

Bangalore



University

NAAC Accredited with
A++ Grade

Curriculum Framework for Four-Year Undergraduate Multidisciplinary Programme (Honours) & Master Programme in Colleges and Universities of Karnataka State Under NEP 2020.



**5th and 6th Semester Model Syllabus
for
BA / BSc. in
Geography**

Submitted to
Karnataka State Higher Education Council

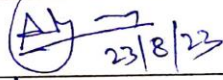
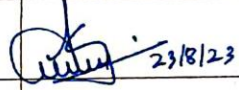
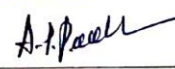
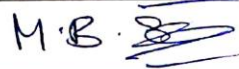

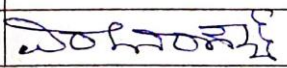
Proceedings Of BOS Meeting in Geography (UG)

23rd August 2023

The BOS (PG) Committee meeting held on 23/08/2023 at 10.30 am in Department of Geography & Geoinformatics, Bangalore University, Bengaluru.

Chairman, BOS (UG) Dr. Ashok D Hanjagi proposed the welcome to the BOS members of UG Geography and briefed the agenda for meeting. The items were taken up for deliberation and were approved the following items given in the table.

Agenda	Discussion / Deliberation	Recommendations of the committee
To update and approve the syllabus of 3 rd Year (5 th and 6 th Semesters) UG B.A. / B.Sc. Geography (4 Years Degree) on par with NEP-2020	The BOS Committee discussed and deliberated about the Four-Year B.A. / B.Sc Geography syllabus of 3 rd Year (5 th and 6 th Semesters) syllabus which had already been designed. The committee observed the essentials of updations.	After detail discussion, the committee recommended updated syllabus of the 3 rd year and approved.
To approve the Panel of Examiners (2023-24) in UG Geography	BOS Members went-through the panel of examiners for UG Geography 2023-24 and carried out the corrections.	The committee approved the Panel of Examiners of UG Geography.

	Members of BOS Committee	Position	Signature
1	Dr. Ashok Hanjagi, Professor & Chairman, Dept. of Geography, Bangalore University	Chairman	 23/8/23
2	Dr. K.N. Amarendra Associate Professor, Dept. of Geography, SSFGC College, Nelamangala, Bengaluru	Member	 23/8/23
3	Sri. Prakasha A.P. Assistant Professor, Department of Geography, Rural College, Knakapura	Member	 A.P. Prakasha
4	Dr. Shivanna M.B, Associate Professor, Department of Geography, GFGC, Vijayanagara, Bangalore.	Member	 M.B. Shivanna
5	Dr. Srinivas, Associate Professor, Dept of Geography, GFGC, Ramanagara, Dist. Ramanagara	Member	 Srinivas
6	Sri. Somshekar Desai, Associate Professor, Dept of Geography, Govt Arts College (Autonomous), Hassan	External	Absent
7	Sri. Ningegowda M.K. Associate Professor, Dept. of Geography, PAAC College, Tiptur.	Member	 Ningegowda M.K.


Chairman, BOS (UG) 23/8/23

Chairman
Department of Geography
Bangalore University
Jnanabharathi Campus,
Bengaluru - 560 056.

Composition of Subject Expert Committee Members

SN	Name & Organization	Designation
1	Prof. Ashok Hanjagi	Chairman
2	Prof. B. Chandrashekar	Member
3	Prof. Aravinda A. Mulimani	Member
4	Prof. Dasharath P. Angadi	Member
5	Prof. Ramu	Member
6	Dr. L.T. Nayak	Member
7	Dr. M.R. Hugar	Member
8	Dr. Rajashekharan D.	Member
9	Dr. Gangadhar Sheeli	Member
10	Dr. Amarendra K.N.	Member
11	Dr. Ramesh	Member Convener

**Model Curriculum
of
BA / BSc Honours
in
Geography
5th & 6th Semester**

Bangalore University

Syllabus Aims:

The aims of the syllabus describe the B.A. / B.Sc in Geography at 5th, 6th, 7th & 8th Level. These aims outline the educational context in which syllabus content should be viewed. Many of these aims may be delivered by the use of suitable case-studies, through application of geographical skills and through practical field visits.

