the entire syllabus (one mark for each sub-part), to be answered in brief. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.

Unit	Topics	Contact Hours
I	1. Physiography, relief and climate of Haryana. 2. Drainage, soils and natural vegetation.	7
II	3. Agriculture: cropping pattern and challenges. 4. Major industries and industrial centers of Haryana.	8
III	5. Population: distribution, density and growth. 6. Population composition: structure and literacy.	8
IV	7. Pattern of trade and transport. 8. Cultural regions of Haryana.	7
V*	NA	

Suggested Evaluation Methods**Internal Assessment:****> Theory**

- Class Participation: **04 Marks**
- Seminar/presentation/assignment/quiz/class test etc.: **04 Marks**
- Mid-Term Exam: **07 Marks**

> Practicum

- Class Participation: **NIL**
- Seminar/Demonstration/Viva-voce/Lab records etc.: **NIL**
- Mid-Term Exam: **NIL**

End-Term Examination:**35 Marks****NIL**

Part C-Learning Resources

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.
6. Singh, R.L. (1971) India-A Regional Geography, National Geographical Society, Varanasi.
7. Spate OHK and ATA Learmonth (1971) India and Pakistan, Methuen, London.
8. Tirtha R and Gopal Krishna (1996) Emerging India, Rawat Publications, Jaipur.
9. Regional division of Haryana, census of India, Chandigarh

*Applicable for courses having practical components

MDC-1			
Session: 2024-25			
Part A – Introduction			
Subject	Geography		
Semester	I		
Name of the Course	Physical Geography of India		
Course Code	25UN-GEO-MDC101		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VA C)	MDC		
Level of the course (As per Annexure-I)	100-199		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO):	After completing this course, the learner will be able to: 1. understand the geological and physiographic structure of India. 2. enrich skills about drainage system and various hydrological regimes. 3. understand the climate and its characteristics. 4. acquire knowledge about different types of flora and soils found in India.		
	5* attain skills in solving various practical problem associated with physical aspects of India.		
Credits	Theory	Practical	Total
	2	1	3
Contact Hours	2	2	4
Max. Marks:70 Internal Assessment Marks: 5+15 =20 End-Term Exam Marks: 35+15 = 50		Time:3 hours	

Part B- Contents of the Course**Instructions for Paper-Setter**

Question 1 is compulsory comprising seven sub-parts spread over the entire syllabus (one mark for each sub-part), to be answered in brief. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.

Unit	Topics	Contact Hours
I	1. Location and extent of India. 2. Physiographic divisions.	7
II	3. Water resources of India 4. Drainage System of India.	7
III	5. Climate: distribution of temperature, pressure and rainfall. 6. Indian Monsoon System.	8
IV	7. Natural vegetation: classification and distribution. 8. Soils: classification and distribution.	8
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 05 marks File record = 5 marks Viva-Voce = 5 marks Practical Record: A project file consisting of 8 exercises on the below mentioned themes: - 1. Hydrological regimes of peninsular and Himalayan rivers (2 exercises). 2. Annual trend of temperature for more than three decades (maximum, minimum and mean) (2 exercises). 3. Comparative analysis of seasonal variability of rainfall from different climatic reasons of India (2 exercises). 4. Preparation of an inventory of flora and fauna in India (1 exercise). 5. Preparation of an inventory of major geological disasters in past one decade in India (1 exercise).	30

Suggested Evaluation Methods	
Internal Assessment: ➤ Theory - Class Participation: 04 Marks - Seminar/presentation/assignment/quiz/class test etc.: 04 Marks - Mid-Term Exam: 07 Marks	End-Term Examination: 35 Marks
➤ Practicum - Class Participation: NIL - Seminar/Demonstration/Viva-voce/Lab records etc.: 05 Marks - Mid-Term Exam: NIL	15 Marks
Part C-Learning Resources	
Recommended Books/e-resources/LMS: - Deshpande, C.D. (1992) India-A Regional Interpretation, Northern Book Depot, New Delhi. - Hussain Majid (2015) Geography of India, Mc Graw Hill Education. - Shafi, M. (2000) Geography of South Asia, McMillan and Company, Calcutta. - Singh, Gopal (2006) Geography of India, Atma Ram and Sons, New Delhi. - Singh, R.L. (1971) India: A Regional Geography, National Geographical Society, India, Varanasi.	

*Applicable for courses having practical components.

SEC-1			
Session: 2024-25			
Part A – Introduction			
Subject	Geography		
Semester	I		
Name of the Course	Digital Cartography		
Course Code	24UN-GEO- SEC-101		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC/SEC-1)	SEC		
Level of the course (As per Annexure-I)	100-199		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO):	1. understand the principles of cartographic design and digital map-making. 2. learn the use of GIS software for creating and analyzing digital maps. 3. explore the role of data visualization in cartography. 4. develop skills in using digital tools for spatial data representation. 5*. integrate spatial data from various sources for digital mapping.		
Credits	Theory	Practical	Total
	2	1	3
Contact Hours	2	2	4

Max. Marks:70 Internal Assessment Marks: 15+05 =20 End-Term Exam Marks: 35+15 = 50	Time:3 hours
---	---------------------

Part B- Contents of the Course**Instructions for Paper-Setter**

Question 1 is compulsory comprising seven sub-parts spread over the entire syllabus (one mark for each sub-part), to be answered in brief. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.

Unit	Topics	Contact Hours
I	1. Definition, scope and significance of cartography 2. History and evolution of cartographic techniques	7
II	3. Analog vs. Digital Cartography 4. Basic Elements of Map Design: Scale, Projections, Symbols, etc.	7
III	5. Vector and Raster Data 6. Data Acquisition: Sources of Spatial Data	8
IV	7. Thematic Maps: Choropleth, Isoline, Proportional Symbols, etc. 8. Integration and Overlay of Raster and Vector Data.	8
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 05 marks File record = 05 marks Viva-Voce = 05 marks Practical Record: A project file consisting of 8 exercises on the below mentioned themes: - 1. Interpretation of Analogue & Digital Maps (1 exercises). 2. Geo-referencing of Topographical Sheets (2 exercises). 3. Digitization of Geographic Features (Point, Line and Polygon) (3 exercises). 4. Preparation of Layout of Map (1exercise). 5. Preparation of Choropleth Map from Socio-Economic Data (1 exercise).	30

Suggested Evaluation Methods

Internal Assessment: ➤ Theory • Class Participation: 04 Marks • Seminar/presentation/assignment/quiz/class test etc.: 04 Marks • Mid-Term Exam: 07 Marks	End-Term Examination: 35 Marks
➤ Practicum • Class Participation: NIL • Seminar/Demonstration/Viva-voce/Lab records etc.: 05 Marks • Mid-Term Exam: NIL	15 Marks
Part C-Learning Resources	
Recommended Books/e-resources/LMS: 1. Kraak, M.-J., & Ormeling, F. (2010) <i>Cartography: Visualization of Geospatial Data</i>, Pearson Education Limited, Harlow. 2. Peterson, G.N. (2015) <i>GIS Cartography: A Guide to Effective Map Design</i>, CRC Press, Boca Raton. 3. Robinson, A.H., Morrison, J.L., Muehrcke, P.C., Kimerling, A.J., & Gaptill, S.C. (1995) <i>Elements of Cartography</i> (6th ed.), John Wiley & Sons, New York. 4. Slocum, T.A., McMaster, R.B., Kessler, F.C., & Howard, H.H. (2009) <i>Thematic Cartography and Geovisualization</i>, Pearson Prentice Hall, Upper Saddle River. 5. Tyner, J.A. (2010) <i>Principles of Map Design</i>, The Guilford Press, New York. 6. Dent, B.D., Torguson, J.S., & Hodler, T.W. (2009) <i>Cartography: Thematic Map Design</i> (6th ed.), McGraw-Hill, New York. 7. Slocum, T.A. (1999) <i>Thematic Cartography and Visualization</i>, Prentice Hall, Upper Saddle River. 8. MacEachren, A.M. (1995) <i>How Maps Work: Representation, Visualization, and Design</i>, The Guilford Press, New York.	

*Applicable for courses having practical components.

SEC-1			
Session: 2024-25			
Part A – Introduction			
Subject	Geography		
Semester	I		
Name of the Course	IT for Spatial Science		
Course Code	24UN-GEO- SEC-102		
Course Type: (CC/MCC/MDC/CC- M/DSEC/VOC/DSE/PC/AEC/VA C/SEC-1)	SEC		
Level of the course (As per Annexure-I	100-199		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO):	1. understand the role of IT in spatial data collection, analysis, and visualization. 2. introduce students to software tools and technologies used in spatial sciences, such as GIS, remote sensing, and databases. 3. develop skills in data acquisition, management, and spatial analysis. 4. develop skills in using digital tools for spatial data representation. 5*. interpretation of the spatial data, spatial data management and map making,		
Credits	Theory	Practical	Total
	2	1	3
Contact Hours	2	2	4
Max. Marks:70 Internal Assessment Marks: 15+05 =20 End-Term Exam Marks: 35+15 = 50		Time:3 hours	

Part B- Contents of the Course

<u>Instructions for Paper-Setter</u>

Question 1 is compulsory comprising seven sub-parts spread over the entire syllabus (one mark for each sub-part), to be answered in brief. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.

Unit	Topics	Contact Hours
I	1. Introduction to IT in Spatial Science 2. Spatial Data: Types, Formats, and Sources	7
II	3. Introduction to GIS: Concepts, Components, and Applications 4. Spatial Data Acquisition, Storage, and Management in GIS	7
III	5. Introduction to Remote Sensing: Principles and Techniques 6. Applications of Remote Sensing in Environmental Monitoring	8
IV	7. Introduction to Database Management Systems (DBMS), Data Visualization Techniques for Spatial Science 8. Mobile and Web GIS and its Application	8
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 05 marks File record = 05 marks Viva-Voce = 05 marks Practical Record: A project file consisting of 8 exercises on the below mentioned themes: - 1. Interpretation of Vector Data (2 exercises). 2. Interpretation of Raster Data (2 exercises). 3. Introduction to GIS Software (ArcGIS/QGIS): Data Import, Analysis, and Visualization (2 exercises). 4. Spatial Database Management: Querying and Managing Spatial Data (2 exercises).	30

Suggested Evaluation Methods

Internal Assessment: ➤ Theory - Class Participation: 04 Marks - Seminar/presentation/assignment/quiz/class test etc.: 04 Marks - Mid-Term Exam: 07 Marks	End-Term Examination: 35 Marks
➤ Practicum - Class Participation: NIL - Seminar/Demonstration/Viva-voce/Lab records etc.: 05 Marks - Mid-Term Exam: NIL	15 Marks
Part C-Learning Resources	
Recommended Books/e-resources/LMS: - Longley, P.A., Goodchild, M.F., Maguire, D.J., & Rhind, D.W. (2015) <i>Geographic Information Systems and Science</i>, John Wiley & Sons, New York. - Burrough, P.A., & McDonnell, R.A. (1998) <i>Principles of Geographical Information Systems</i>, Oxford University Press, Oxford. - Jensen, J.R. (2007) <i>Remote Sensing of the Environment: An Earth Resource Perspective</i>, Pearson Education, Upper Saddle River. - Heywood, I., Cornelius, S., & Carver, S. (2011) <i>An Introduction to Geographical Information Systems</i>, Pearson Education, Harlow. - Chang, K.-T. (2018) <i>Introduction to Geographic Information Systems</i>, McGraw-Hill, New York. - DeMers, M.N. (2008) <i>Fundamentals of Geographic Information Systems</i>, John Wiley & Sons, Hoboken. - Shekhar, S., & Chawla, S. (2003) <i>Spatial Databases: A Tour</i>, Prentice Hall, Upper Saddle River. - Schowengerdt, R.A. (2007) <i>Remote Sensing: Models and Methods for Image Processing</i>, Elsevier, Amsterdam. - Li, S., Dragicevic, S., & Veenendaal, B. (2011) <i>Advances in Web-based GIS, Mapping Services and Applications</i>, CRC Press, Boca Raton. - Tomlin, C.D. (1990) <i>Geographic Information Systems and Cartographic Modeling</i>, Prentice Hall, Englewood Cliffs.	

*Applicable for courses having practical components.

SEC-1			
Session: 2024-25			
Part A – Introduction			
Subject	Geography		
Semester	I		
Name of the Course	Spatial Data Science and Application		
Course Code	24UN-GEO- SEC-103		
Course Type: (CC/MCC/MDC/CC- M/DSEC/VOC/DSE/PC/AEC/VA C/SEC-1)	SEC		
Level of the course (As per Annexure-I	100-199		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO):	1. introduce the concepts and methodologies of spatial data science. 2. develop skills in handling and analyzing spatial data using modern data science techniques. 3. explore machine learning, statistics, and big data tools for spatial analysis. 4. provide hands-on experience with geospatial data and its applications in various fields. 5*. develop acutance in visualization, analysis and interpretation of the spatial data and its application		
Credits	Theory	Practical	Total
	2	1	3
Contact Hours	2	2	4
Max. Marks:70 Internal Assessment Marks: 15+05 =20 End-Term Exam Marks: 35+15 = 50		Time:3 hours	

Part B- Contents of the Course

Instructions for Paper-Setter

Question 1 is compulsory comprising seven sub-parts spread over the entire syllabus (one mark for each sub-part), to be answered in brief. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.

Unit	Topics	Contact Hours
I	1. Overview of Spatial Data Science & Role of Spatial Data in Data Science 2. Sources of Spatial Data: Remote Sensing, GPS, and Surveys	7
II	3. Geocoding and Spatial Data Integration, Spatial Databases and Big Data Management for Geospatial Data 4. Introduction to Open-Source Tools and Platforms (i.e. QGIS)	7
III	5. Exploratory Spatial Data Analysis (ESDA) 6. Spatial Statistics and Geostatistics	8
IV	7. Spatial Data Visualization and Web Mapping 8. Application of Spatial Data for Earth Resource Mapping	8
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 05 marks File record = 05 marks Viva-Voce = 05 marks Practical Record: A project file consisting of 8 exercises on the below mentioned themes: - 1. Collection of Spatial Data (2 exercises). 2. Representation of Spatial data on Map with QGIS (2 exercises). 3. Integration & Overlay of Spatial Data (2 exercises). 4. Application of Spatial Data for Earth Resource mapping (2 exercises).	30

Suggested Evaluation Methods	
Internal Assessment: ➤ Theory - Class Participation: 04 Marks - Seminar/presentation/assignment/quiz/class test etc.: 04 Marks - Mid-Term Exam: 07 Marks	End-Term Examination: 35 Marks
➤ Practicum - Class Participation: NIL - Seminar/Demonstration/Viva-voce/Lab records etc.: 05 Marks - Mid-Term Exam: NIL	15 Marks
Part C-Learning Resources	
Recommended Books/e-resources/LMS: - Longley, P.A., Goodchild, M.F., Maguire, D.J., & Rhind, D.W. (2015) <i>Geographic Information Systems and Science</i>, John Wiley & Sons, New York. - Burrough, P.A., & McDonnell, R.A. (1998) <i>Principles of Geographical Information Systems</i>, Oxford University Press, Oxford. - Jensen, J.R. (2007) <i>Remote Sensing of the Environment: An Earth Resource Perspective</i>, Pearson Education, Upper Saddle River. - Heywood, I., Cornelius, S., & Carver, S. (2011) <i>An Introduction to Geographical Information Systems</i>, Pearson Education, Harlow. - Chang, K.-T. (2018) <i>Introduction to Geographic Information Systems</i>, McGraw-Hill, New York. - DeMers, M.N. (2008) <i>Fundamentals of Geographic Information Systems</i>, John Wiley & Sons, Hoboken. - Shekhar, S., & Chawla, S. (2003) <i>Spatial Databases: A Tour</i>, Prentice Hall, Upper Saddle River. - Schowengerdt, R.A. (2007) <i>Remote Sensing: Models and Methods for Image Processing</i>, Elsevier, Amsterdam. - Li, S., Dragicevic, S., & Veenendaal, B. (2011) <i>Advances in Web-based GIS, Mapping Services and Applications</i>, CRC Press, Boca Raton. - Tomlin, C.D. (1990) <i>Geographic Information Systems and Cartographic Modeling</i>, Prentice Hall, Englewood Cliffs.	

*Applicable for courses having practical components.

SEC-1			
Session: 2024-25			
Part A – Introduction			
Subject	Geography		
Semester	I		
Name of the Course	Web GIS		
Course Code	24UN-GEO- SEC-104		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC/SEC-1)	SEC		
Level of the course (As per Annexure-I	100-199		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO):	1. understand the principles and architecture of Web GIS. 2. Explore the various web-GIS portals and their application 3. learn how to publish, visualize, and interact with geospatial data on the web. 4. develop skills in using Web GIS platforms, such as Leaflet, OpenLayers, and ArcGIS Online. 5*. explore the applications of Web GIS in fields like urban planning, environmental monitoring, and disaster management.		
Credits	Theory	Practical	Total
	2	1	3
Contact Hours	2	2	4
Max. Marks:70 Internal Assessment Marks: 15+05 =20 End-Term Exam Marks: 35+15 = 50		Time:3 hours	

Part B- Contents of the Course

<u>Instructions for Paper-Setter</u>

Question 1 is compulsory comprising seven sub-parts spread over the entire syllabus (one mark for each sub-part), to be answered in brief. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.

Unit	Topics	Contact Hours
I	1. Overview of Web GIS: Definition, Components, and Applications 2. Evolution of Web GIS: From Desktop GIS to Web GIS	7
II	3. Key Concepts: Servers, Clients, APIs, and Web Services 4. Spatial Data Formats for the Web: GeoJSON, KML, GML, Shapefiles	7
III	5. Spatial Data Infrastructure (SDI) and Data Sharing Protocols 6. Open-Source Web GIS Platforms: GeoServer, MapServer, PostGIS	8
IV	7. Explore the various Web_GIS Portals 8. Applications of Web GIS Urban Planning and Management Disaster Management and Crisis Mapping Citizen Science and Participatory GIS	8
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 05 marks File record = 05 marks Viva-Voce = 05 marks Practical Record: A project file consisting of 8 exercises on the below mentioned themes: - 1. Exploration of Various Web-GIS Portal and Their Application (2 exercises). 2. Create a Simple Web Map Using Leaflet/OpenLayers (2 exercises). 3. Interactive Mapping Using Mapbox API (2 exercises). 4. Application of Web-GIS for Urban Area (2 exercises).	30

Suggested Evaluation Methods

Internal Assessment: ➤ Theory • Class Participation: 04 Marks • Seminar/presentation/assignment/quiz/class test etc.: 04 Marks • Mid-Term Exam: 07 Marks	End-Term Examination: 35 Marks
➤ Practicum • Class Participation: NIL • Seminar/Demonstration/Viva-voce/Lab records etc.: 05 Marks • Mid-Term Exam: NIL	15 Marks
Part C-Learning Resources	
Recommended Books/e-resources/LMS: 1. Fu, P., & Sun, J. (2010) <i>Web GIS: Principles and Applications</i>, Esri Press, Redlands. 2. Mitchell, T. (2005) <i>Web Mapping Illustrated Using Open-Source GIS Toolkits</i>, O'Reilly Media, Sebastopol. 3. Zhang, P. (2014) <i>Developing Web Applications with ArcGIS API for JavaScript and HTML5</i>, Packt Publishing, Birmingham. 4. Anderson, C. (2012) <i>Designing Maps for the Web</i>, Packt Publishing, Birmingham. 5. Peng, Z.-R., & Tsou, M.-H. (2003) <i>Internet GIS: Distributed Geographic Information Services for the Internet and Wireless Networks</i>, Wiley, Hoboken.	

*Applicable for courses having practical components.

CC-2/MCC-3			
Session: 2024-25			
Part A - Introduction			
Subject	Geography		
Semester	II		
Name of the Course	Human Geography		
Course Code	25UN-GEO-201		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC)	CC/MCC		
Level of the course (As per Annexure-I)	100-199		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO):	After completing this course, the learner will be able to: 1. gain knowledge about the fundamentals of human geography. 2. enhance the knowledge of race and religion. 3. understand the organization of space. 4. familiarize with world economic systems. 5* gain knowledge of mapping socio – economic and demographic data.		
Credits	Theory	Practical	Total
	3	1	4
Contact Hours	3	2	5
Max. Marks: 100 Internal Assessment Marks:20+10=30 End Term Exam Marks: 50+20=70		Time: 03 Hours	

Part B- Contents of the Course

<u>Instructions for Paper- Setter</u>
--

Question 1 is compulsory consisting of five sub parts spread over entire syllabus (two marks for each sub parts), to be answered in brief. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.

Unit	Topics	Contact Hours
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.	11
II	3. Human race: Meaning, classification of races and their global diffusion and distribution. 4. Religion: Evolution and global distribution of major religions in the world.	11
III	5. Organization of space: central place theory, agricultural location model and industrial location model. 6. Distribution, density and growth of population: Determinants and world pattern.	11
IV	7. Concept and Pattern of development. 8. World pattern of migration: streams and determinants.	12
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks	30

12. Michael, C. (1996) *New Patterns: Process and Change in Human Geography*, Nelson.
13. Qazi, S.A. (2010) *Population Geography*, APH publishers.
14. Ramachandra, R. (1992) *Urbanization and Urban System in India*, Oxford, London.
15. Sharma, Y.K. (2017). *Human Geography*, Narainpublishers.
16. Singh, N. (2015) *A Text Book of Human Geography*, Rajesh Publishing.

*Applicable for courses having practical component.

DSEC-1			
Session: 2024-25			
Part A – Introduction			
Subject	Geography		
Semester	II		
Name of the Course	Cartographic Techniques in Geography		
Course Code	24UN-GEO-202		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC)	DSEC		
Level of the course (As per Annexure-I)	100-199		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO):	After the completion of course, the students will have ability to: 1. understand and differentiate types of map scales. 2. become aware about the applications of map scales. 3. gains the basic understanding of map making and will be able to prepare different kinds of thematic maps. 4. apprehend the knowledge about surveying and survey tools. 5* acquire skills to make use of scales and making thematic maps and diagrams		
Credits	Theory	Practical	Total
	3	1	4
Contact Hours	3	2	5
Max. Marks:100 Internal Assessment Marks: 20+10 =30 End-Term Exam Marks: 50+20 = 70		Time:3 hours	

Part B- Contents of the Course		
<u>Instructions for Paper-Setter</u> Question 1 is compulsory comprising five sub-parts spread over the entire syllabus (two marks for each sub-part), to be answered in brief. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.		
Unit	Topics	Contact Hours
I	1. Nature and scope of cartography, historical and recent development. 2. Drawing instruments: properties and characteristics; drawing techniques.	11
II	3. Scale: types, significance and applications. 4. Maps: classification, characteristics, significance and limitations.	11
III	5. Basic concepts of surveying and survey equipment's, coordinate system and map: magnetic and true north, polar and rectangular. 6. Techniques of map enlargement and reduction; map producing agencies in India (GSI, SOI, FSI, NATMO, NBBSLUP, NRSC, AISSLUP and IMD).	11
IV	7. Methods and representation of climatic data. 8. Methods and representation of socio-economic data.	12
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks Practical Record: A project file consisting of 8 exercises on the below mentioned themes: - 1. Graphical representation of scales (2 exercises) 2. Construction of thematic maps (3 exercises) 3. Representation of data by one, two and three-dimensional diagrams (3 exercises)	30

Suggested Evaluation Methods	
Internal Assessment: ➤ Theory • Class Participation: 05 Marks • Seminar/presentation/assignment/quiz/class test etc.: 05 Marks • Mid-Term Exam: 10 Marks ➤ Practicum • Class Participation: NIL • Seminar/Demonstration/Viva-voce/Lab records etc.: 10 Marks • Mid-Term Exam: NIL	End-Term Examination: 50 Marks 20 Marks
Part C-Learning Resources	
Recommended Books/e-resources/LMS: 1. Dent, B.D. (1999) Cartography: Thematic Map Design, (Vol. 1), McGraw Hill. 2. Gupta, K.K. and Tyagi, V.C (1992) Working with Maps, Survey of India, DST, New Delhi. 3. Monkhouse, F.J and Wilkinson, H.R (1971) Maps and Diagrams. Methuen and Co. Ltd., London 4. Ramamurthy, K (1982) Map Interpretation, Rex Printers, Madras. 5. Robinson A (1953) Elements of Cartography, John Wiley. 6. Siddhartha, K (2006) Geography through maps, Kisalaya Publications Pvt. Ltd, Delhi 7. Singh, G (2005) Map work and practical geography. Vikas Publishing House Pvt. Ltd., New Delhi 8. Singh, L.R and Singh, R (1973) Map work and practical geography, Central Book Allahabad 9. Singh, R.L (2005) Elements of Practical Geography. Kalyani Publishers, New Delhi. India.	

*Applicable for courses having practical components.

CC-M2			
Session: 2024-25			
Part A - Introduction			
Subject	Geography		
Semester	II		
Name of the Course	General Geography of India		
Course Code	24UN-GEO-203		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VA C)	CC-M		
Level of the course (As per Annexure-I	100-199		
Pre-requisite for the course (if any)	NA		
Course Learning Outcomes (CLO):	After completing this course, the learner will be able to: 1. understand the location, geographical expansion, and physiography. 2. have acquaintance with the drainage and climate. 3. enrich knowledge about peopling of the nation. 4. internalize the concept of unity in diversity of our nation. 5* NA		
Credits	Theory	Practical	Total
	02	00	02
Contact Hours	2	-	2
Max. Marks:50 Internal Assessment Marks:15 End-Term Exam Marks: 35		Time:3 hours	

Part B- Contents of the Course		
<u>Instructions for Paper-Setter</u> Question 1 is compulsory comprising seven sub-parts spread over the entire syllabus (one mark for each sub-part), to be answered in brief. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.		
Unit	Topics	Contact Hours
I	1. India: Locational setting and geographical expansion. 2. Physiographic divisions of India.	8
II	3. Drainage system and climate. 4. Soil and natural vegetation.	8
III	5. Peoples of India. 6. Population distribution, density and growth.	7
IV	7. Population composition: ethnic and socio-cultural attributes (castes and tribes). 8. Unity in diversity in India.	7
V*	NA	
Suggested Evaluation Methods		
Internal Assessment: ➤ Theory - Class Participation: 04 marks - Seminar/presentation/assignment/quiz/class test etc.: 04 marks - Mid-Term Exam: 7 marks ➤ Practicum - Class Participation: NIL - Seminar/Demonstration/Viva-voce/Lab records etc.: NIL - Mid-Term Exam: NIL		End-Term Examination: 35 Marks NIL
Part C-Learning Resources		

Recommended Books/e-resources/LMS:

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. Mandal R. B. (ed.) (1990) Patterns of Regional Geography – An International Perspective. Vol. 3 – Indian Perspective.
5. Sdyasuk Galina and P Sengupta (1967) Economic Regionalization of India, Census of India
6. Sharma, T. C. (2003) India - Economic and Commercial Geography. Vikas Publ., New Delhi.
7. Singh R. L. (1971) India: A Regional Geography, National Geographical Society of India.
8. Singh, Jagdish (2003) India - A Comprehensive & Systematic Geography, Gyanodaya Prakashan, Gorakhpur.
9. Spate O. H. K. and Learmonth A. T. A. (1967) India and Pakistan: A General and Regional Geography, Methuen.
10. Pathak, C. R. (2003) Spatial Structure and Processes of Development in India. Regional Science Assoc., Kolkata.
11. Tirtha, Ranjit (2002) Geography of India, Rawat Pubs., Jaipur & New Delhi.

