

**GOVERNMENT ARTS COLLEGE  
(AUTONOMOUS)**

**COIMBATORE - 641 018**

**Learning outcomes-based Curriculum Framework (LOCF)  
and  
Choice Based Credit System (CBCS) for**

**M.Sc., GEOGRAPHY**

**SYLLABUS**

**(Effective from Academic year 2021-2022)**



**POSTGRADUATE AND RESEARCH  
DEPARTMENT OF GEOGRAPHY**

**MAY-2021**

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## **PREAMBLE**

The UGC committee constituted for preparing the Learning Outcomes Based Curriculum Framework for MSc. Geography. The Committee suggested the curriculum for the students considering the global, national, regional, local issues and programs for better learning outcomes. The LOCF is designed to emphasize the teaching-learning process at the Postgraduate level to sensitize and train the students to develop a sound and systematic approach regarding mechanism and processes of natural and human activities. The focus is to help the students to understand the latest tools and techniques, which would help in giving focused and precise understanding of geographical phenomenon. The purpose is to enhance the capability of the students in perceiving, creating and analyzing sound geographical bases and concepts.

Over the past decades the higher education system of our country has undergone substantial structural and functional changes resulting in both quantitative and qualitative development of the beneficiaries. Such changes have gained momentum with the introduction of Choice Based Credit System (CBCS) which further expects learning outcome-based curriculum in order to maximize the benefits of the newly designed curriculum. The learning outcome-based curriculum will definitely help the teachers of the discipline to visualize the curriculum more specifically in terms of the learning outcomes expected from the students at the end of the instructional process. It is pertinent to mention here that the purpose of education is to develop an integrated personality of the individual and the educational system provides all knowledge and skills to the learner for this.

Tamil Nadu State Council for Higher Education (TANSCHE) has formed the State Integrated Boards of Studies, which, with great diligence and expertise has devised the mandatory areas that have to be covered for three-year under graduation and two-year post graduation courses to realize the facilitation of the mobility of faculty and students from one university to another and to easily solve the problem of equivalence among courses. Great care has been taken so that these areas would take 75% of the course content and the remaining 25% can be decided by the individual institutions. The areas that must be covered by the student that are mandatory for earning the degree to have due value has been worked out so that the student will gain enough depth of knowledge in the subject concerned. 25% percent of the syllabus should be designed by the institutions, and the areas covered under this also must have a weightage of 25%. This gives the autonomous institution seamless

liberty on every Board of Studies (BOS) to innovate and experiment, and more importantly, it is here that the institution devises appropriate strategies by which (i) to make creative and critical applications of what has been learnt in the mandatory components, and (ii) to meaningfully connect the learners to the career demands and expectations. It is essential that the theoretical subject knowledge of the students must be translated into practical hands-on experience.

This Learning Outcome based Curriculum Framework is designed to emphasize the teaching and learning process at the postgraduate level, M.Sc., from teacher centric to student centric by strengthening the quality of teaching and learning in the present day real life scenario of global, regional and local level. It is considered learning as an activity of creativity of innovations and analyzing geographical phenomena. The committee prepared the major learning outcomes, which would help the students to understand and critically analyze various dimensions of the geographical issues.

The following objectives would be achieved:

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

## 1. INTRODUCTION

Geography has been broadly accepted as a bridge discipline between human and physical sciences. In the beginning, geography focussed on the physical aspects of the earth but the modern geography is an all-encompassing discipline that seeks to understand the earth and all of its human and natural processes as integrating elements. Geography has emerged through time as a trans-disciplinary subject integrating the regional diversity with the concepts of the timing of space and the spacing of time. It provides broad, human and place-centred perspectives on the transformation of rural ecology to globalized urban landscape at different levels, from the local/regional/national to global. Geography is transformed through:

- Journey from Village Ecology to Urban Regional Studies
- Qualitative Techniques to Spatial Information Technology
- Global to Micro-level Community Perception Approach

It is essential to focus on the current socio-spatial problems, issues and challenges to make the students aware of the application of geography to sort out the societal upcoming problems. It is also essential to rejuvenate the ancestral geographical knowledge to address the current local and global problems. In the light of exponential changes in the field of arts, science and technology, it is to be studied from multifaceted angles.

It is important for the policy makers to consider the geo-spatial aspects with references to the location and in context of the best utilization of public utilities. It is further expected that if the above said spatial aspects are considered, it will certainly develop the lagging regions and people living therein.

### 1.1 Types of courses and Course structure

Each program may have three types of courses namely Core courses, Elective courses and Self-study/Skill-based courses

#### 1.1.1 Core Courses

The Core courses are those courses whose knowledge is deemed essential for the students registered for a particular Master's degree program. Where feasible and necessary two or more programs may prescribe one or more common core courses.

- The core courses shall be mandatory for all the students registered for the master's degree program.
- The core courses shall be spread all the semesters of the program.

### **1.2.1 Elective courses**

The elective courses can be chosen from a pool of papers. These courses are intended to

- Allow the student to specialize in one or more branches of the broad subject area;
- Help the student to acquire knowledge and skills in a related area that may have applications in the broad subject area;
- Help the student to bridge any gap in the curriculum and enable acquisition of essential skills, for example, statistical, computational, language, communication skills etc.
- Help the student to pursue area of interest
- The student may also choose additional elective courses offered by the college to enable him /her to acquire extra credits from the discipline or across the discipline

### **1.3.1 Project work**

A course (core/elective/self-study/skill based) may take the form of a project work.

## **2. LEARNING OUTCOMES BASED APPROACH TO CURRICULUM**

### **PLANNING IN MSc. GEOGRAPHY**

#### **2.1 Nature and Extent**

Learning Outcomes based Curriculum Framework (LOCF) for geography curriculum revision incorporates dynamic processes including fundamental and modern techniques, contemporary paradigms such as global initiatives like Sustainable Development Goals (SDGs), Disaster Risk Reduction (DRR), Paris Climate Action and national initiatives like smart cities, Securities of food, water, energy, human health and livelihood, biodiversity, and disaster management. The approaches are to make geography more scientific and societal-need oriented that could be the panacea of India's developmental challenges. Geography uses scientific knowledge with the current focus that includes spatio-temporal analysis, skill development and GIS Technology in sustainable development and human security.

#### **2.2 Aims of M.Sc. Programme**

Four distinct and new learning outcomes have been incorporated from each Course such as:

- Appreciate the relevance of geographical knowledge to everyday life.
- Demonstrate the ability to communicate geographic information by utilising both lecture and practical exercises.
- Inculcate the ability to evaluate and solve geographical problems effectively.
- Demonstrate the skills in using geographical research tools including spatial statistics, cartography, remote sensing, IRNSS and GIS Technology.
- Based on the field knowledge and advanced technologies, the students should be able to understand the on-going geographical problems in different regions and levels with appropriate pragmatic solutions.

### 3. GRADUATE ATTRIBUTES IN M.Sc., GEOGRAPHY

- 1. Disciplinary knowledge-Basic Concept:** The fundamental concepts and philosophical foundation of each course need to be discussed.
- 2. Understanding Landscape:** An understanding of landscape at different levels needs to be discussed and understood for a thorough knowledge of spatial dimensions.
- 3. Understanding Ecosystem Structure and Potential:** To comprehend the dynamic dimensions of human and ecosystem relationships.
- 4. Human Perception and Behaviour:** Learning human perception and behaviour to acquire the geographical knowledge evolved over time, is essential to improve decision making process.
- 5. Identification of Critical Problems and Issues:** Detection and identification of the critical problems and spatial issues are essential for sustainable development.
- 6. Field Based Knowledge:** Field based knowledge is essential to understand the ground reality, spatial patterns and processes.
- 7. Spatial Tools and Techniques:** The basics and applications of spatial tools and techniques are essential to make the studies more scientific and applicable.
- 8. Statistical Techniques:** Use of statistical tools and techniques is essential for precise and objective geographic analysis and interpretation of complex phenomena.
- 9. Applied Dimensions:** Identification of the critical problems and spatial issues form the core of the modern geography for various applications and decision making, including Resources, Environment & Disaster Management, Land Use Planning, and Urban and Regional Development together with Climate Change Mitigation and Adaptation, etc.
- 10. Case Study based Analysis:** There is a need to understand the specificities of the problems in specific areas for their in depth comprehension and solution. The case studies are essential, especially to find out the solutions to the lagging regions for their solutions based on first-hand information.



**11. Public Policy and Management:** Spatial aspects and dimensions are the integral parts in the policy making for sustainable regional development. Geographical knowledge needs to be inculcated for application and solutions of the various local, regional and national problems.

**12. Communication Skills:** Communication through models, maps, images and other geographical tools form the sound base for the dissemination of geographical information.

#### **4. QUALIFICATION DESCRIPTORS FOR M.Sc., PROGRAMME IN GEOGRAPHY**

The qualification descriptors for the M.Sc., programme in Geography shall have the learning attributes such as field knowledge, use of advance tools and techniques for better comprehension of space and society etc. It also involves awareness among the students regarding the issues of different regions and socio-cultural aspects. The main qualification descriptors for the geography M.Sc. Students are to develop the critical evaluation and understanding. Each Honour student in Geography should be able to;

- Demonstrate systematically geographical knowledge and understanding the theoretical as well as practical applications with understanding of various aspects.
- Demonstrate the ability to understand the significance of geographical aspects in relation to development of the regions and minimizing regional inequalities.
- Demonstrate the ability and geographical thinking critically regarding rural and urban spaces and their day-to-day problems with the application of geographical knowledge.
- Students have to demonstrate their geographical knowledge acquired in the class and apply the same in real world.
- Recognise the scope of geography in terms of exploring the career opportunities, employment and life-long engagement in teaching and utilise the knowledge for publication for the future academic endeavours.

The students have to develop the ability through the theoretical and practical means for realising the Sustainable Development Goals (SDG) both in rural and urban spaces to minimize the differentials in developmental aspects.

## **5. THE PROGRAMME LEARNING OUTCOMES OF M.Sc., GEOGRAPHY PROGRAMME**

The programme learning outcomes relating to M.Sc., Programme in geography:

- Demonstrating the understanding of basic concepts in geography.
- Demonstrating the coherent and systematic knowledge in the discipline of geography to deal with current issues and their solution.
- Display an ability to read and understand maps and topographic sheets to look at the various aspects on the space.
- Cultivate ability to evaluate critically the wider chain of network of spatial aspects from global to local level on various time scales as well.
- Recognize the skill development in Geographical studies programme as part of career avenues in various fields like teaching, research and administration.

It is also suggested that after the completion of M.Sc., Programme, students should be able to demonstrate the knowledge obtained in such way so that they can explore the employability options and service to the society.

**M.Sc., GEOGRAPHY Degree Course**  
**PG - SCHEME OF EXAMINATIONS: CBCS PATTERN**  
 (For the students admitted during the academic year 2021 - 2022 and onwards)

Sub Code	Part	Title of the Paper	Hrs (wk)	Internal (CA) Marks	External Marks	Total Marks	Ext – Min.	Total Pass Mark	Credits
<b>Semester – I</b>									
21MGE11C	A	Core 1: Applied Geomorphology	6	50	50	100	25	50	4
21MGE12C	A	Core 2: Applied Climatology	6	50	50	100	25	50	4
21MGE13C	A	Core 3: Advanced Cartography	6	50	50	100	25	50	4
21MGE14E	B	Elective I: Environmental Geography	6	50	50	100	25	50	4
21MGE25P	A	<b>Core Practical I:</b> Techniques of Terrain Mapping	3	Examination at the end of Even Semester					
21MGE26P	A	<b>Core Practical II:</b> Mapping of Qualitative and Quantitative Data	3	Examination at the end of Even Semester					
<b>Semester – II</b>									
21MGE21C	A	<b>Core 4:</b> Urban Geography	6	50	50	100	25	50	4
21MGE22C	A	<b>Core 5:</b> Concepts and Trends in Geography	6	50	50	100	25	50	4
21MGE23C	A	<b>Core 6:</b> Social ,Cultural and Political Geography	6	50	50	100	25	50	4
21MGE24E	B	<b>Elective II:</b> Statistical Methods in Geography	4	50	50	100	25	50	4
21MGE25P	A	<b>Core Practical I:</b> Techniques of Terrain Mapping	4	50	50	100	25	50	3
21MGE26P	A	<b>Core Practical II:</b> Mapping of Qualitative and Quantitative Data	4	50	50	100	25	50`	3

Sub Code	Part	Title of the Paper	Hrs (wk)	Internal (CA) Marks	External Marks	Total Marks	Ext – Min.	Total Pass Mark	Credits
<b>Semester – III</b>									
21MGE31C	A	<b>Core 7:</b> Population and Geography of Health	6	50	50	100	25	50	4
21MGE32C	A	<b>Core 8:</b> Agricultural Geography	6	50	50	100	25	50	4
21MGE33C	A	<b>Core 9:</b> Research Methodology in Geography	6	50	50	100	25	50	4
21MGE34E	B	<b>Elective III:</b> GIS and Its Applications	4	50	50	100	25	50	4
21MGE45P	A	<b>Core Practical III:</b> GNSS and GIS mapping survey	4	Examination at the end of Even Semester					
21MGE46P	A	<b>Core Practical IV:</b> Quantitative Techniques in Geography	4	Examination at the end of Even Semester					
<b>Semester – IV</b>									
21MGE41C	A	<b>Core 10:</b> Regional Planning and Development	5	50	50	100	25	50	4
21MGE42C	A	<b>Core 11:</b> Geography of India	5	50	50	100	25	50	4
21MGE43C	A	<b>Core 12:</b> Transport and Industrial Geography	5	50	50	100	25	50	4
21MGE44E	B	<b>Elective IV:</b> Remote Sensing and GNSS	4	50	50	100	25	50	3
21MGE45P	A	<b>Core Practical III:</b> GNSS and GIS mapping survey	4	50	50	100	25	50	3
21MGE46P	A	<b>Core Practical IV:</b> Quantitative Techniques in Geography	4	50	50	100	25	50	3
21MGE47V	A	<b>Project Viva Voce</b>	3	50	50	100	25	50	15
<b>Total Credits</b>						<b>2100</b>			<b>90</b>

Core - Includes core theory, practical and electives

Includes 50/50 continuous Internal Assessment Marks for Theory and Practical papers respectively

Project evaluation done by both Internal and External examiner for 100 Marks

<b>Subject</b>	<b>Part</b>	<b>No. of Papers</b>	<b>Credit/Paper</b>	<b>Total Credit</b>	<b>Total Marks</b>
Core Papers	A	12	4	48	1200
Practical Papers	A	4	3	12	400
Project and Viva-voce	A	1	15	15	100
Elective –Theory	B	4	3/4	15	400
<b>Total</b>		<b>21</b>		<b>90</b>	<b>2100</b>

Year	Sem.	Subject Code	Title of the paper	Hours/ Week
2021 -2022 onwards	I	21MGE11C	CORE 1: APPLIED GEOMORPHOLOGY	6

### **COURSE LEVEL OUTCOMES:**

On the successful completion of the course, students will be able to:

1. Understand the Fundamental Concepts of Geomorphology.
2. Understand the functioning of Earth systems in real time and analyze how the natural and anthropogenic operating factors affect the development of landforms.
3. To analyse the process of weathering, Mass movement and understand the landform creation.
4. To understand the features of Glacial, Aeolian and coastal land form creation for geomorphic processes
5. Distinguish between the mechanisms and these processes
6. Understand the roles of structure, process, stage and time in shaping the landforms development theories and slope development theories.
7. Interpret geomorphologic maps and apply the knowledge in geographical research.
8. To apply the spectrum of application in various discipline.

