



Tuljaram Chaturchand College, Baramati

Autonomous College

Two Year Degree Program in Geography

(Faculty of Science & Technology)

Revised Syllabus for

M.A./M.Sc. (Geography) Part-I

For Tuljaram Chaturchand College, Baramati

Choice Based Credit System Syllabus

To be implemented from Academic Year 2022-2023

Title of the Course: M.A./M.Sc. (Geography)

Preamble

Introduction:

Tuljaram Chaturchand College has decided to change the syllabi of various faculties from June,2019. Taking into consideration the rapid changes in science and technology and new approaches in different areas of Geography and related subjects, Board of Studies in Geography after a thorough discussion with the teachers of Geography from different colleges affiliated to the Tuljaram Chaturchand College, Baramati - Pune has prepared the syllabus of M.Sc./M. A. Semester - I and Geography course under the Choice Based Credit System (CBCS). The model curriculum as developed by U.G.C. is used as a guideline for the present syllabus.

Aims and Objectives of the new curriculum:

- i) To maintain updated curriculum.
- ii) To take care of fast development in the knowledge of Geography.
- iii) To enhance the quality and standards of Geography Education.
- iv) To provide a broad common frame work, for exchange, mobility and free dialogue across the Indian Geography and associated community.
- v) To create and aptitude for Geography in those students who show a promise for higher studies and creative work in Geography.
- vi) To create confidence in others, for equipping themselves with that part of Geography which is needed for various branches of Sciences or Humanities in which they have aptitude for higher studies and original work.

Programme outcomes (Pos) (M.A./M.Sc. Geography):

PO.1. Ability of Problem Analysis: Student will be able to analyse the problems of physical as well as cultural environments of both rural and urban areas. Moreover, they will try to find out the possible measures to solve those problems.

PO.2. Conduct Social Survey Project: They will be eligible for conducting social survey project, which is necessary for the assessment of development status of a particular group or section of the society.

PO.3. Individual and teamwork: Works effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.

PO.4. Application of modern instruments: Students will be able to apply various modern instruments for data collection and field survey.

PO.5. Application of GIS and modern Geographical Map Making Techniques: Students will learn how to prepare map based on GIS by using the modern geographical map-making techniques.

PO.6. Critical Thinking: Students will be able to understand and solve the critical problems of physical and cultural environment.

PO.7. Development of Observation Power: As a student of Geography, they will be capable to develop their observation power through field experience and in future, they will be able to identify the socio-environmental problems of a locality.

PO.8. Development of Communication Skill and Interaction Power: After the completion of the course, they will be efficient in their communication skill as well as power of social interaction.

PO.9. Effective Citizenship: Demonstrate empathetic social concern and equity centred national development and the ability to act with an informed awareness of issues and participate in civic life through volunteering.

PO.10. Enhancement of the ability of Management: Demonstrate knowledge and understanding of the management principles and apply these to their own work, as a member and leader in a team, to manage projects. They will perform effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO.11. Ethics: Recognize different value systems including your own, understand the moral dimensions of your decisions and accept responsibility for them.

PO.12. Understand Environmental Ethics and Sustainability: Understand the impact of the acquired knowledge in societal and environmental contexts and demonstrate the knowledge of need for sustainable development.

PO.13. Self-directed and Life-long Learning: Acquire the ability to engage in independent and life-long learning in the broadest context social, environmental and technological changes.

PO.14. Presentation Skill: Students are being able to understand and write effective reports and design credentials, make effective demonstrations, give and receive clear instruction.

Tuljaram Chaturchand College, Baramati

Autonomous College

Board of Studies in Geography

From 2022-23 To 2024-25

Sr.No.	Name	Designation
1.	Dr. Asaram S. Jadhav	Chairman
2.	Dr. Arun S. Magar	Member
3.	Mr. Vinayak D. Chavan	Member
4.	Ms. Nayan D. Zagade	Member
5.	Ms. Aarti M. Borade	Member
6.	Dr. Santosh Lagad	Vice-Chancellor Nominee
7.	Dr. Pravin Kokane	Expert from other University
8.	Dr. T. P. Shinde	Expert from other University
9.	Dr. Babaji Maskare	Industry Expert
10.	Mr. Ganesh Ghanawat	Meritorious Alumni
11.	Ms. Akshata Raje	Student
12.	Mr. Vaibhav Harihar	Student

M.A./M. Sc. [I] **M.Sc. GEOGRAPHY PROGRAMME CREDIT DISTRIBUTION PATTERN (108)**

Class	Semester	Core Course	Elective Course			Ability Enhancement Compulsory Courses (AECC)		Total Credit
			Discipline Specific Elective	Dissertation Project	Generic Elective Course	Ability Enhancement Compulsory Courses	Skill Enhancement Courses	
M.Sc. I	I	i) PAGG111 Principles of Geomorphology ii) PAGG112 Principles of Climatology iii) PAGG113 Principles of Economic Geography iv) PAGG114 Principles of Population and Settlement Geography	-	-	HR – I 2 Credit CS – I 2 Credit	Communication Skill 2 Credit	i) PAGG115 Practical in Physical Geography ii) Practical in Human Geography	30
	II	4 papers 4 x 4= 16 Credits	-	-	CS – II 2 Credit	-	2 Practicals = 8 Credits	26
M.Sc. II	III	3 papers 3 x 4= 12 Credits	Paper (A) 4 Credit <u>OR</u> Paper (B) 4 Credits	-	-	-	2 Practicals = 8 Credits Subject Related Skill Dev. Course 2 Credit	26
	IV	3 papers 3 x 4= 12 Credits	Paper (A) 4 Credit <u>OR</u> Paper (B) 4 Credits	1 Project = 4 Credits	-	-	1 Practical = 4 Credits Subject Related Skill Dev. Course 2 Credit	
Total Credits		56	8	4	6	2	32	108