*Applicable for courses having practical component.

MDC-II			
Session: 2024-25			
Part A - Introduction			
Subject	Geography		
Semester	II		
Name of the Course	General Geography of India		
Course Code	25UN-GEO-MDC 201		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC)	MDC		
Level of the course (As per Annexure-I	100-199		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO):	After completing this course, the learner will be able to: 1. gain knowledge about population characteristics of India. 2. have understanding about distribution of tribes in India 3. acquaint with distribution of religion in India 4. gain insight into intricacies of caste structure of India 5* understand the mapping of racial and cultural characteristics of Indian population		
Credits	Theory	Practical	Total
	2	1	3
Contact Hours	2	2	4
Max. Marks: 70 Internal Assessment Marks:15+05=20 End Term Exam Marks: 35+15=50		Time: 03 Hours	

Part B- Contents of the Course		
<u>Instructions for Paper- Setter</u>		
Question 1 is compulsory comprising of seven sub parts spread over entire syllabus (one mark for each sub part), to be answered in brief. There will be eight long questions, two from each unit. All questions carry equal marks.		
Unit	Topics	Contact Hours
I	1. Population distribution, density and growth. 2. Population composition, sex ratio and literacy.	11
II	3. Pattern and growth of urbanization. 4. Working population: composition and distribution.	11
III	5. Distribution of caste & tribes in India 6. Religion: distribution of major religions in India.	11
IV	7. Linguistic and cultural diversity in India. 8. Unity and diversity in India.	12
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks	30

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

1. Age and sex pyramid of Indian population (1 exercise).
2. State wise distribution and composition of working population in India (1 exercises).
3. Map the scheduled tribe population distribution in India (1 exercises).
4. Concentration of urban population by location quotient (1 exercise).
5. Distribution of scheduled caste population (1 exercises).
6. Composition of the major religions in India (1 exercises).
7. Distribution of literacy –rural - urban and male-female (2 exercises).

SEC-2			
Session: 2024-25			
Part A – Introduction			
Subject	Geography		
Semester	II		
Name of the Course	Map Making Techniques		
Course Code	24UN-GEO- SEC-201		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC/SEC-1)	SEC		
Level of the course (As per Annexure-I)	100-199		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO):	1. provide a comprehensive understanding of cartographic principles and map design. 2. develop skills in both traditional and digital map-making techniques. 3. explore thematic and analytical cartography for representing spatial data. 4. introduce students to digital tools for producing high-quality maps. 5*. understand the role of maps in communicating spatial information effectively		
Credits	Theory	Practical	Total
	2	1	3
Contact Hours	2	2	4
Max. Marks:70 Internal Assessment Marks: 15+05 =20 End-Term Exam Marks: 35+15 = 50		Time:3 hours	

Part B- Contents of the Course

<u>Instructions for Paper-Setter</u>

Question 1 is compulsory comprising seven sub-parts spread over the entire syllabus (one mark for each sub-part), to be answered in brief. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.

Unit	Topics	Contact Hours
I	1. Cartography: Definition, Scope, and History of Cartography 2. Importance of Maps in Spatial Analysis and Communication	7
II	3. Types of Maps: General Reference, Thematic, and Topographic 4. Elements of a Map: Scale, Symbols, Legend, North Arrow, and Grid	7
III	5. Cartographic Design Principles for Map Making 6. Digital Map Making Tools and Techniques	8
IV	7. Techniques for Making Thematic Maps 8. Techniques for Making Topographic Maps	8
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 05 marks File record = 05 marks Viva-Voce = 05 marks Practical Record: A project file consisting of 8 exercises on the below mentioned themes: - 1. Creating Hand-Drawn Maps and Understanding Traditional Techniques (2 exercises). 2. Using GIS Software (ArcGIS/QGIS) for Map Creation and Layout (2 exercises). 3. Developing Topographic Maps with Contours, Hill shading, and Elevation 4. Creating Physical and Thematic Maps for a Given Region Using Different Techniques (2 exercises).	30

Suggested Evaluation Methods	
Internal Assessment: ➤ Theory • Class Participation: 04 Marks • Seminar/presentation/assignment/quiz/class test etc.: 04 Marks • Mid-Term Exam: 07 Marks	End-Term Examination: 35 Marks
➤ Practicum • Class Participation: NIL • Seminar/Demonstration/Viva-voce/Lab records etc.: 05 Marks • Mid-Term Exam: NIL	15 Marks
Part C-Learning Resources	
Recommended Books/e-resources/LMS: 1. Dent, B.D., Torguson, J.S., & Hodler, T.W. (2009) <i>Cartography: Thematic Map Design</i> (6th ed.), McGraw-Hill, New York. 2. Slocum, T.A., McMaster, R.B., Kessler, F.C., & Howard, H.H. (2009) <i>Thematic Cartography and Geovisualization</i>, Pearson Prentice Hall, Upper Saddle River. 3. Tyner, J.A. (2010) <i>Principles of Map Design</i>, The Guilford Press, New York. 4. Robinson, A.H., Morrison, J.L., Muehrcke, P.C., & Kimerling, A.J. (1995) <i>Elements of Cartography</i> (6th ed.), John Wiley & Sons, New York. 5. Kraak, M.-J., & Ormeling, F. (2010) <i>Cartography: Visualization of Geospatial Data</i>, Pearson Education Limited, Harlow.	

*Applicable for courses having practical components.

SEC-2			
Session: 2024-25			
Part A – Introduction			
Subject	Geography		
Semester	II		
Name of the Course	Remote Sensing		
Course Code	24UN-GEO- SEC-202		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC/SEC-1)	SEC		
Level of the course (As per Annexure-I)	100-199		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO):	1. provide a comprehensive understanding of cartographic principles and map design. 2. develop skills in both traditional and digital map-making techniques. 3. explore thematic and analytical cartography for representing spatial data. 4. introduce students to digital tools for producing high-quality maps. 5*. understand the role of maps in communicating spatial information effectively		
Credits	Theory	Practical	Total
	2	1	3
Contact Hours	2	2	4
Max. Marks:70 Internal Assessment Marks: 15+05 =20 End-Term Exam Marks: 35+15 = 50		Time:3 hours	

Part B- Contents of the Course

<u>Instructions for Paper-Setter</u>

Question 1 is compulsory comprising seven sub-parts spread over the entire syllabus (one mark for each sub-part), to be answered in brief. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.

Unit	Topics	Contact Hours
I	1. Remote Sensing: Definition, History and Scope 2. Electromagnetic Spectrum: Wavelengths and Frequencies & Interaction of EM Radiation with Atmosphere and Earth's Surface	7
II	3. Types of Remote Sensing: Active vs. Passive 4. Platforms and Sensors in Remote Sensing	7
III	5. Remote Sensing Software and Tools 6. Data Acquisition from Remote Sensing Portals (USGS Earth Explorer, Copernicus Open Access Hub, BHUVAN)	8
IV	7. Remote Sensing Data Interpretation and Processing 8. Applications of Remote Sensing	8
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 05 marks File record = 05 marks Viva-Voce = 05 marks Practical Record: A project file consisting of 8 exercises on the below mentioned themes: - 1. Interpretation of Spectral Reflectance Curve (2 exercises). 2. Interpretation of Optical and Thermal Image (2 exercises). 3. Hands-on Training with Remote Sensing Software (QGIS, ERDAS, ENVI etc.) (2 exercises). 4. Satellite Data Acquisition and Preprocessing (2 exercises).	30

Suggested Evaluation Methods	
Internal Assessment: ➤ Theory • Class Participation: 04 Marks • Seminar/presentation/assignment/quiz/class test etc.: 04 Marks • Mid-Term Exam: 07 Marks	End-Term Examination: 35 Marks
➤ Practicum • Class Participation: NIL • Seminar/Demonstration/Viva-voce/Lab records etc.: 05 Marks • Mid-Term Exam: NIL	15 Marks
Part C-Learning Resources	
Recommended Books/e-resources/LMS: 1. Lillesand, T.M., Kiefer, R.W., & Chipman, J. (2015) <i>Remote Sensing and Image Interpretation</i>, John Wiley & Sons, New York. 2. Jensen, J.R. (2016) <i>Introductory Digital Image Processing: A Remote Sensing Perspective</i>, Pearson Education, Upper Saddle River. 3. Campbell, J.B., & Wynne, R.H. (2011) <i>Introduction to Remote Sensing</i>, The Guilford Press, New York. 4. Richards, J.A., & Jia, X. (2006) <i>Remote Sensing Digital Image Analysis</i>, Springer, Berlin. 5. Schowengerdt, R.A. (2007) <i>Remote Sensing: Models and Methods for Image Processing</i>, Elsevier, Amsterdam.	

*Applicable for courses having practical components.

SEC-2			
Session: 2024-25			
Part A – Introduction			
Subject	Geography		
Semester	II		
Name of the Course	Geospatial Technology and Resource Management		
Course Code	24UN-GEO- SEC-203		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC/SEC-1)	SEC		
Level of the course (As per Annexure-I)	100-199		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO):	1. provide an understanding of the principles and applications of geospatial technology. 2. develop skills in using GIS and remote sensing tools for resource management. 3. explore applications of geospatial technology in environmental conservation and sustainable resource management. 4. enhance decision-making skills through spatial data analysis and geospatial modeling. 5*. Application of geospatial technology in resource management		
Credits	Theory	Practical	Total
	2	1	3
Contact Hours	2	2	4
Max. Marks:70 Internal Assessment Marks: 15+05 =20 End-Term Exam Marks: 35+15 = 50		Time:3 hours	

Part B- Contents of the Course

<u>Instructions for Paper-Setter</u>

Question 1 is compulsory comprising seven sub-parts spread over the entire syllabus (one mark for each sub-part), to be answered in brief. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.

Unit	Topics	Contact Hours
I	1. Introduction to Geospatial Technology, Components and Scope of Geospatial Technology 2. Overview of GIS, Remote Sensing, and GPS	7
II	3. Role of Geospatial Technology in Resource Management 4. Platforms and Sensors in Remote Sensing	7
III	5. Remote Sensing Software and Tools 6. Remote Sensing for Environmental Monitoring	8
IV	7. Geospatial Applications in Water and Land Resource Management 8. Geospatial Technology in Disaster and Hazard Management	8
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 05 marks File record = 05 marks Viva-Voce = 05 marks Practical Record: A project file consisting of 8 exercises on the below mentioned themes: - 1. Hands-on GIS Software (ArcGIS/QGIS): Data Visualization and Spatial Analysis (2 exercises). 2. Remote Sensing Data Acquisition and Interpretation for Resource Management (2 exercises). 3. GPS-Based Field Surveys for Resource Mapping (2 exercises). 4. Geospatial Analysis of Land Use and Water Resource Changes (2 exercises).	30

Suggested Evaluation Methods	
Internal Assessment: ➤ Theory • Class Participation: 04 Marks • Seminar/presentation/assignment/quiz/class test etc.: 04 Marks • Mid-Term Exam: 07 Marks	End-Term Examination: 35 Marks
➤ Practicum • Class Participation: NIL • Seminar/Demonstration/Viva-voce/Lab records etc.: 05 Marks • Mid-Term Exam: NIL	15 Marks
Part C-Learning Resources	
Recommended Books/e-resources/LMS: 1. Chang, K.-T. (2018) <i>Introduction to Geographic Information Systems</i>, McGraw-Hill, New York. 2. Jensen, J.R. (2016) <i>Remote Sensing of the Environment: An Earth Resource Perspective</i>, Pearson Education, Upper Saddle River. 3. Burrough, P.A., & McDonnell, R.A. (1998) <i>Principles of Geographical Information Systems</i>, Oxford University Press, Oxford. 4. Schowengerdt, R.A. (2007) <i>Remote Sensing: Models and Methods for Image Processing</i>, Elsevier, Amsterdam. 5. Goodchild, M.F. (2000) <i>Geographical Information Systems and Science</i>, John Wiley & Sons, New York.	

*Applicable for courses having practical components.

SEC-2			
Session: 2024-25			
Part A – Introduction			
Subject	Geography		
Semester	II		
Name of the Course	GIS, Mapping and Spatial Analysis		
Course Code	24UN-GEO-SEC-204		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC/SEC-1)	SEC		
Level of the course (As per Annexure-I	100-199		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO):	1. introduce the fundamental concepts of GIS and spatial data management. 2. develop skills in mapping and spatial data visualization. 3. explore spatial analysis techniques for solving geographic problems. 4. To gain hands-on experience in GIS software for geospatial analysis and mapping. 5*. application of geospatial technology in mapping and spatial analysis.		
Credits	Theory	Practical	Total
	2	1	3
Contact Hours	2	2	4
Max. Marks:70 Internal Assessment Marks: 15+05 =20 End-Term Exam Marks: 35+15 = 50		Time:3 hours	

Part B- Contents of the Course

<u>Instructions for Paper-Setter</u>

Question 1 is compulsory comprising seven sub-parts spread over the entire syllabus (one mark for each sub-part), to be answered in brief. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.

Unit	Topics	Contact Hours
I	1. Introduction to GIS and Spatial Data 2. Sources of Spatial Data: Remote Sensing, GPS, Surveys, and Open-Source Data	7
II	3. Cartography and Map Design 4. Spatial Data Management	7
III	5. Basic Spatial Analysis Techniques (IDW, Kriging, Spline) 6. Advanced Spatial Analysis	8
IV	7. GIS Applications in Various Sectors 8. Geospatial Technology in Disaster and Hazard Management	8
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 05 marks File record = 05 marks Viva-Voce = 05 marks Practical Record: A project file consisting of 8 exercises on the below mentioned themes: - 1. Introduction to GIS Software (ArcGIS/QGIS): Data Import, Editing, and Mapping (2 exercises). 2. Thematic Map Creation and Design Techniques (2 exercises). 3. Spatial Analysis: Buffering, Overlay, and Distance Calculations (2 exercises). 4. Hotspot and Density Analysis for Urban Planning (2 exercises). 5. Application of GIS and Spatial Analysis for Solving a Real-World Problem (2 exercises).	30

Suggested Evaluation Methods	
Internal Assessment: ➤ Theory • Class Participation: 04 Marks • Seminar/presentation/assignment/quiz/class test etc.: 04 Marks • Mid-Term Exam: 07 Marks	End-Term Examination: 35 Marks
➤ Practicum • Class Participation: NIL • Seminar/Demonstration/Viva-voce/Lab records etc.: 05 Marks • Mid-Term Exam: NIL	15 Marks
Part C-Learning Resources	
Recommended Books/e-resources/LMS: 1. Longley, P.A., Goodchild, M.F., Maguire, D.J., & Rhind, D.W. (2015) <i>Geographic Information Systems and Science</i>, John Wiley & Sons, New York. 2. Chang, K.-T. (2018) <i>Introduction to Geographic Information Systems</i>, McGraw-Hill, New York. 3. Burrough, P.A., & McDonnell, R.A. (1998) <i>Principles of Geographical Information Systems</i>, Oxford University Press, Oxford. 4. Heywood, I., Cornelius, S., & Carver, S. (2011) <i>An Introduction to Geographical Information Systems</i>, Pearson Education, Harlow. 5. Mitchell, A. (1999) <i>The ESRI Guide to GIS Analysis, Volume I: Geographic Patterns & Relationships</i>, ESRI Press, Redlands.	

*Applicable for courses having practical components.

CC-3/MCC-4/CC-M3			
Session: 2024-25			
Part A – Introduction			
Subject	Geography		
Semester	III		
Name of the Course	Geography of India		
Course Code	25UN-GEO-301		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC)	CC/MCC/CC-M		
Level of the course (As per Annexure-I)	200-299		
Pre-requisite for the course (if any)	NA		
Course Learning Outcomes (CLO):	After completing this course, the learner will be able to: 1. provide knowledge about the physiography of our nation. 2. understand the agriculture and irrigation system. 3. understand the basic demographic structure and literacy. 4. provide awareness about the resources and industries of our nation. 5* acquire knowledge of socio-economic and demographic data		
Credits	Theory	Practical	Total
	03	01	04
Contact Hours	3	2	5
Max. Marks:100 Internal Assessment Marks:20+10=30 End-Term Exam Marks: 50+20=70		Time:3 hours	

Part B- Contents of the Course

<u>Instructions for Paper-Setter</u>

Question 1 is compulsory comprising five sub-parts spread over the entire syllabus (two marks for each sub-part), to be answered in brief. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.

Unit	Topics	Contact Hours
I	1. Physical divisions and drainage system. 2. Climate, soils and natural vegetation.	12
II	3. Agricultural crops: major crops and cropping pattern. 4. Development of irrigation sources - canals and tubewells.	11
III	5. Population: distribution, density and growth. 6. Population composition: sex ratio, rural and urban, literacy, language and religion.	11
IV	7. Resources: Production and distribution of iron ore, coal, petroleum, hydro power, solar and thermal power 8. Industries: iron and steel, sugar, cotton textile and IT industry.	11
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks	30

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

1. Identification and delineation of watershed of major rivers on map
2. Land use pattern of India (pie chart)
3. Occupational structure of India (pie chart)
4. Distribution and population density map of India (choropleth and dot method)
5. Age and sex structure (pyramid diagram)
6. Identification of the major industrial region of India by cartogram
7. Rainfall deviation diagram of at least 20 years
8. Cropping intensity and irrigation intensity (bivariate method)

Suggested Evaluation Methods

Internal Assessment:

➤ Theory

- Class Participation: **05 marks**
- Seminar/presentation/assignment/quiz/class test etc.: **05 marks**
- Mid-Term Exam: **10 marks**

➤ Practicum

- Class Participation: **NIL**
- Seminar/Demonstration/Viva-voce/Lab records etc.: **10 Marks**
- Mid-Term Exam: **NIL**

End-Term Examination:

50 Marks

20 Marks

Part C-Learning Resources

Recommended Books/e-resources/LMS:

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.
6. Sdyasuk Galina and P Sengupta (1967) Economic Regionalisation of India, Census of India
7. Sharma, T. C. (2003) India - Economic and Commercial Geography. Vikas Publ., New Delhi.
6. Singh R. L. (1971) India: A Regional Geography, National Geographical Society of India.
8. Singh, Jagdish (2003) India - A Comprehensive & Systematic Geography, Gyanodaya Prakashan, Gorakhpur.
9. Pathak, C. R. (2003) Spatial Structure and Processes of Development in India. Regional Science Assoc., Kolkata.
10. Sharma, T.C. (2013) Economic Geography of India. Rawat Publication, Jaipur
11. Spate O. H. K. and Learmonth A. T. A. (1967) India and Pakistan: A General and Regional Geography, Methuen.
12. Tirtha, Ranjit (2002) Geography of India, Rawat Publs., Jaipur & New Delhi.
13. Tiwari, R.C. (2007) Geography of India. Prayag Pustak Bhawan, Allahabad

*Applicable for courses having practical components.

MCC-5			
Session: 2024-25			
Part A - Introduction			
Subject	Geography		
Semester	III		
Name of the Course	History and Philosophy of Geography		
Course Code	25UN-GEO-302		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC)	MCC		
Level of the course (As per Annexure-I)	200-299		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO):	After completing this course, the learner will be able to: 1. develop an understanding on nature and philosophy of geography 2. have geographical knowledge regarding ancient and medieval period 3. acquaint with philosophical development in subject 4. acquire knowledge of modern geographical thinking 5* develop skills of making 3D earth on 2D surface.		
Credits	Theory	Practical	Total
	03	01	04
Contact Hours	3	2	5
Max. Marks:100 Internal Assessment Marks:20+10=30 End Term Exam Marks: 50=20=70		Time: 3 hours	

Part B- Contents of the Course

Question 1 is compulsory comprising five sub-parts spread over the entire syllabus (two marks for each sub-part). There will be eight questions, two from each unit. The candidate has

to answer four more questions selecting at least one question from each unit. All questions carry equal marks.

Unit	Topics	Contact Hours
I	1. Space, place and location in geography. 2. Nature of geography as a scientific discipline and its relationship with other sciences.	11
II	3. Contribution of Greeks, Romans and Arabs in geographic knowledge. 4. Modern Geography: contribution of Humboldt and Ritter.	12
III	5. Emergence of geography as chorological science – landerkunde and landschaftkunde. 6. Concepts – environmental determinism and possibilism, areal differentiation.	11
IV	7. Quantitative revolution and development of geography as spatial science. 8. Approaches in contemporary geography – behavioral, welfare and radical.	11
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks Practical Record: A project file consisting of 8 exercises on the below mentioned themes: - 1. Interactive Mapping Exercise: Students use physical or digital maps (e.g., Google Earth, QGIS) to identify and categorize examples of space (open areas), place (localities with meaning), and location (absolute vs. relative coordinates) (02).	30

	2. Interdisciplinary Web: Create a concept web of geography with sciences and social science etc. (02) 3. Timeline and Biography Poster Presentation: Students prepare posters highlighting the geographic contributions of Greek, Roman and Arab with historical maps (02). 4. Comparative Case Study: For Environmental Determinism and Possibilism (with local examples (01) 5. Debate or Role Play: divide class into three groups—each represents one approach. Groups present their philosophy using a geographic issue (01).	
Suggested Evaluation Methods		

Internal Assessment: ➤ Theory • Class Participation: 5 • Seminar/presentation/assignment/quiz/class test etc.: 5 • Mid-Term Exam: 10 ➤ Practicum • Class Participation: NIL • Seminar/Demonstration/Viva-voce/Lab records etc.: 10 • Mid-Term Exam: NIL	End Term Examination: 50 20
---	--

Part C-Learning Resources
Recommended Books/e-resources/LMS: 1. Dickinson, R. E (1969) The Makers of Modern Geography, London. 2. Dikshit, R.D (1997) Geographical Thought-A Contextual History of Ideas, Prentice Hall of India, New Delhi. 3. Hartshorne, R (1959) Perspectives on the Nature of Geography, Rand MacNelly, Chicago. 4. Harvey David (1989) Explanation in Geography, Edward Arnold, London. 5. Holt-Jonson (2011) Geography, History and Concepts: A Study's Guide, Sage Publications. 6. James P.E and Martin J Geoffrey (1972) All possible Worlds, John Wiley and Sons, New York. 7. Johnston, R.J (1983) Geography and Geographers, Edward Heinemann, London. 8. Peet, Richard (1998) Modern Geographical Thought, Oxford, Blackwell Publishers.

*Applicable for courses having practical components.

MDC-3			
Session: 2024-25			
Part A - Introduction			
Subject	Geography		
Semester	III		
Name of the Course	Resource Geography of India		
Course Code	25UN-GEO-MDC-301		
Course Type: (CC/MCC/MDC/CCM/DSEC/VOC/ DSE/PC/AEC/VAC)	MDC		
Level of the course (As per Annexure-I)	200-299		
Pre-requisite for the course (if any)	NA		
Course Learning Outcomes (CLOs):	After completing this course, the learner will be able to: 1. understand regional diversity of India with respect to its agriculture, water, energy and mineral resources. 2. enhance knowledge about policies and problems of resource management in India. 3. to develop ideas on different aspects of resources, and the linkages with development issues that geographers usually address. 4. introduce about policies of resource management and its relevance to sustainable development. 5* attain skills in plotting graphs, correlation and time series analysis of resource-based data.		
Credits	Theory	Practical	Total
	2	1	3
Contact Hours	2	2	4
Max. Marks: 75 Internal Assessment Marks: 15+05 = 20 End Term Exam Marks: 35+20 = 55		Time: 03 Hours	

Part B- Contents of the Course

<u>Instructions for Paper- Setter</u>
--

Question 1 is compulsory comprising of seven sub parts spread over entire syllabus (one mark for each sub part), to be answered in brief. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.

Unit	Topics	Contact Hours
I	1. Agriculture: Environmental, technological and institutional factors affecting Indian Agriculture.	3
	2. Distribution and production of rice, wheat, sugarcane and tea.	4
II	3. Water resources: development and means of irrigation, intensity of irrigation.	3
	4. Development and management of water resources, national water mission and policy; Jal Shakti Abhiyan.	4
III	5. Economic significance of minerals; production, distribution and trade of metallic minerals (iron ore and bauxite).	3
	6. Production, distribution and trade of non-metallic minerals (mica and limestone); problems of mining industry and conservation of minerals.	4
IV	7. Energy resources: production, distribution and trade of coal, and petroleum.	4
	8. Non-conventional energy resources (solar and wind); energy crisis and conservation.	5
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. 1. Distribution of marks for evaluation 2. Exercise = 10 marks 3. File record = 5 marks 4. Viva-Voce = 5 marks	30

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

1. Distribution of net sown area India or Haryana (1 exercises).

2. Proportion of irrigated area by 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 poly graph (2 exercises).
4. Time series analysis of the trend of coal/crude oil/natural gas production in India since 1950-51 using 3/5/10-year moving average method (3 exercises).
5. Proportional distribution of conventional and non - conventional energy using comparative bar diagram (1 exercise).

Suggested Evaluation Methods

Internal Assessment:

➤ Theory

- Class Participation: **04 Marks**
- Seminar/presentation/assignment/quiz/class test etc.: **04 Marks**
- Mid-Term Exam: **07Marks**

➤ Practicum

- Class Participation: **NIL**
- Seminar/Demonstration/Viva-voce/Lab records etc.: **05 Marks**
- Mid-Term Exam: **NIL**

End Term Examination:

35 Marks

20 Marks

Part C-Learning Resources

Recommended Books/e-resources/LMS:

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.
4. Johnson, BLC (2001) Geographical Dictionary of India, Vision Books, New Delhi.
5. Khullar, DR (2011) India-A Comprehensive Geography, Kalyani Publishers, New Delhi.
6. Misra, R (2002) Fresh Water Environment, Anmol Publications, New Delhi.
7. Misra, RP and Sundaram, KV (1979) Rural Area Development: Perspectives and Approaches, Sterling Publications, New Delhi.
8. Pathak, CR (2003) Spatial Structure and Processes of Development in India. Regional Science Association, Kolkata.
9. Saroha, J and Singh, S (2022) Geography of India, Pearson, Noida.
10. Sharma, TC (2003) India: Economic and Commercial Geography, Vikas Publications, New Delhi.
11. Sharma, TC (2013) Economic Geography of India, Rawat Publications, Jaipur.
12. Shetty, R (2009) An Analysis of World Resources with reference to India, Sarala Raj Ria Publishers, Mysore.
13. Singh, RL (1971) India: A Regional Geography, National Geographical Society of India, Varanasi.
14. Singh, J (2003) India: A Comprehensive and Systematic Geography, Gyanodaya Prakashan, Gorakhpur.
15. Tirtha, R (2002) Geography of India, Rawat Publications, Jaipur.
16. Tiwari, RC (2007) Geography of India, Prayag Pustak Bhawan, Allahabad.