The BA. / B.Sc Geography syllabus aims to enable students to:

1. Know the significance of scale in studying geography
2. Know the processes functioning at various scales within physical and human environments
3. Improve a sense of space, place and location
4. Develop consciousness of the relevance of geography to understanding and solving contemporary environmental problems
5. Realisation of the main fundamentals of physical geography and human geography and the interconnectedness between them
6. Explain the causes and effects of change over space and time on physical and human environments
7. Develop an insight into the nature, value, limitations and importance of different approaches to analyse and explanation in geography
8. Increase the knowledge and ability to use and apply appropriate skills and techniques including fieldwork
9. Improve a logical approach in order to present a structured, coherent and evidence-based argument
10. Develop a concern for accuracy and objectivity in extracting, recording, processing, presenting, analysing and interpreting geographical data

Program Outcomes (POs)			
By the end of the program the students will be able to:			
PO1	Geographical Knowledge	:	Give an explanation of relevant terms and concept of geography including definitions
PO2	Project Management	:	Recognize geographical principles, theories and models to manage projects and achieve its objectives.
PO3	Problem Analysis	:	Find solution to environmental and Human problems
PO4	Modern Tool	:	Application of modern tools and techniques to interpret how processes bring changes in systems, distributions and environments.
PO5	Research of Complex Problems	:	Apply research-based knowledge to provide valid conclusions and demonstrate skill of analysis and synthesis of geographical information.
PO6	Communication	:	Communicate effectively by identifying human activities and use geographical data to identify trends and patterns.
PO7	Design / development of solutions	:	Carry out investigation into the complex and interactive nature of physical and human environments.
PO8	Geography and Society	:	To inspect the environmental and societal issues and compare between the places, environments and people.
PO9	Multi-disciplinary Settings	:	Assemble geographical evidence, ideas and arguments with multi-disciplinary setting.
PO10	Ethics	:	Develop ethical principles and commit to professional ethics and responsibilities and norms of scientific practices.
PO11	Life-long Learning	:	Understand the effects of geographical processes and change on physical and human environments and life-long learning of geographical studies.
PO12	Environment and Sustainability	:	Assess how the viewpoints of different groups of people, potential conflicts of interest and other factors interact in the management of physical and human environments to bring environmental sustainability.

Program Name	BA / BSc in Geography	Semester	5
Course Title	Population Resources and Dynamics		
Course Code:	GEO C9-T	No. of Credits	4
Contact hours	60 Hours	Duration of SEA/Exam	2 hours
Formative Assessment Marks	40	Summative Assessment Marks	60

Course Pre-requisite(s): No Pre-requisite course(s)	
Course Outcomes (COs): After the successful completion of the course, the student will be able to: CO1 Apply critical analysis skills on the demographic composition of a country. CO2 Classify and evaluate migrations and their types. CO3 Understanding the population resources. CO4 Analyse population growth issues and challenges. CO5 Investigate how migration takes place	
Contents	60 Hrs
Introduction: Nature and Scope of Population Geography, Population Geography and Demography, Sources of Population Data. Density of Population. World Population: Measures, patterns, and determinants. Growth, distribution, and problems.	10
Population Change: Concept of over, under & optimum population; Growth of Population in the World and India, Components of Population Change. Fertility and Mortality Analysis: Indices, determinants, and world patterns. Demographic Attributes and Demographic Transition. Theories of Population Growth: Malthus, Sadler, and Ricardo. Assignment: Students are to be prepared a report regarding population change in their own area and submit a report.	20
Migration: Meaning, types, causes, consequences, and models. Theories of Migration Ravenstein & Lee. Population composition and characteristics. Age, Sex, rural-urban, occupational structure, and educational level. Field Activity: Students need to visit a nearby village and get to know how and why migration takes place and submit a report.	15
Population as Resource, Population Resource Regions. Population Policy of India. Policy issues; Social well-being and quality of life; population as social capital. Contemporary Issues – Ageing of Population; Declining Sex Ratio; HIV/AIDS. Population policies in developed and developing countries. Human Development Index (HDI)	15

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-15)

Course Outcomes (COs) / Program Outcomes (POs)	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	1	-	3	-	-	-	-	-	2	-	2	-
CO2	1	-	-	-	-	1	-	1	2	-	2	-
CO3	3	-	-	-	-	2	1	1	2	-	2	-
CO4	1	-	3	-	-	1	2	1	2	-	2	-
CO5	1	1	2	-	2	1	3	1	2	1	2	-

Pedagogy:

Teaching Strategies: Interactive Lectures, inquiry-based learning, group discussions, quiz, group work, field-based study, study tour, case studies and debates.

Rigorous Assessment and Evaluation: Formative and summative assessments, feedback and oral examinations.

Use of digital tools and platforms for teaching, learning and research / dissertation analysis.