### **UNIT I**

**Fundamentals of Geomorphology:** Meaning, Nature, Scope and Development- Main Branches of Geomorphology -Fundamental Concepts –Catastrophism, Uniformitarianism, Neo-Catastrophism- Geological Time Scale.

### **UNIT II**

**Distribution of Oceans and Continents:**Concept of Isostasy: Models of Airy and Pratt - Continental Drift Theory - Sea-Floor Spreading - Plate Tectonics - Earth Movements: Folding, Faulting, Seismicity and Vulcanicity.

### **UNIT III**

**Geomorphic Processes** – Denudation and Weathering, Mass Movement - Dynamics of Landforms – Fluvial, Coastal and Karst Landforms, Glacial Processes and Landforms, Ice Ages, Aeolian Processes and Landforms.

### **UNIT IV**

**Conceptual Development in Geomorphology:** Theories of Cycle of Erosion - W.M. Davis Concept of Cycle of Erosion, W. Penck Concepts of Erosion Cycle and L.C. King Cycle of Pediplanation- Slope Development Theories: Slope Decline Theory of W.M. Davis, Slope Replacement Theory of W. Penck and Parallel Retreat Theory of L.C. King - Morphogenetic Regions.

## UNIT V

**Applied Geomorphology:** Meaning - Nature and Objectives- Applications in Mineral Exploration – Hydrology –Coastal Zone Management- Military - Engineering –Forestry– Water Resource Management – Land Use – Regional Planning.

### PEDAGOGY STRATEGIES:

- Board and Chalk lecture
- Power point slide presentations
- Seminar
- Assignments
- Online and Offline Class Practicals
- Quizes
- Group discussion
- Field visit

### REFERENCE:

1. Dayal, P., (1995). Text Book of Geomorphology, Shukla Book Depot, Patna.
2. Savindra Singh, (2002). Geomorphology, PrayagPustakBhawan, Allahabad.
3. Sharma, V.K., (1986). Earth Surface Process and forms, Tata McGraw Hill Publishing Company Ltd, New Delhi.
4. Strahler, A.N. and Strahler A.H., (1992). Modern Physical Geography, John and Wiley Sons, New York.
5. Thornbury, W.D., (1984). Principles of Geomorphology, John Wiley and Sons, New York.

### FURTHER READING:

1. Bloom, Arthur L. (1998). Geomorphology, Pearson Education Pvt. Ltd. Singapore.
2. Kale, V.S., Gupta, A. (2001). Introduction to Geomorphology, Orient Longman.
3. Kearey, P., Klepeis, K.A., Vine, F.J. (2011). Global Tectonics, 3rd ed, Wiley-India.
4. Knighton, A.D. (1984). Fluvial Forms and Processes, Edward Arnold, London.
5. McCullagh, P. (1978). Modern Concepts in Geomorphology, Oxford University Press. UK.
6. Philip Lake. (2006). Physical Geography. Cambridge University Press, UK
7. Thornbury, W.D., (1984). Principles of Geomorphology, John Wiley and Sons, New York.
8. Woolridge & Morgan. (1986). An outline of Geomorphology. Longman. London.

### Website(s):

- <https://www.britannica.com/geomorphology>
- <https://www.sciencedirect.com/geomorphology>
- [https://study.sagepub.com/sites/default/files/01\\_Gregory\\_Lewin\(web\)\\_Ch-01%20\\_1.pdf](https://study.sagepub.com/sites/default/files/01_Gregory_Lewin(web)_Ch-01%20_1.pdf)
- <https://en.wikipedia.org/wiki/Geomorphology>
- <https://www.elsevier.com/Geomorphology>
- <https://serc.carleton.edu/NAGTWorkshops/geomorph/index.html>
- <https://www.physicalgeography.net>



**COURSE LEVEL MAPPING OF PROGRAM LEVEL OUTCOMES.**

			Course Level Outcomes (CLO)							
			1	2	3	4	5	6	7	8
<b>Program Level Outcomes (PLO)</b>	<b>Disciplinary Knowledge</b>	<b>1</b>	✓	✓		✓		✓	✓	✓
	<b>Communication skills</b>	<b>2</b>	✓		✓			✓		✓
	<b>Critical thinking</b>	<b>3</b>		✓	✓		✓	✓		
	<b>Research-related skills</b>	<b>4</b>		✓	✓		✓		✓	✓
	<b>Analytical reasoning</b>	<b>5</b>		✓	✓	✓		✓	✓	
	<b>Problem solving</b>	<b>6</b>		✓	✓		✓		✓	
	<b>Team work</b>	<b>7</b>			✓	✓		✓		✓
	<b>Moral and ethical awareness</b>	<b>8</b>	✓	✓		✓		✓		✓

Year	Sem.	Subject Code	Title of the paper	Hours/Week
2021 -2022 onwards	I	21MGE12C	CORE 2: APPLIED CLIMATOLOGY	6

### COURSE LEVEL OUTCOMES:

On the successful completion of the course, students will be able to:

1. Comprehend the climatic characteristics and its bearing on planet earth.
2. Appreciate the meaning of applied climatology and heat balance.
3. Comprehend the atmospheric pressure and General Circulation of the Atmosphere.
4. Analyze the foundational classification of climate.
5. Evaluate the climate change in the past, Human impact on Global Climate.
6. To apply the climatic knowledge to various problems related to climate.
7. Discuss the El-Nino, Southern Oscillation (ENSO) and La-Nina Impacts on climatic changes.
8. Synthesize and develop the idea of Applications in Climatology.

### UNIT I

**Applied Climatology:** Meaning, Nature and Scope – Relation with Meteorology- Atmosphere: Origin, Composition and Structure– Insolation - Heat Balance of the Earth - Temperature: Controls and Distribution.

### UNIT II

**Atmospheric Pressure:** Distribution - General Circulation of the Atmosphere: Planetary, Seasonal and Local winds - Jet Streams: Characteristics - Atmospheric Moisture: Humidity, Fogs - Clouds - Precipitation - Air Masses and Fronts.

### UNIT III

**Atmospheric Disturbances:** Cyclones and Anticyclones (Tropical and Temperate) - Climatic Classification: Koppen and Thornthwaite - Ocean and Atmospheric interaction: El-Nino, Southern Oscillation (ENSO) and La-Nina Impacts.

### UNIT IV

**Meteorological Hazards and Disasters:** Thunderstorms, Tornadoes, Hailstorms, Heat and Cold waves, Drought and Cloudburst, Glacial Lake Outburst (GLOF) -Climate Change: Evidences and Causes of Climatic Change in the past, Human impact on Global Climate.

### UNIT V

**Applications in Climatology:** Agro-Climatology - Climate and Human Health - Human Comfort– Climate and Housing – Climate and Water Supply – Climate and Urban Planning - Indian Meteorological Department (IMD): Functions - Weather Forecasting: Types – Meteorological Satellites.

## **PEDAGOGY STRATEGIES:**

- Board and Chalk lecture
- Power point slide presentations
- Seminar
- Assignments
- Online and Offline Class Practicals
- Quizes
- Group discussion

## **REFERENCES:**

1. Lal, D.S., (1990). Climatology, Chatianya Publishing House, Allahabad.
2. Richmond W. Longley (1970). Elements of Meteorology, John Willey & sons inc, New York
3. Siddhartha, K., (2005). Atmosphere, Weather and Climate, Kisalaya Publications Pvt. Ltd., New Delhi
4. Tewartha, G.T., (1980). Introduction to Climate, Tata McGraw Hill, New York.

## **FURTHER READING:**

1. Barry R. G. and Carleton A. M., (2001) Synoptic and Dynamic Climatology, Routledge, UK.
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3. Bhutani, S., (2000). Our Atmosphere, Kalyani Publishers, Ludhina.
4. Craghan M, (2003).Physical Geography: A Self Teaching Guide, John Wiley & Sons, Canada.
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7. Oliver J. E. and Hidore J. J., (2002). Climatology: An Atmospheric Science, Pearson Education, New Delhi.
8. Savindra Singh, (2002). Physical Geography, PrayagPustakBhawan, Allahabad.

## **Website(s):**

- <https://swayam.gov.in/course/4242-physical-geography-ii-climatology-oceanography>
- <https://www.britannica.com/science/climatology>
- <https://www.ncdc.noaa.gov/>
- <http://www.realclimate.org/>
- <https://serc.carleton.edu/NAGTWorkshops/complexsystems/courses/42415.html>
- <https://www.loc.gov/rr/scitech/SciRefGuides/weather.html>
- <http://www.globalissues.org/issue/178/climate-change-and-global-warming>
- <https://www.skymetweather.com/>
- <http://www.imd.gov.in/Welcome%20To%20IMD/Welcome.php>
- <https://www.windy.com>
- <https://www.environmentalscience.org/climatology>

**COURSE LEVEL MAPPING OF PROGRAM LEVEL OUTCOMES.**

			Course Level Outcomes (CLO)							
			1	2	3	4	5	6	7	8
<b>Program Level Outcomes (PLO)</b>	<b>Disciplinary Knowledge</b>	<b>1</b>		✓			✓	✓		✓
	<b>Communication skills</b>	<b>2</b>	✓		✓	✓			✓	
	<b>Critical thinking</b>	<b>3</b>	✓	✓		✓	✓			✓
	<b>Research-related skills</b>	<b>4</b>			✓		✓		✓	✓
	<b>Analytical reasoning</b>	<b>5</b>	✓	✓		✓			✓	
	<b>Problem solving</b>	<b>6</b>		✓	✓		✓	✓		✓
	<b>Team work</b>	<b>7</b>	✓		✓	✓	✓	✓		✓
	<b>Moral and ethical awareness</b>	<b>8</b>		✓	✓	✓			✓	

Year	Sem.	Subject Code	Title of the paper	Hours/Week
2021 -2022 onwards	I	21MGE13C	CORE 3: ADVANCED CARTOGRAPHY	6

### COURSE LEVEL OUTCOMES:

On the successful completion of the course, students will be able to:

1. Comprehend basics knowledge of the earth shape, size, and areas.
2. Understand the map scales and kinds of symbols and their usage.
3. Apply and Use of Colour and pattern for making maps.
4. Analyse the Map compilation and Generalization for making of quality maps.
5. Evaluate the Technology and its application in Cartography in the recent period.
6. Construct thematic maps, general purpose maps and special purpose maps.
7. Recognise the advancement of cartography with computer cartography.
8. Prepare different types of projection according to the requirements of map making.

### UNIT I

**Applied Cartography:** Meaning, Nature and Historical Development - The Earth: Shape, Size, Areas and Great Circle – Co-ordinate System: Cartesian and Spherical, Latitude and Longitude, Directions and Distance - Concept of Base Map - Map Projections: Merits and Demerits of Cylindrical, Conical and Zenithal - Projection Suitable for Maps of India.

### UNIT II

**Basics of Map Making:** Determination of Map scale – Simplification - Symbolization: Kind of Symbols: Point, Line and Area- Maps: Types - Thematic, Isarithmic, Dasymetric, Chorocromatic, Choroschematic, Choropleth and Isoleths.

### UNIT III

**Map Design and Layout:** Principles of Map Design - Theory of Visual Perception- Constraints in Map Designing - Design Planning: Colour Theory and Models – Colour and Pattern Use- Lettering and Typography: Lettering Style, Size, and Types - Nature of Typography– Lettering the Map- Geographical Names.

### UNIT IV

**Map Compilation and Generalization** - Compilation Process – Generalization – Map Reproduction: Methods and Techniques of Map Reproduction –Modern Printing: Inkjet Print, Laser Print and 3D Printing–Dynamic/Interactive Mapping- Mapping Organizations of India: GSI, SOI and NATMO - International cooperation in Cartography: ICA and UNGIWG.

## **UNIT V**

**Technology and Its Application in Cartography:** Aerial Photos and Satellite Data, Generating Cartographic Data From Aerial Photographs and Remote Sensing Data Products- Impact of Information Technology on Cartography: GIS, LIS and GNSS- Automation in Cartography – Web Map Design –Geo-visualization.