*Applicable for courses having practical component.

SEC-3			
Session: 2024-25			
Part A – Introduction			
Subject	Geography		
Semester	III		
Name of the Course	Thematic Mapping		
Course Code	25UN-GEO-SEC 301		
Course Type: (CC/MCC/MDC/CC- M/DSEC/VOC/DSE/PC/AEC/VA C/SEC-1)	SEC		
Level of the course (As per Annexure-I	200-299		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO):	1. Understand the fundamental concepts of thematic mapping and its importance in spatial sciences. 2. Identify different types of thematic maps and their applications. 3. Develop skills in designing and producing thematic maps using GIS software. 4. Interpret thematic maps for spatial analysis and decision-making. 5*. Apply cartographic principles and design elements effectively in map-making.		
Credits	Theory	Practical	Total
	2	1	3
Contact Hours	2	2	4
Max. Marks:70 Internal Assessment Marks: 15+05 =20 End-Term Exam Marks: 35+15 = 50		Time:3 hours	

Part B- Contents of the Course

Instructions for Paper-Setter

Question 1 is compulsory comprising seven sub-parts spread over the entire syllabus (one mark for each sub-part), to be answered in brief. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.

Unit	Topics	Contact Hours
I	1. Introduction to Thematic Mapping: Definition, History, and Applications 2. Types of Thematic Maps: Choropleth, Isopleth, Dot, Flow, and Cartograms	7
II	3. Cartographic Principles: Scale, Projections, Generalization, and Symbolization 4. Data Classification Methods: Equal Interval, Quantile, Natural Breaks, and Standard Deviation	8
III	5. Visual Variables in Thematic Mapping: Color, Size, Shape, and Texture 6. Map Layout and Design: Title, Legend, North Arrow, Scale Bar, and Annotation	7
IV	7. GIS Software for Thematic Mapping: QGIS/ArcGIS etc. 8. Accuracy, Ethics, and Interpretation of Thematic Maps	8
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 05 marks File record = 05 marks Viva-Voce = 05 marks Practical Record: A project file consisting of 8 exercises on the below mentioned themes with GIS Software: - 1. Prepare Base Map for the Thematic mapping (2 exercises). 2. Add all the elements of Maps in a Thematic Map (2 exercises). 3. Prepare One Choropleth and One Isopleth Map (2 exercises). 4. Apply Two Data Classification Methods on Thematic Maps (2 exercises).	30

Suggested Evaluation Methods	
Internal Assessment: ➤ Theory - Class Participation: 04 Marks - Seminar/presentation/assignment/quiz/class test etc.: 04 Marks - Mid-Term Exam: 07 Marks	End-Term Examination: 35 Marks
➤ Practicum - Class Participation: NIL - Seminar/Demonstration/Viva-voce/Lab records etc.: 05 Marks - Mid-Term Exam: NIL	15 Marks
Part C-Learning Resources	
Recommended Books/e-resources/LMS: - Dent, B.D., Torguson, J.S., & Hodler, T.W. (2008). <i>Cartography: Thematic Map Design</i>, McGraw-Hill, New York. - Slocum, T.A., McMaster, R.B., Kessler, F.C., & Howard, H.H. (2009). <i>Thematic Cartography and Geovisualization</i>, Pearson Education, Upper Saddle River. - Robinson, A.H., Morrison, J.L., Muehrcke, P.C., Kimerling, A.J., & Guptill, S.C. (1995). <i>Elements of Cartography</i>, Wiley, New York. - Tyner, J.A. (2010). <i>Principles of Map Design</i>, Guilford Press, New York. - Brewer, C.A. (2015). <i>Designing Better Maps: A Guide for GIS Users</i>, Esri Press, Redlands. - MacEachren, A.M. (2004). <i>How Maps Work: Representation, Visualization, and Design</i>, Guilford Press, New York. - Monmonier, M. (1996). <i>How to Lie with Maps</i>, University of Chicago Press, Chicago. - QGIS Documentation and Training Manual – https://docs.qgis.org - ArcGIS Online Resources – https://www.esri.com/training	

*Applicable for courses having practical components.

SEC-3			
Session: 2024-25			
Part A – Introduction			
Subject	Geography		
Semester	III		
Name of the Course	Geographic Information System		
Course Code	25UN-GEO-SEC 302		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC/SEC-1)	SEC		
Level of the course (As per Annexure-I)	200-299		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO):	1. understand the fundamental concepts, components, and functions of Geographic Information Systems. 2. identify and describe different types and sources of spatial and non-spatial data. 3. acquire, manage, and analyse geospatial data using GIS techniques. 4. design, create, and interpret thematic maps for informed decision-making. 5*. gain proficiency in using GIS software (e.g., QGIS or ArcGIS) for data processing and visualization.		
Credits	Theory	Practical	Total
	2	1	3
Contact Hours	2	2	4
Max. Marks:70 Internal Assessment Marks: 15+05 =20 End-Term Exam Marks: 35+15 = 50		Time:3 hours	

Part B- Contents of the Course

Instructions for Paper-Setter

Question 1 is compulsory comprising seven sub-parts spread over the entire syllabus (one mark for each sub-part), to be answered in brief. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.

Unit	Topics	Contact Hours
I	1. Introduction to GIS: Definition, History and Components 2. Spatial and Non-Spatial Data: Types, Sources & Data Formats	7
II	3. Spatial Data Models: Raster and Vector Data Structures, ad Advantages 4. Coordinate Systems and Map Projections: Concepts and Types	7
III	5. Data Input and Editing: Digitization, Scanning, and Geo-referencing 6. Spatial Analysis: Buffering, Overlay, and Query Techniques	8
IV	7. Cartographic Design: Map Elements, Layout, Symbolization etc. 8. Application of GIS: Environment, Urban Planning, Disaster Management etc.	8
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 05 marks File record = 05 marks Viva-Voce = 05 marks Practical Record: A project file consisting of 8 exercises on the below mentioned themes with GIS Software: - 1. Importing and Exploring Spatial and Non-Spatial Data (2 exercises). 2. Visualization of Raster and Vector Data (2 exercises). 3. Buffer and Overlay Analysis for Site Suitability (2 exercises). 4. Cartographic Design and Map Layout Creation (2 exercises).	30

Suggested Evaluation Methods	
Internal Assessment: ➤ Theory • Class Participation: 04 Marks • Seminar/presentation/assignment/quiz/class test etc.: 04 Marks • Mid-Term Exam: 07 Marks	End-Term Examination: 35 Marks
➤ Practicum • Class Participation: NIL • Seminar/Demonstration/Viva-voce/Lab records etc.: 05 Marks • Mid-Term Exam: NIL	15 Marks
Part C-Learning Resources	
Recommended Books/e-resources/LMS: 1. Longley, P.A., Goodchild, M.F., Maguire, D.J., & Rhind, D.W. (2015). <i>Geographic Information Systems and Science</i>. John Wiley & Sons. 2. Heywood, I., Cornelius, S., & Carver, S. (2011). <i>An Introduction to Geographical Information Systems</i>. Pearson Education. 3. Chang, K.-T. (2018). <i>Introduction to Geographic Information Systems</i>. McGraw-Hill. 4. Burrough, P.A., & McDonnell, R.A. (1998). <i>Principles of Geographical Information Systems</i>. Oxford University Press. 5. DeMers, M.N. (2008). <i>Fundamentals of Geographic Information Systems</i>. Wiley. 6. Shekhar, S., & Chawla, S. (2003). <i>Spatial Databases: A Tour</i>. Prentice Hall. 7. QGIS Documentation: https://docs.qgis.org 8. Esri GIS Tutorials and Resources: https://www.esri.com/trainin	

*Applicable for courses having practical components.

SEC-3			
Session: 2024-25			
Part A – Introduction			
Subject	Geography		
Semester	III		
Name of the Course	Geospatial Technology for Disaster Mitigation & Management		
Course Code	25UN-GEO-SEC 303		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC/SEC-1)	SEC		
Level of the course (As per Annexure-I	200-299		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO):	1. understand the fundamentals of disaster types and management frameworks. 2. explain the role and application of geospatial technologies (GIS, Remote Sensing, GPS) in disaster risk reduction. 3. acquire, manage, and analyse spatial data relevant to natural and anthropogenic disasters. 4. apply geospatial tools for hazard mapping, risk analysis, early warning systems, and disaster mitigation planning. 5*. create thematic, hazard, and vulnerability maps using geospatial software and remote sensing data through hands-on lab exercises.		
Credits	Theory	Practical	Total
	2	1	3
Contact Hours	2	2	4
Max. Marks:70 Internal Assessment Marks: 15+05 =20 End-Term Exam Marks: 35+15 = 50		Time:3 hours	
Part B- Contents of the Course			

Instructions for Paper-Setter

Question 1 is compulsory comprising seven sub-parts spread over the entire syllabus (one mark for each sub-part), to be answered in brief. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.

Unit	Topics	Contact Hours
I	1. Introduction to Disasters: Types and Management Frameworks 2. Role of Geospatial Technology in Disaster Management	7
II	3. Data Sources for Disaster Management: Satellite Imagery, Ground Data etc. 4. Spatial Data Models and Techniques for Hazard Mapping	7
III	5. GIS Applications in Hazard and Risk Assessment: Floods, Earthquakes, Landslides 6. Remote Sensing Applications in Disaster Monitoring and Early Warning Systems	8
IV	7. Case Studies: Tsunami, Cyclone and Urban Disasters 8. Disaster Mitigation Planning: Vulnerability Mapping and Decision Support Systems	8
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 05 marks File record = 05 marks Viva-Voce = 05 marks Practical Record: A project file consisting of 8 exercises on the below mentioned themes with GIS Software: - 1. Spatial data preparation for disaster management (2 exercises) 2. Thematic and Hazard Mapping (2 exercises) 3. Remote sensing for disaster monitoring (2 exercises). 4. Vulnerability mapping (2 exercises).	30

Suggested Evaluation Methods	
Internal Assessment: ➤ Theory - Class Participation: 04 Marks - Seminar/presentation/assignment/quiz/class test etc.: 04 Marks - Mid-Term Exam: 07 Marks	End-Term Examination: 35 Marks
➤ Practicum - Class Participation: NIL - Seminar/Demonstration/Viva-voce/Lab records etc.: 05 Marks - Mid-Term Exam: NIL	15 Marks
Part C-Learning Resources	
Recommended Books/e-resources/LMS: Bhatt, C.M. & Bhandari, L. (2012). <i>Disaster Management: A Geographic Perspective</i>. G.K. Publishers. Schneid, T.D. & Collins, L. (2001). <i>Disaster Management and Preparedness</i>. Lewis Publishers. ESRI Guide (2020). <i>GIS for Disaster Management</i>. Environmental Systems Research Institute. Alexander, D. (2000). <i>Confronting Catastrophe: New Perspectives on Natural Disasters</i>. Oxford University Press. Coppola, D.P. (2015). <i>Introduction to International Disaster Management</i>. Elsevier. Jensen, J.R. (2007). <i>Remote Sensing of the Environment: An Earth Resource Perspective</i>. Pearson. NDMA Guidelines (India): https://ndma.gov.in/ UNDRR Knowledge Base: https://www.undrr.org/publications NASA Earth Observatory: https://earthobservatory.nasa.gov/ Google Earth Engine Developer Guide: https://developers.google.com/earth-engine/	

*Applicable for courses having practical components.

SEC-3			
Session: 2024-25			
Part A – Introduction			
Subject	Geography		
Semester	III		
Name of the Course	Introduction to Python for Geographic Data Analysis		
Course Code	25UN-GEO-SEC 304		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC/SEC-1)	SEC		
Level of the course (As per Annexure-I	200-299		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO):	1. understand basic programming concepts using Python. 2. read, manipulate, and analyse spatial data using Python libraries. 3. perform geospatial operations and visualization using packages such as geopandas, matplotlib, and folium. 4. automate spatial data processing tasks and generate reproducible workflows. 5*. develop a basic geospatial analysis script for mapping, querying, and data transformation through lab-based practice.		
Credits	Theory	Practical	Total
	2	1	3
Contact Hours	2	2	4
Max. Marks:70 Internal Assessment Marks: 15+05 =20 End-Term Exam Marks: 35+15 = 50		Time:3 hours	
Part B- Contents of the Course			

Instructions for Paper-Setter

Question 1 is compulsory comprising seven sub-parts spread over the entire syllabus (one mark for each sub-part), to be answered in brief. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.

Unit	Topics	Contact Hours
I	1. Introduction to Python: Syntax, Data Types, Lists, 2. Introduction to Python: Dictionaries, Loops, and Functions	7
II	3. Introduction to Geographic Data and Formats (Shapefile, GeoJSON, Raster). 4. Python Environment Setup: Jupyter Notebook, Anaconda, IDEs for GIS Workflows.	7
III	5. Working with <code>pandas</code> and <code>geopandas</code> : 6. Data Frames, Geodata Frames, and I/O operations	8
IV	7. Geospatial Data Visualization using <code>matplotlib</code> , <code>seaborn</code> , and <code>folium</code> 8. Coordinate Systems, Projections, and Geometric Operations with <code>shapely</code> and <code>pyproj</code>	8
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 05 marks File record = 05 marks Viva-Voce = 05 marks Practical Record: A project file consisting of 8 exercises on the below mentioned themes with GIS Software: - 1. Python Basics for Geographic Data (2 exercises) 2. Geospatial Data Handling and Mapping (2 exercises) 3. Spatial Analysis and Operations (2 exercises) 4. Web Mapping and Automation (2 exercises)	30

Suggested Evaluation Methods	
Internal Assessment: ➤ Theory • Class Participation: 04 Marks • Seminar/presentation/assignment/quiz/class test etc.: 04 Marks • Mid-Term Exam: 07 Marks	End-Term Examination: 35 Marks
➤ Practicum • Class Participation: NIL • Seminar/Demonstration/Viva-voce/Lab records etc.: 05 Marks • Mid-Term Exam: NIL	15 Marks
Part C-Learning Resources	
Recommended Books/e-resources/LMS: 1. Sullivan, C. (2019). <i>Geographic Data Science with Python</i>. Packt Publishing. 2. Reis, B. & Silva, A. (2021). <i>Geospatial Analysis with Python</i>. No Starch Press. 3. Fitzgerald, K. (2022). <i>Python for Data Analysis</i> (3rd ed.). O'Reilly Media. 4. GeoPandas Documentation: https://geopandas.org/ 5. Folium Documentation: https://python-visualization.github.io/folium/ 6. PyShp, Rasterio, Shapely, and Fiona Libraries: https://pypi.org 7. Google Earth Engine Python API: https://developers.google.com/earth-engine/python 8. Python for Geospatial Analysis (Coursera/MOOC) – Available through major e-learning platforms.	

*Applicable for courses having practical components.

VOC-3			
Session: 2024-25			
Part A - Introduction			
Subject	Geography		
Semester	III		
Name of the Course	GIS, Mapping and Spatial Analysis		
Course Code	25UN-GEO-VOC 301		
Course Type: (CC/MCC/MDC/CCM/DSEC/VOC/ DSE/PC/AEC/VAC)	VOC		
Level of the course (As per Annexure-I)	200-299		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLOs):	After completing this course, the learner will be able to: 1. understand the core concepts of GIS, mapping, and spatial data types. 2. demonstrate practical knowledge of spatial data acquisition, map design, and cartographic elements. 3. apply GIS tools and techniques for spatial analysis and thematic mapping. 4. conduct basic geospatial investigations using GIS software (QGIS/ArcGIS/Open-source tools).. 5* attain skills in solving practical problems associated with mapping and spatial analysis with GIS.		
Credits	Theory	Practical	Total
	3	1	4
Contact Hours	3	2	5
Max. Marks: 100 Internal Assessment Marks: 20+10 = 30 End Term Exam Marks: 50+20 = 70		Time: 03 Hours	

Part B- Contents of the Course		
<u>Instructions for Paper- Setter</u>		
Question 1 is compulsory comprising of five sub parts spread over entire syllabus (two marks for each sub part). There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.		
Unit	Topics	Contact Hours
I	1. Introduction to GIS: Definition, Components, and Applications 2. Types of Spatial Data: Raster and Vector – Concepts, Sources, and Formats	11
II	3. Cartographic Principles: Scale, Projections, Symbols, Layout Design 4. Spatial Data Collection: GPS, Satellite Imagery, and Field Survey Techniques	11
III	5. Introduction to GIS Software: Interface, Data Input, Editing, and Management (QGIS/ArcGIS) 6. Thematic Mapping: Choropleth, Isopleth, Dot Maps, and Flow Maps	11
IV	7. Spatial Analysis Tools: Buffering, Overlay, Query, and Spatial Statistics 8. Case Studies and Applications: Urban Planning, Disaster Management, Environmental Monitoring.	12
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks Practical Record: A project file consisting of 8 exercises on the below mentioned themes: -	30

	1. Base Map Creation and Feature Mapping (Create base maps and digitize roads, land use, and landmarks) (2 Exercises) 2. Map Design and Cartographic Elements (Add scale, legend, north arrow, and title using QGIS layout designer) (2 Exercises) 3. Thematic Mapping (Choropleth & Isopleth) (Create population density maps and rainfall distribution maps) (2 Exercises) 4. Basic Spatial Analysis using GIS Tools (Buffer analysis for service zones; Overlay analysis of land use and population layers) (2 Exercises)	
--	---	--

Suggested Evaluation Methods

Internal Assessment: ➤ Theory • Class Participation: 05 Marks • Seminar/presentation/assignment/quiz/class test etc.: 05 Marks • Mid-Term Exam: 10 Marks ➤ Practicum • Class Participation: NIL • Seminar/Demonstration/Viva-voce/Lab records etc.: 10 Marks • Mid-Term Exam: NIL	End Term Examination: 50 Marks 20 Marks
---	--

Part C-Learning Resources

Recommended Books/e-resources/LMS:

1. Longley, P. A., Goodchild, M. F., Maguire, D. J., & Rhind, D. W. (2015). *Geographic Information Systems and Science*, Wiley.
2. Heywood, I., Cornelius, S., & Carver, S. (2011). *An Introduction to Geographical Information Systems*, Pearson.
3. Burrough, P. A., & McDonnell, R. A. (1998). *Principles of Geographical Information Systems*, Oxford University Press.
4. Jensen, J. R. (2007). *Remote Sensing of the Environment: An Earth Resource Perspective*, Pearson.
5. QGIS Training Manual – <https://docs.qgis.org>
6. OpenStreetMap Learning Portal – <https://learnosm.org>
7. ESRI e-Learning Platform – <https://www.esri.com/training>

*Applicable for courses having practical component.

VOC-3			
Session: 2024-25			
Part A - Introduction			
Subject	Geography		
Semester	III		
Name of the Course	Basic of QGIS		
Course Code	25UN-GEO-VOC 302		
Course Type: (CC/MCC/MDC/CCM/DSEC/VOC/ DSE/PC/AEC/VAC)	VOC		
Level of the course (As per Annexure-I)	200-299		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLOs):	After completing this course, the learner will be able to: 1. understand the core concepts of GIS and the QGIS environment. 2. perform basic spatial data handling, map creation, and data visualization using QGIS. 3. apply QGIS tools to digitize features, create thematic maps, and manage spatial data. 4. conduct simple spatial queries and geoprocessing tasks for real-world applications. 5* attain skills in solving practical problems associated with mapping and spatial analysis with QGIS.		
Credits	Theory	Practical	Total
	3	1	4
Contact Hours	3	2	5
Max. Marks: 100 Internal Assessment Marks: 20+10 = 30 End Term Exam Marks: 50+20 = 70		Time: 03 Hours	

Part B- Contents of the Course		
<u>Instructions for Paper- Setter</u>		
Question 1 is compulsory comprising of five sub parts spread over entire syllabus (two marks for each sub part). There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.		
Unit	Topics	Contact Hours
I	1. Introduction to GIS and QGIS: Overview, Interface, Features 2. Types of Spatial Data: Raster vs Vector, Coordinate Reference Systems (CRS)	11
II	3. Spatial Data: Shapefiles, GeoJSON, CSV, Raster files 4. Attribute Table, Field Calculator, and Data Queries	11
III	5. Digitization and Editing Tools: Creating Point, Line, and Polygon Layers 6. Processing of Raster Data in QGIS and Its application	11
IV	7. Symbolology and Thematic Mapping: Graduated Symbols, Categorized Maps, Layout Manager: Creating Map Layouts, Legends, and Exporting Maps 8. Case Studies and Applications: Urban Planning, Disaster Management, Environmental Monitoring.	12
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks Practical Record: A project file consisting of 8 exercises on the below mentioned themes: - 1. QGIS Interface and Project Setup (Load vector/raster layers, set CRS, navigate map tools) 2. Data Import and Attribute Handling (Join CSV with spatial data, use Field Calculator for basic operations) 3. Digitization and Feature Editing (Create and edit shapefiles; draw roads, rivers, land use) 4. Georeferencing (Georeference scanned map using ground control points) 5. Thematic Mapping (Create choropleth and symbol maps using attribute data)	30

	6. Map Layout and Export (Add north arrow, legend, scale bar, and export high-quality map) 7. Buffer and Overlay Analysis (Perform buffer zones for schools or hospitals; intersect analysis) 8. Final Project (Neighborhood Mapping) & Digitize and map local features (roads, land use, services) and present map)	
Suggested Evaluation Methods		
Internal Assessment: ➤ Theory • Class Participation: 05 Marks • Seminar/presentation/assignment/quiz/class test etc.: 05 Marks • Mid-Term Exam: 10 Marks ➤ Practicum • Class Participation: NIL • Seminar/Demonstration/Viva-voce/Lab records etc.: 10 Marks • Mid-Term Exam: NIL		End Term Examination: 50 Marks 20 Marks
Part C-Learning Resources		
Recommended Books/e-resources/LMS: 1. QGIS Documentation and Training Manual – https://docs.qgis.org 2. Graser, A. (2016). <i>Learning QGIS</i> , Packt Publishing. 3. Sherman, G. (2014). <i>The Geospatial Desktop: Open-Source GIS & Mapping</i> , Locate Press. 4. OpenStreetMap Resources – https://learnosm.org 5. GISGeography Tutorials – https://gisgeography.com		

*Applicable for courses having practical component.

VAC-3			
Session: 2024-25			
Part A - Introduction			
Subject	Geography		
Semester	III		
Name of the Course	Mapping Our Neighborhood		
Course Code	25UN-GEO-VAC301		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC)	VAC		
Level of the course (As per Annexure-I)	200-299		
Pre-requisite for the course (if any)	NA		
Course Learning Outcomes (CLO):	After completing this course, the learner will be able to: 1. understand the basics of spatial thinking and mapping, including types of maps, direction, scale, and map symbols. 2. collect and organize geographic information through field surveys, observation, and basic GPS techniques. 3. use digital mapping tools (e.g., Google Maps, Google Earth, OpenStreetMap) to visualize and analyze neighborhood features. 4. design and present a thematic neighborhood map, demonstrating understanding of layout, data representation, and local issues. 5*. NA		
Credits	Theory	Practical	Total
	02	00	02
Contact Hours	02	-	02
Max. Marks:50 Internal Assessment Marks:15 End-Term Exam Marks: 35		Time:3 hours	

Part B- Contents of the Course		
<u>Instructions for Paper-Setter</u>		
Question 1 is compulsory comprising seven sub-parts spread over the entire syllabus (one mark for each sub-part), to be answered in brief. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.		
Unit	Topics	Contact Hours
I	1. Introduction to Mapping and Spatial Thinking 2. Sketch Maps, Landmarks, Directions, and Types of Maps	7
II	3. Elements of a Map: Scale, Legend, Symbols, and Orientation 4. Methods of Data Collection: Field Survey, Observation, and GPS	8
III	5. Base Map Creation and Feature Mapping (Land Use, Roads, Amenities) 6. Introduction to Digital Mapping Tools: Bhuvan, Google Earth, Google Maps, OpenStreetMap.	8
IV	7. Thematic Mapping: Social, Environmental, and Civic Issues 8. Neighborhood Mapping Project: Issue Identification and Data Representation	7
V*	NA	
Suggested Evaluation Methods		
Internal Assessment: ➤ Theory • Class Participation: 04 Marks • Seminar/presentation/assignment/quiz/class test etc.: 04 Marks • Mid-Term Exam: 07 Marks ➤ Practicum • Class Participation: NIL • Seminar/Demonstration/Viva-voce/Lab records etc.: NIL • Mid-Term Exam: NIL		End-Term Examination: 35 Marks NIL

Part C-Learning Resources

Recommended Books/e-resources/LMS:

1. Krygier, J., & Wood, D. (2016). *Making Maps: A Visual Guide to Map Design for GIS* (3rd ed.), Guilford Press.
2. Monmonier, M. (1996). *How to Lie with Maps*, University of Chicago Press.
3. <https://bhuvan.nrsc.gov.in>
4. Google Earth User Guide – <https://earth.google.com>
5. Google My Maps Help Center – <https://support.google.com/mymaps>
6. OpenStreetMap Learn Resources – <https://learnosm.org>
7. QGIS Documentation for Beginners – <https://docs.qgis.org>
8. Participatory Mapping Toolkit, Mapping for Change – <https://mappingforchange.org.uk>

*Applicable for courses having practical components.