Formative Assessment for Theory	
Assessment Occasion/ type	Marks
Sessional Tests-1	10
Sessional Tests-2	10
Seminars / Presentations / Assignment	10
Case study / Field-Study / Project work etc	10
Total	40 Marks
<i>Formative Assessment as per NEP guidelines are compulsory</i>	

Program Name	BA / BSc in Geography		Semester	5
Course Title	Techniques in Population Geography		Practical Credits	02
Course Code	GEO C10-P		Contact Hours	60 Hours
Formative Assessment	25 Marks	Summative Assessment	25 Marks	

Course Pre-requisite(s): No Pre-requisite course(s)

Course Outcomes (COs): After the successful completion of the course, the student will be able to:

- CO1 Learn various methods of representative of demographic data
CO2 Apply various technologies in representation of demographic data
CO3 Analyse the trend and pattern of demographic data
CO4 Construct different diagrams using the data
CO5 Formulate the future trend of the data

Practical Contents

- Sources of population data: Census of India, UNPD (United Nations Population Division), birth and death registry, VSS (Vital Statistics Survey), NSS (National Sample Survey), NFHS (National Family and Health Survey),
- Population distribution and density
 - Thematic maps for population Distribution-patterns (dot map, Choropleth maps).
 - Calculation of Population Growth rate,
 - Calculation of population projection, arithmetic method,
 - Calculation of population Density, arithmetic density, and agriculture density.
- Calculation of different types of fertility and mortality rates for any one region Eg: India / Karnataka /District, using the Census of India latest data.
 - Crude birth rate,
 - General fertility rate, Total fertility rate
 - Crude death rate/ Mortality rate, Infant mortality rate
 - Age-specific mortality rate
 - Sex-specific mortality rate
- Thematic maps for Population composition: construction of population pyramids for Age, Sex, Rural and Urban, for important places on outline map Eg: India / Karnataka /District, using the Census of India latest data.

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-15)

Course Outcomes (COs) / Program Outcomes (POs)	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	-	-	-	-	1	-	-	2	-	2	-
CO2	2	-	-	3	-	1	-	-	2	-	2	-
CO3	1	-	3	-	-	1	2	-	2	-	2	--
CO4	1	-	1	-	-	1	-	-	2	-	2	-
CO5	1	-	1	-	1	1	2	-	2	-	2	-

Pedagogy:

Teaching Strategies: Interactive Lectures, inquiry-based learning, group discussions, quiz, group work, field-based study, study tour, case studies and debates.

Rigorous Assessment and Evaluation: Formative and summative assessments, feedback and oral examinations.

Use of digital tools and platforms for teaching, learning and research / dissertation analysis.

Formative Assessment for Practical	
Assessment Occasion/ type	Marks
Sessional Tests-1	05
Sessional Tests-2	05
Case study /Assignment / Field-activity / Project work etc	05
Practical Record Maintenance	10
Total	25 Marks
<i>Formative Assessment as per NEP guidelines are compulsory</i>	

References	
1	Chandna R.C. (2009), Geography of Population, Kalyani Publicishers, Aneari Road, Daryaganj, New Delhi.
2	Majid Hussain (1999), Human Geography, Rawat publications, Jaipur.
3	Trewartha GT. (1959) A Geography of Population, world Patterns, John Wiley and Sons Inc. New York.
4	Ghosh BN. (1987) Fundamentals of population Geography s, sterling publishing company, New Delhi
5	Jingam ML. B.K. Bhat, JN Deasi (2003) Demography, Urinda Publishers Pvt. Ltd. Delhi.
6	R.K. Tripathi ((2000) Population geography, commonwealth publishers, New Delhi.
7	Kayastha SL. (1998) Geography of Population, Rawat publications, jaipur.
8	Clerk I (1984) Geography of populations, approaches and applications, pergamon press, Oxford, UK.
9	Ritu Malik (2013), Changes in population Dynamics, Sanjay Prakashan
10	Prthvish Nag, G.C.Debnath (2021), Population Geography, Bharti Prakashan, Varanasi
Resource Websites:	
1	https://censusindia.gov.in/census.website/
2	https://mea.gov.in/icm.htm
3	https://population.un.org/wpp/
4	https://www.popcouncil.org/research/india
5	https://www.cdc.gov/csels/dsepd/ss1978/lesson3/section3.html

Program Name	BA / BSc in Geography	Semester	V
Course Title	Fundamentals of Remote Sensing		
Course Code:	GEO C11-T	No. of Credits	04
Contact hours	60 Hours	Duration of SEA/Exam	2 hours
Formative Assessment Marks	40	Summative Assessment Marks	60