### **PEDAGOGY STRATEGIES:**

- Board and Chalk lecture
- Power point slide presentations
- Seminar
- Assignments
- Online and Offline Class Practicals
- Quizes
- Group discussion

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2. Gopal Singh, (2006). Map work and Practical Geography, Vikas Publishing House, New Delhi.
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- [http://www.library.yale.edu/MapColl/gis\\_workshop\\_materials.html](http://www.library.yale.edu/MapColl/gis_workshop_materials.html)
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- [http://www.wvu.edu/huxley/spatial/tut/cart/cart\\_arcgis.htm](http://www.wvu.edu/huxley/spatial/tut/cart/cart_arcgis.htm)
- <http://andywoodruff.com/>
- <https://www.cartographersguild.com>
- <https://www.esri.com/arcgis-blog/products/product/mapping/favorite-tools-and-resources-forcartographers/>
- <https://makingmaps.net/>
- NRSA
- ISRO
- Google maps/Earth
- Bhuvan
- SOI/NATMO

**COURSE LEVEL MAPPING OF PROGRAM LEVEL OUTCOMES.**

			Course Level Outcomes (CLO)							
			1	2	3	4	5	6	7	8
<b>Program Level Outcomes (PLO)</b>	<b>Disciplinary Knowledge</b>	1			✓	✓		✓	✓	
	<b>Communication skills</b>	2	✓	✓			✓	✓		✓
	<b>Critical thinking</b>	3	✓		✓				✓	✓
	<b>Analytical reasoning</b>	4		✓		✓	✓		✓	
	<b>Research-related skills</b>	5	✓		✓	✓			✓	
	<b>Problem solving</b>	6		✓		✓		✓		
	<b>Application of learning</b>	7	✓		✓		✓			✓
	<b>Social commitment</b>	8		✓	✓		✓			

Year	Sem.	Subject Code	Title of the paper	Hours/ Week
2021 -2022 onwards	I	21MGE14E	<b>ELECTIVE I: ENVIRONMENTAL GEOGRAPHY</b>	<b>6</b>

### **COURSE LEVEL OUTCOMES:**

On the successful completion of the course, students will be able to:

1. Analyze the scope, significance and various approaches of Environmental Geography.
2. Understand the structure of the ecosystem as well as the Man – Environment interrelationships.
3. Identify man’s impact and modification on the biosphere.
4. Examine the causes and consequences of Environmental deterioration.
5. Understand the environment management and protection laws.
6. Demonstrate an integrative approach to environmental issues with a focus on sustainability
7. Understand and evaluate the global scale of environmental problems
8. Develop critical-thinking skills, analyze real-world problems, and understand the power of narrative to create sustainable solutions for local and global communities.

### **UNIT I**

**Nature and Scope of Environmental Geography :**Man and Environment Relationship – Changing Nature of the Concepts- Environmentalism – Ecosystem (Geographic Classification) and Human Ecology – Structure and Functions: Tropic Levels, Energy Flows, Cycles (Geo-Chemical, Carbon, Nitrogen and Oxygen), Food Chain, Food Web and Ecological Pyramid - Natural Disruptions of the Ecosystem - Biodiversity, Leopold Matrix, Ecological Footprint, Desert and Coastal Ecosystems.

### **UNIT II**

**Environmental Disasters and Hazards:** Meaning, Classification and Types (Natural and Man Induced Hazards) Causes, Impacted Remedial Measures - Changes in Patterns of Land Use; Population Explosion and Food Security; Deforestation, Desertification, Soil Erosion, Global Warming, Ozone depletion and Urban Heat Island.

### **UNIT III**

**Man’s Modification on Biosphere:** Agriculture – Green Revolution – HYV, Bio-Fertilizers, Pesticides and Insecticides–Environmental Degradation: Concepts, Types, Process and Causes– Environmental Degradation Affects to Deforestation, Agricultural Development, Population Growth, Industrial Development and Urbanization.



## **UNIT IV**

**Environmental Pollution:** - Environmental Pollution: Sources, Causes and Effects, Control Measures - Types: Air, Water, Land and Noise Pollution - Solid Waste Management: Causes, Effects and Control Measures of Urban and Industrial Waste.

## **UNIT V**

**Environmental Management and Planning:** Environmental Law and Protection - Environmental Impact Assessment - CPCB – TNPCB –National Programmes and Policies: Legal Framework, Environmental Policy, International Treaties - International Programmes and Policies: Brundtland Commission, Kyoto Protocol, Agenda 21, Sustainable Development Goals and Paris Agreement.

### **PEDAGOGY STRATEGIES:**

- Board and Chalk lecture
- Power point slide presentations
- Seminar
- Assignments
- Online and Offline Class Practical
- Quizes
- Group discussion

### **REFERENCE:**

1. Odum, E. P. et al, (2005).Fundamentals of Ecology, Ceneage Learning India.
2. Savindra Singh (1991). Environmental Geography, Kalyan Publications, New Delhi.
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### **FURTHER READING:**

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**COURSE LEVEL MAPPING OF PROGRAM LEVEL OUTCOMES.**

			Course Level Outcomes (CLO)							
			1	2	3	4	5	6	7	8
<b>Program Level Outcomes (PLO)</b>	<b>Disciplinary Knowledge</b>	<b>1</b>	✓		✓	✓	✓		✓	
	<b>Communication skills</b>	<b>2</b>	✓				✓	✓	✓	
	<b>Critical thinking</b>	<b>3</b>		✓	✓	✓		✓		✓
	<b>Research-related skills</b>	<b>4</b>	✓		✓	✓	✓	✓	✓	
	<b>Analytical reasoning</b>	<b>5</b>		✓		✓		✓		✓
	<b>Problem solving</b>	<b>6</b>		✓		✓		✓	✓	
	<b>Team work</b>	<b>7</b>		✓	✓	✓		✓	✓	✓
	<b>Moral and ethical awareness</b>	<b>8</b>	✓	✓			✓	✓		✓

Year	Sem.	Subject Code	Title of the paper	Hours/ Week
2021 -2022 onwards	II	21MGE21C	CORE 4: URBAN GEOGRAPHY	6

### COURSE LEVEL OUTCOMES:

On the successful completion of the course, students will be able to:

1. Appreciate the fundamentals and patterns of urbanization process.
2. Understand the functional classification of cities and Central Place Theory
3. Analyze the Internal Structure of cities and CBD.
4. Evaluate the Urban concepts and Theories.
5. Study of Urban Expansion with special reference to selected towns need to be encouraged.
6. Identify the Contemporary Urban Issues of pollution, crime and poverty.
7. Examine characteristics of Slums in Indian Cities.
8. Analyse the types of Urban Planning and study about smart cities.

### UNIT- I

**Urban Geography:** Nature and Scope– Origin and Spread of Cities -Theories of Origin of Towns: Gordon Childe, Henri Pirenne and Lewis Mumford- Urbanization: Growth and Causes – World Urbanization – Trends of Urbanization in India.

### UNIT- II

**Urban Morphology:** Definition – Urban Ecology - Urban Land use: Types – Internal Structure of Cities: Burgess, Homer Hoyt, Harris and Ullman -Urban Social Area Analysis - Concept of Central Business District (CBD), Hinterland, Umland and its Characteristics.

### UNIT- III

**Urban Economic Base, Urban Systems and Theories:** Urban Economic Base: Basic and Non-basic Functions - Functional Classification of Towns by H.Nelson and Richard Forstall - Central Place Theory: Christaller and Losch – Urban Systems: The Law of the Primate City and Rank Size Rule.

### UNIT- IV

**Urban Expansion:** Concepts of Megacities, Conurbation, City Region, Smart City and its Characteristics, Global Cities and Edge Cities, Changing Urban Forms: Peri-urban Areas, Rural-Urban Fringe, Suburban, Ring and Satellite Towns.

### UNIT- V

**Contemporary Urban Issues:** Manifestation of Poverty in the City: Urban Slums; Characteristics, Causes, Slums in Indian Cities – Informal Sector Growth, Urban Crime and

Social Exclusion– Environmental Pollution: Air, Water, Noise and Solid Waste- Water Supply and Transport - Urban Planning: Need – Types – Concepts - Urban Planning in India.

### **PEDAGOGY STRATEGIES:**

- Board and Chalk lecture
- Power point slide presentations
- Seminar
- Assignments
- Online and Offline Class Practicals
- Quizes
- Group discussion

### **REFERENCE:**

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- [http://lcgeography.preswex.ie/uploads/6/9/4/9/6949966/chapter\\_5\\_urban\\_land-use\\_theories.ppt](http://lcgeography.preswex.ie/uploads/6/9/4/9/6949966/chapter_5_urban_land-use_theories.ppt)
- <https://www.geographypods.com/1-urban-settlements--service-provision.html>
- <https://www.bbc.co.uk/bitesize/guides/z3n9gdm/revision/3>
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**COURSE LEVEL MAPPING OF PROGRAM LEVEL OUTCOMES.**

			Course Level Outcomes (CLO)							
			1	2	3	4	5	6	7	8
<b>Program Level Outcomes (PLO)</b>	<b>Disciplinary Knowledge</b>	<b>1</b>	✓	✓		✓			✓	✓
	<b>Communication skills</b>	<b>2</b>	✓			✓	✓	✓		✓
	<b>Critical thinking</b>	<b>3</b>	✓		✓	✓			✓	✓
	<b>Research-related skills</b>	<b>4</b>	✓	✓		✓	✓	✓		
	<b>Analytical reasoning</b>	<b>5</b>		✓	✓		✓		✓	
	<b>Problem solving</b>	<b>6</b>	✓		✓	✓	✓			✓
	<b>Team work</b>	<b>7</b>		✓	✓			✓		✓
	<b>Moral and ethical awareness</b>	<b>8</b>		✓	✓	✓			✓	

Year	Sem.	Subject Code	Title of the paper	Hours/Week
2021 -2022 onwards	II	21MGE22C	<b>CORE 5: CONCEPTS AND TRENDS IN GEOGRAPHY</b>	<b>6</b>

### **COURSE LEVEL OUTCOMES:**

On the successful completion of the course, students will be able to:

1. Know the major place of Geography in all other sciences.
2. Summarize the evolution of geographical thought from ancient to modern.
3. Understand geographical thought in different regions of the world
4. Understand the modern geographical thought.
5. Examine the dualism concepts in geographical perspectives.
6. Analyze the Quantification in geography and system approach in geographical studies.
7. Evaluate the recent trends in geographical analysis.
8. Discuss about the Perspectives in Geography in geographical thought.

### **UNIT- I**

**Geography:** Nature and Scope - Place of Geography in Classification of Sciences – Fundamental Concepts- Ancient and Medieval Period: Contributions of Greek, Roman, Arab, Chinese and Indian.

### **UNIT- II**

**Development of Geography in Modern Period:** German School, French School, British School and American School – Contributions of Geographers (Bernhardus Varenus, Immanuel Kant, Alexander Von Humboldt, Carl Ritter, Vidal de la Blache, Schaefer and Hartshorne) - Impact of Darwinian theory in Geographical thought.

### **UNIT- III**

**Dualism and Dichotomies:** Systematic Vs. Regional, Physical Vs. Human, Qualitative Vs. Quantitative and idiographic Vs. Nomothetic -Major Geographic Traditions: Man-Land, Area studies, Spatial and Earth Science.

### **UNIT- IV**

**Contemporary Tradition:**– Paradigms in Geography- Paradigm Shift - Kuhn’s paradigm – Quantitative Revolution -Explanations in Geography: Laws and Theories - Models: Functions, Classification and Uses– Hypothesis -Systems Analysis: Structure- Contemporary trends in Indian Geography: Cartography, Thematic and Methodological Contributions.

### **UNIT- V**

**Perspectives in Geography:** Positivism, Behaviouralism, Humanism, Structuralism, feminism and postmodernism - Current ideas in Geography: Human Ecology, Welfare Geography, Behavioural Geography and Geo-Spatial Technology.

## **PEDAGOGY STRATEGIES:**

- Board and Chalk lecture
- Power point slide presentations
- Seminar
- Assignments
- Online and Offline Class Practicals
- Quizes
- Group discussion

## **REFERENCES:**

1. Adhikari .S (1992). Geographical Thought, Chiatanya Publishing House, Allahabad.
2. Dikshit .R .D (2006). Geographical Thought – A contextual History of Ideas, Prentice Hall of India.
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- <https://web.csulb.edu/~rodrigue/geog140/lectures/4tradgeo.html>
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- <https://www.directionias.com/wp-content/uploads/2019/04/Geographical-Thought-by-Neetu-Singh-Class-Notes-with-video-lecture.pdf>

## COURSE LEVEL MAPPING OF PROGRAM LEVEL OUTCOMES

			Course Level Outcomes (CLO)							
			1	2	3	4	5	6	7	8
<b>Program Level Outcomes (PLO)</b>	<b>Disciplinary Knowledge</b>	<b>1</b>	✓		✓	✓	✓		✓	✓
	<b>Communication skills</b>	<b>2</b>	✓	✓		✓				✓
	<b>Critical thinking</b>	<b>3</b>		✓			✓	✓		✓
	<b>Research-related skills</b>	<b>4</b>	✓	✓				✓	✓	
	<b>Analytical reasoning</b>	<b>5</b>	✓				✓	✓		✓
	<b>Problem solving</b>	<b>6</b>				✓	✓		✓	✓
	<b>Team work</b>	<b>7</b>	✓		✓			✓		
	<b>Moral and ethical awareness</b>	<b>8</b>			✓	✓			✓	



Year	Sem.	Subject Code	Title of the paper	Hours/ Week
2021 -2022 onwards	II	21MGE23C	<b>CORE 6: SOCIAL, CULTURAL AND POLITICAL GEOGRAPHY</b>	6

### **COURSE LEVEL OUTCOMES:**

On the successful completion of the course, students will be able to:

1. Understand the social justice, gender issues and social development.
2. Acquire knowledge on spatial dimensions of social diversity components.
3. Evaluate fundamental concept of cultural region and cultural ecology.
4. Know about the concept of cultural hearth and realm and diffusion of religion.
5. Explain the concept of nation and state and geo-political theories.
6. Summarize the various morphological classification boundaries.
7. Discuss the different dimensions of electoral geography and Importance of political study.
8. Compare the different organization of SAARC, ASEAN, OPEC and EU.

### **UNIT- I**

**Social Geography:** Definition, Scope and Development- Evolution of Social Geography: Approaches- Possibilistic, Behavioral, Radical and Welfare - Social Structure and Social Processes: Macro and Micro; Social Patterns - Concept of Space: Social Space, Material Space; Social Wellbeing, Social Justice and Gender Issues.

### **UNIT- II**

**Components of Social Geography:** Region as a Social Unit - Social Elements; Class, Caste and Ethnicity with Special Reference to India - Social Structure and Processes, Social Well-being and Quality of Life, Social Exclusion, Social Issues in Urban Areas -Social Area Analysis -Social Ecology - Spatial Distribution of Social Groups in India: Tribe, Caste, Religion and Language.

### **UNIT- III**

**Cultural Geography:** Meaning and Nature, Components of Culture, Cultural Traits, Complexes and Systems - Basic Cultural Processes - Fundamental Themes in Cultural Geography: Concepts of Cultural Region, Cultural Diffusion, Cultural Ecology, Culture Integrations and Cultural Landscape.