VAC-3			
Session: 2024-25			
Part A - Introduction			
Subject	Geography		
Semester	III		
Name of the Course	Water Resource Management		
Course Code	25UN-GEO-VAC 302		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC)	VAC		
Level of the course (As per Annexure-I)	200-299		
Pre-requisite for the course (if any)	NA		
Course Learning Outcomes (CLO):	After completing this course, the learner will be able to: 1. understand the types, distribution, and significance of water resources. 2. explain modern and traditional water resource management techniques. 3. evaluate water-related issues such as scarcity, pollution, and interlinking of rivers. 4. sustainable and participatory approaches in water conservation, drawing from Indian traditional systems and contemporary practices. 5*. NA		
Credits	Theory	Practical	Total
	02	00	02
Contact Hours	02	-	02
Max. Marks:50 Internal Assessment Marks:15 End-Term Exam Marks: 35		Time:3 hours	

Part B- Contents of the Course		
<u>Instructions for Paper-Setter</u>		
Question 1 is compulsory comprising seven sub-parts spread over the entire syllabus (one mark for each sub-part), to be answered in brief. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.		
Unit	Topics	Contact Hours
I	1. Introduction to Water Resources: Types (Surface, Groundwater), Global and Indian Water Distribution 2. Water Cycle and Watershed Concepts	7
II	3. Traditional Water Management Systems in India: Stepwells, Baolis, Johads, Tankas, Ahar-Pyne, Zabo System 4. Sacred Waterscapes and Indigenous Water Ethics.	8
III	5. Contemporary Water Management: Dams, Irrigation, Rainwater Harvesting, Groundwater Recharging. 6. Water Quality, Pollution, and Urban Water Issues.	7
IV	7. Sustainable Water Resource Management: Community Participation and Policy. 8. Case Studies: River Rejuvenation, Jal Shakti Abhiyan, Namami Ganga etc.	8
V*	NA	
Suggested Evaluation Methods		
Internal Assessment: ➤ Theory - Class Participation: 04 Marks - Seminar/presentation/assignment/quiz/class test etc.: 04 Marks - Mid-Term Exam: 07 Marks ➤ Practicum - Class Participation: NIL - Seminar/Demonstration/Viva-voce/Lab records etc.: NIL - Mid-Term Exam: NIL		End-Term Examination: 35 Marks NIL

Part C-Learning Resources

Recommended Books/e-resources/LMS:

1. **Agarwal, A., & Narain, S. (1997).** *Dying Wisdom: Rise, Fall and Potential of India's Traditional Water Harvesting Systems*, Centre for Science and Environment, New Delhi.
2. **Michael, A. M. (2008).** *Irrigation: Theory and Practice*, Vikas Publishing House.
3. **Kumar, M.D. (2010).** *Water Management in India: Issues and Challenges*, Academic Foundation.
4. **Verma, S., & Bakshi, N. (2021).** *Traditional Water Management Systems in India*, INTACH.
5. **Ramaswamy, R.I. (Ed.). (2007).** *Indigenous Knowledge Systems and Sustainable Development*, IKS Division, IGNCA.
6. **NIH (National Institute of Hydrology)** – <http://nihroorkee.gov.in>
7. **Jal Shakti Ministry (Govt. of India)** – <https://jalshakti-dowr.gov.in>
8. **Documentaries:**
 - *India's Water Warriors* (Down To Earth / CSE etc.)
 - *The Story of India's Ancient Stepwells* (YouTube/National Geographic etc.)

*Applicable for courses having practical components.

VAC-3			
Session: 2024-25			
Part A - Introduction			
Subject	Geography		
Semester	III		
Name of the Course	Cultural Landscape of India		
Course Code	25UN-GEO-VAC 303		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VA C)	VAC		
Level of the course (As per Annexure-I)	200-299		
Pre-requisite for the course (if any)	NA		
Course Learning Outcomes (CLO):	After completing this course, the learner will be able to: 1. understand the core concepts and diversity of Indian culture, including unity in diversity and cultural continuity. 2. identify and appreciate major cultural elements such as epics, folk traditions, art, literature, festivals, and rituals. 3. recognize the significance of Indian aesthetic traditions in music, dance, architecture, and visual arts. 4. analyze the relevance of indigenous knowledge systems and cultural practices in promoting sustainability and national identity. 5*. NA		
Credits	Theory	Practical	Total
	02	00	02
Contact Hours	02	-	02
Max. Marks:50 Internal Assessment Marks:15 End-Term Exam Marks: 35		Time:3 hours	

Part B- Contents of the Course		
<u>Instructions for Paper-Setter</u>		
Question 1 is compulsory comprising seven sub-parts spread over the entire syllabus (one mark for each sub-part), to be answered in brief. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.		
Unit	Topics	Contact Hours
I	1. Introduction to Indian Culture: Concept, Characteristics, Spatiality and Unity in Diversity. 2. People and Practices of India: Ethnic, Regional, and Cultural Diversity	7
II	3. Epics, Folk Traditions, and Archaeological Evidence 4. Languages, Literature, and Knowledge Traditions	8
III	5. Indian Art and Aesthetics: Music, Dance and Painting 6. Fairs, Festivals, and Rituals: Local Traditions and Cultural Continuity	7
IV	7. Cultural Symbols and National Identity: Role of Symbols, Values, and the Indian Diaspora. 8. Culture and Sustainable Living: Indigenous Practices, Traditional Knowledge Systems, and Heritage Preservation.	8
V*	NA	
Suggested Evaluation Methods		
Internal Assessment: > Theory • Class Participation: 04 Marks • Seminar/presentation/assignment/quiz/class test etc.: 04 Marks • Mid-Term Exam: 07 Marks > Practicum • Class Participation: NIL • Seminar/Demonstration/Viva-voce/Lab records etc.: NIL • Mid-Term Exam: NIL		End-Term Examination: 35 Marks NIL

Part C-Learning Resources

Recommended Books/e-resources/LMS:

1. Kapila Vatsyayan (1997). *The Cultural Heritage of India*, IGNCA.
2. S. Radhakrishnan (1927). *The Hindu View of Life*, HarperCollins India.
3. Rajeev Bhargava (Ed.) (2008). *Politics and Ethics of the Indian Constitution*, Oxford University Press.
4. Michel Danino (2010). *The Lost River: On the Trail of the Sarasvati*, Penguin India.
5. Pawan K. Verma (2007). *The Great Indian Middle Class*, Penguin.
6. NCERT e-books (Class XI & XII): Indian Heritage and Culture – <https://ncert.nic.in>
7. Bharatiya Vidya Bhavan Publications – Books on Indian traditions, festivals, and history.
8. e-Content (SWAYAM / NPTEL / IGNOU):
 - *Introduction to Indian Culture* – NPTEL
 - *Understanding Indian Culture and Heritage* – IGNOU

*Applicable for courses having practical components.

CC-4/MCC-6			
Session: 2024-25			
Part A - Introduction			
Subject	Geography		
Semester	IV		
Name of the Course	Fundamentals of Economic Geography		
Course Code	25UN -GEO-401		
Course Type: (CC/MCC/MDC/CCM/DSEC/VOC/ DSE/PC/AEC/VAC)	CC/MCC		
Level of the course (As per Annexure-I)	200-299		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLOs):	After completing this course, the learner will be able to: 1. provides knowledge about the fundamental concepts of economic geography. 2. acquisition of knowledge about resources and their conservation. 3. enrichment of knowledge about distribution of crops, minerals and energy resources 4. acquaintance with global industries, transport, communication and trade. 5* attain skills in solving practical problems associated with economic geography.		
Credits	Theory	Practical	Total
	3	1	4
Contact Hours	3	2	5
Max. Marks: 100 Internal Assessment Marks: 20+10 = 30 End Term Exam Marks: 50+20 = 70		Time: 03 Hours	

Part B- Contents of the Course**Instructions for Paper- Setter**

Question 1 is compulsory comprising of five sub parts spread over entire syllabus (two marks for each sub part). There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.

Unit	Topics	Contact Hours
I	1. Nature, scope, and major branches of economic geography. 2. Classification of economic activities and their impact on environment.	11
II	3. Natural resources: types, bases of classification. 4. Utilization and conservation of natural resources.	11
III	5. World distribution of food crops (rice and wheat), commercial crops (cotton and sugarcane) and plantation crops (tea and coffee). 6. World distribution and production of coal, petroleum and natural gas, iron ore and bauxite.	11
IV	7. World distribution and production of iron and steel industry, textile industry, sugar industry, automobile & IT industry. 8. International trade and transport and major oceanic trade routes.	12

V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks Practical Record: A project file consisting of 8 exercises on the below mentioned themes: - 1. Choropleth mapping of state/country-wise variation in GDP and PCI (2 exercises). 2. Computation of rail and road transport network accessibility index (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	30
----	--	----

	exercise). 5. Representation of decadal production of major petroleum and iron and steel producing countries using multiple bar diagram (1 exercise).	
--	--	--

Suggested Evaluation Methods

Internal Assessment: ➤ Theory • Class Participation: 05 Marks • Seminar/presentation/assignment/quiz/class test etc.: 05 Marks • Mid-Term Exam: 10 Marks ➤ Practicum • Class Participation: NIL • Seminar/Demonstration/Viva-voce/Lab records etc.: 10 Marks • Mid-Term Exam: NIL	End Term Examination: 50 Marks 20 Marks
---	---

Part C-Learning Resources

Recommended Books/e-resources/LMS:

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. Knowled, R. and Wareing, J. 1992. Economic and Social Geography. Rupa and Company, Calcutta.
6. Knox, P. 2003. The Geography of World Economy. Arnold, London.
7. Saxena, H.M. 2013. Economic Geography. Rawat Publications, Jaipur.
8. Thomas, RS. 1962. The Geography of Economic Activities. McGraw Hill, New York.
9. Wheeler, J.O. and Muller, P.O. 1995. Economic Geography. John Wiley and Sons. New York.

*Applicable for courses having practical component.

MCC-7			
Session: 2024-25			
Part A - Introduction			
Subject	Geography		
Semester	IV		
Name of the Course	Introduction to Social Geography		
Course Code	25UN -GEO-402		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC)	MCC		
Level of the course (As per Annexure-I	200-299		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO):	After completing this course, the learner will be able to: 1. acquaint with social structure in spatial context. 2. gain knowledge about ethnic and social groups in India. 3. understand the social structure and religious diversity of India. 4. be well versed with concept of well-being and its indicators. 5* develop the skill to process social data.		
Credits	Theory	Practical	Total
	03	01	04
Contact Hours	3	2	5
Max. Marks: 100 Internal Assessment Marks: 20+10=30 End Term Exam Marks: 50+20=70		Time: 3 hours	

Part B- Contents of the Course

Question 1 is compulsory and comprise five sub-parts spread over the entire syllabus (two marks for each sub-part). There will be eight questions, two from each unit. The candidate has to answer four questions from these by selecting at least one question from each unit. All questions carry equal marks.

Unit	Topics	Contact Hours
I	1. Definition, nature and scope of social geography. 2. Development of social geography and approaches to study.	12
II	3. Social Structure and Processes: Tribes, and their spatial distribution. 4. Caste: origin, form and its distribution.	11
III	5. Language and dialects: origin and linguistic diversity. 6. Religion: major religion and religious plurality in India.	11
IV	7. Social problems: geography of poverty and human development index. 8. Gender inequality and gender development index	11
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks	30

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

1. Computation and mapping of human development index (1 exercise)
2. Computation and mapping of gender development index (1 exercise).
3. Concentration of S.C. population: Location Quotient & dissimilarity index (2 exercises).
4. Graphical representation of income inequality: Lorenz curve (2 exercises).
5. Construction of composite index by ranking and standardization method (2 exercises).

Suggested Evaluation Methods

Internal Assessment:

➤ Theory

- Class Participation: 5
- Seminar/presentation/assignment/quiz/class test etc.:5
- Mid-Term Exam: 10

➤ Practicum

- Class Participation: NIL
- Seminar/Demonstration/Viva-voce/Lab records etc.:10
- Mid-Term Exam: NIL

End Term Examination:

70

30

Part C-Learning Resources

Recommended Books/e-resources/LMS:

1. Ahmad, A. (1993) Social Structure and Regional Development, Rawat Publications, Jaipur
2. Ahmad, A. (1999) Social Geography, Rawat Publications, Jaipur
3. Ahmad, A. (2012) Social Geography of India, Concept Publishing Company, New Delhi
4. Knox, P. L. (1975) Social Wellbeing- A Spatial Perspective, Oxford University Press, London
5. Pain, R., Barke, M., Fuller, D., Gough, J., MacFarlane, R. and Mowl, G. (2001) Introducing Social Geographies, Arnold and Oxford University Press, New York
6. Panelli, R. (2004) Social Geographies: From Difference to Action, Sage Publications, London
7. Sopher, D. (1980) An Exploration of India: Geographical Perspectives on Society and Culture, Cornell Press, New York
8. Smith, D.M. (1977) Human Geography: A Welfare Approach, Arnold Heinemann.
9. Smith, D.M. (1973) The Geography of Social Well-being in the United States. McGraw Hill, New York.
10. Smith, D.M. (1977) Where the Grass is Greener: Geographical Perspectives on Inequality, Penguin.

*Applicable for courses having practical component.

MCC-8			
Session: 2024-25			
Part A - Introduction			
Subject	Geography		
Semester	IV		
Name of the Course	Geography of Settlements		
Course Code	254UN -GEO-403		
Course Type: (CC/MCC/MDC/CC- M/DSEC/VOC/DSE/PC/AEC/VAC)	MCC		
Level of the course (As per Annexure-I)	200-299		
Pre-requisite for the course (if any)	NA		
Course Learning Outcomes (CLO):	After completing this course, the learner will be able to: 1. provide knowledge about the fundamentals of settlements geography. 2. enrich knowledge about the distribution of rural and urban settlements. 3. familiarized with the types and patterns of rural and urban settlements. 4. acquaint with the issues and policies regarding settlement. 5* develop skill of mapping socio-economic and demographic data.		
Credits	Theory	Practical	Total
	03	01	04
Contact Hours	3	2	5
Max. Marks:100 Internal Assessment Marks:20+10=30 End-Term Exam Marks: 70		Time:3 hours	

Part B- Contents of the Course		
<u>Instructions for Paper-Setter</u> Question 1 is compulsory comprising five sub-parts spread over the entire syllabus (two marks for each sub-part), to be answered in brief. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.		
Unit	Topics	Contact Hours
I	1. Definition, nature, scope, significance and approaches to study settlement geography. 2. Theories of evolution and development of settlements.	12
II	3. Geographical factors affecting the growth of settlements distribution, importance of settlement studies in geography 4. Types of settlement: rural and urban, rural-urban dichotomy and continuum.	11
III	5. Rural settlement: shape, site, types and pattern. 6. Urban settlement: Characteristics of ancient and medieval cities.	11
IV	7. Hierarchy of urban settlement: rank-size rule and primate city. 8. Issues and policies in settlements.	11
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks Practical Record: A project file consisting of 8 exercises on the below mentioned themes: - 1. Location and distribution of urban and rural settlements using toposheets (1 exercises). 2. Graphical representation of rank size rule (1 exercise). 3. Identification of settlement pattern (2 exercises). 4. Traffic flow diagram (1 exercise). 5. Diagrammatic distribution of different class towns (1 exercise).	30

	6. Composition of urban & rural population (1 exercise). 7. Distribution of types of houses by bar diagram (1 exercise).	
Suggested Evaluation Methods		
Internal Assessment: ➤ Theory - Class Participation: 05 marks - Seminar/presentation/assignment/quiz/class test etc.: 05 Marks - Mid-Term Exam: 10 Marks ➤ Practicum - Class Participation: NIL - Seminar/Demonstration/Viva-voce/Lab records etc.: 10 Marks - Mid-Term Exam: NIL		End-Term Examination: 50 Marks 20 Marks
Part C-Learning Resources		
Recommended Books/e-resources/LMS: - Deshpande, C. D. (2005) "Cities: A Geographical Study", Translated by V. G. Amrita, Manan Prakashan, Mumbai - Gharpure, V. (2013) "Nagari Bhugol", (Marathi) Pimpalpure and Company Publishers, Nagpur - Gharpure, V. (2013) "Vasti Bhugol", (Marathi) Pimpalpure and Company Publishers, Nagpur - Gharpure, V. (2017) "Manavi Bhugol", (Marathi) Pimpalpure and Company Publishers, Nagpur - Ghosh. S. (2015) "Introduction to Settlement Geography", Orient Blackswan Private Limited, Hyderabad - Jyptirmoy Sen (2007) A Text Book of Social and Cultural Geography," Kalyani Publishers, New Delhi. - Knowles, R, and Wareing, J. (1996) "Economic and Social Geography", the Made Simple Series, Rupa & Co., Calcutta - Leong, Goh-Cheng and Morgan, G. (1994) "Human and Economic Geography", Oxford University Press, Oxford - Misra, R. P. & Misra, K. eds. (1998) Million Cities of India, Sustainable Development Foundation, New Delhi. - Siddhartha, K and Mukherjee, S. (2016) "Cities, Urbanisation and Urban Systems (Settlement Geography)", Kitab Mahal, Allahabad - Singh, L. R. (2009) "Fundamentals of Human Geography", Sharda Pustak Bhawan, Allahabad - Singh, R. Y. (2012) "Geography of Settlements", Rawat Publications, Jaipur - Thakur S. A. (2012) "Settlement Geography"/ Vasti Bhugol- Konkan Geographers, Publication - Tiwari, R. C. (2016) "Geography of India", Pravalika Publications, Allahabad		

*Applicable for courses having practical components.

DSE-1			
Session: 2024-25			
Part A - Introduction			
Subject	Geography		
Semester	IV		
Name of the Course	Fundamentals of Biogeography		
Course Code	25UN-GEO-DSE-404		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC)	DSE		
Level of the course (As per Annexure-I)	200-299		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO):	After completing this course, the learner will be able to: 1. understand the basic ecological principles. 2. enrich understanding about distribution of plants and animals' life on the earth. 3. aware about conservation of biotic resources and effects of industrial effluents on ecosystems. 4. acquaint with environmental hazards and bio reserves. 5* develop the skill of mapping ecological areas, flora and fauna.		
Credits	Theory	Practical	Total
	3	1	4
Contact Hours	3	2	5
Max. Marks: 100 Internal Assessment Marks: 20+10=30 End Term Exam Marks: 50+20=70		Time: 03 Hours	

Part B- Contents of the Course**Instructions for Paper- Setter**

Question 1 is compulsory consisting of five sub parts spread over entire syllabus (two marks for each sub parts), to be answered in brief. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.

Unit	Topics	Contact Hours
I	1. Nature, scope and significance of biogeography. 2. Basic ecological principles: Bio-energy cycle in territorial ecosystem; trophic levels, food web and energy budget.	11
II	3. Distribution of plant life on the earth and its relation to soil, climate and human activities. 4. Geographical distribution of animal life on the earth and its relation to vegetation types, climate and human activities.	12
III	5. Communities: nature of communities and ecosystems: bio-diversities; human induced communities' change; habitat decay and conservation of biotic resources. 6. Environmental Pollution and its effect on geosphere.	11
IV	7. Environmental hazards: ecological consequences; human perception and adjustment with respect to flood, drought and earthquake. 8. Bio-Reserves in India; distribution and characteristics.	11
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks	30

	Practical Record: A project file consisting of 8 exercises on the below mentioned themes: - 1. Identification of natural vegetation of neighborhood environment and interpretation of their characteristics. 2. Identification of wild animals of neighborhood environment and interpretation of their characteristics. 3. Mapping of forest area and percent of forest to geographical area of selected individual countries.	
	4. Trend in population of selected wild animal species. 5. Trends in flood frequency and casualties in India for at least 2-3 decades. 6. Mapping of national parks and sanctuaries of India by suitable method. 7. Mapping the ecological hot spots of the world and interpretation of their characteristics. 8. Mapping the water bodies based on topographical sheets of an area. 9. Mapping the frequency or intensity of earthquakes and casualties of a geographical area. 10. Comparative analysis of seasonal variability of rainfall from different climatic reasons of India.	
Suggested Evaluation Methods		
Internal Assessment: ➤ Theory • Class Participation: 05 Marks • Seminar/presentation/assignment/quiz/class test etc.:05 Marks • Mid-Term Exam: 10 Marks ➤ Practicum: • Class Participation: NIL • Seminar/Demonstration/Viva-voce/Lab records etc.: 10 Marks • Mid-Term Exam: NIL	End Term Examination: 50 Marks 20 Marks	

Part C-Learning Resources

Recommended Books/e-resources/LMS:

1. Chandna R. C., (2002) Environmental Geography, Kalyani, Ludhiana.
2. Cox, C.D. and Moore, P.D. (1993) Biogeography: An Ecological and Evolutionary Approach, Blackwell.
3. Cunningham W. P. and Cunningham M. A., (2004) Principals of Environmental Science, McGraw hill, London.
4. Huggett, R.J. (1998) Fundamentals of Biogeography. Routledge, U.S.A.
5. Khushoo, T.N. and Sharma, M. (1991) Indian Geosphere-Biosphere Har-Anand Publication, Delhi.
6. Lillies, J. (1974) Introduction of Zoogeography, McMillan. London.
7. Mathur, H.S. (1998) Essentials of Biogeography, Anuj Printers, Jaipur.
8. MOEF (2006) National Environmental Policy-2006, Ministry of Environment and Forests, Government of India.
9. Odum, E. P. et al. (2005) Fundamentals of Ecology, Ceneage Learning India.
10. Pears, N. (1985) Basic Biogeography, Longman, London.
11. Simmon, I.G. (1974) Biogeography, Natural and Cultural, Longman, London.
12. Singh S. (1997) Environmental Geography, Prayag Pustak Bhawan. Allahabad.
13. Tivy, J. (1992) Biogeography: A study of Plants in Ecosphere, Oliver and Boyd, U.S.A.
14. UNEP (2007) Global Environment Outlook: GEO4: Environment for Development,
15. United Nations Environment Programme.

Hindi Reading List

16. Singh, Savindra (2001) Paryavaran Bhugol, Prayag Pustak Bhawan, Allahabad.
17. Singh, Shri Narayan (1993) Vatavaran Bhugol, Tara Book Agency.

*Applicable for courses having practical component.

DSE-1			
Session: 2024-25			
Part A – Introduction			
Subject	Geography		
Semester	IV		
Name of the Course	Geography of Tourism		
Course Code	25UN-GEO-DSE-405		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC)	DSE		
Level of the course (As per Annexure-I)	200-299		
Pre-requisite for the course (if any)	NA		
Course Learning Outcomes (CLO):	After completing this course, the learner will be able to: 1. familiarization with the fundamentals of tourism geography 2. understand the types of tourism and their trend 3. acquaintance with tourism infrastructure and its impact 4. provide awareness of the carrying capacity of tourism destinations 5* attain skills in solving practical problems associated with tourism.		
Credits	Theory	Practical	Total
	03	01	04
Contact Hours	3	2	5
Max. Marks:100 Internal Assessment Marks:20+10=30 End-Term Exam Marks:50+20=70		Time: 3 hours	

Part B- Contents of the Course**Instructions for Paper-Setter**

Question 1 is compulsory comprising five sub-parts spread over the entire syllabus (two marks for each sub-part), to be answered in brief. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.

Unit	Topics	Contact Hours
I	1. Tourists and tourism. Nature, scope, approaches and significance of tourism. 2. Travel and tourism through ages. Role of geography in tourism industry.	11
II	3. Types of tourism and its importance. Development of tourism in India and other major tourist countries. 4. Trends of international and domestic tourism. Tourism motivation and tourism demand.	11
III	5. Tourism infrastructure; transport, accommodation, hospitality and other facilities. 6. Positive and negative impact of tourism: economic, political, socio-cultural and environmental.	11
IV	7. Carrying capacity: a tool for sustainable development 8. Tourism planning and policies.	12
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks	30

	Practical Record: A project file consisting of 8 exercises on the below mentioned themes: - 1. State-wise distribution of tourists (Bar diagram). 2. Development of accommodations in India (comparative bar diagram). 3. Composition of tourists - states wise or of different tourist destinations (comparative bar). 4. Total, domestic, and foreign tourists (Compound bar diagram). 5. Tourism infrastructure (Trend graph). 6. Location and characteristics of highway tourism	
--	--	--

	resorts of Haryana (dot method). 7. Tourist-population pressure (Bivariate method). 8. Explored and unexplored tourist destinations (Point method).	
--	---	--

Suggested Evaluation Methods

Internal Assessment: ➤ Theory • Class Participation: 05 Marks • Seminar/presentation/assignment/quiz/class test etc.: 05 Marks • Mid-Term Exam: 10 Marks ➤ Practicum • Class Participation: NIL • Seminar/Demonstration/Viva-voce/Lab records etc.: 10 Marks • Mid-Term Exam: NIL	End-Term Examination: 50 Marks 20 Marks
---	---

Part C-Learning Resources

Recommended Books/e-resources/LMS:

1. Bhatia, A. K., (1991) International Tourism: Fundamentals and Practices, Sterling Publishers, New Delhi.
2. Dhar, P.N. (2006) International Tourism: Emerging Challenges and Future Prospects. Kanishka, New Delhi.
3. Kaul R. N., Dynamics of Tourism: Sterline Publisher Ltd.
4. Shinde S.B., Geography of Tourism, Phadke Prakashan, Kolhapur.
5. Hall, M. and Stephen, P. (2006) Geography of Tourism and Recreation – Environment, Place and Space, Routledge, London.
6. Kamra, K. K. and Chand, M. (2007) Basics of Tourism: Theory, Operation and Practise, Kanishka Publishers, Pune.
7. Muluk, Musmade, Doke, More, (2021) Geography of Tourism-I, Nirali Publication, Pune.
8. Page, S. J. (2011) Tourism Management: An Introduction, Butterworth-Heinemann USA. Chapter 2.
9. Singh Jagbir (2014) “Eco-Tourism” Published by - I.K. International Pvt. Ltd. S-25, Green Park Extension, Uphaar Cinema Market, New Delhi, India (www.ikbooks.com).
10. Seth P.N. (1985) Successful Tourism Management: Sterling Publisher Ltd., New Delhi.

*Applicable for courses having practical components.

VOC-4			
Session: 2024-25			
Part A - Introduction			
Subject	Geography		
Semester	IV		
Name of the Course	Web GIS		
Course Code	25UN-GEO-VOC-401		
Course Type: (CC/MCC/MDC/CCM/DSEC/VOC/ DSE/PC/AEC/VAC)	VOC		
Level of the course (As per Annexure-I)	200-299		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLOs):	After completing this course, the learner will be able to: 1. understand the fundamentals and architecture of Web GIS and web mapping technologies. 2. differentiate between desktop GIS and Web GIS, and identify suitable platforms for online spatial applications. 3. use open-source tools and APIs (e.g., Leaflet, OpenLayers) to publish interactive web maps. 4. develop and deploy simple Web GIS applications using geospatial data and web frameworks 5* attain skills in using WebGIS for the Geospatial mapping and analysis.		
Credits	Theory	Practical	Total
	3	1	4
Contact Hours	3	2	5
Max. Marks: 100 Internal Assessment Marks: 20+10 = 30 End Term Exam Marks: 50+20 = 70		Time: 03 Hours	

Instructions for Paper- Setter

Question 1 is compulsory comprising of five sub parts spread over entire syllabus (two marks for each sub part). There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.