Course Pre-requisite(s): No Pre-requisite course(s)	
Course Outcomes (COs): After the successful completion of the course, the student will be able to: CO1. Define and describe the components of remote sensing and explain the history of remote sensing. CO2. Differentiate between the types of remote sensors and platforms and analyze CO3. Interpret aerial photographs and identify and compare digital and analog data. CO4. Evaluate the applications of remote sensing, including the new satellite programs of India. CO5. Analyze ground truth verification using Google Earth and evaluate its usefulness	
Contents	60 Hrs
Introduction to Remote Sensing: Definition and Components, History of Remote Sensing, Electromagnetic Magnetic Spectrum, Interaction of EMR with the atmosphere and with the surface feature, Atmospheric window, spectral reflectance of land covers (minerals, rocks, water, vegetation, and urban area).	15
Sensors & Platforms: Types of orbits-sun-synchronous and geosynchronous, Sources of energy, Classification of remote sensors - Active, Passive, Electro-mechanical, and optical sensors. Resolution concept - Spectral, Radiometric, and temporal resolution. Platform types and characteristics, Launch of space vehicles. Angular characteristics-FOV and IFOV, pushbroom and whiskbroom cameras, Panchromatic, multispectral, hyperspectral scanners, and geometric characteristics of the imageries. Assignment: Students need to prepare a report on how satellite images are captured, processed, and distributed to the end users by citing Bhuvan, ISRO, ISAC, NRSC, and SGC Websites.	20
Aerial Photography: Elements, Types and interpretation of Aerial photography, Principles, Classification of Aerial photographs based on Height and Tilt, Scales, Components of camera, film, Aerial platforms. Elements of Aerial photo interpretation, Digital and Analog data, Image formats, Stereo pairs, Applications of Aerial Photography.	15
Applications of Remote Sensing: Indian remote sensing Centers and their activities, new satellite programs of India. Different Satellites and their Application in Land Resources, Meteorology, and Hydrology. Ground truth verification using Google Earth. Field Activity: Students need to visit a nearby village and get to know how remote sensing images and real world looks and submit a report.	10

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-15)

Course Outcomes (COs) / Program Outcomes (POs)	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	-	-	-	-	2	-	-	2	-	2	-
CO2	2	-	-	-	-	2	2	-	2	-	2	-
CO3	1	--	1	3	-	2	2	-	2	-	2	-
CO4	1	-	2	-	-	2	2	-	2	-	2	-
CO5	1	-	3	3	-	2	2	-	2	-	2	-

Pedagogy:

Teaching Strategies: Interactive Lectures, inquiry-based learning, group discussions, quiz, group work, field-based study, study tour, case studies and debates.

Rigorous Assessment and Evaluation: Formative and summative assessments, feedback and oral examinations.

Use of digital tools and platforms for teaching, learning and research / dissertation analysis.

Formative Assessment for Theory	
Assessment Occasion/ type	Marks
Sessional Tests-1	10
Sessional Tests-2	10
Seminars / Presentations / Assignment	10
Case study / Field-Study / Project work etc	10
Total	40 Marks
<i>Formative Assessment as per NEP guidelines are compulsory</i>	

Program Name	BA / BSc in Geography			Semester	V
Course Title	Interpretation of Aerial Photos and Satellite Images			Practical Credits	02
Course Code	GEO C12-P			Contact Hours	60 Hours
Formative Assessment	25 Marks		Summative Assessment	25 Marks	
Course Pre-requisite(s): No Pre-requisite course(s)					
Course Outcomes (COs): After the successful completion of the course, the student will be able to: CO1. Learn remote sensing techniques CO2. Apply modern technology in various geographical area CO3. Interpret remotely sensed data CO4. Analyse digital imageries CO5. Analyze ground truth verification using Google Earth and evaluate its usefulness					
Practical Content					
<ol style="list-style-type: none"> 1. Basic information of the image (projection histogram, layers, pixel) 2. Visual interpretation: colour, texture, association, pattern, tone, shape. 3. Satellite Products and Band Characteristics, band combination 4. Satellite image downloading portals, Bhuvan, USGS explorer. 5. Image Enhancement: Radiometric, spatial enhancement 6. Layers Stacking 7. Pre-Processing: Geometric and Radiometric Correction 8. Spectral enhancement: Spectral Indices, NDVI 9. Image Classification: Supervised and Unsupervised 10. Change Detection 					

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-15)

Course Outcomes (COs) / Program Outcomes (POs)	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	-	-	2	-	-	-	-	2	-	2	-
CO2	2	-	-	3	-	-	2	-	2	-	2	-
CO3	1	--	-	3	-	2	2	-	2	-	2	-
CO4	1	-	3	3	-	-	2	-	2	-	2	-
CO5	1	-	2	3	1	-	3	-	2	-	2	-

Pedagogy:

Teaching Strategies: Interactive Lectures, inquiry-based learning, group discussions, quiz, group work, field-based study, study tour, case studies and debates.