### **UNIT- IV**

**Political Geography:** Meaning, Nature, Scope and Approaches- State, Nation and Nation State – Concept of Nation and State, Attributes of State – Frontiers, Boundaries (with special reference to India), Shape, Size, Territory and Sovereignty, Concept of Nation State; Geopolitics; Theories (Heartland and Rim land).

## **UNIT- V**

**Trends and Developments in Political Geography:** Geography of Federalism, Electoral Reforms in India, Determinants of Electoral Behaviour, Geopolitics of Climate Change, Geopolitics of World Resources, Geo-politics of India Ocean, Regional Organisations of Cooperation (SAARC, ASEAN, OPEC, EU). Neo-politics of World Natural Resources.

### **PEDAGOGY STRATEGIES:**

- Board and Chalk lecture
- Power point slide presentations
- Seminar
- Assignments
- Online and Offline Class Practicals
- Quizes
- Group discussion

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12. Panelli, R., (2004). Social Geographies: From Difference to Action, Sage.

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15. Spencer, J. E. and Thomas, W. L. (1969). Cultural Geography, John Wiley and Sons Inc., New York.

**Website(s):**

- <https://www.yourarticlelibrary.com/social-geography/social-geography-definition-study/42831>
- [http://www.wbnsou.ac.in/online\\_services/SLM/PG/PGGR-03-Gr-B.pdf](http://www.wbnsou.ac.in/online_services/SLM/PG/PGGR-03-Gr-B.pdf)
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- <https://www.jagranjosh.com/general-knowledge/regional-distribution-of-tribes-in-india-1521799367-1>
- <https://old.amu.ac.in/emp/studym/99996105.pdf>
- <https://www.e-education.psu.edu/geog128/node/534>
- <http://ndl.ethernet.edu.et/bitstream/123456789/79454/19/Political%20Geography%20GeES%20202063.pdf>

**COURSE LEVEL MAPPING OF PROGRAM LEVEL OUTCOMES.**

			Course Level Outcomes (CLO)							
			1	2	3	4	5	6	7	8
<b>Program Level Outcomes (PLO)</b>	<b>Disciplinary Knowledge</b>	<b>1</b>	✓	✓	✓		✓	✓	✓	
	<b>Communication skills</b>	<b>2</b>	✓		✓	✓				✓
	<b>Problem solving</b>	<b>3</b>	✓			✓		✓		✓
	<b>Analytical thinking</b>	<b>4</b>	✓	✓						✓
	<b>Research related skills</b>	<b>5</b>	✓		✓				✓	✓
	<b>Reflective thinking</b>	<b>6</b>		✓	✓	✓	✓			
	<b>Team work</b>	<b>7</b>	✓			✓				✓
	<b>Moral and ethical awareness</b>	<b>8</b>	✓	✓		✓		✓		✓

Year	Sem	Subject Code	Title of the paper	Hours/Week
2021 - 2022 onwards	II	21MGE24E	ELECTIVE II: STATISTICAL METHODS IN GEOGRAPHY	4

### COURSE LEVEL OUTCOMES:

On the successful completion of the course, students will be able to:

1. Have an introductory idea about statistical methods and tools that are essential for the empirical and analytical study
2. Collect, Analyse and interpret empirical data.
3. Have a better understanding about the Centographic Analysis in Geographic data.
4. Organize proper sampling techniques for the collection of data.
5. Employ appropriate mathematical tools to solve problems.
6. Classify the geographical data relates to the system analysis.
7. Memorise the appropriate tools for research process.
8. Measure the quality of a data and test it for the future studies.

### UNIT- I

**Statistics:** Definition and Concepts - Statistical Geography and Academic Lineage – Measurement of Scales: Nominal, Ordinal, Interval and Ratio - Inferential Statistics: Normal Probability Curve- Meaning, Characteristics and Applications - Standard Error - Confidence Intervals and Fiduciary Limits - Type I and Type II Errors - Estimating Population Means.

### UNIT- II

**Geographical Data:** Data and Its Types - Data Frequency Distribution and Curve – Central Tendency Measures: Mean, Median and Mode – Measures of Dispersion – Variance and Standard Deviation – Measures of Skewness and Kurtosis.

### UNIT- III

**Probabilistic Treatment:** Normal Distribution – Binominal Distribution – Poisson Distribution – Spatial Statistics: Centographic Analysis: Mean, Median and Modal Center– Standard Distance Deviation – Nearest Neighbour Analysis.

### UNIT- IV

**Parametric Statistics:** Sampling Distribution, Null Hypothesis- Alternative Hypothesis - ‘Z’ test – Student ‘T’ test – Analysis of Variance – ‘F’ Distribution - Time Series Analysis.

## **UNIT- V**

**Non-Parametric Statistics:** Chi Square Test — Correlations: Significance of Correlation - Concept of Variance - Rank Difference Method - Pearson's Product Moments Correlation) - Partial and Multiple correlation, Biserial, Point Biserial, tetra choric and Phi correlation. Principle Component Analysis and Cluster Anaysis- Computation of Composite Index - Factor Analysis – SPSS Software - Regression and Multiple Regression equations (concept and applications).

### **PEDAGOGY STRATEGIES:**

- Board and Chalk lecture
- Power point slide presentations
- Seminar
- Assignments
- Online and Offline Class Practicals
- Quizes
- Group discussion

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1. Cole, John P. and Cuchlaine a. M. King (1968). Quantitative Geography, Techniques and Theories in Geography, John Wiley and Sons Ltd.,London.
2. Kothari, C.R. (1996). Research Methodology: Methods and Techniques, VishwasPrakashan, New Delhi.
3. S.P. Gupta (2014).Elementary Statistical Methods- Sultan chand& sons, Educational publishers, New Delhi.
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### **FURTHER READING:**

1. Burt, J.E., Barber, G.M., and Rigby, D.L. (2009). Elementary Statistics for Geographers (3rd Ed.), The Guilford Press.
2. Dey, Ian (1993). Quantitative Data Analysis, Routledge,London.
3. Gupta, C.B.(1978): An introduction to Statistical Methods, VikasPub.House, New Delhi.
4. Hammond, R., and McCullagh, P.S. (1978). Quantitative Techniques in Geography: An Introduction (2nd Ed.), Oxford University Press, USA.
5. King, L.J. (1991). Statistical Analysis in Geography. Prentice Hall, Englewood Cliff
6. Mahmood, A. N.J. (1977). Statistical Methods in Geographical Studies, Rajesh Pub, New Delhi.
7. Mishra, R.P. (1991). Research Methodology in Geography, Concept Publishing, New Delhi.
8. Robinson A.H. (1984). Elements of Cartography, John Wiley,London.
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- <http://marra.cosmo-ufes.org/uploads/1/3/7/0/13701821/compstat-hd.pdf>
- <https://ocw.mit.edu/courses/economics/14-30-introduction-to-statistical-methods-in-economics-spring-2009/lecture-notes/>
- <https://www.statsref.com/StatsRefSample.pdf>
- <https://people.richland.edu/james/lecture/m170/>
- <https://pages.mtu.edu/~tbco/cm3215/StatisticsNotes.pdf>

**COURSE LEVEL MAPPING OF PROGRAM LEVEL OUTCOMES**

			Course Level Outcomes (CLO)							
			1	2	3	4	5	6	7	8
<b>Program Level Outcomes (PLO)</b>	<b>Disciplinary Knowledge</b>	<b>1</b>	✓			✓	✓	✓		
	<b>Communication skills</b>	<b>2</b>	✓			✓		✓		✓
	<b>Critical thinking</b>	<b>3</b>	✓		✓		✓		✓	
	<b>Analytical reasoning</b>	<b>4</b>		✓			✓	✓	✓	
	<b>Research-related skills</b>	<b>5</b>	✓		✓		✓		✓	
	<b>Problem solving</b>	<b>6</b>		✓		✓		✓		
	<b>Application of learning</b>	<b>7</b>	✓		✓		✓		✓	✓
	<b>Social commitment</b>	<b>8</b>			✓		✓	✓		

Year	Sem.	Subject Code	Title of the paper	Hours/ Week
2021 -2022 onwards	II	21MGE25P	<b>CORE PRACTICAL:TECHNIQUES OF TERRAIN MAPPING</b>	4

### **COURSE LEVEL OUTCOMES:**

On the successful completion of the course, students will be able to:

1. To familiarize to the students remember the basic mapping knowledge.
2. Comprehend the representation and interpretation of the profiles.
3. Appreciate the student learn slope of the map.
4. Have comprehensive understand of Hypsographic for the construction of maps.
5. Analyze the real world physical features from the toposheets to draw clinographic curve.
6. Construction and evaluate the results of the Linear and Relief Aspects of morphometric features.
7. Appreciate the preparation of various Linear and Relief Aspects of morphometric features with the application of various techniques.
8. To analyze the topographic knowledge and representation of river thalweg.

### **UNIT- I**

**Representing Relief:** Different Methods: Pictorial (Hachuring, Hill Shading) and Mathematical (Spot Heights, Bench Marks, Trigonometrical Station and Contour) - Interpolation of Contours -Profiles: Meaning and Types: Longitudinal, Transverse Profiles - Simple, Serial, Super-imposed, Projected and Composite profiles – Exaggeration in the Vertical scale.

### **UNIT- II**

**Slope Analysis:** C.K. Wentworth: Method of Average Slope, G.H. Smith: Relative Relief Method and A.H. Robinson: Method of Slope Analysis.

### **UNIT- III**

**Drawing of Hypsographic Curve:** Hypsographic– Percentage Hypsographic – Clinographic Curve and Altimetric Frequency Curve.

### **UNIT- IV**

**Morphometric Analysis- Linear and Relief Aspects:** Linear aspects: Stream Orders, Stream Numbers, Stream Length, Mean Stream Length, Bifurcation Ratio and Mean Bifurcation Ratio - Relief Aspects: Relief ratio and Ruggedness number.

### **UNIT- V**

**Morphometric Analysis–Areal Aspects:** Stream Frequency, Drainage Texture and Drainage Density, Elongation Ratio, Basin Circularity Ratio and Form Factor–Thalweg.

**PRACTICALS:**

- Profile drawing
- Exaggeration of vertical scale
- Slope analysis
- Hypsographic curve drawing
- Morphometric Analysis
- Thalweg

**PEDAGOGY STRATEGIES:**

- Toposheet
- Board and Chalk lecture
- Power point slide presentations
- Seminar
- Assignments
- Online and Offline Class Practicals
- Quizes
- Group discussion
- Field Visit

**REFERENCE:**

1. Khullar (1997). Practical Geography, Educational Publishers, New Delhi.
2. Monk house, F.J. and Wilkinson, H.R., (1989). Maps and Diagrams, B.I.Publications, New Delhi.
3. PijushkantiSaha and Partha Basu, (2010). Advanced Practical Geography, Books and Allied (P) Ltd, Kolkata.
4. Sarkar, A.,(2015). Practical geography: A systematic approach, Orient Black Swan Private Ltd., New Delhi.
5. Singh, R. L., (2005). Elements of Practical Geography, Kalyani Publishers, New Delhi.
6. Zulfequar Ahmad Khan, M. D., (1998). Text Book of Practical Geography, Concept Publishing Company, New Delhi.

**FURTHER READING:**

1. Buch T.W. (1952). Maps – Topographical and Statistical Maps, Oxford Lavender Press – London.
2. Bygott. J. (1955). Mapwork and Practical Geography, University Tutorial Press-London.
3. Gopalsingh, (1996). Map work and practical geography, Vikas Publishing House Pvt. Ltd., New Delhi.
4. Gupta, K.K. and Tyagi V.C.,(1992). Working with Map, Survey of India, DST, New Delhi.
5. Khullar, (1997). Practical Geography, Educational Publishers, New Delhi.
6. Misra, R.P. and Ramesh, A., (2002). Fundamentals of Cartography, Concept Publication Company, New Delhi.
7. Phyllis Dink (1967). Map Work, Atnaram & sons, New Delhi.
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- [https://www.brainkart.com/article/Profile-Diagram\\_33845/](https://www.brainkart.com/article/Profile-Diagram_33845/)
- <https://serc.carleton.edu/mathyouneed/slope/topoprofile.html>
- [https://en.wikipedia.org/wiki/Topographic\\_profile](https://en.wikipedia.org/wiki/Topographic_profile)
- [https://www.e-education.psu.edu/natureofgeoinfo/c7\\_p6.html](https://www.e-education.psu.edu/natureofgeoinfo/c7_p6.html)
- <https://www.britannica.com/science/morphometric-analysis>
- <http://studymaterial.unipune.ac.in:8080/jspui/bitstream/123456789/5516/1/Morphometric%20Analysis.pdf>

**COURSE LEVEL MAPPING OF PROGRAM LEVEL OUTCOMES.**

			Course Level Outcomes (CLO)							
			1	2	3	4	5	6	7	8
<b>Program Level Outcomes (PLO)</b>	<b>Disciplinary Knowledge</b>	<b>1</b>		✓		✓	✓			✓
	<b>Communication skills</b>	<b>2</b>	✓		✓	✓		✓		
	<b>Critical thinking</b>	<b>3</b>		✓	✓				✓	✓
	<b>Research-related skills</b>	<b>4</b>	✓	✓		✓		✓	✓	
	<b>Analytical reasoning</b>	<b>5</b>	✓		✓		✓		✓	✓
	<b>Problem solving</b>	<b>6</b>		✓		✓		✓	✓	✓
	<b>Team work</b>	<b>7</b>	✓		✓		✓			
	<b>Moral and ethical awareness</b>	<b>8</b>		✓	✓	✓			✓	

Year	Sem.	Subject Code	Title of the paper	Hours/ Week
2021 -2022 onwards	II	21MGE26P	<b>CORE PRACTICALII:MAPPING OF QUALITATIVE AND QUANTITATIVE DATA</b>	4

### **COURSE LEVEL OUTCOMES:**

On the successful completion of the course, students will be able to:

1. Think about various types of data used.
2. Identify different types of data and collection
3. To understand the student learns distributional maps.
4. Preparing various types of maps with data collected
5. Analyze the different thematic maps for various data sources.
6. Draw and evaluate the results of the agricultural Data.
7. To analyze the qualitative and quantitative knowledge and representation of diagrams.
8. Observe features in surrounding and interprets.