Unit	Topics	Contact Hours
I	1. Introduction to Web GIS: Concepts, Components, and Evolution 2. Web GIS Architecture: Client-Server Model, Services (WMS, WFS, WMTS), APIs	11
II	3. Data for Web GIS: Spatial Data Formats (GeoJSON, KML, Tiles, etc.) 4. Web Mapping Services and Standards: OGC, WMS/WFS/WCS, REST APIs	11
III	5. Platforms for Web GIS: ArcGIS Online, QGIS2Web, GeoServer, Leaflet, OpenLayers 6. Designing Web Maps: UI Elements, Map Styling, Legends, Basemaps	11
IV	7. Introduction to HTML, CSS, and JavaScript for Web Mapping 8. Web GIS Applications: Case Studies (Urban Planning, Disaster Management, Environment Monitoring).	12
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks Practical Record: A project file consisting of 8 exercises on the below mentioned themes: - 1. Explore Web GIS Interface (Access and navigate ArcGIS Online / QGIS2Web; publish base layers) 2. Data Conversion for Web Use (Convert shapefiles to GeoJSON and visualize in browser) 3. Create Basic Web Map with Leaflet (build a basic HTML	30

VOC-4			
Session: 2024-25			
Part A - Introduction			
Subject	Geography		
Semester	IV		
Name of the Course	Basic of Professional GIS		
Course Code	25UN-GEO-VOC-402		
Course Type: (CC/MCC/MDC/CCM/DSEC/VOC/ DSE/PC/AEC/VAC)	VOC		
Level of the course (As per Annexure-I)	200-299		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLOs):	After completing this course, the learner will be able to: 1. understand the core concepts of GIS and the ArcGIS environment. 2. perform basic spatial data handling, map creation, and data visualization using ArcGIS. 3. apply ArcGIS tools to digitize features, create thematic maps, and manage spatial data. 4. conduct simple spatial queries and geo-processing tasks for real-world applications. 5* attain skills in solving practical problems associated with mapping and spatial analysis with ArcGIS.		
Credits	Theory	Practical	Total
	3	1	4
Contact Hours	3	2	5
Max. Marks: 100 Internal Assessment Marks: 20+10 = 30 End Term Exam Marks: 50+20 = 70		Time: 03 Hours	

Part B- Contents of the Course		
<u>Instructions for Paper- Setter</u>		
Question 1 is compulsory comprising of five sub parts spread over entire syllabus (two marks for each sub part). There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.		
Unit	Topics	Contact Hours
I	1. Introduction to GIS and ArcGIS: Overview, Interface, Features 2. Types of Spatial Data: Raster vs Vector, Coordinate Reference Systems (CRS)	11
II	3. Spatial Data: Shapefiles, GeoJSON, CSV, Raster files 4. Attribute Table, Field Calculator, and Data Queries	11
III	5. Digitization and Editing Tools: Creating Point, Line, and Polygon Layers 6. Processing of Raster Data in ArcGIS and Its application	11
IV	7. Symbolology and Thematic Mapping: Graduated Symbols, Categorized Maps, Layout Manager: Creating Map Layouts, Legends, and Exporting Maps 8. Case Studies and Applications: Urban Planning, Disaster Management, Environmental Monitoring.	12
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks Practical Record: A project file consisting of 8 exercises on the below mentioned themes: - 1. ArcGIS Interface and Project Setup (Load vector/raster layers, set CRS, navigate map tools) 2. Data Import and Attribute Handling (Join CSV with spatial data, use Field Calculator for basic operations) 3. Digitization and Feature Editing (Create and edit shapefiles; draw roads, rivers, land use) 4. Georeferencing (Georeference scanned map using ground control points) 5. Thematic Mapping (Create choropleth and symbol maps)	30

	using attribute data) 6. Map Layout and Export (Add north arrow, legend, scale bar, and export high-quality map) 7. Buffer and Overlay Analysis (Perform buffer zones for schools or hospitals; intersect analysis) 8. Final Project (Neighborhood Mapping) & Digitize and map local features (roads, land use, services) and present map)	
Suggested Evaluation Methods		
Internal Assessment: ➤ Theory • Class Participation: 05 Marks • Seminar/presentation/assignment/quiz/class test etc.: 05 Marks • Mid-Term Exam: 10 Marks ➤ Practicum • Class Participation: NIL • Seminar/Demonstration/Viva-voce/Lab records etc.: 10 Marks • Mid-Term Exam: NIL		End Term Examination: 50 Marks 20 Marks
Part C-Learning Resources		
Recommended Books/e-resources/LMS: 1. Chang, Kang-Tsung (2018). <i>Introduction to Geographic Information Systems</i> , McGraw-Hill Education. 2. DeMers, Michael N. (2008). <i>Fundamentals of Geographic Information Systems</i> , John Wiley & Sons. 3. Longley, Paul A., Goodchild, M.F., Maguire, D.J., & Rhind, D.W. (2015). <i>Geographic Information Science and Systems</i> , Wiley. 4. Bolstad, Paul (2016). <i>GIS Fundamentals: A First Text on Geographic Information Systems</i> , Eider Press. 5. Burrough, P.A., & McDonnell, R.A. (1998). <i>Principles of Geographical Information Systems</i> , Oxford University Press. 6. Esri Training Portal: https://www.esri.com/training 7. Learn ArcGIS: https://learn.arcgis.com 8. ArcGIS Documentation: https://pro.arcgis.com 9. Esri Community (GeoNet): https://community.esri.com 10. GISGeography Tutorials: https://gisgeography.com 11. YouTube Channels Esri Events & Training – https://www.youtube.com/user/esritv GeoDelta Labs:		

*Applicable for courses having practical component.

VAC-4			
Session: 2024-25			
Part A - Introduction			
Subject	Geography		
Semester	IV		
Name of the Course	Population, Environment and Ecology		
Course Code	25UN-GEO-VAC-401		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC)	VAC		
Level of the course (As per Annexure-I)	200-299		
Pre-requisite for the course (if any)	NA		
Course Learning Outcomes (CLO):	After completing this course, the learner will be able to: 1. understand the interrelationship between population, environment, and ecological systems. 2. analyze demographic dynamics and their impact on environmental sustainability. 3. examine ecological concepts through both modern and traditional (IKS) perspectives. 4. evaluate environmental issues and conservation strategies by integrating scientific and indigenous approaches		
Credits	Theory	Practical	Total
	02	00	02
Contact Hours	02	-	02
Max. Marks:50 Internal Assessment Marks:15 End-Term Exam Marks: 35		Time:3 hours	

Part B- Contents of the Course		
<u>Instructions for Paper-Setter</u>		
Question 1 is compulsory comprising seven sub-parts spread over the entire syllabus (one mark for each sub-part), to be answered in brief. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.		
Unit	Topics	Contact Hours
I	1. Introduction to Population Studies: Concepts, Growth, Distribution, and Demographic Transition 2. Population and Resource Relationship: Carrying Capacity, Population Pressure	7
II	3. Basic Concepts of Ecology: Ecosystems, Food Chains, Trophic Levels 4. Ecological Balance and Indigenous Conservation Practices (e.g., Bishnoi community, sacred groves)	8
III	5. Man-Environment Interaction: Environmental Determinism, Possibilism, Human Adaptation 6. Environmental Challenges in India: Pollution, Deforestation, Urbanization	8
IV	7. Sustainable Development: Goals, Principles, and Approaches 8. Indigenous Ecological Wisdom: Water harvesting, Biodiversity conservation, Agro-ecological Practices	7
V*	NA	
Suggested Evaluation Methods		
Internal Assessment: > Theory • Class Participation: 04 Marks • Seminar/presentation/assignment/quiz/class test etc.: 04 Marks • Mid-Term Exam: 07 Marks > Practicum • Class Participation: NIL • Seminar/Demonstration/Viva-voce/Lab records etc.: NIL • Mid-Term Exam: NIL		End-Term Examination: 35 Marks NIL

Part C-Learning Resources

Recommended Books/e-resources/LMS:

- | |
|---|
| <ol style="list-style-type: none"> 1. Singh, R.B. (2009). <i>Environmental Geography</i>, Rawat Publications, Jaipur. 2. Chandna, R.C. (2022). <i>Population Geography</i>, Kalyani Publishers, Ludhiana. 3. Dash, M.C. (2001). <i>Fundamentals of Ecology</i>, Tata McGraw-Hill, New Delhi. 4. Gadgil, M., & Guha, R. (1992). <i>This Fissured Land: An Ecological History of India</i>, Oxford University Press. 5. Mishra, S.N. (2019). <i>Environment and Ecology</i>, McGraw Hill Education. 6. UNDP & NITI Aayog Reports on Sustainable Development Goals in India – https://niti.gov.in 7. IKS Division, Ministry of Education (GoI) – https://iksindia.org 8. Documentary Resources: <ul style="list-style-type: none"> • <i>India's Healing Forests</i> (YouTube) • <i>Sacred Groves of India</i> (Films Division/IGNCA) |
|---|

*Applicable for courses having practical components.

VAC-4			
Session: 2024-25			
Part A - Introduction			
Subject	Geography		
Semester	IV		
Name of the Course	Introduction to Climate Change		
Course Code	25UN-GEO-VAC-402		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VA C)	VAC		
Level of the course (As per Annexure-I)	200-299		
Pre-requisite for the course (if any)	NA		
Course Learning Outcomes (CLO):	After completing this course, the learner will be able to: 1. understand the science behind climate change and the Earth's climate system. 2. identify the causes and consequences of climate change at global, regional, and local levels. 3. analyze the impact of climate change on natural systems, societies, and economies. 4. examine global, national, and community-level responses to climate change, including mitigation and adaptation strategies.		
Credits	Theory	Practical	Total
	02	00	02
Contact Hours	02	-	02
Max. Marks:50 Internal Assessment Marks:15 End-Term Exam Marks: 35		Time:3 hours	

[illegible]

Part C-Learning Resources

Recommended Books/e-resources/LMS:

- | |
|---|
| <ol style="list-style-type: none"> 1. IPCC Reports (AR6 Synthesis Report) – https://www.ipcc.ch 2. Kump, L.R., Kasting, J.F., & Crane, R.G. (2010). <i>The Earth System</i>, Pearson. 3. Singh, M. (2020). <i>Climate Change and Environmental Ethics</i>, Rawat Publications. 4. Mark Maslin (2021). <i>Climate Change: A Very Short Introduction</i>, Oxford University Press. 5. National Action Plan on Climate Change (NAPCC) – https://moef.gov.in 6. NASA Climate Change Portal – https://climate.nasa.gov 7. UNDP India – Climate Resilience Programs – https://www.in.undp.org 8. TED Talks & Documentaries: <ol style="list-style-type: none"> i. <i>Before the Flood</i> (NatGeo) ii. <i>An Inconvenient Truth</i> (Al Gore) iii. <i>Our Planet</i> (Netflix/WWF) |
|---|

*Applicable for courses having practical components.

VAC-4			
Session: 2024-25			
Part A - Introduction			
Subject	Geography		
Semester	IV		
Name of the Course	Environmental Ethics		
Course Code	25UN-GEO-VAC-403		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC)	VAC		
Level of the course (As per Annexure-I)	200-299		
Pre-requisite for the course (if any)	NA		
Course Learning Outcomes (CLO):	After completing this course, the learner will be able to: 1. understand key concepts and schools of thought in environmental ethics. 2. analyze the moral dimensions of human-environment relationships. 3. evaluate contemporary environmental problems through ethical frameworks. 4. reflect on indigenous, cultural, and spiritual values related to nature and sustainability. 5*. NA		
Credits	Theory	Practical	Total
	02	00	02
Contact Hours	02	-	02
Max. Marks:50 Internal Assessment Marks:15 End-Term Exam Marks: 35		Time:3 hours	

Part B- Contents of the Course		
<u>Instructions for Paper-Setter</u>		
Question 1 is compulsory comprising seven sub-parts spread over the entire syllabus (one mark for each sub-part), to be answered in brief. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.		
Unit	Topics	Contact Hours
I	1. Introduction to Environmental Ethics: Meaning, Scope, and Historical Development 2. Major Ethical Theories: Anthropocentrism, Biocentrism, Eco-centrism, Deep Ecology	7
II	5. Moral Standing of Nature: Intrinsic vs Instrumental Value, Rights of Nature 6. Ethics of Environmental Responsibility: Duties toward Non-Human Beings, Future Generations	8
III	5. Environmental Justice and Sustainable Development: Equity, Climate Ethics, Ecological Justice 6. Environmental Movements: Indian (e.g., Chipko, Narmada Bachao Andolan)	7
IV	7. Indian Philosophical Traditions and Indigenous Worldviews: Vedic, Jain, Buddhist, Tribal Ethics. 8. Spiritual Ecology and Ecological Citizenship: Ethics of Simplicity, Harmony with Nature.	8
V*	NA	
Suggested Evaluation Methods		
Internal Assessment: > Theory - Class Participation: 04 Marks - Seminar/presentation/assignment/quiz/class test etc.: 04 Marks - Mid-Term Exam: 07 Marks > Practicum - Class Participation: NIL - Seminar/Demonstration/Viva-voce/Lab records etc.: NIL - Mid-Term Exam: NIL		End-Term Examination: 35 Marks NIL

Part C-Learning Resources

Recommended Books/e-resources/LMS:

- | |
|--|
| <ol style="list-style-type: none"> 1. Des Jardins, J.R. (2012). <i>Environmental Ethics: An Introduction to Environmental Philosophy</i>, Wadsworth. 2. Palmer, C. (2003). <i>Environmental Ethics</i>, ABC-CLIO. 3. Guha, R. (2006). <i>How Much Should a Person Consume? Environmentalism in India and the United States</i>, Permanent Black. 4. Sessions, G. (Ed.) (1995). <i>Deep Ecology for the 21st Century</i>, Shambhala Publications. 5. Dwivedi, O.P. (1997). <i>India's Environmental Policies, Programmes, and Stewardship</i>, Macmillan. 6. E-resources: <ol style="list-style-type: none"> i. Stanford Encyclopedia of Philosophy – <i>Environmental Ethics</i> https://plato.stanford.edu ii. United Nations Environment Programme (UNEP) – https://www.unep.org iii. IGNC & IKS Division – for Indigenous Knowledge and Nature-Human Harmony 7. Documentary Resources: <ol style="list-style-type: none"> i. <i>The 11th Hour</i> (Narrated by Leonardo DiCaprio) ii. <i>The Story of Stuff</i> (Annie Leonard) iii. <i>Sacred Groves: India's Spiritual Forests</i> (Films Division) |
|--|

*Applicable for courses having practical components.

CC-5 / MCC-9			
Session: 2023-24			
Part A – Introduction			
Subject	Geography		
Semester	V		
Name of the Course	Statistical Methods in Geography (Theory)		
Course Code	25UN-GEO-501		
Course Type: (CC/MCC/MDC/CC- M/DSEC/VOC/DSE/PC/AEC/VAC)	CC-5 MCC-9		
Level of the course (As per Annexure-I	300-399		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO):	After completing this course, the learner will be able to: 1. understand the basics of quantitative methods 2. enrich understanding about types of data 3. skilled to data analysis and its presentation. 4. acquaint with data summarization and nuances of data. 5* develop the skill of mapping data, interpretation and analysis		
Credits	Theory	Practical	Total
	3	1	4
Contact Hours	3	2	5
Max. Marks: 100 Internal Assessment Marks: 20+10=30 End Term Exam Marks: 50+20=70		Time: 03 Hours	
Part B- Contents of the Course			
<u>Instructions for Paper- Setter</u> Question 1 is compulsory consisting of five sub parts spread over entire syllabus (two marks for each sub parts), to be answered in 15-20 words. There will be eight long questions, two from each unit. The			

candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.

Unit	Topics	Contact Hours
I	1. Data organization and its type. Tabulation of data, frequency distribution of nominal, interval and ordinal data, class interval, ratios and rates. 2. Graphical presentation of data: histogram, frequency polygon and ogives.	11
II	3. Measures of central tendency: mean, median and mode. 4. Measure of quantile, decile and percentile.	12
III	5. Absolute measures of dispersion: range, quartile deviation. 6. Mean deviation and standard deviation (grouped and ungrouped data).	11
IV	7. Relative measures of deviation: coefficient of variation, Location quotient. 8. Basics of bivariate: scatter diagram, rank correlation	11
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks Practical Record: A project file consisting of 8 exercises on the below mentioned themes: - 1. Mapping/ Graphic presentation of mean Centre. 2. Mapping/ Graphic presentation of median center. 3. Graphical presentation of mode. 4. Illustration of standard distance 5. Mapping/ Graphical representation relative distance. 6. Exercise based on coefficient of variation. (Temperature and Rainfall variability across seasons and its mapping). (2) 7. Graphical presentation of Bi-variate data.	30
Suggested Evaluation Methods		

Internal Assessment: ➤ Theory • Class Participation: 05 Marks • Seminar/presentation/assignment/quiz/class test etc.: 05 Marks • Mid-Term Exam: 10 Marks ➤ Practicum: • Class Participation: NIL • Seminar/Demonstration/Viva-voce/Lab records etc.: 10 Marks • Mid-Term Exam: NIL	End Term Examination: 50 Marks 20 Marks
Part C-Learning Resources	
Recommended Books/e-resources/LMS: 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, New Delhi, 1998. 6. Houshmand, A.R. Statistical Methods for Environmental and Agricultural Sciences, CRC Press, New York, 1998. 7. Levin, J and Fox, J.A. Elementary Statistics in Social Research, Pearson Education, New Delhi, 2006. 8. Rogerson. P. A. Statistical Methods for Geography, Sage Publication, New Delhi, 2010. 9. Sarkar, A. Quantitative Geography: Techniques and Presentations. 2013.	

MCC-10			
Session: 2023-24			
Part A – Introduction			
Subject	Geography		
Semester	V		
Name of the Course	Regional Development and Planning		
Course Code	25UN-GEO-502		
Course Type: (CC/MCC/MDC/CC- M/DSEC/VOC/DSE/PC/AEC/VAC)	MCC-10		
Level of the course (As per Annexure-I	300-399		
Pre-requisite for the course (if any)	No		
Course Learning Outcomes (CLO):	After completing this course, the learner will be able to: 1. understand the concept of region and development. 2. enrich understanding about pluralism and significance of diversity. 3. acquaint with the concept of planning and five-year plans. 4. enhanced understanding of various planning nuances. 5* develop the skill of mapping data, interpretation and analysis		
Credits	Theory	Practical	Total
	3	1	4
Contact Hours	3	2	5
Max. Marks: 100 Internal Assessment Marks: 20+10=30 End Term Exam Marks: 50+20=70		Time: 03 Hours	
Part B- Contents of the Course			
Instructions for Paper- Setter			

Question 1 is compulsory consisting of five sub parts spread over entire syllabus (two marks for each sub parts), to be answered in 15-20 words. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.

Unit	Topics	Contact Hours
I	1. Concept and meaning of region and its type. Identification of region, elements of region. 2. Development vs growth. Regional development and its dimensions. Regional disparity vs diversity.	11
II	3. Regional growth theories: Stage theory (Rostow). Harrod Domer model of development 4. Theory of cumulative causation and regional development (Myrdal).	12
III	5. Regional Planning: concept and definition. Features of regional planning. Role of regional planning in development. 6. India in Five-year plans. NITI Aayog and its characteristics.	11
IV	7. Multi- level planning in India. DPAP and backward area development plans. 8. Metropolitan planning in India, environmental issues in planning.	11
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks Practical Record: A project file consisting of 8 exercises on the below mentioned themes: 1. Method of delineating region (Fixed and variable method) (2) 2. Methods of mapping levels of regional development. (Ranking, division by mean, division by SD, standardization) (4). 3. Concentration and dispersal of tribes (1) 4. Similarity and dissimilarity index (1)	
Suggested Evaluation Methods		

Internal Assessment: ➤ Theory • Class Participation: 05 Marks • Seminar/presentation/assignment/quiz/class test etc.: 05 Marks • Mid-Term Exam: 10 Marks ➤ Practicum: • Class Participation: NIL • Seminar/Demonstration/Viva-voce/Lab records etc.: 10 Marks • Mid-Term Exam: NIL	End Term Examination: 50 Marks 20 Marks
Part C-Learning Resources	
Recommended Books/e-resources/LMS: 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. Chand, M and Puri, V.K. (1983): Regional Planning in India, Allied Publishers, New Delhi. 4. Misra, R.P. (1992): Regional Planning: Concepts, Techniques, Policies and Case Studies. Concept Publishing Company, New Delhi. 5. Misra, R.P. and Natraj, V.K. (1978): Regional Planning and National Development. Vikas Publication, New Delhi. 6. Sundaram K V (1986): Urban and Regional Planning in India, Vikas Publishing House, New Delhi. 7. Raza Moonis (1988): Regional Development Vol. 10, Contribution to Indian Geography Heritage Publishers, New Delhi. 8. Uma Kapila, Indian Economic Development since Independence, OUP, New Delhi	

DSE-2			
Session: 2023-24			
Part A – Introduction			
Subject	Geography		
Semester	V		
Name of the Course	Geography of Trade and Transport		
Course Code	25UN-GEO-DSE-503		
Course Type: (CC/MCC/MDC/CC- M/DSEC/VOC/DSE/PC/AEC/VAC)	DSE-2		
Level of the course (As per Annexure-I)	300-399		
Pre-requisite for the course (if any)	NA		
Course Learning Outcomes (CLO):	After completing this course, the learner will be able to: 1. Gain knowledge about the basic concept of trade and transport and its approaches 2. familiarization with the elements of trade and transport geography and its significance 3. Understand the meaning of trade, development and its impact on economy. 4. Familiarize the problems of trade & transport and the government policies for it. 5* attain skills in mapping trade and transport data		
Credits	Theory	Practical	Total
	03	01	04
Contact Hours	3	2	5
Max. Marks:100 Internal Assessment Marks:20+10=30 End-Term Exam Marks:50+20=70		Time: 3 hours	
Part B- Contents of the Course			

Instructions for Paper-Setter

Question 1 is compulsory comprising five sub-parts spread over the entire syllabus (two marks for each sub-part), to be answered in 15-20 words. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.

Unit	Topics	Contact Hours
I	1. Nature, scope, significance and development of transport, 2. Approaches of transportation geography	
II	3. Elements of transportation, geographical factors affecting the development of transportation 4. Distribution and economic significance of transportation in India	11
III	5. Trade – meaning and scope as tertiary activity. Eco-geographical aspects of trade. Internal, international and export trade. Balance of trade and trading regions. 6. Development of trade and its impact on economy	11
IV	7. Problems of trade and transportation, role of technology in the developments of transportation 8. Government policies in development of trade and transportation	12
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks Practical Record: A project file consisting of 8 exercises on the below mentioned themes: - 1. Import and export basket of India (Comparative bar) 2. Show the major import and export items with the help of polygraph 3. State-wise distribution of trade (Bar diagram). 4. Composition of trade - states wise (comparative bar). 5. Total, domestic, and foreign trade (Compound bar diagram). 6. Draw express ways, trade corridors of India, freight train corridors of India 7. Volume of trade (bar diagram) 8. Spatial and temporal share of trade in India (bar)	

Suggested Evaluation Methods	
Internal Assessment: ➤ Theory • Class Participation: 05 Marks • Seminar/presentation/assignment/quiz/class test etc.: 05 Marks • Mid-Term Exam: 10 Marks ➤ Practicum • Class Participation: NIL • Seminar/Demonstration/Viva-voce/Lab records etc.: 10 Marks • Mid-Term Exam: NIL	
Part C-Learning Resources	
Recommended Books/e-resources/LMS: 1. Feulks R. W. Lan Allen: Principals of Transport – 1973 2. Feulks R. W. Lan Allen: Principals of Transport 1973 3. H & Bamford C. G.: Geography of transport Robinson 4. H. M. Saxena: Transport Geography Rawat Publications. 5. Majid Hussain (1999) Human Geography, Rawat, Jaipur 6. Moonis Raza & Yash Aggarwal: Transport Geography of India 7. O'dell A. C. and Richards R. S. Railway and geography (Hutchinson University) 8. Seaby K. R. The Geography of Air Transport: Hytchinson University 9. Taaffe E. J. and Gauthies H. L. geography of transportation (Prentice Hall – 1973) 10. Thompson J. M. Modern Transportation economics (Penguin Books – 1974)	

DSE-2			
Session: 2023-24			
Part A - Introduction			
Subject	Geography		
Semester	V		
Name of the Course	Cultural Geography		
Course Code	25UN-GEO-DSE -504		
Course Type: (CC/MCC/MDC/CC- M/DSEC/VOC/DSE/PC/AEC/VAC)	DSE-2		
Level of the course (As per Annexure-I)	300-399		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO):	After completing this course, the learner will be able to: 1. familiarise the students with the nature, scope and approaches of cultural geography. 2. understand the origin and evolution of human races and cultural regions of the world. 3. understand the races of the world and origin of human settlements 4. enhance the knowledge regarding the patterns of livelihood, modernization, technological changes and culture. 5* attain skills in mapping of cultural data through different cartographic techniques		
Credits	Theory	Practical	Total
	03	01	04
Contact Hours	03	02	05
Max. Marks:100 Internal Assessment Marks:20+10=30 End Term Exam Marks: 50+20=70		Time: 3 hours	
Part B- Contents of the Course			
Question 1 is compulsory comprising five sub-parts spread over the entire syllabus (two marks for			

each sub-part). There will be eight questions, two from each unit. The candidate has to answer four more questions selecting at least one question from each unit. All questions carry equal marks.

Unit	Topics	Contact Hours
I	1. Definition, nature and scope, elements and significance of cultural geography 2. Historical development of cultural geography; approaches of cultural geography	11
II	3. Origin and evolution of man, basis of cultural diversity: race, religion and language 4. Cultural world: realm and regions of the world,	12
III	5. Human races and their classification, tribes of India (Santhal, Gond, Todda, Naga and Bhil). 6. Origin and evaluation of human settlements	11
IV	7. Pattern of livelihood: economic activities and cultural adaptation 8. Impact of technological changes on culture with special reference to agriculture, industrialization, and modernization.	11
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks Practical Record: A project file consisting of 8 exercises on the below mentioned themes: - 1. Distribution of major languages in the world (1 exercise) 2. Racial distribution of India and world (2 exercises) 3. Patterns of human settlements (1 exercise) 4. Distribution of tribal groups of India (1 exercise) 5. Major cultural heritage sites of India by UNESCO-1 exercise 6. Distribution of cultural regions of the world- 1 exercise 7. Distribution of major crops/industries in India- 1 exercise	30
Suggested Evaluation Methods		

Internal Assessment: ➤ Theory • Class Participation: 5 • Seminar/presentation/assignment/quiz/class test etc.: 5 • Mid-Term Exam: 10 ➤ Practicum • Class Participation: NIL • Seminar/Demonstration/Viva-voce/Lab records etc.: 10 • Mid-Term Exam: NIL	End Term Examination: 50 20
Part C-Learning Resources	
Recommended Books/e-resources/LMS: 1. Anderson, K. (2006): Race and Crises of Human Development, Routledge, London and New Delhi 2. Beteille, A. (1983): Equality and Inequality, Oxford University Press, New Delhi 3. Cavallaro Davi (2001) Critical and Cultural Theory: Thematic Variations, Athlone Press, London and New Brunswick, NJ. 4. Coates, B.E., Johnston, R.J. and Knox, P.L. (1977): Geography and Inequality, Oxford University Press, Oxford and London 5. Crang, M (1998). Cultural Geography, Routledge, London 6. Dubey. S.C. (1991): Indian Society, National Book Trust, New Delhi 7. Haq, M. (2000): Reflections on Human Development, Oxford University Press, New Delhi 8. Norton, W. (2006): Cultural Geography: Environments, Landscapes, Identities, Inequalities, Oxford University Press, Toronto 9. Planning Commission, Government of India (1981): Report on Development of Tribal Areas, New Delhi 10. Robertson, I and Penny, R (2003). Studying Cultural Landscapes. Oxford University Press, London. 11. Sahlins, M.D. (1968): Tribesmen, Prentice Hall, Upper Saddle River, New Jersey 12. Smith, D. (1977): Geography: A Welfare Approach, Edward Arnold, London 13. Sopher, D. (1980): An Exploration of India: Geographical Perspectives on Society and Culture, Cornell University Press, Ithaca, New York 14. Subba R.B. (1958): Personality of India: Pre- and Proto- Historic Foundation of India and Pakistan.	