Rigorous Assessment and Evaluation: Formative and summative assessments, feedback and oral examinations.

Use of digital tools and platforms for teaching, learning and research / dissertation analysis.

Formative Assessment for Theory	
Assessment Occasion/ type	Marks
Sessional Tests-1	05
Sessional Tests-2	05
Case study /Assignment / Field-activity / Project work etc	05
Practical Record Maintenance	10
Total	25 Marks
Formative Assessment as per NEP guidelines are compulsory	

References	
	Books
1	Lillesand T. Mand Kiefer R.W (2021), Remote Sensing and Image interpretation, 7 th Edition, John Wiley & Sons, Canada.
2	Jensen J. R, (2012), Remote Sensing of Environment: An Earth Resources Perspective, 2 nd Edition, Pearson Education, Upper Saddle River, Prentice Hall, New Jersey.
3	Elachi Candvan Zyl J .J, (2006), Introduction to the Physics and Techniques of Remote Sensing, John Wiley & Sons, Canada.
4	Joseph G, (2005), Fundamentals of Remote Sensing, 2 nd Edition, Universities Press (India) Pvt Ltd, Hyderabad.
5	Narayan LRA, (1999), Remote Sensing and its Applications, Universities Press (India) Pvt Ltd, Hyderabad.
6	Rampal K. K, (1999), Handbook of Aerial Photography and Interpretation, Concept Publishing Co, New Delhi.
7	Avery T. E and Berlin G.L, (1992), Fundamentals of Remote Sensing and Air Photo Interpretation, 5 th Edition, Prentice Hall, New Jersey.
8	Sabins, F.F. Jr, (1987), Remote Sensing; Principles and Interpretation, 2 nd Edition, W.H. Freeman and Co, New York.
9	Jensen, John R., (2005), Introductory Digital Image Processing, 3 rd Ed., Upper Saddle River, NJ: Prentice Hall, 526 pages.
	MOOC
1	Remote Sensing: https://nptel.ac.in/courses/105/108/105108077/
2	Introduction to Remote Sensing: https://nptel.ac.in/courses/121/107/121107009/
3	Digital Image Processing of Remote Sensing Data: https://nptel.ac.in/courses/105/107/105107160/
4	Remote Sensing and GIS: https://nptel.ac.in/courses/105/103/105103193/
5	Remote Sensing Essentials: https://nptel.ac.in/courses/105/107/105107201/
6	Remote Sensing: Principles and Applications: https://nptel.ac.in/courses/105/101/105101206/
7	Basics of Remote sensing, GIS & GNSS technology and their applications:
8	https://onlinecourses.swayam2.ac.in/aic20_ge05/preview
9	http://rst.gsfc.nasa.gov/Front/tofc.html .
	Web Resources
1	Projections: https://map-projections.net/imglist.php
2	Textbook of Canadian Remote Sensing: https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/earthsciences/pdf/resource/tutor/fundam/pdf/fundamentals_e.pdf
3	ITC Netherlands, Principles of Remote Sensing https://webapps.itc.utwente.nl/librarywww/papers_2009/general/principlesremotesensing .
4	Pdf http://earthobservatory.nasa.gov/Library/RemoteSensing
5	https://earthexplorer.usgs.gov/
6	https://bhuvan.nrsc.gov.in/home/index.php
7	https://map-projections.net/imglist.php

CBCS Question Paper Pattern for UG Semester

DSC, DSEC & OEC

Paper Code:	DSC-I	Paper Title:	Principles of Geomorphology
Duration of Exam	2 Hours	Max Marks	60
Instruction:	Answer all the sections		

Section-A

Answer any four of the following questions	(2X4=8)	Marks
<ol style="list-style-type: none">1. Father of Geography2. Cenozoic Era3. Types of Volcanoes4. Types of Folds5. Weathering6. Barkhans		

Section-B

Answer any four of the following questions	(5X4=20)	Marks
<ol style="list-style-type: none">7. Explain inter-relationship between Physical and human geography.8. Explain Isostasy theory in the view of Pratt.9. Explain Geological Time Scale.10. Explain Tetrahedral hypothesis of Lowthian Green.11. Explain the types of crustal movements.12. Explain the depositional landforms of Wind.		