### **UNIT- I**

**Data:**Sources, Types and Classification-Tabulation– Coding- Sampling: Systematic, Stratified and Random (Point- Line - Area Sampling).

### **UNIT- II**

**Preparations and Interpretation of Graphs:** Simple, Semi log – Log log- Triangular – Lorenz Curve - Distribution Maps – Located Bar, Pie Graph, Proportional Circle and Squares, Wheel diagram, Block piles, Dot and Spheres.

### **UNIT- III**

**Drawing and Interpretation of Maps:** Isopleths: Isotherm, Isobar and Isohyets– Choropleth - Dasymetric – Chrochromatic and Chroschematic - Flow map.

### **UNIT- IV**

**Mapping of Agricultural Data:** Crop Concentration and Diversification: Ranking of Crops: Bhatia and Gibbs - Crop Combination: Weaver, Doi's and Rafiullh.

### **UNIT- V**

**Field Study:** Field Trip / Field Excursions for Maximum of Two Weeks (14 days) are Mandatory and Report of the Field Trip with Geo Tagged Photos and Route Map to be Submitted.

## **PRACTICALS:**

- Sampling Analysis
- Lorenz curve
- Distribution maps drawing
- Crop concentration
- Crop Diversification
- Field study

## **PEDAGOGY STRATEGIES:**

- Board and Chalk lecture
- Power point slide presentations
- Seminar
- Assignments
- Online and Offline Class Practicals
- Quizes
- Group discussion

## **REFERENCE:**

1. Khullar (1997). Practical Geography, Educational Publishers, New Delhi.
2. Monk house, F.J. and Wilkinson, H.R., (1989). Maps and Diagrams, B.I.Publications, New Delhi.
3. PijushkantiSaha and ParthaBasu, (2010). Advanced Practical Geography, Books and Allied (P) Ltd, Kolkata.
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5. Singh, R. L., (2005). Elements of Practical Geography, Kalyani Publishers, New Delhi.
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## **FURTHER READING:**

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3. Gopalsingh, (1996). Map work and practical geography, Vikas Publishing House Pvt. Ltd., New Delhi.
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- [http://gsp.humboldt.edu/OLM/Courses/GSP\\_510/Q-2g-A-Guide-to-Sampling-Techniques-WF.pdf](http://gsp.humboldt.edu/OLM/Courses/GSP_510/Q-2g-A-Guide-to-Sampling-Techniques-WF.pdf)
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- [http://lib.unipune.ac.in:8080/jspui/bitstream/123456789/3848/16/16\\_chapter%207.pdf](http://lib.unipune.ac.in:8080/jspui/bitstream/123456789/3848/16/16_chapter%207.pdf)
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**COURSE LEVEL MAPPING OF PROGRAM LEVEL OUTCOMES.**

			Course Level Outcomes (CLO)							
			1	2	3	4	5	6	7	8
<b>Program Level Outcomes (PLO)</b>	<b>Disciplinary Knowledge</b>	<b>1</b>	✓				✓	✓		✓
	<b>Communication skills</b>	<b>2</b>	✓		✓		✓			✓
	<b>Critical thinking</b>	<b>3</b>	✓		✓	✓	✓		✓	✓
	<b>Research-related skills</b>	<b>4</b>		✓	✓	✓	✓	✓	✓	✓
	<b>Analytical reasoning</b>	<b>5</b>		✓	✓	✓	✓	✓	✓	✓
	<b>Problem solving</b>	<b>6</b>		✓		✓	✓		✓	✓
	<b>Team work</b>	<b>7</b>		✓		✓				✓
	<b>Application of learning</b>	<b>8</b>	✓	✓	✓	✓	✓	✓	✓	✓

Year	Sem.	Subject Code	Title of the paper	Hours/Week
2021 -2022 onwards	III	21MGE31C	<b>CORE 7: POPULATION AND GEOGRAPHY OF HEALTH</b>	6

### **COURSE LEVEL OUTCOMES:**

On the successful completion of the course, students will be able to:

1. Discuss the sources of population data, sample survey and data reliability.
2. Know about the patterns and processes of population growth and its implications.
3. Illustrate the different aspects of Malthus, Sadler, Ricardo and Demographic Transition theories
4. Examine population composition and occupational Structure characteristics.
- 5...Explain the forms of human migration, types, regional patterns and its characteristics,
6. Evaluate population policies for developed and developing countries with contemporary issues in India
7. Identify the linkages between the health, environment, exposure and risk.
8. Explain the relationships among health and disease pattern in India.

### **UNIT- I**

**Population Geography:** Definition, Scope and Development – Population Geography and Demography - Sources of Population Data: Census, Registers and Sample Survey -Data Reliability and Errors -World Population Distribution: Measures, Patterns and Determinants, World Population Growth (Prehistoric to Modern period).

### **UNIT- II**

**Classical and Modern Theories in Population Growth:** Malthus, Sadler, Ricardo and Demographic Transition -Population Composition: Age and Sex - Occupational Structure - Literacy and Education – Religion and Caste - Rural and Urban -Population Composition of India.

### **UNIT- III**

**Population Dynamics:** Fertility and Mortality Analysis: indices, determinants and world patterns - Migration: Types, Causes and Consequences – Models: Regenstein and Lee theory of migration - World regional patterns, migration in India -Population Policies in developed and developing countries - India's population policies.

### **UNIT- IV**

**Geography of Health:** Health and Healthcare: Definition, Concept and Approaches – Classification of Diseases: Genetic, Communicable, Non-communicable, Occupational, Deficiency Diseases, WHO Classification of Diseases- Endemics, Epidemics and Pandemics -Coronavirus (COVID-19): Outbreak, Impact, and Prevention - Exposure and Health Risks: Air and Water Pollution; Household Wastes; Housing; Workplace.

## **UNIT- V**

**Health care systems in India:** Environment and Human Health, Diseases Ecology, Nutritional Status (etiological conditions, classification and spatial and seasonal distributional patterns)- Healthcare Planning and Policies in India - Medical Tourism in India.

### **PEDAGOGY STRATEGIES:**

- Board and Chalk lecture
- Power point slide presentations
- Seminar
- Assignments
- Online and Offline Class Practicals
- Quizzes
- Group discussion

### **REFERENCE:**

1. Chandha, R.C (1986). Geography of population, Concepts, patterns, Kalyani publishers, New Delhi.
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2. BeaujeauGarnier .J (1966). Geography of Population, Longman Group, London.
3. Bradley,D.,(1977). Water, Wastes and Health in Hot Climates, John Wiley Chichesten.
4. Christaler, George and Hristopoles, Dionissios (1998). Spatio-Temporal Environment Health Modelling, Boston Kluwer Academic Press.
5. Hazra, J. (Ed.)(1997). Health care planning in developing countries, University of Calcutta, Calcutta.
6. Kayastha, S.L., (1998). Geography of Population, Rawat, Publications, Jaipur.
7. May, J.M. (1959). Ecology of Human diseases, M.D. Publications, New York.
8. Philips, D.R. (1990). Health and Health care in Third World, Longman, London.
9. Rais, Akhtar., (Ed.), (1990). Environment and Health Themes in Medical Geography, Ashish Publishing House, New Delhi.
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- <https://humangeography.pressbooks.com/chapter/2-1/>
- <https://www.economicdiscussion.net/theory-of-population/top-3-theories-of-population-with-diagram/18461>
- [https://en.wikipedia.org/wiki/Health\\_geography](https://en.wikipedia.org/wiki/Health_geography)
- [http://geonature.uni-eger.hu/public/uploads/visi-geography-of-health-532c3d3517f9c\\_557176c7ae663.pdf](http://geonature.uni-eger.hu/public/uploads/visi-geography-of-health-532c3d3517f9c_557176c7ae663.pdf)
- [https://www.physio-pedia.com/Endemics,\\_Epidemics\\_and\\_Pandemics](https://www.physio-pedia.com/Endemics,_Epidemics_and_Pandemics)
- <https://www.clearias.com/coronavirus/>

**COURSE LEVEL MAPPING OF PROGRAM LEVEL OUTCOMES.**

			Course Level Outcomes (CLO)								
			1	2	3	4	5	6	7	8	
<b>Program Level Outcomes (PLO)</b>	<b>Disciplinary Knowledge</b>	<b>1</b>	✓		✓			✓	✓	✓	✓
	<b>Communication skills</b>	<b>2</b>						✓	✓	✓	✓
	<b>Problem solving</b>	<b>3</b>	✓	✓				✓		✓	✓
	<b>Analytical thinking</b>	<b>4</b>			✓			✓		✓	✓
	<b>Research related skills</b>	<b>5</b>	✓	✓	✓	✓	✓	✓			
	<b>Scientific reasoning</b>	<b>6</b>	✓					✓	✓	✓	✓
	<b>Problem solving</b>	<b>7</b>				✓	✓	✓	✓		
	<b>Team work</b>	<b>8</b>		✓		✓	✓				✓

Year	Sem.	Subject Code	Title of the paper	Hours/Week
2021 -2022 onwards	III	21MGE32C	CORE 8: AGRICULTURAL GEOGRAPHY	6

### COURSE LEVEL OUTCOMES:

On the successful completion of the course, students will be able to:

1. Understand the origin and development of agriculture and major agricultural systems of the World
2. Evaluate the determinants of agriculture and models.
3. Analyze the different agricultural data's.
4. Practically delineate the agricultural regions
5. Evaluate the land capability and follow food security
6. Ability to produce crop calendar
7. Analyze the recent agricultural policies of India.
8. Ability to find out the solutions for recent agricultural problems

### UNIT- I

**Agricultural Geography:** Scope and Content – Approaches – Origin and Development of Agriculture –Agricultural systems of the World (Whittlessey).

### UNIT- II

**Determinants of Agriculture:** Physical, Socio-economic, Institutional and Technological - Models: Von Thunen's and Jonson's model.

### UNIT- III

**Agricultural Data Sources and Analysis: Sources** – Types of Data – Land use Surveys: USGS, NRSC -Agricultural Statistics -G-Return– Sampling and Land use data - NBSS & LUP, Indian Council of Agricultural Research.

### UNIT- IV

**Agricultural Regionalization:** Cropping Pattern: Methods of delineating crop combination regions: Weaver, Doi and Rafiullah– Crop Concentration - Crop Diversification – Agricultural Productivity: Measurement and Determinants, Regional variations in Agricultural Productivity– Degree of Commercialization – Patterns of Crop Rotation.

### UNIT- V

**Land Evaluation and Development:** Classification – Agricultural Revolution (Green, White, Blue and Pink) - Salient Features and Impact on Land use – Land use planning - Need for second Green Revolution– Crop Calendar - Agricultural Regions of India - Sustainable Agriculture –Agro-ecology, Food security – Agribusiness - Agricultural Policy in India - Recent Problems.



## **PEDAGOGY STRATEGIES:**

- Board and Chalk lecture
- Power point slide presentations
- Seminar
- Assignments
- Online and Offline Class Practicals
- Quizes
- Group discussion

## **REFERENCE:**

1. Hussain .M.(1996). Systematic Agricultural Geography, Rewat publication, New Delhi.
2. Jasbir Singh and Dhillon S.S.(2004). Agricultural Geography, Tata Mc Graw-Hill Publishing Company Ltd, New Delhi.
3. Mohammed Shafi, (2005). Agricultural Geography, Dorling Kinerly (India) Pvt. Ltd. New Delhi.
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## **FURTHER READING:**

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- <https://www.thoughtco.com/von-thunen-model/1435806>
- <https://www.yourarticlelibrary.com/geography/whittleseys-classification-of-agricultural-regions/42221>
- <https://lotusarise.com/agricultural-regionalisation-upsc/#>

## COURSE LEVEL MAPPING OF PROGRAM LEVEL OUTCOMES

			Course Level Outcomes (CLO)							
			1	2	3	4	5	6	7	8
<b>Program Level Outcomes (PLO)</b>	<b>Disciplinary Knowledge</b>	<b>1</b>	✓	✓	✓		✓			✓
	<b>Communication skills</b>	<b>2</b>		✓	✓	✓	✓	✓		✓
	<b>Critical thinking</b>	<b>3</b>	✓		✓	✓			✓	
	<b>Research-related skills</b>	<b>4</b>	✓	✓	✓	✓	✓			✓
	<b>Analytical reasoning</b>	<b>5</b>		✓		✓	✓	✓	✓	✓
	<b>Problem solving</b>	<b>6</b>		✓	✓			✓	✓	✓
	<b>Team work</b>	<b>7</b>	✓			✓	✓	✓	✓	✓
	<b>Moral and ethical awareness</b>	<b>8</b>	✓			✓	✓	✓	✓	✓

Year	Sem.	Subject Code	Title of the paper	Hours/ Week
2021 -2022 onwards	III	21MGE33C	<b>CORE 9: RESEARCH METHODOLOGY IN GEOGRAPHY</b>	6

### **COURSE LEVEL OUTCOMES:**

On the successful completion of the course, students will be able to:

1. Able to identify a research problem stated in a study.
2. To distinguish a purpose statement, a research question and a research objective.
3. Familiar with conducting a literature review for a scholarly educational study.
4. To know the steps in the process of quantitative data collection.
5. Experience with the steps involved in identifying and selecting a good instrument to use in a study.
6. Hypothesis the research problem.
7. Judge the quality of a research work based on the social needs.
8. Outline advanced reference tools for research report.

### **UNIT- I**

**Meaning of Research:** Objectives - Motivations in Research - Types, Approaches and Significance of Research, Research Methods v/s Methodology, Research and Scientific Methods, Research Process, Criteria of Good Research - Defining the Research Problem: Definition, Concept and Need, Identification and Delimiting Research Problem.

### **UNIT- II**

**Research Questions and Hypothesis:** Variables and Their Linkages, Characteristics of Good Hypothesis - Research Question and Formulation of hypotheses-Directional and Non-directional Hypotheses, Basis for Hypotheses - Research design: Meaning, Need, Features of Good Design, Concepts and Types - Basic principles of Experimental Design - Various Methods of Research: Survey, Philosophical, Historical, Experimental, Causal, Comparative, Genetic and Case Studies.

### **UNIT- III**

**Literature Review** – Purpose of Literature Review, Framework of Searching, Search Tools: Library Catalogues, Abstracts and Reviews, Citation Indexes, Bibliographies, Websites, Other Literature Sources, Evaluating the Literature - Sampling: Probability and Non-Probability Sampling- Types and Criteria for Selection - Developing Sampling Frames.