DSE-3			
Session: 2023-24			
Part A - Introduction			
Subject	Geography		
Semester	V		
Name of the Course	Geography of Disaster Management		
Course Code	25UN-GEO-DSE-505		
Course Type: (CC/MCC/MDC/CCM/DSEC/VOC/DSE/P C/AEC/VAC)	DSE-3		
Level of the course (As per Annexure-I)	300-399		
Pre-requisite for the course (if any)	NA		
Course Learning Outcomes (CLOs):	After completing this course, the learner will be able: 1. to understand the fundamental issues pertaining to disaster. 2. to understand the mechanism of disaster classification. 3. to understand the causes, effects and control measures of different hazards. 4. to evaluate the functioning of various agencies for disaster risk reduction in India. 5*. to attain skills in solving practical problems associated with disaster and their management.		
Credits	Theory	Practical	Total
	3	1	4
Contact Hours	3	2	5
Max. Marks: 100 Internal Assessment Marks: 20+10 = 30 End Term Exam Marks: 50+20 = 70		Time: 03 Hours	
Part B- Contents of the Course			
Instructions for Paper- Setter			
Question 1 is compulsory comprising of five sub parts spread over entire syllabus (two marks for			

each sub part), to be answered in 15-20 words. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.

Unit	Topics	Contact Hours
I	1. Natural hazards and disasters: definition, nature and classification 2. Geography and disasters: occurrence of major disasters in world and India.	11
II	3. Tectonic hazards: causes, effects and control measures of earthquakes and tsunamis. 4. Geological hazards: causes, effects and control measures of landslides and volcanoes	11
III	5. Meteorological hazards: causes, assessment, effects and control measures of cyclones and cloud bursts. 6. Hydrological hazards: causes, assessment, effects and control measures of floods and droughts.	12
IV	7. Human induced disasters: causes, assessment, effects and control measures of oil spills and stampedes. 8. Disaster management in India: policy and organizational setup	11
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks Practical Record: A project file consisting of 8 exercises on the below mentioned themes: - 1. Mapping and demarcation of hazard prone areas in the district/state (1 exercise). 2. Analysis of extreme rainfall events in district/state (1 exercise). 3. Plotting of annual distribution of occurrence of cyclones in India (1 exercise). 4. Plotting of annual distribution of flood mortalities in Haryana since 2000 (1 exercise). 5. Plotting of decadal distribution of flood prone and flood affected area in Haryana since 1966 (1 exercise). 6. Plotting of progress of flood forecasting stations in India (1 exercise). 7. Mapping of district-wise heat wave mortalities in Haryana (1	30

	exercise). 8. Mapping of district-wise cold wave mortalities in Haryana (1 exercise).	
Suggested Evaluation Methods		
Internal Assessment: ➤ Theory • Class Participation: 05 Marks • Seminar/presentation/assignment/quiz/class test etc.: 05 Marks • Mid-Term Exam: 10 Marks ➤ Practicum • Class Participation: NIL • Seminar/Demonstration/Viva-voce/Lab records etc.: 10 Marks • Mid-Term Exam: NIL		End Term Examination: 50 Marks 20 Marks
Part C-Learning Resources		
Recommended Books/e-resources/LMS: 1. Alexander, D (1993) Natural Disasters, Springer, Berlin. 2. Carter, NW (1991) Disaster Management: A Disaster Manager's Handbook, ADB, Manila. 3. Coch, NK (1994) Geohazards: Natural and Human, Pearson, New Delhi. 4. Cuny, FC (1983) Disasters and Development, Oxford University Press. 5. Cutter, SL (2006) Hazards Vulnerability and Environmental Justice, Routledge, London. 6. Gupta, HK (2013) Disaster Management, University Press, New Delhi. 7. Hewitt, K (1977) Regions of Risk: A Geographical Introduction to Disasters, Longman, Harlow. 8. Husky, T (2012) Encyclopedia of the Hazardous Earth, Viva Books, New Delhi. 9. Kapur, A (2010) Vulnerable India: A Geographical Study of Disasters, Sage Publication, New Delhi. 10. Modh, S (2010) Managing Natural Disaster: Hydrological, Marine and Geological Disasters, Macmillan, New Delhi. 11. National Policy on Disaster Management (2009) Ministry of Home Affairs, Govt. of India, New Delhi. 12. Nlaikie, P (1994) At Risk: Natural Hazards, People's Vulnerability and Disaster, Routledge, London. 13. Pine, JC (2014) Hazards Analysis: Reducing the Impact of Disasters, CRC Press, New Delhi. 14. Singh, RB (2006) Natural Hazards and Disaster Management: Vulnerability and Mitigation, Rawat Publications, New Delhi. 15. Singh, S and Singh J (2013) Disaster Management, Pravalika Publications, Allahabad. 16. Sinha, A (2001) Disaster Management: Lessons Drawn and Strategies for Future, New United Press, New Delhi. 17. Smith, K (1996) Environmental Hazards: Assessing Risks and Reducing Disasters, Routledge, London. 18. Stoltman, JP (2004) International Perspectives on Natural Disasters, Kluwer Academic Publications. Dordrecht.		

19. Turk, J (1985) Introduction to Environmental Studies, Saunders Publications, Tokyo, Japan.
20. Varley, A. Disaster, Development and Environment, John Wiley and Sons, Chichester.

*Applicable for courses having practical component

DSE-3			
Session: 2023-24			
Part A - Introduction			
Subject	Geography		
Semester	V		
Name of the Course	Geography of Water Resources		
Course Code	25UN-GEO-DSE-506		
Course Type: (CC/MCC/MDC/CCM/DSEC/VOC/ DSE/PC/AEC/VAC)	DSE-3		
Level of the course (As per Annexure-I)	300-399		
Pre-requisite for the course (if any)	NA		
Course Learning Outcomes (CLOs):	After completing this course, the learner will be able: 1. to understand the fundamental issues pertaining to water resources. 2. to justify the importance of surface and ground water resources management. 3. to understand water conservation techniques and approaches to attain sustainable development. 4. to evaluate the contemporary issues and problems of water resources management. 5*. to attain skills in solving practical problems associated with water resources.		
Credits	Theory	Practical	Total
	3	1	4
Contact Hours	3	2	5
Max. Marks: 100 Internal Assessment Marks: 20+10 = 30 End Term Exam Marks: 50+20 = 70		Time: 03 Hours	
Part B- Contents of the Course			
Instructions for Paper- Setter			
Question 1 is compulsory comprising of five sub parts spread over entire syllabus (two			

marks for each sub part), to be answered in 15-20 words. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.

Unit	Topics	Contact Hours
I	1. Water resource: its importance and types; recent trends in water use in the world and in India; contemporary water crisis (stress)-causes and consequences; factors affecting water resources development. 2. Surface water: use, issues and management for irrigation and hydropower development. Big and small irrigation projects and their impact on water resources.	11
II	3. Ground water: assessment and development, depletion (regional pattern and consequences) and measures of conservation. conjunctive use of surface and ground water. 4. Water quality and its parameters; sources and types of water pollution; impact of water pollution on urban and human health; water quality management and pollution control.	11
III	5. Watershed management: concept and delineation; its types and functions; principles and significance of integrated watershed management. 6. Rainwater harvesting: techniques and approaches as strategies of water resource conservation; water recycling.	11
IV	7. Hydrological input and output; floods and droughts- their causes, consequences and management. National water grid (river linking). 8. Politics regarding conflicts over water resource: river water sharing disputes with examples from world (Brahmaputra, Indus, Teesta) and India (Cauvery, Krishna, Yamuna); Central Water Commission and Water Tribunals and their role.	12
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks	30
	Practical Record: A project file consisting of 8 exercises on the below mentioned themes: -	

	1. Mapping and demarcation of different size and shape of watersheds (2 exercises). 2. Analysis of extreme rainfall indices (2 exercises). 3. Derivation of water balance chart (2 exercises). 4. Mapping of major wetlands in a district and computation of shape and size (area) for classification (1 exercise). 5. Preparation of a map of a nearby wetland and to identify the changes in dimension, water level changes and encroachments it faced in the last one decade. Presentation of data in tabular form along with a map (field-based) (1 exercise).	
Suggested Evaluation Methods		
Internal Assessment: ➤ Theory • Class Participation: 05 Marks • Seminar/presentation/assignment/quiz/class test etc.: 05 Marks • Mid-Term Exam: 10 Marks ➤ Practicum • Class Participation: NIL • Seminar/Demonstration/Viva-voce/Lab records etc.: 10 Marks • Mid-Term Exam: NIL		End Term Examination: 50 Marks 20 Marks
Part C-Learning Resources		
Recommended Books/e-resources/LMS: 1. Bouwer, H (1978) Ground Water Hydrology, McGraw-Hill, New York. 2. Brutsaert, W (2005) Hydrology: An Introduction, Cambridge University Press, Cambridge. 3. Chow, VT (1988) Applied Hydrology, McGraw-Hill Education, New York. 4. Dingman, SL (2002) Physical Hydrology, Prentice Hall, Englewood Cliffs. 5. Gurjar, RK and Jat BC (2017) Geography of Water Resources, Rawat Publications, Jaipur. 6. Karanth, KR (1988) Ground Water: Exploration, Assessment and Development, Tata-McGraw Hill, New Delhi. 7. Karanth KR (1989) Hydrology, Tata McGraw Hill Publications, New Delhi. 8. Khan, RNA (2013) Indus Water Treaty: A Geo Political Study, University of Kashmir, Srinagar. http://hdl.handle.net/10603/14384. 9. Mather, JR (1984) Water Resources Distribution, Use and management, John Wiley and Sons, Maryland. 10. Meinzer, OE (1949) Hydrology, Dover Publications, Mineola, New York. 11. Newson, M (1992) Land, Water and Development River Basin Systems and their Sustainable Management, Routledge, London. 12. Raghunath, HM (2006) Hydrology: Principles, Analysis and Design, New Age International Publishers, New Delhi. 13. Reddy, PJR (2005) A Textbook of Hydrology, Firewall Media, New Delhi. 14. Tideman, EM (1996) Watershed Management: Guidelines for Indian Conditions, Omega		

Publications, New Delhi.

15. Todd, DK and Mays, LW (2005) Groundwater Hydrology, John Wiley and Sons, Chichester.
16. Vaidyanathan, A (2008) Water Resources: Contemporary Issues on Irrigation, Oxford University Press, New Delhi.

*Applicable for courses having practical component.

CC-M5 (V)			
Session: 2024-25			
Part A – Introduction			
Subject	Geography		
Semester	V		
Name of the Course	Cyber GIS		
Course Code	25UN-GEO-VOC-501		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC/SEC-1)	VOC		
Level of the course (As per Annexure-I)	300-399		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO):	1. Understand the fundamentals, architecture, and components of Cyber GIS and Web GIS. 2. Use cloud-based GIS platforms, web services, and geospatial data formats for spatial data sharing. 3. Develop interactive web maps using open-source tools and web technologies. 4. Apply Cyber GIS techniques for geospatial mapping, visualization, and spatial analysis. 5*. design simple web-based geospatial solutions by integrating spatial databases, web services, and cloud computing technologies.		
Credits	Theory	Practical	Total
	3	1	4
Contact Hours	3	2	5
Max. Marks: 100 Internal Assessment Marks: 20+10 = 30 End Term Exam Marks: 50+20 = 70		Time:3 hours	

Part B- Contents of the Course

Instructions for Paper-Setter

Question 1 is compulsory comprising of five sub parts spread over entire syllabus (two marks for each sub part), to be answered in 15-20 words. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.

Unit	Topics	Contact Hours
I	1. Introduction to Cyber GIS: Concept, evolution, components, scope, applications, cyber infrastructure, and advantages and challenges of Cyber GIS. 2. Web GIS Architecture: Client–server architecture, cloud computing, distributed GIS, Spatial Data Infrastructure (SDI), and geospatial web services.	11
II	3. Geospatial Data: Data models and formats (GeoJSON, KML, GML, Shapefile, raster and vector tiles), metadata, and spatial data sharing. 4. Web Services and Standards: OGC standards, WMS, WFS, WMTS, WCS, REST APIs, and interoperability of geospatial data.	11
III	5. Cyber GIS Platforms: ArcGIS Online, QGIS2Web, GeoServer, GeoNode, Leaflet, OpenLayers, and Mapbox GL JS. 6. Interactive Web Mapping: Map design, basemaps, symbology, legends, layer control, pop-ups, publishing, and sharing web maps.	11
IV	7. Cyber GIS Applications: Smart cities, disaster management, environmental monitoring, agriculture, transportation, and urban planning 8. Emerging Trends in Cyber GIS: AI, Machine Learning, Big Geospatial Data, IoT, Digital Twins, Real-Time GIS, and 3D Web GIS.	12
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 05 marks File record = 05 marks Viva-Voce = 05 marks Practical Record: A project file consisting of 8 exercises on the below mentioned themes: - 1. ArcGIS Online, QGIS2Web and GeoJSON/KML Conversion. (2 exercises). 2. Web Mapping using Leaflet.js with Basemaps, Pop-ups and Layer Controls. (2 exercises). 3. Map Styling, OpenStreetMap Integration and Web Map Publishing using GitHub Pages. (2 exercises). 4. Mini Cyber GIS Project using Web Mapping Tools. (2 exercises).	30

Suggested Evaluation Methods	
Internal Assessment: ➤ Theory - Class Participation: 05 Marks - Seminar/presentation/assignment/quiz/class test etc.: 05 Marks - Mid-Term Exam: 10 Marks ➤ Practicum - Class Participation: NIL - Seminar/Demonstration/Viva-voce/Lab records etc.: 10 Marks - Mid-Term Exam: NIL	End-Term Examination: 50 Marks 20 Marks
Part C-Learning Resources	
Recommended Books/e-resources/LMS: - Fu, P., & Sun, J. (2011). <i>Web GIS: Principles and Applications</i>. ESRI Press. - Wang, S. (2010). <i>CyberGIS: Blueprint for Integrated and Scalable Geospatial Software Ecosystems</i>. University of Illinois. - Peterson, M. P. (2014). <i>Mapping in the Cloud</i>. Guilford Press. - Hall, B. (2016). <i>Leaflet.js Essentials</i>. Packt Publishing. - Kraak, M. J., & Brown, A. (2001). <i>Web Cartography: Developments and Prospects</i>. CRC Press. - Sherman, G. (2018). <i>The Geospatial Desktop: Open Source GIS and Mapping</i>. Locate Press..	

*Applicable for courses having practical components.

CC-M5 (V)			
Session: 2024-25			
Part A – Introduction			
Subject	Geography		
Semester	V		
Name of the Course	Basic of GEE		
Course Code	25UN-GEO-VOC-502		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC/SEC-1)	VOC		
Level of the course (As per Annexure-I)	300-399		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO):	1. understand the fundamentals and interface of Google Earth Engine (GEE). 2. access and manage geospatial datasets available in the GEE data catalog. 3. apply JavaScript-based tools in GEE for geospatial visualization and analysis. 4. perform basic remote sensing analysis using satellite imagery in GEE 5*. develop simple cloud-based geospatial applications using Google Earth Engine..		
Credits	Theory	Practical	Total
	3	1	4
Contact Hours	3	2	5
Max. Marks: 100 Internal Assessment Marks: 20+10 = 30 End Term Exam Marks: 50+20 = 70		Time:3 hours	

Part B- Contents of the Course

Instructions for Paper-Setter

Question 1 is compulsory comprising of five sub parts spread over entire syllabus (two marks for each sub part), to be answered in 15-20 words. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.

Unit	Topics	Contact Hours
I	1. Fundamentals of GEE: Introduction, cloud computing, interface, Code Editor, Asset Manager, Data Catalog, Image and Image Collection. 2. JavaScript Basics in GEE: Variables, functions, objects, geometry, feature collections and map visualization.	11
II	3. GEE Data Catalog: Landsat, Sentinel, MODIS, DEMs and vector datasets. 4. Image Processing: Filtering, clipping, mosaicking, band combinations, visualization parameters and image composites..	11
III	5. Raster Analysis: Spectral indices (NDVI, NDWI, NDBI), reducers, zonal statistics and image classification. 6. Time-Series Analysis: Change detection, temporal analysis and chart generation.	11
IV	7. Exporting Results: Exporting images, tables and maps to Google Drive and Assets. 8. Applications: Land Use/Land Cover Mapping, vegetation monitoring, agriculture, water resources, disaster management and environmental monitoring.	12
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 05 marks File record = 05 marks Viva-Voce = 05 marks Practical Record: A project file consisting of 8 exercises on the below mentioned themes: - 1. Exploring the GEE Interface and Data Catalog. (2 exercises) 2. Image Visualization and Spectral Index Mapping (NDVI/NDWI/NDBI). (2 exercises). 3. Image Processing, Classification and Change Detection. (2 exercises). 4. Mini Project using Google Earth Engine for Geospatial Analysis. (2 exercises).	30

Suggested Evaluation Methods	
Internal Assessment: ➤ Theory - Class Participation: 05 Marks - Seminar/presentation/assignment/quiz/class test etc.: 05 Marks - Mid-Term Exam: 10 Marks ➤ Practicum - Class Participation: NIL - Seminar/Demonstration/Viva-voce/Lab records etc.: 10 Marks - Mid-Term Exam: NIL	End-Term Examination: 50 Marks 20 Marks
Part C-Learning Resources	
Recommended Books/e-resources/LMS: - Gorelick, N., et al. (2017). <i>Google Earth Engine: Planetary-Scale Geospatial Analysis for Everyone</i>. Remote Sensing of Environment. - Tamiminia, H., et al. (2020). <i>Google Earth Engine for Geo-Big Data Applications: A Meta-Analysis and Systematic Review</i>. ISPRS Journal of Photogrammetry and Remote Sensing. - Lillesand, T. M., Kiefer, R. W., & Chipman, J. W. <i>Remote Sensing and Image Interpretation</i>. Wiley. - Jensen, J. R. <i>Introductory Digital Image Processing</i>. Pearson. - Chang, K. T. <i>Introduction to Geographic Information Systems</i>. McGraw-Hill. - Longley, P. A., Goodchild, M. F., Maguire, D. J., & Rhind, D. W. <i>Geographic Information Systems and Science</i>. Wiley.	

C-6, MCC-11 / CC-M6			
Session: 2023-24			
Part A – Introduction			
Subject	Geography		
Semester	VI		
Name of the Course	Fundamentals of Remote Sensing		
Course Code	25UN-GEO-601		
Course Type: (CC/MCC/MDC/CC- M/DSEC/VOC/DSE/PC/AEC/VA C)	CC-6, MCC-11 / CC-M6		
Level of the course (As per Annexure-I	300-399		
Pre-requisite for the course (if any)	No		
Course Learning Outcomes (CLO):	After completing this course, the learner will be able to: 1. understand the concept of remote sensing 2. enrich understanding about satellite images and aerial photographs 3. acquaint with the various space programme. 4. enhanced understanding of Indian satellites and their product. 5* develop the skill of using satellite data, interpretation and analysis		
Credits	Theory	Practical	Total
	3	1	4
Contact Hours	3	2	5
Max. Marks: 100 Internal Assessment Marks: 20+10=30 End Term Exam Marks: 50+20=70		Time: 03 Hours	
Part B- Contents of the Course			

<u>Instructions for Paper- Setter</u> Question 1 is compulsory consisting of five sub parts spread over entire syllabus (two marks for each sub parts), to be answered in 15-20 words. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.		
Unit	Topics	Contact Hours
I	1. Introduction to remote sensing: historical development/ evolution and process of remote sensing.	11
II	2. Aerial photography, photogrammetry and photo interpretation: process of aerial photography, types of aerial photograph, and elements of air photo interpretation.	12
III	3. Types of remote sensing, digital image, Indian remote sensing satellites and their characteristics.	11
IV	4. Applications of aerial photographs and satellite remote sensing in geographical studies and management of natural resources.	11
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks Practical Record: A project file consisting of 8 exercises on the below mentioned themes: 1. Information recorded on aerial photographs and satellite imageries. (2) 2. Determination of Principal point and flight line. (1) 3. Determination of scale of aerial photographs. (2) 4. Use of stereoscope and making of 3D (using Zeiss card, features on air photo) (1) 5. Interpretation of aerial photographs: physical and socio-cultural features. (2)	30
Suggested Evaluation Methods		

Internal Assessment: ➤ Theory • Class Participation: 05 Marks • Seminar/presentation/assignment/quiz/class test etc.: 05 Marks • Mid-Term Exam: 10 Marks ➤ Practicum: • Class Participation: NIL • Seminar/Demonstration/Viva-voce/Lab records etc.: 10 Marks • Mid-Term Exam: NIL	End Term Examination: 50 Marks 20 Marks
Part C-Learning Resources	
Recommended Books/e-resources/LMS: 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, T M. and Keiffer 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. 7. Reddy, A. (2000) Remote Sensing and Geographical Information System (An Introduction), Hyderabad.	

MCC-12			
Session: 2023-24			
Part A – Introduction			
Subject	Geography		
Semester	VI		
Name of the Course	Urban Geography		
Course Code	25UN-GEO-602		
Course Type: (CC/MCC/MDC/CCM/DSEC/VOC/ DSE/PC/AEC/VAC)	MCC-12		
Level of the course (As per Annexure-I)	300-399		
Pre-requisite for the course (if any)	NA		
Course Learning Outcomes (CLOs):	After completing this course, the learner will be able to: 1. understand the concept, characteristics, and history of urban geography, the emergence and expansion of cities in India and around the world. 2. examine the causes and effects of urbanization on a global scale and in relation to particular contexts, noting trends, patterns, and phases of the urbanization cycle. 3. understand the generalized models of cities 4. identify and analyze urban problems and to comprehend the nitty- gritty of urban planning.		
	5. attain skills in mapping urbanization data.		
	Theory	Practical	Total
	3	1	4
Contact Hours	3	2	5
Max. Marks: 100 Internal Assessment Marks: 20+10 = 30 End Term Exam Marks: 50+20 = 70		Time: 03 Hours	

Part B- Contents of the Course		
<u>Instructions for Paper- Setter</u>		
Question 1 is compulsory comprising of seven sub parts spread over entire syllabus (one mark for each sub part), to be answered in 10-15 words. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.		
Unit	Topics	Contact Hours
I	1. Definition, nature, scope and significance of urban geography, basic concepts of urban geography. 2. Origin and growth of urban settlements in world and India, their process and geographical distribution.	11
II	3. Pattern, trend, and cycle of urbanization; its causes and consequences. 4. Classification of urban centres by size class as per census of India; functional classification of urban centres.	11
III	5. Theories of urban internal structure: concentric zone theory, sector theory and multiple nuclei model. 6. Central place theory by Christaller & Losch; bid rent theory by William Alonso.	12
IV	7. Urban problems; causes and mitigation strategies. 8. Urban Planning: concept, need and types; historical development in context to India.	11
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks Practical Record: A project file consisting of 8 exercises on the below mentioned themes: - 1. Locating the megalopolis on world map (1 exercise). 2. Hierarchical representation of size class towns as per census of India through compound bar diagram (1 exercise). 3. Representation of population of major cities of world through proportionate circle (1 exercise). 4. State-wise level of urbanization in India through choropleth method (1 exercise). 5. Diagrammatic representation of size and number of	30

	different size class urban centres by applying Zipf method (1 exercise) 6. Diagrammatic representation of urban land use model (2 exercises). 7. Representing the layout plan of any planned city of India (1 exercise).	
Suggested Evaluation Methods		
Marks	Internal Assessment: ➤ Theory • Class Participation: 05 marks • Seminar/presentation/assignment/quiz/class test etc.: 05 Marks • Mid-Term Exam: 10 Marks ➤ Practicum • Class Participation: NIL • Seminar/Demonstration/Viva-voce/Lab records etc.: 10 • Mid-Term Exam: NIL	End-Term Examination: 50 Marks 20 Marks
Part C-Learning Resources		
Recommended Books/e-resources/LMS: 1. Carter, H. (2010). The Study of Urban Geography, Arnold Publishers, London: UK. 2. Hall, T., & Barrett, H. (2018). Urban geography. 5th Edition, Routledge, London. 3. Johnston, R. J. (2013). <i>City and society: An outline for urban geography</i>. Routledge, London: UK. 4. Kaplan, D., Wheeler, J. And Holloway, S. (2009) Urban Geography, Wiley, USA. 5. Knox, P. L., and McCarthy, L. (2005) <i>Urbanization: An Introduction to Urban Geography</i>, Pearson Prentice Hall, New York: USA. 6. Mandal, R. B. (2008). <i>Urban Geography A Text-Book</i>. Concept Publishing Company, New Delhi. 7. Maurya, S.D. (2018) <i>Urban Geography</i>, Sharda Pustak Bhawan, Allahabad. 8. Pacione, M. (2009). Urban Geography: A Global Perspective. Routledge, London: UK. 9. Rao, B.P. and Sharma, N (2001) Urban Geography, Vasundhara, Gorakhpur. 10. Siddhartha, K., and Mukherjee (2019) <i>Cities, Urbanisation and Urban Systems (Settlement Geography)</i>, Kitab Mahal Publishers, New Delhi. 11. Singh, A.K. (2021) Fundamentals of Urban Geography, K.K. Publications. 12. Singh, R. Y. (2012) Geography of Settlements, Rawat Publications, Jaipur. 13. Singh, S. And Saroha, J. (2021). Urban Geography, Pearson Publication. 14. Taylor, G. (2013). Urban Geography: A Study of Site, Evolution, Patern and 15. Verma, L. N. (2006). Urban geography. Rawat Publications: Jaipur, India.		

DSE-4			
Session: 2023-24			
Part A – Introduction			
Subject	Geography		
Semester	VI		
Name of the Course	Political Geography		
Course Code	25UN-GEO-DSE-603		
Course Type: (CC/MCC/MDC/CCM/DSEC/VOC/ DSE/PC/AEC/VAC)	DSE-4		
Level of the course (As per Annexure-I)	300-399		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLOs):	After completing this course, the learner will be able to: 1. familiarization with the basic concept of political geography. 2. augmentation of knowledge about state, nation and their boundaries. 3. enhancement of knowledge about unitary, federal and landlocked state. 4. awareness about contemporary geo-political situation and problems faced in India. 5* attain skills in mapping of political data.		
Credits	Theory	Practical	Total
	3	1	4
Contact Hours	3	2	5
Max. Marks: 100 Internal Assessment Marks: 20+10 = 30 End Term Exam Marks: 50+20 = 70		Time: 03 Hours	
Part B- Contents of the Course			
Instructions for Paper- Setter			
Question 1 is compulsory comprising of five sub parts spread over entire syllabus (two marks			

for each sub part). There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.