Section-C

Answer any four of the following questions	(8X4=32)	Marks
<ol style="list-style-type: none">13. Explain the scope and content of Physical Geography.14. Explain the Convection Current Theory.15. Explain types of folds.16. Explain "Glacier as an agent of Denudation"17. Explain Cycle of Erosion of Davis and Penk.18. What is weathering? Explain its types.		

6th SEMESTER
BA / BSc
Geography

Program Name	BA / BSc in Geography	Semester	6
Course Title	Environmental Geography		
Course Code:	GEO C14-T	No. of Credits	4
Contact hours	60 Hours	Duration of SEA/Exam	2 hours
Formative Assessment Marks	40	Summative Assessment Marks	60

Course Pre-requisite(s): No Pre-requisite course(s)	
Course Outcomes (COs): After the successful completion of the course, the student will be able to: CO1. Understand the interdisciplinary nature and the relationship between man and the environment. CO2. Know functioning of ecosystems, including the impact of human activity and global ecological changes. CO3. Evaluate man-made changes like pollution, environmental hazards, and the depletion of natural resources. CO4. Examine environmental policy, impact assessment, and conservation measures. CO5. Apply knowledge of environmental geography to real-world situations.	
Contents	60 Hrs
Introduction to Environment Geography: Nature and Interdisciplinary Aspect of Environmental Geography. Ecological Approaches. Definition and meaning of environment. Habitat. Ecological Niche. Biosphere and Biodiversity; bio-diversity and sustainable development. Biomes – major Biomes of the world. Man and Environmental Relationships	10
Ecosystem: Structure and Functioning of Ecosystem, Pond as an Ecosystem, ecosystem management, and conservation. Principle of ecology; human ecological adaptation; the influence of man on ecology and environment. Global and regional ecological change & imbalance. Food Chains, Food Webs, Food Pyramid.	20
Man-Induced Changes in Environment: Environmental Pollution, i.e., Air, Water, Noise; Solid Waste with special reference to India. Environmental Hazards, i.e., earth as Warehouses, Flood, Famines; Land Slides, Avalanches, Forest Fires; Impact of Green Revolution and Extinction of Species. Man-Made Ecosystem - Urban, Ecotourism, National Parks and Sanctuaries. Depletion of Ozone, Green House Effect, and Acid Rain.	15
Principles of Environmental Management: Environmental Policy of India, (post-2000 AD). Environment Impact Assessment (EIA). Global Summits & Agencies of Environment Conservation. Environmental degradation, management and conservation. Problems of Deforestation and conservation measures. Environmental policy; environmental hazards and remedial measures. Environmental Education and Legislation.	15

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-15)

Course Outcomes (COs) / Program Outcomes (POs)	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	-	-	-	-	-	-	2	2	-	-	-
CO2	2	-	-	-	-	-	-	3	-	-	-	1
CO3	-	-	-	-	-	-	3	-	-	-	1	-
CO4	-	-	-	-	-	-	2	-	-	-	-	3

Course Outcomes (COs) / Program Outcomes (POs)	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
CO5	-	-	3	-	-	-	2	-	-	-	-	-

Pedagogy:

Teaching Strategies: Interactive Lectures, inquiry-based learning, group discussions, quiz, group work, field-based study, study tour, case studies and debates.

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Use of digital tools and platforms for teaching, learning and research / dissertation analysis.

Formative Assessment for Theory	
Assessment Occasion/ type	Marks
Sessional Tests-1	10
Sessional Tests-2	10
Seminars / Presentations / Assignment	10
Case study / Field-Study / Project work etc	10
Total	40 Marks
<i>Formative Assessment as per NEP guidelines are compulsory</i>	

Program Name	BA / BSc in Geography		Semester	6
Course Title	Methods in Environmental Geography		Practical Credits	02
Course Code	GEO C15-P		Contact Hours	60 Hours
Formative Assessment	25 Marks	Summative Assessment	25 Marks	
Practical Content				
<ol style="list-style-type: none"> 1. List out Biotic and Abiotic elements in the local region. 2. Identify and map micro-Biomes in the local region and study the biodiversity of the place. 3. List some ecosystem management and conservation methods in the local region for water bodies, 4. mapping of water bodies, 5. Mapping of bore wells. 6. Map the polluting points in the local area and their influence of man on the local environment. 7. Mapping of Waste disposal sites 8. Suitability of the site for waste disposal (with reference to height, location, land use, land value, slope, 9. Mapping of parks and open spaces in the neighbourhood. 10. Mapping of areas in the neighbourhood where crowding is prevalent and type of land use around such places. 11. Materials required for the practical survey: Use a Boundary map of the neighbourhood area and GPS (field mapping) or Google Earth can also be used for mapping neighbourhood area. 				