### **UNIT- IV**

**Tools for Data Collection:** Collections of Primary Data: Collection of Data Through Questionnaire and Schedules, Interview Methods - Collection of Secondary Data: Selection of Appropriate Method for Data Collection: Case Study, Focus Group Discussion -

Techniques of Developing Research Tools - Questionnaire and Rating Scales - Reliability and Validity of Research Tools.

#### **UNIT- V**

**Writing Research Report:** Format and Style - Review of Related Literature Its Implications at Various Stages of Research: Formulation of Research Problem, Hypothesis, Interpretation and Discussion of Results - Major Findings, Conclusions and Suggestions - Citation of References and Bibliography – Online Advanced Reference Tools - Publication Ethics: Patent, Copyright and Plagiarism.

#### **PEDAGOGY STRATEGIES:**

- Board and Chalk lecture
- Power point slide presentations
- Seminar
- Assignments
- Online and Offline Class Practicals
- Quizes
- Group discussion

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4. Harvey, David (1969). Explanation in Geography, Edward Arnold, London.
5. John A. Mathews (1981). Quantitative and statistical approaches to Geography, Pergamon Press, Oxford.
6. Lloyd L., John F., John W. (1992). Introduction to Scientific Geographical Research, Brown (William C.) Co, U.S.
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9. Somekh, Bridget and Cathy Lewin (eds.) (2005). Research Methods in the Social Sciences, Vistaar Publications, New Delhi.

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- <http://14.139.185.6/website/SDE/sde578.pdf>
- [https://www.cartercenter.org/resources/pdfs/health/ephti/library/lecture\\_notes/health\\_science\\_students/In\\_research\\_method\\_final.pdf](https://www.cartercenter.org/resources/pdfs/health/ephti/library/lecture_notes/health_science_students/In_research_method_final.pdf)
- <https://www.scribd.com/doc/185378498/Research-Methodology-Full-Notes>
- [https://ebooks.lpude.in/commerce/mcom/term\\_2/DCOM408\\_DMGT404\\_RESEARCH\\_METHODODOLOGY.pdf](https://ebooks.lpude.in/commerce/mcom/term_2/DCOM408_DMGT404_RESEARCH_METHODODOLOGY.pdf)

**COURSE LEVEL MAPPING OF PROGRAM LEVEL OUTCOMES**

			Course Level Outcomes (CLO)							
			1	2	3	4	5	6	7	8
<b>Program Level Outcomes (PLO)</b>	<b>Disciplinary Knowledge</b>	<b>1</b>	✓		✓		✓		✓	
	<b>Communication skills</b>	<b>2</b>		✓	✓	✓		✓		
	<b>Critical thinking</b>	<b>3</b>	✓		✓	✓			✓	
	<b>Analytical reasoning</b>	<b>4</b>		✓		✓	✓	✓		✓
	<b>Research-related skills</b>	<b>5</b>	✓		✓		✓		✓	
	<b>Problem solving</b>	<b>6</b>		✓		✓		✓		
	<b>Application of learning</b>	<b>7</b>	✓		✓		✓			✓
	<b>Social commitment</b>	<b>8</b>		✓			✓		✓	

Year	Sem.	Subject Code	Title of the paper	Hours/Week
2021 -2022 onwards	III	21MGE34E	ELECTIVE III: GIS AND ITS APPLICATIONS	4

### COURSE LEVEL OUTCOMES:

On the successful completion of the course, students will be able to:

1. Understand various components and principles of GIS.
2. To familiarize with vector and raster data.
3. Analyses various types of spatial data.
4. Understand GIS data input and editing.
5. Understand spatial Analysis in GIS.
6. Uses spatial analysis in for problem solving.
7. Aware of recent development in spatial technology.
8. To know the application of GIS in various departments.

### UNIT- I

**GIS:** Definition –History and Development - Maps and Spatial Information - Computer Assisted Mapping - Components – Data Types – Geographic and Spherical Coordinate system-Thematic characteristics of Spatial Data - Sources of Spatial Data.

### UNIT- II

**GIS Data Structures:** Spatial entities - Raster and Vector data model and structures - Raster and Vector approach to Digital Terrain Modelling (DTM) – Modelling third and fourth dimensions – RDBMS – Problems - Integrating spatial and attribute data.

### UNIT- III

**Data Input and Editing:** Data Input – Data Editing: Topology- Data analysis: Measurements of Length, Perimeter and Area - Queries – Reclassification - Buffering and Neighbourhood functions.

### UNIT- IV

**GIS Data Analysis:** Overlay: Raster and Vector –Spatial Analysis - Spatial Interpolation – Surface Analysis - Network Analysis - GIS Output: Maps as Output - Spatial Multimedia - Map as Decision Tool.

### UNIT- V

**Applications of GIS:** Agriculture, Environment, Forestry, Emergency Services, Health, Regional and Local Planning, Transport and Tourism – Web GIS –Mobile GIS.

## **PEDAGOGY STRATEGIES:**

- Board and Chalk lecture
- Power point slide presentations
- Seminar
- Assignments
- Online and Offline Class Practicals
- Quizes
- Group discussion

## **REFERENCE:**

1. Anji Reddy, M., (2004). Geo-informatics for Environmental Management, BS Publications, Hyderabad.
2. Chang, Kang-tsung (2002). Introduction to Geographic Information Systems, Tata McGraw Hills Publishing Company Ltd, New Delhi.–Hill Publishing Company Limited, New Delhi.
3. Ian Heywood, (2009). An Introduction to Geographical Information System, Pearson Education Pvt. Ltd., New Delhi.
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1. Bhatta , B. (2008). Remote Sensing and GIS, Oxford University Press, New Delhi.
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- <https://gis.e-education.psu.edu/>
- <https://arset.gsfc.nasa.gov/>
- <https://rscc.umn.edu/>
- <https://www.isprs.org/>

## COURSE LEVEL MAPPING OF PROGRAM LEVEL OUTCOMES

			Course Level Outcomes (CLO)								
			1	2	3	4	5	6	7	8	
Program Level Outcomes (PLO)	<b>Disciplinary Knowledge</b>	<b>1</b>	✓		✓				✓	✓	
	<b>Communication skills</b>	<b>2</b>	✓							✓	
	<b>Critical thinking</b>	<b>3</b>	✓	✓	✓		✓	✓	✓	✓	✓
	<b>Research-related skills</b>	<b>4</b>	✓	✓	✓	✓	✓	✓			
	<b>Analytical reasoning</b>	<b>5</b>	✓	✓	✓		✓	✓			✓
	<b>Problem solving</b>	<b>6</b>	✓	✓		✓	✓	✓			✓
	<b>Team work</b>	<b>7</b>		✓	✓	✓	✓				
	<b>Application of learning</b>	<b>8</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓



Year	Sem.	Subject Code	Title of the paper	Hours/ Week
2021 -2022 onwards	IV	21MGE41C	<b>CORE 10: REGIONAL PLANNING AND DEVELOPMENT</b>	5

### **COURSE LEVEL OUTCOMES:**

On the successful completion of the course, students will be able to:

1. Analyze the concept of regions, planning regions and regional planning,
2. Ability to do the regionalization
3. Demonstrate the objectives of planning, different levels of planning, planning process and role of district, block and local planning.
4. Apply the different methods and techniques in regional analysis studies.
5. Analyze the regional imbalances and inequalities and process of planning in India.
6. Identify the measures of inequality and various indicators of regional development
7. Ability to prepare the plans for development in backward region
8. Aware and Involvement in the planning process.

### **UNIT- I**

**Regional Planning:** Definition of Region, Evolution and Types of Regional planning: Formal, Functional, and Planning Regions and Regional Planning; Need and types of Regional Planning – Regionalization- Delineation of Regions in India: Physical and Economic.

### **UNIT- II**

**Planning:** Constituents and Objectives –Micro, Meso and Macro Urban and Rural Planning – Planning Process – Criticism of Planning – Role of District, Block and Local Planning – Rural Planning: MGNREGA, IADP, DPAP, CADP, DDP and IRDP- 73rd and 74th CAA - Powers and Functions of Nagar Panchayat, Municipal Council and Municipal Corporation.

### **UNIT- III**

**Regional Analysis:** Concepts, Methods and Techniques – Economic Base Analysis-Regional Multiplier Analysis - Input-Output Analysis – Theories of Industrial Location, Center Pole and Growth Pole - Theories of Regional Development: Albert O. Hirschman, Gunnar Myrdal, John Friedman-World Regional Disparities.

### **UNIT- IV**

**Regional Planning in India:** Regional imbalances and inequalities in India – Ashoka Mitra Study – Process of Urbanization – Regional Planning in Agriculture and Industries - Regional Planning India: Five Year Plans, Ten Year Plans, NITI Aayog – Directions of Regional Policy - Recent policies in India- Regional Development: Indicators- Regional Development Strategies for India -Development of Backward Areas: Identification, Measures Adopted –

Rural Industrial Project – NABARD – NCDBA – CADA – Centre State Resource Transfer – Planning for Tribal Development.

## **UNIT- V**

**Current Trends in Town Planning:** Town Planning: Basic Concepts and Need of Town Planning – Functions of Town Planning –Town Planning Activities in Tamil Nadu - Smart City Plan - Concepts of Sustainable Urban Development, Sustainable Transportation, E – Governance – City Development Plans - Business Plans, JNNURM, AMRUT, National Rural Health Mission, Public Private Partnership, Local Bodies and Urban Finance - Special Economic Zones.

### **PEDAGOGY STRATEGIES:**

- Board and Chalk lecture
- Power point slide presentations
- Seminar
- Assignments
- Online and Offline Class Practicals
- Quizes
- Group discussion

### **REFERENCE:**

1. Bhatt, L.S. (1972). Regional Planning in India, Statistical Publishing Society, Calcutta.
2. Chand, M and V.K. Puri (1985). Regional Planning in India, Allied Pub. Pvt. Ltd. New Delhi.
3. Chandna, R.C. (2000). Regional Planning- A Comprehensive Text, Kalyani Publishers, Ludhiana.
4. Misra .R.P. (1971). Regional Planning: Concepts Techniques. Politics and case studies. University Mysore, Mysore.

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6. Gore, C. G., (1984). Regions in Question: Space, Development Theory and Regional Policy, Methuen, London.
7. Khanna K.K. and Gupta, V.K., (2004). Economic and Commercial Geography, Sultan Chand

8. Kukhinski A.R. ed. (1972). Growth poles and Growth centers in Regional Planning - Mouton, Paris, The Hague.
9. MajidHussain (2015). Geography of India, McGraw Hill Education (India), Pvt. Ltd., New Delhi.
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**Website(s):**

- <https://planningtank.com/regional-planning>
- [https://www.swmpc.org/downloads/5\\_expanded\\_regional\\_planning.pdf](https://www.swmpc.org/downloads/5_expanded_regional_planning.pdf)
- <https://www.google.com/search?q=formal+and+functionaregions&sxsrf>
- [http://www.economia.unam.mx/cedrus/descargas/ Weber.pdf](http://www.economia.unam.mx/cedrus/descargas/Weber.pdf)
- <https://www.yourarticlelibrary.com/essay/essay-on-the-profit-maximisation-theory-of-august-losch/74856#:~:text>

**COURSE LEVEL MAPPING OF PROGRAM LEVEL OUTCOMES**

			Course Level Outcomes (CLO)							
			1	2	3	4	5	6	7	8
<b>Program Level Outcomes (PLO)</b>	<b>Disciplinary Knowledge</b>	<b>1</b>		✓		✓		✓		✓
	<b>Communication skills</b>	<b>2</b>	✓		✓				✓	
	<b>Critical thinking</b>	<b>3</b>			✓	✓	✓	✓	✓	✓
	<b>Research-related skills</b>	<b>4</b>	✓	✓			✓			✓
	<b>Analytical reasoning</b>	<b>5</b>		✓	✓	✓	✓	✓	✓	
	<b>Problem solving</b>	<b>6</b>	✓		✓	✓	✓	✓	✓	✓
	<b>Team work</b>	<b>7</b>		✓	✓		✓		✓	
	<b>Moral and ethical awareness</b>	<b>8</b>	✓			✓	✓	✓	✓	✓

Year	Sem.	Subject Code	Title of the paper	Hours/Week
2021 -2022 onwards	IV	21MGE42C	CORE 11: GEOGRAPHY OF INDIA	5

### COURSE LEVEL OUTCOMES:

On the successful completion of the course, students will be able to:

1. To introduce to the students remember the physical setting of India.
2. To understand the student learns agriculture resources of India.
3. Discuss about the different types of mineral resources of India.
4. The analyze various energy resources, conventional and non-conventional Energy.
5. Evaluate the industries and mode of transports in India.
6. To analyze the human resources and trade of India.
7. Summarize industrial policies and regions of India.
8. Discuss about the natural disasters in India.

### UNIT- I

**Physical Setting:** Location, Administrative Units - Major Physiographic Divisions – Climate: Seasons, Indian Monsoon: Mechanism and Characteristics, Soil: Types and Distribution – Drainage Systems and Irrigation Types – Multi-purpose Projects - Natural Vegetation.

### UNIT- II

**Agriculture Resources:** Food Crops: Rice and Wheat - Cash Crops: Sugarcane and Tobacco - Plantation Crops: Tea, Coffee - Fibre Crops: Cotton and Jute - Green Revolution - Food Security and Right to Food - Animal Resources: Cattle and Sheep Rearing – White Revolution - Fisheries: Fresh and Marine Water Fishing – Blue Revolution – Agro-climatic regions of India.

### UNIT- III

**Mineral and Energy Resources:** Mineral Resources: Distribution and Production of Iron ore, Bauxite, and Mica - Energy Resources: Distribution and Production of Coal, Petroleum and Atomic Minerals – Non-Conventional Energy: Solar, Wind, Geothermal, Hydal and Tidal.

### UNIT- IV

**Industries and Transport:** Distribution and Production: Iron and Steel, Cotton Textiles, Cement, Chemical, Automobile and IT Industry – Industrial Development since Independence, Industrial Regions and Their Characteristics, Industrial Policies in India - Industrial Regions of India -Transport: Roadways, Railways, Airways and Waterways – Major Ports in India.