Unit	Topics	Contact Hours
I	1. Nature, scope and concepts of political geography 2. Approaches to the study of political geography	11
II	3. The state: concept and evolution; nation, and the nation-states 4. Frontiers and boundaries; demarcation, classification and functions of boundaries	11
III	5. Landlocked state and their advantages and disadvantages; Heartland theory. 6. Systems of governmental organization: unitary and federal.	11
IV	7. India's relationships with neighbouring countries; emergence of India as regional power: aspiration and challenges. 8. Geo-political significance of Indian ocean; Kashmir problem: POK and Aksai chin	12
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks Practical Record: A project file consisting of 8 exercises and 1 assignment on the below mentioned themes: - 1. Formation of states in India since independence. 2. Formation of districts in Haryana since 1966. 3. Changing parliament constituency boundaries in Haryana since 1966. 4. Changing assembly constituency boundaries in Haryana since 1966. 5. Identification of landlocked states on world map. 6. Identification of boundaries (genetic and morphological) on global map. 7. Assignment based on field visit regarding political perception/views of people.	30
Suggested Evaluation Methods		

Internal Assessment: ➤ Theory • Class Participation: 05 Marks • Seminar/presentation/assignment/quiz/class test etc.: 05 Marks • Mid-Term Exam: 10 Marks ➤ Practicum • Class Participation: NIL • Seminar/Demonstration/Viva-voce/Lab records etc.: 10 Marks • Mid-Term Exam: NIL	End Term Examination: 50 Marks 20 Marks
Part C-Learning Resources	
Recommended Books/e-resources/LMS: 1. Adhikari, S. Political Geography. Jaipur: Rawat Publications. 1997 2. Alexander, L.M. World Political Patterns Ran Mc Nally, Chicago, 1963. 3. Cox, K. Political Geography: Territory, State and Society. Wiley-Blackwell. 2002 4. De Blij, H.J. and Glassner, Martin. Systematic Political Geography, John Wiley, New York, 1968. 5. Deshpande C.D: India-A Regional Interpretation Northern Book Centre, New Delhi, 1992. 6. Dikshit, R. D. Political Geography: A Contemporary perspective, Tata McGraw Hill, New Delhi, 1996. 7. Dikshit, R.D. Political geography: A Century of Progress, Sage, New Delhi, 1999. 8. Fisher Charles A. Essays in Political Geography, Methuen, London, 1968. 9. Glassner, M. L., De Blij, H. J., & Yacher, L. Systematic Political Geography. John Wiley. 1980. 10. John R. Short. An Introduction to Political Geography, Routledge, London, 1982. 11. John, R. S. An introduction to Political Geography. Taylor & Francis.2002 12. Moddie, A.E. Geography Behind Political Hutchinson, London, Latest edition. 13. Pounds N.J.G. Political Geography. McGraw Hill, New York, 1972. 14. Prescott. J.R.V. The Geography of Frontiers and Boundaries Aldine, Chicago. 15. Sukhwal, B.L. Modern Political Geography of India Sterling Publishers, New Delhi. 1968. 16. Taylor, P. Political Geography, Longman, London. 1985.	

*Applicable for courses having practical component.

DSE-4			
Session: 2023-24			
Part A – Introduction			
Subject	Geography		
Semester	VI		
Name of the Course	Agricultural Geography		
Course Code	25UN-GEO-DSE-604		
Course Type: (CC/MCC/MDC/CCM/DSEC/VOC/ DSE/PC/AEC/VAC)	DSE-4		
Level of the course (As per Annexure-I)	300-399		
Pre-requisite for the course (if any)	NA		
Course Learning Outcomes (CLOs):	After completing this course, the learner will be able to: 1. familiarise the students with the concept, origin, and development of agriculture; the course aims to shed light on the changing nature and scope of the agricultural geography 2. understand the crop concentration and crop diversification of agriculture 3. understand the landuse pattern and agricultural revolutions in India. 4. the course further aims to familiarise the problems, planning and policies of agriculture among the students 5* attain skills in mapping of agricultural data through different cartographic techniques.		
Credits	Theory	Practical	Total
	3	1	4
Contact Hours	3	2	5
Max. Marks: 100 Internal Assessment Marks: 20+10 = 30 End Term Exam Marks: 50+20 = 70		Time: 03 Hours	
Part B- Contents of the Course			
Instructions for Paper- Setter			
Question 1 is compulsory comprising of five sub parts spread over entire syllabus (two marks			

for each sub part), to be answered in 15-20 words. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.

Unit	Topics	Contact Hours
I	1. Definition, nature and scope of agricultural geography, approaches to agricultural geography 2. Physical, cultural and institutional factors affecting agriculture	11
II	3. Salient features of Indian agriculture, types of farming in India 4. Crop combination and crop diversification in India	11
III	5. Land use pattern with special reference to India 6. Rainbow agricultural revolution in India	12
IV	7. Problems associated with Indian agriculture 8. Agricultural planning and policies in India	11
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks Practical Record: A project file consisting of 8 exercises on the below mentioned themes: - 1. Representation of crop calendar using Ergograph (one exercise) 2. Preparation of crop-combination and crop diversification method (2 exercises) 3. Determination and mapping of cropping and irrigation intensity by bivariate method (one exercise) 4. Preparation and interpretation of different cereals through polygraph (one exercise) 5. Different methods representing the production and distribution of crops (2 exercises) 6. Prepare a proportional circle for showing landuse pattern of India (one exercise)	30
Suggested Evaluation Methods		

Internal Assessment: ➤ Theory • Class Participation: 05 Marks • Seminar/presentation/assignment/quiz/class test etc.: 05 Marks • Mid-Term Exam: 10 Marks ➤ Practicum • Class Participation: NIL • Seminar/Demonstration/Viva-voce/Lab records etc.: 10 Marks • Mid-Term Exam: NIL	End Term Examination: 50 Marks 20 Marks
Part C-Learning Resources	
Recommended Books/e-resources/LMS: 1. Basu, D.N., and Guha, G.S., 1996: Agro-Climatic Regional Planning in India, Vol.I & II, Concept Publication, New Delhi. 2. Bryant, C.R., Johnston, T.R, 1992: Agriculture in the City Countryside, Belhaven Press, London. 3. Burger, A., 1994: Agriculture of the World, Aldershot, Avebury. 4. Grigg, D.B., 1984: Introduction to Agricultural Geography, Hutchinson, London. 5. Hussain, M. 1978. Agricultural Geography, Rawat Publication. 6. Ilbery B. W., 1985: Agricultural Geography: A Social and Economic Analysis, Oxford University Press. 7. Mohammad, N., 1992: New Dimension in Agriculture Geography, Vol. I to VIII, Concept Pub., New Delhi. 8. Roling, N.G., and Wageruters, M.A.E., (ed.) 1998: Facilitating Sustainable Agriculture, Cambridge University Press, Cambridge. 9. Shafi, M., 2006: Agricultural Geography, Doring Kindersley India Pvt. Ltd., New Delhi 10. Singh, J., and Dhillon, S.S., 1984: Agricultural Geography, Tata McGraw Hill, New Delhi. 11. Tarrant J. R., 1973: Agricultural Geography, David and Charles, Devon.	

DSE-5			
Session: 2023-24			
Part A - Introduction			
Subject	Geography		
Semester	VI		
Name of the Course	Elementary Soil Geography		
Course Code	25UN-GEO-DSE-605		
Course Type: (CC/MCC/MDC/CCM/DSEC/VOC/ DSE/PC/AEC/VAC)	DSE-5		
Level of the course (As per Annexure-I)	300-399		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLOs):	After completing this course, the learner will be able to: 1. understand the basic concepts related to soil and various factors and processes of soil formation. 2. recognize various physical and chemical properties of soil. 3. identify the world pattern of soil. 4. understand the problems of soil erosion, degradation processes and its impact on environment. 5* attain skills in identifying and solving practical problems associated with soils.		
Credits	Theory	Practical	Total
	3	1	4
Contact Hours	3	2	5
Max. Marks: 100 Internal Assessment Marks: 20+10 = 30 End Term Exam Marks: 50+20 = 70		Time: 03 Hours	
Part B- Contents of the Course			
Instructions for Paper- Setter			
Question 1 is compulsory comprising of five sub parts spread over entire syllabus (two marks			

for each sub part). There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.		
Unit	Topics	Contact Hours
I	1. Nature and scope of soil geography and its relationship with pedology and edaphology. 2. Soil factors-parent material, organic matter, climate, topography, and spatio-temporal dimensions.	11
II	3. Physical properties of soils: texture, structure, 4. Chemical properties of soil: humus and soil organism	12
III	5. Soil profile and its development. 6. Soils: classification and distribution at world level.	11
IV	7. Soil erosion and degradation, salinity, alkalinity, waterlogging, soil fertility and major soil problems of Haryana. 8. Environmental problems of soil, soil conservation measures, and management of salt-affected and degraded soils in Haryana.	11
V*	Instructions for external practical examiner: There will be three questions in all, and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks	30
	Practical Record: A project file consisting of 8 exercises on the below mentioned themes: - 1. Taking soil profile in the field (1 exercise) 2. Identification of soil parent material (1 exercise) 3. Determining soil texture through feel method (2 exercises) 4. Making of soil textural diagram (2 exercises) 5. Determination of soil structure (2 exercise)	
Suggested Evaluation Methods		

Internal Assessment: ➤ Theory • Class Participation: 05 Marks • Seminar/presentation/assignment/quiz/class test etc.: 05 Marks • Mid-Term Exam: 10 Marks ➤ Practicum • Class Participation: NIL • Seminar/Demonstration/Viva-voce/Lab records etc.: 10 Marks • Mid-Term Exam: NIL	End Term Examination: 50 Marks 20 Marks
Part C-Learning Resources	
Recommended Books/e-resources/LMS: 1. Birkeland, P. W (1999). Soils and Geomorphology. New York: Oxford University Press. 2. Brady, N. C., & Weil, R. R. (2008). The Nature and Properties of Soils. New Jersey: Prentice Hall. 3. Bridges, E. M., & Davidson, D. A. (1982). Principles and Applications of Soil Geography. London: Longman Group. 4. Daji, J. A. (1970). A Textbook of Soil Science. New York: Asia Publication House. 5. Miller, R. W., & Donahue, R. L. (1992). Soils: An Introduction to Soils and Plant Growth, New Delhi: Prentice- Hall of India. 6. Pitty, A. F. (1978). Geography and Soil Properties, London: Methuen and Co. 7. Dury, G. H. (1972). Map Interpretation. London: Pitman and Sons. 8. Gupta, K. K., & Tyagi, V. C. (1992). Working with Maps. Survey of India Publication. 9. Kimerling, A.J., Buckley, A.R., Muehrcke, P.C., Muehrcke, J.O. (2011). Map Use: Reading, Analysis, Interpretation. 7th ed, Esri Press. 10. Ramamurthy, K. (1982). Map Interpretation. Madras: Rex Printer. 11. Singh, G. (1996). Map Work and Practical Geography. New Delhi: Vikas Publication. 12. Tamaskar, B. G., & Deshmukh, V. M. (1974). Geographical Interpretation of Indian Topographical maps. Kolkata: Orient Longman. 13. Scovel, M. J. S., Brien, E. J. O', McCormack, J. C., & Chapman, R. B. (1965). Atlas of Landforms. John Wily and Sons / U.S. Military Academy. 14. Vaidyanadhan, R., & Subbarao, K. V. (2014). Landforms of India from Topomaps and Images. Geological Society of India. 15. Vaidyanadhan, R. & Subbarao, K. V. (2006). Recognition of Landforms from Topographical Maps of India. 16. Vaidyanadhan, R. (1968). Index to a Set of Sixty Topographic Maps: Illustrating Specified Physiographic Features from India. Council of Scientific and Industrial Research, Ministry of Education, Government of India.	

DSE-5			
Session: 2023-24			
Part A - Introduction			
Subject	Geography		
Semester	VI		
Name of the Course	Introduction to Population Geography		
Course Code	25UN-GEO-DSE-606		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC)	DSE-5		
Level of the course (As per Annexure-I	300-399		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO):	After completing this course, the learner will be able to: 1. gain knowledge about the basic concepts of population geography. 2. enhance the knowledge how space is occupied by population. 3. understand the composition of population. 4. familiarize with world pattern of literacy and work participation. 5* gain knowledge of mapping demographic and socio – economic data.		
Credits	Theory	Practical	Total
	3	1	4
Contact Hours	3	2	5
Max. Marks: 100 Internal Assessment Marks:20+10=30 End Term Exam Marks: 50+20=70		Time: 03 Hours	
Part B- Contents of the Course			

Instructions for Paper- Setter

Question 1 is compulsory consisting of five sub parts spread over entire syllabus (two marks for each sub parts), to be answered in 15-20 words. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.

Unit	Topics	Contact Hours
I	1. Definition, nature, scope and significance of population geography; basic concepts of population geography 2. Approaches to study population geography, and its relation with other subjects.	11
II	3. Sources of population data: census, civil registration system, and sample survey. 4. Distribution, density and growth of population: determinants and world pattern.	11
III	5. Age and sex composition of population: pattern, determinants and impacts. 6. Migration: concepts, types, factors and trends.	11
IV	7. Occupational structure of population: pattern and determinants; work participation rate (WPR) gender gaps in WPR, dependency ratio. 8. Literacy: difference between literacy and education, world pattern and determinants of literacy rate and gender gaps in literacy.	12
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks Practical Record: A project file consisting of 8 exercises on the below mentioned themes: - 1. Methods of representing population distribution and density (2 exercises). 2. Spatial and temporal growth of world population (2 exercises). 3. Composition of population (1 exercises). 4. Method of representing occupational structure, types of workers and work participation rates (2 exercises). 5. Methods of representing gender gap in literacy rate (1 exercise)	30

[illegible]

SEC-4			
Session: 2024-25			
Part A - Introduction			
Subject	Geography		
Semester	VI		
Name of the Course	GNSS and Positioning Technologies		
Course Code	25UN-GEO-SEC-601		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VA C)	SEC		
Level of the course (As per Annexure-I)	300-399		
Pre-requisite for the course (if any)	NA		
Course Learning Outcomes (CLO):	After completing this course, the learner will be able to: 1. understand the principles, components, and functioning of Global Navigation Satellite Systems (GNSS) and satellite-based positioning technologies. 2. identify different GNSS constellations, coordinate systems, satellite signals, errors, and correction techniques used in positioning and navigation. 3. analyze the applications of GNSS in surveying, mapping, transportation, disaster management, agriculture, and geospatial sciences. 4. apply GNSS instruments, field survey techniques, and positioning methods for geospatial data acquisition and spatial analysis.. 5*. NA		
Credits	Theory	Practical	Total
	02	00	02
Contact Hours	02	-	02
Max. Marks:50 Internal Assessment Marks:15 End-Term Exam Marks: 35		Time:3 hours	

Part B- Contents of the Course		
<u>Instructions for Paper-Setter</u>		
Question 1 is compulsory comprising seven sub-parts spread over the entire syllabus (one mark for each sub-part), to be answered in brief. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.		
Unit	Topics	Contact Hours
I	1. Introduction to GNSS: Concepts, principles, evolution, and components of satellite positioning systems. 2. GNSS Constellations: GPS, GLONASS, Galileo, BeiDou, NavIC, and their operational characteristics.	7
II	3. Coordinate Systems and Positioning: Geodetic datums, reference systems, and positioning principles. 4. GNSS Signals and Errors: Signal structure, atmospheric effects, multipath, clock, and orbital errors.	8
III	5. Positioning Techniques: Absolute positioning, DGPS, RTK, and Precise Point Positioning (PPP). 6. GNSS Surveying and Data Collection: Field survey methods, navigation, waypoint collection, and geotagging.	7
IV	7. Applications of GNSS: Surveying, mapping, transportation, disaster management, agriculture, and smart cities. 8. Emerging Trends: Integration with GIS, Remote Sensing, UAVs, IoT, and location-based services.	8
V*	NA	
Suggested Evaluation Methods		
Internal Assessment: ➤ Theory - Class Participation: 04 Marks - Seminar/presentation/assignment/quiz/class test etc.: 04 Marks - Mid-Term Exam: 07 Marks ➤ Practicum - Class Participation: NIL - Seminar/Demonstration/Viva-voce/Lab records etc.: NIL - Mid-Term Exam: NIL		End-Term Examination: 35 Marks NIL
Part C-Learning Resources		

Recommended Books/e-resources/LMS:

1. Hofmann-Wellenhof, B., Lichtenegger, H., & Wasle, E. (2008). *GNSS – Global Navigation Satellite Systems: GPS, GLONASS, Galileo and More*. Springer.
2. Kaplan, E. D., & Hegarty, C. J. (2017). *Understanding GPS/GNSS: Principles and Applications* (3rd ed.). Artech House.
3. Misra, P., & Enge, P. (2011). *Global Positioning System: Signals, Measurements and Performance* (2nd ed.). Ganga-Jamuna Press.
4. Leick, A., Rapoport, L., & Tatarnikov, D. (2015). *GPS Satellite Surveying* (4th ed.). Wiley.
5. Parkinson, B. W., Spilker, J. J., Axelrad, P., & Enge, P. (1996). *Global Positioning System: Theory and Applications*. American Institute of Aeronautics and Astronautics.
6. NavIC Programme Documentation – <https://www.isro.gov.in>
7. United States GPS Programme – <https://www.gps.gov>
8. European Galileo Programme – <https://www.gsc-europa.eu>
9. International GNSS Service (IGS) – <https://igs.org>
10. UNAVCO GNSS Educational Resources – <https://www.unavco.org>
11. ESRI GNSS and Field Data Collection Resources – <https://www.esri.com>

*Applicable for courses having practical components.

SEC-4			
Session: 2024-25			
Part A - Introduction			
Subject	Geography		
Semester	VI		
Name of the Course	Drone Technology and Applications		
Course Code	25UN-GEO-SEC-602		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VA C)	SEC		
Level of the course (As per Annexure-I)	300-399		
Pre-requisite for the course (if any)	NA		
Course Learning Outcomes (CLO):	After completing this course, the learner will be able to: 1. Understand the principles, components, and operational characteristics of drone and UAV technologies. 2. Identify different types of drones, sensors, platforms, and flight planning techniques used in geospatial applications. 3. Analyze the applications of drone technology in mapping, surveying, agriculture, disaster management, and environmental monitoring. 4. Apply drone-based data acquisition, image processing, and geospatial analysis techniques for spatial problem solving.		
Credits	Theory	Practical	Total
	02	00	02
Contact Hours	02	-	02
Max. Marks:50 Internal Assessment Marks:15 End-Term Exam Marks: 35		Time:3 hours	

Part B- Contents of the Course

<u>Instructions for Paper-Setter</u>		
Question 1 is compulsory comprising seven sub-parts spread over the entire syllabus (one mark for each sub-part), to be answered in brief. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.		
Unit	Topics	Contact Hours
I	1. Introduction to Drone Technology: Concepts, evolution, principles, components, and classification of UAVs and drones. 2. Drone Platforms and Sensors: Fixed-wing, rotary-wing, hybrid UAVs, and onboard sensors including RGB, multispectral, thermal, and LiDAR sensors.	7
II	3. Flight Planning and Regulations: Mission planning, flight parameters, safety protocols, and drone regulations and policies. 4. Drone Data Acquisition: Aerial photography, image acquisition, geotagging, and ground control points (GCPs).	8
III	5. Drone Data Processing: Orthomosaic generation, DEMs, DSMs, point clouds, and 3D surface models. 6. Drone Mapping and Surveying: Applications in topographic mapping, cadastral surveys, infrastructure mapping, and terrain analysis.	7
IV	7. Applications of Drone Technology: Precision agriculture, disaster management, environmental monitoring, forestry, urban planning, and resource management. 8. Emerging Trends: AI-enabled drones, autonomous UAVs, drone swarms, digital twins, and smart city applications.	8
V*	NA	
Suggested Evaluation Methods		
Internal Assessment: > Theory - Class Participation: 04 Marks - Seminar/presentation/assignment/quiz/class test etc.: 04 Marks - Mid-Term Exam: 07 Marks > Practicum - Class Participation: NIL - Seminar/Demonstration/Viva-voce/Lab records etc.: NIL - Mid-Term Exam: NIL		End-Term Examination: 35 Marks NIL
Part C-Learning Resources		

Recommended Books/e-resources/LMS:

1. Jensen, J. R. (2016). *Introductory Digital Image Processing: A Remote Sensing Perspective* (4th ed.). Pearson.
2. Colomina, I., & Molina, P. (2014). Unmanned aerial systems for photogrammetry and remote sensing: A review. *ISPRS Journal of Photogrammetry and Remote Sensing*, 92, 79–97.
3. Eisenbeiss, H. (2009). *UAV Photogrammetry*. ETH Zurich.
4. Aber, J. S., Marzolf, I., & Ries, J. (2019). *Small-format aerial photography and UAV applications*. Elsevier.
5. Lillesand, T. M., Kiefer, R. W., & Chipman, J. W. (2015). *Remote Sensing and Image Interpretation* (7th ed.). Wiley.
6. Nex, F., & Remondino, F. (2014). UAV for 3D mapping applications: A review. *Applied Geomatics*, 6(1), 1–15.
7. [Directorate General of Civil Aviation \(DGCA\) Drone Rules and Guidelines](#)
8. [Digital Sky Platform, Government of India](#)
9. [ISRO Bhuvan Geoportal](#)
10. [Pix4D Learning Resources](#)
11. [DroneDeploy Academy and Tutorials](#)
12. [OpenDroneMap Documentation](#)

*Applicable for courses having practical components.

SEC-4			
Session: 2024-25			
Part A - Introduction			
Subject	Geography		
Semester	VI		
Name of the Course	Advanced GIS and Spatial Analysis		
Course Code	25UN-GEO-SEC-603		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VA C)	SEC		
Level of the course (As per Annexure-I)	300-399		
Pre-requisite for the course (if any)	NA		
Course Learning Outcomes (CLO):	After completing this course, the learner will be able to: 1. Understand advanced concepts, data models, and analytical capabilities of Geographic Information Systems. 2. Identify suitable GIS techniques and spatial analytical methods for solving geographical problems. 3. Analyze spatial patterns, relationships, and processes using advanced GIS tools and techniques. 4. Apply GIS-based modelling and spatial analysis for decision-making and planning applications. 5*. NA		
Credits	Theory	Practical	Total
	02	00	02
Contact Hours	02	-	02
Max. Marks:50 Internal Assessment Marks:15 End-Term Exam Marks: 35		Time:3 hours	

Part B- Contents of the Course		
<u>Instructions for Paper-Setter</u>		
Question 1 is compulsory comprising seven sub-parts spread over the entire syllabus (one mark for each sub-part), to be answered in brief. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.		
Unit	Topics	Contact Hours
I	1. Advanced GIS Concepts: GIS architecture, spatial data models, geodatabases, and data management. 2. Spatial Data Processing: Data integration, editing, transformation, topology, and quality assessment.	7
II	3. Spatial Analysis Techniques: Buffering, overlay analysis, proximity analysis, and spatial queries. 4. Terrain and Surface Analysis: DEM analysis, slope, aspect, watershed, and visibility analysis.	8
III	5. Spatial Statistics and Modelling: Interpolation, hotspot analysis, clustering, and suitability modelling. 6. Network and Location Analysis: Route optimization, service area analysis, and location-allocation models.	7
IV	7. Applications of Advanced GIS: Urban planning, disaster management, environmental monitoring, agriculture, and resource management. 8. Emerging Trends: Web GIS, cloud GIS, GeoAI, digital twins, and real-time geospatial analytics..	8
V*	NA	
Suggested Evaluation Methods		
Internal Assessment: ➤ Theory - Class Participation: 04 Marks - Seminar/presentation/assignment/quiz/class test etc.: 04 Marks - Mid-Term Exam: 07 Marks ➤ Practicum - Class Participation: NIL - Seminar/Demonstration/Viva-voce/Lab records etc.: NIL - Mid-Term Exam: NIL		End-Term Examination: 35 Marks NIL

Part C-Learning Resources

Recommended Books/e-resources/LMS:

- | |
|---|
| <ol style="list-style-type: none"> 1. Longley, P. A., Goodchild, M. F., Maguire, D. J., & Rhind, D. W. (2015). <i>Geographical Information Systems and Science</i> (4th ed.). Wiley. 2. O'Sullivan, D., & Unwin, D. J. (2014). <i>Geographic Information Analysis</i> (2nd ed.). Wiley. 3. Chang, K. T. (2021). <i>Introduction to Geographic Information Systems</i> (10th ed.). McGraw-Hill Education. 4. Burrough, P. A., & McDonnell, R. A. (1998). <i>Principles of Geographical Information Systems</i>. Oxford University Press. 5. De Smith, M. J., Goodchild, M. F., & Longley, P. A. (2024). <i>Geospatial Analysis</i> (7th ed.). The Winchelsea Press. 6. Mitchell, A. (2005). <i>The ESRI Guide to GIS Analysis</i> (Vol. I & II). ESRI Press. 7. Heywood, I., Cornelius, S., & Carver, S. (2011). <i>An Introduction to Geographical Information Systems</i> (4th ed.). Pearson Education. 8. Bolstad, P. (2019). <i>GIS Fundamentals</i> (6th ed.). XanEdu Publishing. |
|---|

*Applicable for courses having practical components.