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-15)

Course Outcomes (COs) / Program Outcomes (POs)	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	-	-	-	-	-	-	2	2	-	-	-
CO2	2	-	-	-	-	-	-	3	-	-	-	1
CO3	-	-	-	-	-	-	3	-	-	-	1	-
CO4	-	-	-	-	-	-	2	-	-	-	-	3
CO5	-	-	3	-	-	-	2	-	-	-	-	-

Pedagogy:

Teaching Strategies: Interactive Lectures, inquiry-based learning, group discussions, quiz, group work, field-based study, study tour, case studies and debates.

Rigorous Assessment and Evaluation: Formative and summative assessments, feedback and oral examinations. Use of digital tools and platforms for teaching, learning and research / dissertation analysis.

Formative Assessment for Practical	
Assessment Occasion/ type	Marks
Sessional Tests-1	05
Sessional Tests-2	05

Case study /Assignment / Field-activity / Project work etc	05
Practical Record Maintenance	10
Total	25 Marks
Formative Assessment as per NEP guidelines are compulsory	

References	
1	Strahler A.N. (1968) The Earth Sciences, Harper International Education, New York.
2	Richard H.B. (2004) Physical Geography, Heinmann Simple Services, Rupa & Company, New Delhi
3	Robinson H. (1982) Bio Geography, ELBS, New York.
4	Healey I.N. and Moore P.D. (1973) Biogeography, Backwell Oxford, U.K.
5	Strahler A.N. and Strahler A.H. (1973) Environmental Geo Science, Hamilton, California, USA.
6	Savindra Singh (2004) Environmental Geography, Prayog Pustak Bhawan, Allahabad, India.
7	Paul Selman (2000) Environmental Planning, Sage Publications, New Delhi
8	Cheryl Simon Silve& Ruth S. De Fries (1991) One Earth One Future-Our chaining Global Environment, National Academy of Sciences, Affiliated to East-West Press Pvt. Ltd. New Delhi.
9	Strahler A.N. and Strahler A.H. (1977) Geography and Man's Environment, John Wiley & Sons, New York
10	Goldsmith Edward et al. (1988) The Earth Report – The Essential Guide to Global Issues, Price Stern Solan Inc. California, USA
11	Y.K. Sharma (2020), Narain's Environmental Geography (Resource and Development), Lakshmi Narain Agarwal
12	H.M. Saxena (2021), Environmental Geography, Rawat Publications
13	Strahler A.N. (1968) The Earth Sciences, Harper International Education, New York.
14	Richard H.B. (2004) Physical Geography, Heinmann Simple Services, Rupa & Company, New Delhi
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18	Savindra Singh (2004) Environmental Geography, Prayog Pustak Bhawan, Allahabad, India.
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21	Strahler A.N. and Strahler A.H. (1977) Geography and Man's Environment, John Wiley & Sons, New York
22	Goldsmith Edward et al. (1988) The Earth Report – The Essential Guide to Global Issues, Price Stern Solan Inc. California, USA
	Websites:
1	https://moef.gov.in/en/
2	http://environmentclearance.nic.in/
3	https://ndma.gov.in/
4	https://bhuvan.nrsc.gov.in/home/index.php
5	http://www.indiaenvironmentportal.org.in/

Program Name	BA / BSc in Geography	Semester	6
Course Title	Fundamentals of Geographic Information Systems		
Course Code:	GEO C16-T	No. of Credits	4
Contact hours	60 Hours	Duration of SEA/Exam	2 hours
Formative Assessment Marks	40	Summative Assessment Marks	60

Course Pre-requisite(s): No Pre-requisite course(s)

Course Outcomes (COs): After the successful completion of the course, the student will be able to:
CO1. Understand the definition, components, and interdisciplinary domains of GIS.
CO2. Apply geodesy and spatial mathematics for measuring distances and coordinates.
CO3. Analyze and evaluate spatial data structures, sources, errors, and scales for precision and accuracy.
CO4. Perform geo-processing and visualization techniques including spatial and non-spatial queries.
CO5. Collect and integrate spatial and non-spatial data for a case study using online resources.