## **UNIT- V**

**Population and Trade:** Growth, Distribution and Density of Population and Composition: Rural-Urban, Age, Sex, Occupational, Educational, Ethnic and Religious, Determinants of Population, Population Policies in India - Trade: Volume and Composition of India's Foreign Trade – Regional Development Planning in India, Globalisation and its impact on Indian Economy - Natural Disasters in India: Earthquake, Drought, Flood, Cyclone, Tsunami, Himalayan Highland Hazards and Disasters.

### **PEDAGOGY STRATEGIES:**

- Board and Chalk lecture
- Power point slide presentations
- Seminar
- Assignments
- Online and Offline Class Practicals
- Quizes
- Group discussion

### **REFERENCES:**

1. Gopal Singh, (1970). A Geography of India, Atnaram& sons, New Delhi.
2. Khullar, D. R., (2010). India – A Comprehensive Geography, Kalyani Publishers, New Delhi.
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2. Mathur, S.M. (1982). Physical Geology of India, National Book Trust, India, New Delhi.
3. Nag, P. and Sengupta, S., (1992). Geography of India, Concept Publishing, New Delhi.
4. Pal, Saroj K. (2003). Physical Geography of India – A study in Regional Earth Sciences, Orient Longman Pvt. Ltd. Kolkata.
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7. Singh R. L., (1971). India: A Regional Geography, National Geographical Society of India.
8. Singh, Jagdish.,(2003). India - A Comprehensive & Systematic Geography, GyanodayaPrakashan, Gorakhpur.
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- [http://www.gov.pe.ca/photos/original/wi\\_India.pdf](http://www.gov.pe.ca/photos/original/wi_India.pdf)
- <https://www.3dgeography.co.uk/geography-of-india>
- <https://www.visionias.net/2020/05/indian-geography-short-notes-pdf.html>

**COURSE LEVEL MAPPING OF PROGRAM LEVEL OUTCOMES.**

			Course Level Outcomes (CLO)							
			1	2	3	4	5	6	7	8
Program Level Outcomes (PLO)	Disciplinary Knowledge	1	✓		✓	✓		✓		✓
	Communication skills	2		✓		✓	✓		✓	
	Critical thinking	3	✓		✓		✓		✓	✓
	Research related skills	4	✓		✓	✓	✓	✓	✓	
	Analytical reasoning	5		✓		✓		✓		✓
	Problem solving	6	✓	✓			✓		✓	✓
	Moral and ethical awareness	7	✓		✓	✓		✓		✓
	Multicultural competence	8		✓			✓	✓	✓	

Year	Sem.	Subject Code	Title of the paper	Hours/Week
2021 -2022 onwards	IV	21MGE43C	<b>CORE 12: TRANSPORT AND INDUSTRIAL GEOGRAPHY</b>	5

### **COURSE LEVEL OUTCOMES:**

On the successful completion of the course, students will be able to:

1. Understand the significance of transport and its role on development.
2. Illustrate the theories and models of spatial interaction.
3. Summarize the development of different modes and Transport cost
4. Analysis of transport networks.
5. Evaluate the transport planning processes.
6. Understand the scope of industrial geography and its role in development.
7. Ability to reduce environmental degradation.
8. Analysis the industrial hazards and occupational health

### **UNIT- I**

**Transport Geography:** Nature, Scope, Significance and Development – Factors Associated with Development of Transport System: Physical, Social, Economic, Cultural and Institutional – Role of Transport in Development- Theories and Models of spatial interaction (Edward Ullman and M. E. Hurst).

### **UNIT- II**

**Characteristics and relative significance of different modes of Transport:** Railways, Roadways, Airways, Waterways and Pipe line - Transport Cost: Comparative Cost Advantages – Structural Analysis: connectivity of networks (alpha, beta, gamma, indices and cyclomatic number), centrality within networks, spread and diameter of network (Pi index, Eta index) and detours – Accessibility.

### **UNIT- III**

**Transport Policy and Planning** – Urban transportation: Transport and Urban Growth and Urban Transport Problems – Transport and Environmental Degradation - Alternative to transport system in mega cities of India – Industrial corridors-Spatial Flow Models: Gravity Model and its variants – Urban Transport Planning Process.

### **UNIT- IV**

**Industrial Geography:** Nature, Scope and Development - Classification of Industries, Factors of Industrial Location; Theories of Industrial Location (A. Weber, E. M. Hoover, August Losch, A. Pred and D. M. Smith)– Resources based and Footloose Industries – Role of Industries in Development.

## **UNIT- V**

**Industries and Environmental degradation** – Industrial Hazards and Occupational Health – Industrial Policies – Need for Integrated Industrial Development- Industrial Regions of India- World Industrial Regions, Impact of Globalisation on manufacturing sector in Less Developed Countries, Tourism Industry, World distribution and growth of Information And Communication Technology (ICT) and Knowledge Production (Education and R & D) Industries.

### **PEDAGOGY STRATEGIES:**

- Board and Chalk lecture
- Power point slide presentations
- Seminar
- Assignments
- Online and Offline Class Practicals
- Quizes
- Group discussion

### **REFERENCE:**

1. Chorley R.J. & Haggett P. (1968). Network analysis, Edward Arnold, London.
2. Pande (1991). Transport Geography, Concept Publication, New Delhi.
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- [http://wiki.gis.com/wiki/index.php/Transportation\\_geography](http://wiki.gis.com/wiki/index.php/Transportation_geography)
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- <https://www.yourarticlelibrary.com/essay/essay-on-the-profit-maximisation-theory-of-august-losch/>
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**COURSE LEVEL MAPPING OF PROGRAM LEVEL OUTCOMES**

			Course Level Outcomes (CLO)							
			1	2	3	4	5	6	7	8
<b>Program Level Outcomes (PLO)</b>	<b>Disciplinary Knowledge</b>	<b>1</b>	✓		✓	✓		✓		✓
	<b>Communication skills</b>	<b>2</b>	✓		✓			✓		✓
	<b>Critical thinking</b>	<b>3</b>		✓			✓	✓	✓	
	<b>Research – Related Skills</b>	<b>4</b>	✓	✓		✓	✓		✓	✓
	<b>Analytical reasoning</b>	<b>5</b>		✓	✓	✓	✓			
	<b>Problem solving</b>	<b>6</b>	✓	✓	✓		✓		✓	✓
	<b>Moral and ethical awareness</b>	<b>7</b>			✓	✓		✓	✓	
	<b>Multicultural competence</b>	<b>8</b>	✓				✓	✓		✓

Year	Sem.	Subject Code	Title of the paper	Hours/ Week
2021 -2022 onwards	IV	21MGE44E	ELECTIVE IV: REMOTE SENSING AND GNSS	4

### COURSE LEVEL OUTCOMES:

On the successful completion of the course, students will be able to:

1. Knows the development in Remote sensing
2. Analyze the energy interactions in the atmosphere and earth surface features.
3. Select the type of remote sensing technique / data for the required purpose.
4. Develop theoretical knowledge about the skill of photogrammetry and identify the earth surface features from satellite images.
5. Examine various techniques in Digital Image Processing.
6. Identification of spatial features from images
7. Evaluate applications of remotely sensed data for monitoring geographical aspects.
8. Develop a sound knowledge of the applications of GNSS for monitoring the terrestrial features.

### UNIT- I

**Remote Sensing:** Definition - Basic Concepts – History and Development – Types: Active and Passive -Electromagnetic Spectrum – Radiation Principles - Energy interaction with Earth and Atmosphere – Ideal Remote Sensing - Platforms.

### UNIT- II

**Aerial and Satellite Remote Sensing:** Aerial Remote Sensing: Aerial photographs: Classifications based on Camera, Photo scale - Stereo Model - Interpretation Keys and Photogrammetry -Satellite Remote Sensing: Satellite – Types, Orbits and Sensors – Resolution: types – Sensor Characteristics of LANDSAT, SPOT, IRS, IKONOS, QUIKBIRD –Microwave and Thermal Remote Sensing.

### UNIT- III

**Digital Image processing:** Pre-processing: Rectification and Enhancements – Manipulation - Classification methods: Supervised and Unsupervised - Ground truth verification – Accuracy assessment - Image transformation: - PCA - EVI – NDVI – SAVI – NDWI -Developments in Remote Sensing Technology and Big Data Sharing and its applications in Natural Resources Management in India.

### UNIT- IV

**Applications of Remote Sensing:** Geomorphology, Hydrology, Oceans and Coastal Monitoring, Disaster studies, Forestry, Agriculture, Land use and Land cover and urban planning.

## **UNIT- V**

**GNSS:** History- Segments: Control - Space and User - Geo Positioning: Point - Relative - Static – Kinematics - GPS Systems: NAVSTAR - GLONASS – GALILEO - Beidou – QZSS– IRNSS- Applications of GNSS.

### **PEDAGOGY STRATEGIES:**

- Board and Chalk lecture
- PowerPoint slide presentations
- Seminar
- Assignments
- Online and Offline Class Practicals
- Quizzes
- Group discussion

### **REFERENCE:**

1. Joseph, George (2003). Fundamental of Remote Sensing, University's Press, India.
2. Leick Alfred (2004).GPS Satellite Surveying, Third Edition, John Wiley & Sons, Inc., Hoboken, New Jersey.
3. Lillesand, T.M. and Ralph W. Keifer (2002). Remote Sensing and Image Interpretation, John Wiley & Sons, Inc., New York Ltd., Hyderabad.
4. Satheesh Gopi (2005). Global Positioning System Principles and Applications, Tata McGraw-Hill Publishing Company Limited, New Delhi.

### **FURTHER READING:**

1. BasudebBhatta, (2011). Remote Sensing and GIS, 2nd edition, Oxford University Press,New Delhi.
2. Campell J.B. (2002). Introduction to remote sensing, Taylor and Francis, London.
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4. Curran, P.J., (1985). Principles of Remote sensing, English Language Book Society Longmans, London.
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6. Kumar, S., (2003). Basics of Remote Sensing and GIS, Laxmi Publications, New Delhi. New Delhi.
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- <https://rsc.umn.edu/>
- <https://www.isprs.org/>
- [http://www.euromap.de/docs/doc\\_001.html](http://www.euromap.de/docs/doc_001.html)
- <http://dst-iget.in/>
- <https://gis.e-education.psu.edu/>
- <http://dst-iget.in/>
- <https://gis.e-education.psu.edu/>
- [https://serc.carleton.edu/research\\_education/geopad/imagery\\_data.html](https://serc.carleton.edu/research_education/geopad/imagery_data.html)
- [https://nptel.ac.in/courses/105104100/lectureE\\_36/E\\_36\\_5.html](https://nptel.ac.in/courses/105104100/lectureE_36/E_36_5.html)

**COURSE LEVEL MAPPING OF PROGRAM LEVEL OUTCOMES**

			Course Level Outcomes (CLO)							
			1	2	3	4	5	6	7	8
<b>Program Level Outcomes (PLO)</b>	<b>Disciplinary Knowledge</b>	<b>1</b>	✓	✓		✓	✓	✓	✓	
	<b>Communication skills</b>	<b>2</b>	✓	✓				✓		
	<b>Critical thinking</b>	<b>3</b>		✓	✓	✓	✓	✓	✓	✓
	<b>Research-related skills</b>	<b>4</b>		✓	✓		✓	✓	✓	
	<b>Analytical reasoning</b>	<b>5</b>		✓		✓	✓	✓		✓
	<b>Problem solving</b>	<b>6</b>			✓		✓	✓	✓	
	<b>Team work</b>	<b>7</b>	✓			✓	✓		✓	✓
	<b>Application of learning</b>	<b>8</b>	✓	✓	✓	✓	✓	✓	✓	✓

Year	Sem.	Subject Code	Title of the paper	Hours/Week
2021 -2022 onwards	IV	21MGE45P	<b>CORE : PRACTICAL –III: GNSS AND GIS MAPPING SURVEY</b>	<b>4</b>

### **COURSE LEVEL OUTCOMES:**

On the successful completion of the course, students will be able to:

1. Understand various components and principles of GNSS survey.
2. To Create the Geo-reference map, spatial data and Attribute data adding and editing.
3. To make map design and create proper layout with the use of GIS software.
4. Analyze the thematic maps using different buffer and overlay analysis.
5. Apply GIS tools in various geographical studies for map making.
6. To identify the creation of topographic elevation models.
7. Analyze the contour map and prepare interpolation map and 3-Dimensional view.
8. To understand comprehensive of the Field study and development geographical knowledge.

### **UNIT- I**

**GNSS Survey:** Principles and Components – Data Collection: Point – Line – Area – Integration with GIS data.

### **UNIT- II**

**GIS:** Survey: Scanning – Digitization – Geo-reference – Database Creation – Attribute Editing.

### **UNIT- III**

**GIS Data editing:** Point, Polyline and Polygon- Map Design and Layout: Inserting Scale, Latitude and Longitude, Legend, North Arrow, Heading and Sub Heading.

### **UNIT- IV**

**GIS Data Analysis:** Buffer – Overlay Analysis - Creation of Elevation Models: Interpolation - Contour, IDW, Kriging, TIN, DEM and 3Dimensional view.

### **UNIT- V**

**Field Study:** Field Trip / Field Excursions for Maximum of Two Weeks (14 days) are Mandatory and Report of the Field Trip with Geo Tagged Photos and Route Map to be submitted.

### **PRACTICALS:**

- Data collection using GPS
- Geo-reference
- Database Creation
- GIS Data Editing and Analysis
- Creation of Elevation Models
- Field study

## **PEDAGOGY STRATEGIES:**

- Board and Chalk lecture
- Power point slide presentations
- Seminar
- Assignments
- Online and Offline Class Practicals
- Quizes
- Group discussion

## **REFERENCE:**

1. Anji Reddy, M., (2004). Geo-informatics for Environmental Management, BS Publications, Hyderabad.
2. Ian Heywood, (2009). An Introduction to Geographical Information System, Pearson Education Pvt. Ltd., New Delhi.
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4. Peter, A. Burrough Rachael, A. and McDonnell, (1998). Principles of Geographical Information Systems, Oxford University Press Inc., New York.
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## **FURTHER READING:**

1. BasudebBhatta, (2011). Remote Sensing and GIS, 2nd edition, Oxford University Press, New Delhi.
2. Chang, Kang-tsung (2002). Introduction to Geographic Information Systems, Tata McGraw Hills Publishing Company Ltd, New Delhi.
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6. Jenson J R (2004), Remote sensing of the Environment, Pearson Education Pvt. Ltd, Delhi.
7. Kang-tsungchang, (2006). Introduction to Geographic Information systems, Tata McGraw Hill Publishing Company Limited, New Delhi.
8. Kumar, S., (2003). Basics of Remote sensing and GIS, Laxmi publications, New Delhi
9. Leick Alfred (2004). GPS Satellite Surveying, Third Edition, John Wiley & Sons, Inc., Hoboken, New Jersey.
10. Rampall K K (1999). Handbook of Aerial Photography and Interpretation, Concept Publishing Co. New Delhi.
11. Siddique, M.A. (2006). Introduction to Geographical Information Systems, ShardaPustakBhawan, Allahabad.