SEC-4			
Session: 2024-25			
Part A - Introduction			
Subject	Geography		
Semester	VI		
Name of the Course	Web GIS and Mapping Applications		
Course Code	25UN-GEO-SEC-604		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VA C)	SEC		
Level of the course (As per Annexure-I)	300-399		
Pre-requisite for the course (if any)	NA		
Course Learning Outcomes (CLO):	After completing this course, the learner will be able to: 1. Understand the concepts, architecture, and components of Web GIS and online mapping systems. 2. Identify web mapping standards, geospatial web services, and online geospatial platforms. 3. Analyze spatial information using web-based GIS tools and interactive mapping applications. 4. Apply Web GIS technologies for publishing, sharing, and visualizing geospatial information. 5*. NA		
Credits	Theory	Practical	Total
	02	00	02
Contact Hours	02	-	02
Max. Marks:50 Internal Assessment Marks:15 End-Term Exam Marks: 35		Time:3 hours	

Part B- Contents of the Course		
<u>Instructions for Paper-Setter</u>		
Question 1 is compulsory comprising seven sub-parts spread over the entire syllabus (one mark for each sub-part), to be answered in brief. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.		
Unit	Topics	Contact Hours
I	1. Introduction to Web GIS: Concepts, evolution, architecture, and components of Web GIS systems. 2. Web Mapping Standards and Services: OGC standards, WMS, WFS, WMTS, APIs, and geospatial web services.	7
II	3. Web Mapping Platforms: ArcGIS Online, QGIS2Web, GeoServer, and cloud-based GIS platforms. 4. Web Spatial Data and Visualization: Web maps, dashboards, story maps, and geospatial visualization techniques.	8
III	5. Interactive Mapping Applications: Data sharing, online editing, crowdsourcing, and collaborative mapping. 6. Web GIS Development Tools: Introduction to Leaflet, OpenLayers, and web mapping frameworks.	7
IV	7. Applications of Web GIS: Urban planning, disaster management, environmental monitoring, tourism, and smart cities. 8. Emerging Trends: Cloud GIS, mobile GIS, real-time mapping, GeoAI, and Digital Twins.	8
V*	NA	
Suggested Evaluation Methods		
Internal Assessment: ➤ Theory - Class Participation: 04 Marks - Seminar/presentation/assignment/quiz/class test etc.: 04 Marks - Mid-Term Exam: 07 Marks ➤ Practicum - Class Participation: NIL - Seminar/Demonstration/Viva-voce/Lab records etc.: NIL - Mid-Term Exam: NIL		End-Term Examination: 35 Marks NIL

Part C-Learning Resources

Recommended Books/e-resources/LMS:

1. Fu, P., & Sun, J. (2011). *Web GIS: Principles and Applications*. ESRI Press.
2. Peterson, M. P. (2014). *Mapping in the Cloud*. Guilford Press.
3. Longley, P. A., Goodchild, M. F., Maguire, D. J., & Rhind, D. W. (2015). *Geographical Information Systems and Science* (4th ed.). Wiley.
4. Chang, K. T. (2021). *Introduction to Geographic Information Systems* (10th ed.). McGraw-Hill Education.
5. O'Sullivan, D., & Unwin, D. J. (2014). *Geographic Information Analysis* (2nd ed.). Wiley.
6. [Open Geospatial Consortium \(OGC\) Standards](#)
7. [ArcGIS Online Resources](#)
8. [QGIS Documentation and Tutorials](#)
9. [Leaflet Documentation](#)
10. [OpenLayers Documentation](#)

*Applicable for courses having practical components.

CC-M5 (V)			
Session: 2024-25			
Part A – Introduction			
Subject	Geography		
Semester	VI		
Name of the Course	Cyber GIS		
Course Code	25UN-GEO-VOC-601		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC/SEC-1)	VOC		
Level of the course (As per Annexure-I)	300-399		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO):	1. Understand the fundamentals, architecture, and components of Cyber GIS and Web GIS. 2. Use cloud-based GIS platforms, web services, and geospatial data formats for spatial data sharing. 3. Develop interactive web maps using open-source tools and web technologies. 4. Apply Cyber GIS techniques for geospatial mapping, visualization, and spatial analysis. 5*. design simple web-based geospatial solutions by integrating spatial databases, web services, and cloud computing technologies.		
Credits	Theory	Practical	Total
	3	1	4
Contact Hours	3	2	5
Max. Marks: 100 Internal Assessment Marks: 20+10 = 30 End Term Exam Marks: 50+20 = 70		Time:3 hours	
Part B- Contents of the Course			

Instructions for Paper-Setter

Question 1 is compulsory comprising of five sub parts spread over entire syllabus (two marks for each sub part), to be answered in 15-20 words. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.

Unit	Topics	Contact Hours
I	1. Introduction to Cyber GIS: Concept, evolution, components, scope, applications, cyber infrastructure, and advantages and challenges of Cyber GIS. 2. Web GIS Architecture: Client–server architecture, cloud computing, distributed GIS, Spatial Data Infrastructure (SDI), and geospatial web services.	11
II	3. Geospatial Data: Data models and formats (GeoJSON, KML, GML, Shapefile, raster and vector tiles), metadata, and spatial data sharing. 4. Web Services and Standards: OGC standards, WMS, WFS, WMTS, WCS, REST APIs, and interoperability of geospatial data.	11
III	5. Cyber GIS Platforms: ArcGIS Online, QGIS2Web, GeoServer, GeoNode, Leaflet, OpenLayers, and Mapbox GL JS. 6. Interactive Web Mapping: Map design, basemaps, symbology, legends, layer control, pop-ups, publishing, and sharing web maps.	11
IV	7. Cyber GIS Applications: Smart cities, disaster management, environmental monitoring, agriculture, transportation, and urban planning 8. Introduction Emerging Trends in Cyber GIS: AI, Machine Learning, Big Geospatial Data, IoT, Digital Twins, Real-Time GIS, and 3D Web GIS.	12
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 05 marks File record = 05 marks Viva-Voce = 05 marks Practical Record: A project file consisting of 8 exercises on the below mentioned themes: - 1. ArcGIS Online, QGIS2Web and GeoJSON/KML Conversion. (2 exercises). 2. Web Mapping using Leaflet.js with Basemaps, Pop-ups and Layer Controls. (2 exercises). 3. Map Styling, OpenStreetMap Integration and Web Map Publishing using GitHub Pages. (2 exercises). 4. Mini Cyber GIS Project using Web Mapping Tools. (2 exercises).	30

Suggested Evaluation Methods

Internal Assessment: ➤ Theory • Class Participation: 05 Marks • Seminar/presentation/assignment/quiz/class test etc.: 05 Marks • Mid-Term Exam: 10 Marks ➤ Practicum • Class Participation: NIL • Seminar/Demonstration/Viva-voce/Lab records etc.: 10 Marks • Mid-Term Exam: NIL	End-Term Examination: 50 Marks 20 Marks
Part C-Learning Resources	
Recommended Books/e-resources/LMS: 1. Fu, P., & Sun, J. (2011). <i>Web GIS: Principles and Applications</i>. ESRI Press. 2. Wang, S. (2010). <i>CyberGIS: Blueprint for Integrated and Scalable Geospatial Software Ecosystems</i>. University of Illinois. 3. Peterson, M. P. (2014). <i>Mapping in the Cloud</i>. Guilford Press. 4. Hall, B. (2016). <i>Leaflet.js Essentials</i>. Packt Publishing. 5. Kraak, M. J., & Brown, A. (2001). <i>Web Cartography: Developments and Prospects</i>. CRC Press. 6. Sherman, G. (2018). <i>The Geospatial Desktop: Open Source GIS and Mapping</i>. Locate Press..	

*Applicable for courses having practical components.

CC-M5 (V)			
Session: 2024-25			
Part A – Introduction			
Subject	Geography		
Semester	VI		
Name of the Course	Basic of GEE		
Course Code	25UN-GEO-VOC-602		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC/SEC-1)	VOC		
Level of the course (As per Annexure-I)	300-399		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO):	1. understand the fundamentals and interface of Google Earth Engine (GEE). 2. access and manage geospatial datasets available in the GEE data catalog. 3. apply JavaScript-based tools in GEE for geospatial visualization and analysis. 4. perform basic remote sensing analysis using satellite imagery in GEE 5*. develop simple cloud-based geospatial applications using Google Earth Engine..		
Credits	Theory	Practical	Total
	3	1	4
Contact Hours	3	2	5
Max. Marks: 100 Internal Assessment Marks: 20+10 = 30 End Term Exam Marks: 50+20 = 70		Time:3 hours	

Part B- Contents of the Course

Instructions for Paper-Setter

Question 1 is compulsory comprising of five sub parts spread over entire syllabus (two marks for each sub part), to be answered in 15-20 words. There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.

Unit	Topics	Contact Hours
I	1. Fundamentals of GEE: Introduction, cloud computing, interface, Code Editor, Asset Manager, Data Catalog, Image and Image Collection. 2. JavaScript Basics in GEE: Variables, functions, objects, geometry, feature collections and map visualization.	11
II	3. GEE Data Catalog: Landsat, Sentinel, MODIS, DEMs and vector datasets. 4. Image Processing: Filtering, clipping, mosaicking, band combinations, visualization parameters and image composites..	11
III	5. Raster Analysis: Spectral indices (NDVI, NDWI, NDBI), reducers, zonal statistics and image classification. 6. Time-Series Analysis: Change detection, temporal analysis and chart generation.	11
IV	7. Exporting Results: Exporting images, tables and maps to Google Drive and Assets. 8. Applications: Land Use/Land Cover Mapping, vegetation monitoring, agriculture, water resources, disaster management and environmental monitoring.	12
V*	Instructions for external practical examiner: There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation Exercise = 05 marks File record = 05 marks Viva-Voce = 05 marks Practical Record: A project file consisting of 8 exercises on the below mentioned themes: - 1. Exploring the GEE Interface and Data Catalog. (2 exercises) 2. Image Visualization and Spectral Index Mapping (NDVI/NDWI/NDBI). (2 exercises). 3. Image Processing, Classification and Change Detection. (2 exercises). 4. Mini Project using Google Earth Engine for Geospatial Analysis. (2 exercises).	30

Suggested Evaluation Methods

Internal Assessment: ➤ Theory • Class Participation: 05 Marks • Seminar/presentation/assignment/quiz/class test etc.: 05 Marks • Mid-Term Exam: 10 Marks ➤ Practicum • Class Participation: NIL • Seminar/Demonstration/Viva-voce/Lab records etc.: 10 Marks • Mid-Term Exam: NIL	End-Term Examination: 50 Marks 20 Marks
Part C-Learning Resources	
Recommended Books/e-resources/LMS: 1. Gorelick, N., et al. (2017). <i>Google Earth Engine: Planetary-Scale Geospatial Analysis for Everyone</i>. Remote Sensing of Environment. 2. Tamiminia, H., et al. (2020). <i>Google Earth Engine for Geo-Big Data Applications: A Meta-Analysis and Systematic Review</i>. ISPRS Journal of Photogrammetry and Remote Sensing. 3. Lillesand, T. M., Kiefer, R. W., & Chipman, J. W. <i>Remote Sensing and Image Interpretation</i>. Wiley. 4. Jensen, J. R. <i>Introductory Digital Image Processing</i>. Pearson. 5. Chang, K. T. <i>Introduction to Geographic Information Systems</i>. McGraw-Hill. 6. Longley, P. A., Goodchild, M. F., Maguire, D. J., & Rhind, D. W. <i>Geographic Information Systems and Science</i>. Wiley.	

CC-M6 (V)			
Session: 2023-24			
Part A - Introduction			
Subject	Geography		
Semester	VI		
Name of the Course	3D Mapping		
Course Code	25-UN-GEO-VOC-603		
Course Type: (CC/MCC/MDC/CCM/DSEC/VOC /DSE/PC/AEC/VAC)	CC-M6 (V)		
Level of the course (As per Annexure-I)	300-399		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLOs):	After successful completion of this course students will be able to: 1. understand the fundamentals and concepts of 3D mapping and geospatial visualization. 2. use DEMs, DSMs, and point cloud data for terrain and surface modelling. 3. develop 3D maps and terrain models using geospatial software. 4. apply 3D mapping techniques for urban planning, infrastructure, and environmental studies.. 5* generate basic 3D geospatial products from remotely sensed and drone datasets.		
Credits	Theory	Practical	Total
	3	1	4
Contact Hours	3	2	5
Max. Marks: 100 Internal Assessment Marks: 20+10 = 30 End Term Exam Marks: 50+20 = 70		Time: 03 Hours	
Part B- Contents of the Course			
Instructions for Paper- Setter			

Question 1 is compulsory comprising of five sub parts spread over entire syllabus (two marks for each sub part). There will be eight long questions, two from each unit. The candidate has to

answer four long questions, at least one question from each unit. All questions carry equal marks.

Unit	Topics	Contact Hours
I	1. Introduction to 3D Mapping: Concepts, principles, coordinate systems, applications, and advantages of 3D geospatial visualization. 2. Elevation Models: DEM, DSM, DTM, TIN, contour models, and sources of elevation data.	11
II	3. 3D Data Sources: Satellite imagery, UAV/drone data, LiDAR, photogrammetry, GPS/GNSS, and point clouds. 4. Data Processing: DEM generation, terrain modelling, interpolation, hillshade, slope, aspect, and contour extraction.	11
III	5. 3D Mapping Software: QGIS 3D, ArcGIS Pro, Cesium, Google Earth Pro, Blender GIS. 6. 3D Visualization: Terrain rendering, extrusion, 3D buildings, fly-throughs, profiles, visibility analysis, and map animation.	11
IV	7. 3D Geospatial Products: Terrain models, city models, infrastructure mapping, and landscape visualization. 8. Applications: Urban planning, disaster management, transportation, mining, archaeology, watershed management, and environmental monitoring.	12
V*	Instructions for external practical examiner: There will be three questions in all, and candidate must attempt two exercises. Distribution of marks for evaluation Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks Practical Record: A project file consisting of 8 exercises on the below mentioned themes: - Representation of various maps and diagrams: 1. Preparation of DEM, DSM and Terrain Models. (2) 2. Generation of Hillshade, Slope, Aspect and Contour Maps. (2) 3. 3D Visualization using QGIS 3D/ArcGIS Pro and Google Earth Pro. (2) 4. Mini Project on 3D Mapping using Satellite or Drone Data. (2)	30

Suggested Evaluation Methods

Internal Assessment: ➤ Theory • Class Participation: 05 Marks • Seminar/presentation/assignment/quiz/class test etc.: 05 Marks • Mid-Term Exam: 10 Marks ➤ Practicum • Class Participation: NIL • Seminar/Demonstration/Viva-voce/Lab records etc.: 10 Marks • Mid-Term Exam: NIL	End Term Examination: 50 Marks 20 Marks
Part C-Learning Resources	
Recommended Books/e-resources/LMS: 1. Burrough, P. A., McDonnell, R. A., & Lloyd, C. D. (2015). <i>Principles of Geographical Information Systems</i> . Oxford University Press. 2. Lillesand, T. M., Kiefer, R. W., & Chipman, J. W. (2015). <i>Remote Sensing and Image Interpretation</i> . Wiley. 3. Jensen, J. R. (2016). <i>Introductory Digital Image Processing</i> . Pearson. 4. Maune, D. F. (Ed.). (2007). <i>Digital Elevation Model Technologies and Applications: The DEM Users Manual</i> . ASPRS. 5. Schenk, T. (2005). <i>Introduction to Photogrammetry</i> . Ohio State University. 6. Longley, P. A., Goodchild, M. F., Maguire, D. J., & Rhind, D. W. (2015). <i>Geographic Information Systems and Science</i> . Wiley.	

*Applicable for courses having practical components.

CC-M6 (V)			
Session: 2023-24			
Part A - Introduction			
Subject	Geography		
Semester	VI		
Name of the Course	Drone Technology		
Course Code	25UN-GEO-VOC-604		
Course Type: (CC/MCC/MDC/CCM/DSEC/VOC /DSE/PC/AEC/VAC)	CC-M6 (V)		
Level of the course (As per Annexure-I)	300-399		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLOs):	After successful completion of this course students will be able to: 1. understand the fundamentals, components, and types of drone technology. 2. operate drones for geospatial data acquisition following standard flight procedures. 3. apply drone-based techniques for aerial surveying, mapping, and image acquisition. 4. process drone imagery for generating orthomosaics, DEMs, and 3D models. 5* demonstrate the applications of drone technology in geospatial and environmental studies.		
Credits	Theory	Practical	Total
	3	1	4
Contact Hours	3	2	5
Max. Marks: 100 Internal Assessment Marks: 20+10 = 30 End Term Exam Marks: 50+20 = 70		Time: 03 Hours	
Part B- Contents of the Course			
Instructions for Paper- Setter			
Question 1 is compulsory comprising of five sub parts spread over entire syllabus (two marks for each sub part). There will be eight long questions, two from each unit. The candidate has to			

answer four long questions, at least one question from each unit. All questions carry equal marks.		
Unit	Topics	Contact Hours
I	1. Introduction to Drones: History, principles, types of UAVs, components, sensors, payloads, GNSS, IMU, flight controllers, batteries, and communication systems. 2. Drone Regulations and Safety: DGCA regulations, drone categories, registration, licensing, flight permissions, safety protocols, ethics, and privacy issues..	11
II	3. Flight Planning: Mission planning, waypoints, overlap, flying height, GCPs, RTK/PPK, and image acquisition. 4. Drone Surveying: Aerial photography, mapping, photogrammetry, image quality assessment, and data collection techniques.	11
III	5. Image Processing: Orthomosaic generation, DEM, DSM, point clouds, contour generation, and 3D models. 6. Drone Mapping Software: Pix4D, Agisoft Metashape, DJI Terra, WebODM, and integration with GIS software.	11
IV	7. Drone Applications: Agriculture, forestry, disaster management, urban planning, infrastructure inspection, mining, environmental monitoring, and water resources. 8. Emerging Trends: AI-enabled drones, autonomous UAVs, LiDAR drones, thermal imaging, precision agriculture, and future prospects of drone technology.	12
V*	Instructions for external practical examiner: There will be three questions in all, and candidate must attempt two exercises. Distribution of marks for evaluation Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks Practical Record: A project file consisting of 8 exercises on the below mentioned themes: - Representation of various maps and diagrams: 1. Drone Components, Flight Planning, and Mission Simulation. (2) 2. Drone Flight, Image Acquisition, and Ground Control Point Survey. (2) 3. Processing Drone Images for Orthomosaic, DEM, and 3D Model Generation. (2) 4. Mini Project on Drone-based Mapping and Geospatial Applications. (2)	30

Suggested Evaluation Methods

Internal Assessment: ➤ Theory • Class Participation: 05 Marks • Seminar/presentation/assignment/quiz/class test etc.: 05 Marks • Mid-Term Exam: 10 Marks ➤ Practicum • Class Participation: NIL • Seminar/Demonstration/Viva-voce/Lab records etc.: 10 Marks • Mid-Term Exam: NIL	End Term Examination: 50 Marks 20 Marks
Part C-Learning Resources	
Recommended Books/e-resources/LMS: 1. Eisenbeiss, H. (2009). <i>UAV Photogrammetry</i>. ETH Zurich. 2. Colomina, I., & Molina, P. (2014). <i>Unmanned Aerial Systems for Photogrammetry and Remote Sensing</i>. <i>ISPRS Journal of Photogrammetry and Remote Sensing</i>, 92, 79–97. 3. Nex, F., & Remondino, F. (2014). <i>UAV for 3D Mapping Applications: A Review</i>. <i>Applied Geomatics</i>, 6(1), 1–15. 4. Lillesand, T. M., Kiefer, R. W., & Chipman, J. W. (2015). <i>Remote Sensing and Image Interpretation</i>. Wiley. 5. Jensen, J. R. (2016). <i>Introductory Digital Image Processing</i>. Pearson. 6. Wolf, P. R., Dewitt, B. A., & Wilkinson, B. E. (2014). <i>Elements of Photogrammetry with Applications in GIS</i>. McGraw-Hill.	

*Applicable for courses having practical components.

CC-M7 (V)			
Session: 2023-24			
Part A - Introduction			
Subject	Geography		
Semester	VI		
Name of the Course	Digital Photogrammetry		
Course Code	25UN-GEO-VOC-605		
Course Type: (CC/MCC/MDC/CCM/DSEC/VOC /DSE/PC/AEC/VAC)	CC-M7 (V)		
Level of the course (As per Annexure-I)	300-399		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLOs):	After successful completion of this course students will be able to: 1. understand the principles and concepts of digital photogrammetry. 2. acquire and process aerial and drone images for photogrammetric applications. 3. generate orthomosaics, DEMs, DSMs, and 3D models using photogrammetric software. 4. apply digital photogrammetric techniques for mapping and spatial analysis. 5* evaluate the applications of digital photogrammetry in geospatial sciences.		
Credits	Theory	Practical	Total
	3	1	4
Contact Hours	3	2	5
Max. Marks: 100 Internal Assessment Marks: 20+10 = 30 End Term Exam Marks: 50+20 = 70		Time: 03 Hours	
Part B- Contents of the Course			
Instructions for Paper- Setter			
Question 1 is compulsory comprising of five sub parts spread over entire syllabus (two marks for each sub part). There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.			

Unit	Topics	Contact Hours
I	1. Introduction to Digital Photogrammetry: Concepts, principles, history, types, aerial and terrestrial photogrammetry, camera geometry, scale, overlap, stereoscopy, and photogrammetric products. 2. Photogrammetric Systems: Digital cameras, UAV sensors, GNSS/IMU, image orientation, interior and exterior orientation, and photogrammetric workflow.	11
II	3. Image Processing: Image matching, tie points, bundle adjustment, image rectification, orthorectification, and mosaicking. 4. Photogrammetric Products: Orthomosaics, Digital Elevation Models (DEM), Digital Surface Models (DSM), point clouds, contour generation, and 3D models.	11
III	5. Photogrammetric Software: Agisoft Metashape, Pix4D Mapper, WebODM, OpenDroneMap, and integration with GIS software. 6. Mapping and Accuracy Assessment: Feature extraction, digitization, map preparation, positional accuracy, quality assessment, and error analysis.	11
IV	7. Applications: Topographic mapping, cadastral mapping, urban planning, agriculture, forestry, mining, archaeology, disaster management, and environmental monitoring. 8. Emerging Trends: UAV photogrammetry, AI-assisted image processing, LiDAR integration, 3D city modelling, and digital twin technologies.	12
V*	Instructions for external practical examiner: There will be three questions in all, and candidate must attempt two exercises. Distribution of marks for evaluation Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks Practical Record: A project file consisting of 8 exercises on the below mentioned themes: - Representation of various maps and diagrams: 1. Image Orientation and Photogrammetric Project Setup. (2) 2. Generation of Orthomosaics, DEMs, and DSMs. (2) 3. Point Cloud Processing and 3D Model Generation. (2) 4. Mini Project using Digital Photogrammetry for Mapping Applications. (2)	30

Suggested Evaluation Methods

Internal Assessment: ➤ Theory • Class Participation: 05 Marks • Seminar/presentation/assignment/quiz/class test etc.: 05 Marks • Mid-Term Exam: 10 Marks ➤ Practicum • Class Participation: NIL • Seminar/Demonstration/Viva-voce/Lab records etc.: 10 Marks • Mid-Term Exam: NIL	End Term Examination: 50 Marks 20 Marks
Part C-Learning Resources	
Recommended Books/e-resources/LMS: 1. Wolf, P. R., Dewitt, B. A., & Wilkinson, B. E. (2014). <i>Elements of Photogrammetry with Applications in GIS</i>. McGraw-Hill Education. 2. Schenk, T. (2005). <i>Introduction to Photogrammetry</i>. The Ohio State University. 3. Luhmann, T., Robson, S., Kyle, S., & Harley, I. (2020). <i>Close-Range Photogrammetry and 3D Imaging</i> (3rd ed.). De Gruyter. 4. Eisenbeiss, H. (2009). <i>UAV Photogrammetry</i>. ETH Zurich. 5. Colomina, I., & Molina, P. (2014). <i>Unmanned Aerial Systems for Photogrammetry and Remote Sensing</i>. <i>ISPRS Journal of Photogrammetry and Remote Sensing</i>, 92, 79–97. 6. Lillesand, T. M., Kiefer, R. W., & Chipman, J. W. (2015). <i>Remote Sensing and Image Interpretation</i>. Wiley.	

*Applicable for courses having practical components.

CC-M7 (V)			
Session: 2023-24			
Part A - Introduction			
Subject	Geography		
Semester	VI		
Name of the Course	AI in Geospatial Technology		
Course Code	25UN-GEO-VOC-606		
Course Type: (CC/MCC/MDC/CCM/DSEC/VOC /DSE/PC/AEC/VAC)	CC-M7 (V)		
Level of the course (As per Annexure-I)	300-399		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLOs):	After successful completion of this course students will be able to: 1. Understand the fundamentals of Artificial Intelligence and Machine Learning in geospatial applications. 2. Apply AI techniques for processing and analyzing geospatial data. 3. Use AI tools for image classification, object detection, and spatial prediction. 4. Develop simple AI-based geospatial models using open-source platforms. 5* evaluate AI applications for solving real-world geospatial problems.		
Credits	Theory	Practical	Total
	3	1	4
Contact Hours	3	2	5
Max. Marks: 100 Internal Assessment Marks: 20+10 = 30 End Term Exam Marks: 50+20 = 70		Time: 03 Hours	
Part B- Contents of the Course			
Instructions for Paper- Setter			
Question 1 is compulsory comprising of five sub parts spread over entire syllabus (two marks for each sub part). There will be eight long questions, two from each unit. The candidate has to answer four long questions, at least one question from each unit. All questions carry equal marks.			

Unit	Topics	Contact Hours
I	1. Introduction to Artificial Intelligence: Concepts, AI, Machine Learning, Deep Learning, Neural Networks, and their role in geospatial sciences. 2. Geospatial Data for AI: Raster and vector data, satellite imagery, drone data, spatial databases, training and validation datasets.	11
II	3. Machine Learning Techniques: Supervised and unsupervised learning, classification, clustering, regression, feature extraction, and accuracy assessment. 4. AI Tools and Platforms: Google Earth Engine, Python, TensorFlow, Google Colab, and open-source AI libraries for geospatial applications.	11
III	5. Image Analysis: Land Use/Land Cover classification, object detection, image segmentation, change detection, and predictive modelling. 6. Spatial Analysis: AI applications in agriculture, urban planning, disaster management, environmental monitoring, transportation, and climate studies.	11
IV	7. Emerging Technologies: GeoAI, Digital Twins, Big Geospatial Data, cloud computing, and intelligent decision support systems. 8. Case Studies: AI applications using satellite imagery, UAV data, smart cities, precision agriculture, and natural resource management.	12
V*	Instructions for external practical examiner: There will be three questions in all, and candidate must attempt two exercises. Distribution of marks for evaluation Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks Practical Record: A project file consisting of 8 exercises on the below mentioned themes: - Representation of various maps and diagrams: 1. Image Classification using Google Earth Engine or Python. (2) 2. Object Detection and Feature Extraction from Satellite or Drone Images. (2) 3. Spatial Analysis using AI Models and Machine Learning Tools. (2) 4. Mini Project on AI-based Geospatial Applications. (2)	30

Suggested Evaluation Methods

Internal Assessment: ➤ Theory • Class Participation: 05 Marks • Seminar/presentation/assignment/quiz/class test etc.: 05 Marks • Mid-Term Exam: 10 Marks ➤ Practicum • Class Participation: NIL • Seminar/Demonstration/Viva-voce/Lab records etc.: 10 Marks • Mid-Term Exam: NIL	End Term Examination: 50 Marks 20 Marks
Part C-Learning Resources	
Recommended Books/e-resources/LMS: 1. Longley, P. A., Goodchild, M. F., Maguire, D. J., & Rhind, D. W. (2015). <i>Geographic Information Systems and Science</i>. Wiley. 2. Lillesand, T. M., Kiefer, R. W., & Chipman, J. W. (2015). <i>Remote Sensing and Image Interpretation</i>. Wiley. 3. Jensen, J. R. (2016). <i>Introductory Digital Image Processing: A Remote Sensing Perspective</i>. Pearson. 4. Goodfellow, I., Bengio, Y., & Courville, A. (2016). <i>Deep Learning</i>. MIT Press. 5. Géron, A. (2022). <i>Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow</i> (3rd ed.). O'Reilly Media. 6. Ehlers, M., Blaschke, T., & Gähler, M. (Eds.). (2021). <i>AI and Geospatial Analysis: Theory and Applications</i>. Springer.	

*Applicable for courses having practical components.