Contents	60 hrs
Introduction: Definition, scope, of GIS in digital world; Components, functionalities, merits and demerits, global market. Interdisciplinary domains, and its integration with GIS.	10
Geodesy and Spatial Mathematics: Meaning scope of geodesy, geographical coordinates, latitude, longitudes; Datum: WGS-84, vs NAD-32. UTM; Aerial Distance measurement using Geographic and projected coordinates, Area, Perimeter, length by coordinates and various international measures. Assignment: students need to prepare hand drawn maps with the help of graticules.	20
Data and Scale: Spatial Data and its structures; Sources and Types of data collection. Data errors, and relationships. Large Scale vs Small Scale; Generalization; precision and accuracy of data.	15
Geo-processing and Visualization: Spatial and Non-Spatial Queries; Proximity analysis, Preparation of Terrain and Surface models. Hotspot and density mapping. Types of maps, thematic maps and its types, relief maps, flow maps and cartograms. Tabulations: Graphs and Pivot tables. Case Study: Students need to collect available spatial and non-spatial data of all the talukas of their districts from online resources.	15

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-15)

Course Outcomes (COs) / Program Outcomes (POs)	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	-	-	-	-	-	-	-	2	-	-	-
CO2	2	-	-	-	-	-	-	-	3	-	-	-
CO3	1	-	2	3	-	-	-	-	-	-	-	-
CO4	-	-	-	-	3	-	-	-	2	-	-	-
CO5	-	1	-	2	-	-	-	-	3	-	-	-

Pedagogy:

Teaching Strategies: Interactive Lectures, inquiry-based learning, group discussions, quiz, group work, field-based study, study tour, case studies and debates.

Rigorous Assessment and Evaluation: Formative and summative assessments, feedback and oral examinations.

Use of digital tools and platforms for teaching, learning and research / dissertation analysis.

Formative Assessment for Theory	
Assessment Occasion/ type	Marks
Sessional Tests-1	10
Sessional Tests-2	10
Seminars / Presentations / Assignment	10
Case study / Field-Study / Project work etc	10
Total	40 Marks
<i>Formative Assessment as per NEP guidelines are compulsory</i>	

Program Name	BA / BSc in Geography		Semester	6
Course Title	GIS for map-making		Practical Credits	02
Course Code	GEO C17-P		Contact Hours	60 Hours
Formative Assessment	25 Marks	Summative Assessment	25 Marks	
Practical Content				
<ol style="list-style-type: none"> 1. Draw manually point, line, and polygon using a toposheet 2. Draw vector structures from the toposheet with reference to settlements, roads, water bodies, etc. 3. Create raster structures of a portion of the toposheet using a graph sheet. 4. Downloading images from the internet portal (Bhuvan); 5. Different image formats 6. File management 7. Geo-referencing of toposheet 8. Digitize the Point line polygon, creating layers. 9. Buffer analysis, 10. proximity analysis, 11. Map layout, map composition, and map designing 				

Pedagogy: Interactive Lectures, Inquiry-based Learning, Cooperative Learning.

Formative Assessment for Practical	
Assessment Occasion/ type	Marks
Sessional Tests-1	05
Sessional Tests-2	05
Case study /Assignment / Field-activity / Project work etc	05
Practical Record Maintenance	10
Total	25 Marks
<i>Formative Assessment as per NEP guidelines are compulsory</i>	

References	
1	Ian Heywood (2011), An Introduction to Geographical Information Systems, Pearson
2	Aronoff, S. (1989), Geographic Information Systems: A Management Perspective, Geocarto International: Vol. 4, No. 4, pp. 58-58.
3	Elangovan, K. (2006), GIS - Fundamentals, Applications, and Implementations, Nipa
4	Chang, Kang – Tsung (2015), Introduction to Geographical Information Systems, McGraw-Hill Education
5	Bhatta, B. (2011), Remote Sensing and GIS, Oxford
6	Sharma, H.S. (2006), Mathematical Modelling in Geographical Information System, Global Positioning System and Digital Cartography – New Delhi, India
7	Spatial Analysis and Location-Allocation Models - Ghosh, A. and G. Rushton (1987)
8	Geographic Information Systems and Cartographic Modelling - Tomlin, C.D. (1990)
9	Geographic Information Systems and Science – Paul A. Longley, et.al. (2015)

References	
10	Geographic Information Systems and Environmental Modelling - Clarke, C.,K. (2002)
11	An Introduction to Geographical Information Systems, 3rd Edition- Ian Heywood, Sarah Cornelius, Steve Carver (2009)
12	Concepts and Techniques of Geographic Information Systems- Chor Pang Lo, Albert K.W. Yeung (2016)
	Web resources:
1	IIRS MOOC programme: https://isat.iirs.gov.in/mooc.php
2	ITC Netherlands, Principles of GIS https://webapps.itc.utwente.nl/librarywww/papers_2009/general/principlesgis.pdf
3	Geographical Information Systems: Principles, Techniques, Management and Applications https://www.geos.ed.ac.uk/~gisteac/gis_book_abridged/
4	https://www.esri.com/en-us/home