**Website(s):**

- <https://scitechconnect.elsevier.com>
- <https://learnigis.org/textbook/section-two-scanning-and-digitizing-data>
- <https://www.tandfonline.com/doi/pdf/10.3896/IBRA.1.52.4.08>
- <https://lib.dr.iastate.edu/cgi/viewcontent.cgi?article=2045&context=etd>
- <https://greenvalleyintl.com/wpcontent/GVITutorials/LiDAR360Terrain/LiDAR360TerrainDEMDSMTINProduction.html>

**COURSE LEVEL MAPPING OF PROGRAM LEVEL OUTCOMES**

			Course Level Outcomes (CLO)							
			1	2	3	4	5	6	7	8
<b>Program Level Outcomes (PLO)</b>	<b>Disciplinary Knowledge</b>	<b>1</b>	✓	✓	✓		✓		✓	✓
	<b>Communication skills</b>	<b>2</b>				✓	✓		✓	✓
	<b>Critical thinking</b>	<b>3</b>		✓	✓	✓		✓	✓	✓
	<b>Research-related skills</b>	<b>4</b>		✓	✓	✓		✓	✓	✓
	<b>Analytical reasoning</b>	<b>5</b>		✓		✓		✓	✓	
	<b>Problem solving</b>	<b>6</b>	✓		✓		✓			✓
	<b>Team work</b>	<b>7</b>	✓			✓		✓	✓	
	<b>Moral and ethical awareness</b>	<b>8</b>	✓	✓	✓		✓		✓	✓

Year	Sem.	Subject Code	Title of the paper	Hours/ Week
2021 -2022 onwards	IV	21MGE46P	<b>CORE : PRACTICAL –IV: QUANTITATIVE TECHNIQUES IN GEOGRAPHY</b>	4

### **COURSE LEVEL OUTCOMES:**

On the successful completion of the course, students will be able to:

1. To train students in System Software.
2. To expose the students to the analysis of statistical data.
3. Perform descriptive analyses with Quantitative methods.
4. Make use of ANOVA in context of collection and processing of data.
5. Prepare and analyse Multivariate statistical techniques in geographical perspectives.
6. Produce diagrammatic representation of quantitative data.
7. Associate in quantitative data reconstruction.
8. Determine the appropriate method for data handling.

### **UNIT- I**

**Data Handling:** Open SPSS Data File – Save – Import From Other Data Source – Data Entry – Labelling for Dummy Numbers - Recode in to Same Variable – Recode in to Different Variable – Transpose of Data – Insert Variables and Cases – Merge Variables and Cases - Split – Select Cases – Compute Total Scores – Table Looks – Changing Column - Font Style and Sizes.

### **UNIT- II**

**Diagrammatic Representation:** Simple Bar Diagram – Multiple Bar Diagram – Sub-Divided Bar Diagram - Percentage Diagram - Pie Diagram – Frequency Table – Histogram – Scatter Diagram – Box Plot.

### **UNIT- III**

**Descriptive Statistics** - Mean Median, Mode, Standard Deviation - Skewness- Kurtosis. Correlation – Karl Pearson’s and Spearman’s Rank Correlation, Regression Analysis: Simple and Multiple Regression Analysis [Enter and stepwise methods].

### **UNIT- IV**

**Testing of Hypothesis:** Parametric: One sample, Two sample Independent t-test , Paired t-test - Non – Parametric: One sample KS test- Mann-Whitney U test – Wilcoxon Signed Rank test - Kruskal Wallis test – Friedman test- Chi-square test - Analysis of variance: One-way and Two-way ANOVA.



## **UNIT- IV**

**Multivariate statistical techniques:** -Logistic Regression and Discriminant Analysis, Factor Analysis and Cluster Analysis.

### **PRACTICALS:**

- Data entry merging and splitting
- Diagrammatic representation
- Descriptive Statistics
- Regression analysis
- Testing of Hypothesis
- Analysis of variance
- Factor Analysis
- Cluster Analysis

### **PEDAGOGY STRATEGIES:**

- Board and Chalk lecture
- Power point slide presentations
- Seminar
- Assignments
- Online and Offline Class Practicals
- Quizes
- Group discussion

### **REFERENCE:**

1. S.P. Gupta(2014). Elementary Statistical Methods- sultan chand& sons, educational publishers, New Delhi.
2. Saroj k. pal, (2010). statistics for Geoscientists-techniques and applications, concept publishing company, NewDelhi.
3. Stoddard, R. H., (1982). Field Techniques and Research Methods in Geography, Kendall/Hunt.
4. Taylor, Peter J. (1977). Quantitative Methods in Geography, An Introduction to Spatial Analysis. HoughtonMifflin Company, Boston,USA.

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3. Creswell, J., (1994). Research Design: Qualitative and Quantitative Approaches Sage Publications.
4. Ebdon D., (1977). Statistics in Geography: A Practical Approach, Oxford.
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9. Mahmood A., (1977). Statistical Methods in Geographical Studies, Rejesh publications, New Delhi.
10. Michael S. Louis – Beck (1995). Data analysis an introduction, Series: quantitative applications in the social sciences. Sage. Publications. London. Oxford University Press.
11. Pal S. K., (1998). Statistics for Geoscientists, Tata McGraw Hill, New Delhi.
12. Robinson A.H. (1984). Elements of Cartography, John Wiley, London.
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14. Silk J., (1979). Statistical Concepts in Geography, Allen and Unwin, London.
15. Yeates M., (1974). An Introduction to Quantitative Analysis in Human Geography, McGraw Hill, New York.

**Website(s):**

- <https://www.ibm.com/in-en/analytics/spss-statistics-software>
- [https://www.slideshare.net/Tech\\_MX/spss-14155493](https://www.slideshare.net/Tech_MX/spss-14155493)
- <https://www.slideshare.net/sspink/seminar-on-spss>
- <https://www.spss-tutorials.com/basics/>
- <https://stats.idre.ucla.edu/spss/seminars/notes/>

**COURSE LEVEL MAPPING OF PROGRAM LEVEL OUTCOMES.**

			Course Level Outcomes (CLO)								
			1	2	3	4	5	6	7	8	
<b>Program Level Outcomes (PLO)</b>	<b>Disciplinary Knowledge</b>	<b>1</b>		✓				✓	✓		✓
	<b>Communication skills</b>	<b>2</b>	✓	✓		✓			✓		
	<b>Critical thinking</b>	<b>3</b>	✓		✓	✓	✓				
	<b>Analytical reasoning</b>	<b>4</b>		✓		✓		✓	✓		
	<b>Research-related skills</b>	<b>5</b>	✓		✓		✓			✓	✓
	<b>Problem solving</b>	<b>6</b>		✓		✓		✓			
	<b>Application of learning</b>	<b>7</b>	✓		✓		✓				✓
	<b>Moral and ethical awareness</b>	<b>8</b>		✓		✓		✓	✓		

Year	Sem.	Subject Code	Title of the paper	Hours/ Week
2021 -2022 onwards	IV	21MGE47V	PROJECT AND VIVA-VOCE	3

### COURSE LEVEL OUTCOMES:

On the successful completion of the course, students will be able to:

1. To understand about the various research methods and its applications
2. To familiarize about data collection, types, analysis, interpretation and report with suggestion

### WRITE –UP: GENERAL GUIDELINES:

S. No.	Title
1	Introduction
2	Statement of the problem
3	Relevance of the study
4	Review of literature
5	Aim and objectives
6	Data and tools
7	Methodology
8	Data arrangements, Analysis and Interpretation
9	Results and discussions
10	Summary and Conclusions
11	References
12	Appendices

- The total number of pages should be minimum of 40, including text, figures, tables, photographs, references and appendices.
- The viva-voce presentation is with the help of equipment which are available in the department.

## **7 .TEACHING LEARNING METHODOLOGIES**

Learning is a challenging, engaging, and enjoyable activity. Learners should be encouraged to engage in a rigorous process of learning and self-discovery by adopting a highly focused and yet flexible approach to education. Each day learners should be encouraged to focus on key areas of the course and spend time on learning the course fundamentals and their application in life and society. In teaching and learning pedagogy, there should be a shift from domain or conclusions based approach to the experiential or process based approach. Geography curriculum inculcates knowledge of essential concepts of physical and human geography together with appropriate techniques using lectures, tutorials, group discussion, presentation, assignment evaluation, lab The faculty should promote learning on a proportionate scale of 20:30:50 principle, where lectures (listening/hearing) constitute 20 per cent of the delivery; visuals (seeing) 30 per cent of the learning methods; and experience (doing/participating) 50 per cent. This ratio is subject to change as per institutional needs. In order to achieve its objective of focused process based learning and holistic development, the Institution/University may use a variety of knowledge delivery methods:

### **1. Lectures**

Lectures should be designed to provide the learners with interesting and fresh perspectives on the subject matter. Lectures should be interactive in a way that students work with their teachers to get new insights in the subject area, on which they can build their own bridges to higher learning.

### **2. Discussions**

Discussions are critical components of learning, and can be used as a platform for students to be creative and critical with old and new ideas. Besides developing critiquing skills, arriving at consensus on various real life issues and discussion groups lead to innovative problem solving and, ultimately to success.

### **3. Life Skills:**

Life skills provide students opportunities to understand real life situations and scenarios (i.e. coping with disaster), and solve challenges in a controlled environment or make use of them in simulating cultural experiences by locating/transposing them in new (local, regional, national and international) situations.

### **4. Case Studies:**

Case studies, wherever possible, should be encouraged in order to challenge students to find creative solutions to complex problems of individual, community, society and various aspects of knowledge domain concerned.

### **5. Role Playing**

Assuming various roles, as in real life, is the key to understanding and learning. Students are challenged to make strategic decisions through role-plays, and to analyze the impact of these decisions. For this purpose, incidents from literary texts may also be used.

### **6. Team Work**

Positive collaboration in the form of teamwork is critical in the classroom environment, for which it is necessary to transcend one's prejudices and predilections so as to achieve the desired outcomes. In the process of teamwork, learners will acquire the skills of managing knowledge acquisition and other collaborative learners, thereby understanding how to incorporate and balance personalities.

### **7. Study Tours/Field Visits:**

Study Tours/ Field trips provide opportunities to the learners to test their in-class learning in real life situations as well as to understand the functional diversity in the learning spaces. These may include visits to sites of knowledge creation, preservation, dissemination and application. Institutions may devise their own methods to substitute/modify this aspect.

### **8. Academics-Industries Interface:**

The course curriculums of M.Sc., should encourage students for closer interaction with industries/corporate/research institutes, etc. for at least one week internship and training.

## **8. ASSESSMENT AND OUTCOME MEASUREMENT**

The assessment of students' achievement in geography will be aligned with course/program learning outcomes and the academic and geographical skills that the program is designed to be developed. Different assessment methods that are appropriate within the discipline of geography will be used. Learning outcomes will be assessed through continuous evaluation using the oral and written examinations, cartographic and computer-based exercises (GIS), practical assignments, observations of practical skills, project and field work reports, seminar presentations, viva voce, output from collaborative work activities and attendances, etc.

**GOVERNMENT ARTS COLLEGE (Autonomous)**  
**(Reaccredited “A” Grade by NAAC)**  
**Affiliated to Bharathiar University,**  
**Coimbatore-641 018**

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**21MGE12C**

**REG No.....**

**TIME: 2 Hrs.**

**MODEL QUESTION PAPER**  
**M.Sc., GEOGRAPHY**

**SEMESTER-I**  
**Maximum Marks: 50**

**TITLE: APPLIED CLIMATOLOGY**

**PART- A**

**I Choose the Best Answers**

**(5 x 1 = 5 marks)**

1. Climatology is a branch of?  
(a) Atmosphere Science (b) Applied Geography  
(c) Physical Geography (d) Astronomy
  
2. “Gambling of Monsoon “is quoted for Indian \_\_\_\_\_  
(a) Climate (b) Population (c) Agriculture (d) Cyclone
  
3. El-Nino is connected with the \_\_\_\_\_  
(a) Indian Ocean (b) Atlantic Ocean  
(c) Antarctic Ocean (d) Pacific Ocean
  
4. EIA –Expand  
(a) Environmental Impact Assessment (b) Environmental Improvement Assessment  
(c) Environmental Internal Agreement (d) Environmental International Agreement
  
5. IMD Collects \_\_\_\_\_ related data  
(a) Land use (b) Pollution (c) Environment (d) Metrological

**II Answer any three questions**

**(3 x 2 = 6 marks)**

6. Applied Climatology
7. Orographic Rain
8. ENSO –expand and brief
9. Avalanche
10. Metrological satellites

**PART– B**

**(5X3=15 Marks)**

**III .ANSWER ALL THE QUESTIONS**

11. (a) Explain the relationship between Meteorology and climatology. (OR)  
(b) Write a brief note on Insolation.
12. (a) Give a note on Jet Streams (OR)  
(b) Illustrate and explain the different type of Fronts
13. (a) Explain the origin of a cyclone. (OR)  
(b) Differentiate –EL-Nino and La-Nina
14. (a) Give a note on the causes and consequences of drought (OR)  
(b) Explain about the climatic change in the past
15. (a) Write a short note on Agro –climatology (OR)  
(b) Explain the process of weather forecasting

**PART– C**

**(3x8=24marks)**

**IV. ANSWER ANY THREE QUESTIONS**

16. Write an essay on the composition and structure of the atmosphere
17. Describe about the general circulation of the atmosphere
18. Give a detailed account on the Koppen’s climatic classification
19. Explain the Human impact on climate change
20. Elaborate the role and function of IMD in predicting the daily weather

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