Structure of the Syllabus:**Semester – I**

Sr. No.	Course Code	Core Compulsory Theory Paper (CTTP)	Choice Based Optional Paper (CBOP)	Core Compulsory Practical Paper (CCPP)	Credit
1	PAGG111	Principles of Geomorphology	-	-	04
2	PAGG112	Principles of Climatology	-	-	04
3	PAGG113	Principles of Economic Geography	-	-	04
4	PAGG114	Principles of Population and Settlement Geography	-	-	04
5	PAGG115	-	-	Practical in Physical Geography	04
6	PAGG116	-	-	Practical in Human Geography	04
				Total Credits	24

Semester – II

Sr. No.	Course Code	Core Compulsory Theory Paper (CCTP)	Choice Based Optional Paper (CBOP)	Theory / Practical	Credit	Core Compulsory Practical Paper (CCPP)	Credit
1	PAGG121	Geoinformatics - I					04
One of the following according to specialization from CCTP							
2	PAGG122 (A)	Synoptic Climatology	-	-	04	-	04
	PAGG122 (B)	Population Geography	-	-	04	-	
One of the following according to specialization from CCTP							
3	PAGG123 (A)	Monsoon Climatology	-	-	04	-	04
	PAGG123 (B)	Geography of Rural Settlements	-	-	04	-	
Optional Paper (CBOP) (1 Theory + 1 Practical)							
4	PAGG124			Geography of Disaster Management	04		08
	PAGG125			Practical in Surveying	04		
Core Compulsory Practical Paper (CCPP)							
5	PAGG126					Practical of Statistical Techniques for Geography	04
Total Credits of Semester - II							24

Semester – III

Course Code	Core Compulsory Theory Paper (CCTP)	Choice Based Optional Paper (CBOP)	Theory / Practical	Credit	Core Compulsory Practical Paper (CCPP)	Credit
PAGG231	Geoinformatics-II	-	-	04	-	04
PAGG232	Geographical Thoughts	-	-	04	-	04
One of the following according to specialization from CCTP						
PAGG233 (A)	Agro Meteorology	-	-	04	-	04
PAGG233 (B)	Urban Geography	-	-	04	-	
Choice Based Optional Paper (CBOP) (1Theory + 1Practical)						
PAGG234			Practical in GIS	04	-	08
PAGG234			Watershed Management	04	-	
One of the following according to specialization from CCPP						
PAGG235 (A)					Practical in Climatology	04
PAGG235 (B)					Practical in Population and Settlement Geography	
Total Credits of Semester -III						24

Semester – IV

	Core Compulsory Theory Paper (CCTP)	Choice Based Optional Paper (CBOP)	Theory / Practical	Credit	Core Compulsory Practical Paper (CCPP)	Credit
PAGG241	Geography of India	-	-	-	-	04
PAGG242	Oceanography	-	-	-	-	04
PAGG243	Research Methodology	-	-	-	-	04
Choice Based Optional Paper (CBOP) (1Theory + 1Practical)						
PAGG244			Geography of Soils	04		04
PAGG245			Practical in Remote Sensing	04		
Core Compulsory Practical Paper (CCPP)						
PAGG246					Dissertation / Research Project	04
Total Credits of Semester - IV						24

M.A./M.Sc Geography, Syllabus for Semester I**Subject: Principles of Geomorphology****Subject Code: PAGG111****No. of Credits: 04**

Course Objectives:

1. To describe the concept of drainage basin and stream network.
2. To understand the basic laws and models of the fluvial process.
3. To discuss characteristics of drainage basin hydrology .
4. To apply quantitative methods to measure and asses fluvial processes and landforms.
5. To analyze the role of fluvial processes in shaping landscapes.
6. To explain the factors influencing the formation and evolution of river channels.
7. To identify the flow types and measure the velocity of the river flow.

Course Outcomes:

After the completion of the course, Students will be able to understand the current issues in Human geography. Specifically Human geography focused on population and agriculture.

1. Accurately describe the concept of a drainage basin and stream network, including their Component and interconnectedness.
2. Demonstrate a comprehensive understanding of the basic laws and models of fluvial Processes, enabling them to explain and apply them to real-world scenarios.
3. Discuss the characteristics of drainage basin hydrology, including aspects such as Precipitation runoff, and stream flow patterns.
4. Identify different flow types within a river system.
5. Analyze the role of fluvial process.
6. Explain in detail the factors influencing the formation and evolution of river channels.
7. Utilizing appropriate measurement techniques and tools.

Semester-I**PAGG-111 : Principles of Geomorphology**

No. of credits-04 No. of lectures- 60

Unit No.	Unit Name	Lectures
1	Introduction to Geomorphology 1.1 Definitions, Nature and Scope of 1.2 Geomorphology 1.3 History of Geomorphology 1.4 Basic concepts in Geomorphology 1.5 Branches of Geomorphology 1.6 Hierarchy of spatial and temporal scales in 1.7 Geomorphology 1.8 Geologic timescale	08
2	Geomorphology and Tectonics 2.1 Internal structure of the Earth: Layers based on physical and chemical properties 2.2 Seismic waves and types Wegener's Continental Drift Theory 2.3 Theory of Plate Tectonics and associated landforms 2.4 Holmes Convectional Current Theory 2.5 Gravity and Isostasy 2.6 Paleomagnetism 2.7 Folds: Types and landforms 2.8 Faults: Types and landforms	10
3	Weathering and Mass Movement Processes Weathering: 3.1 Types and related landforms 3.2 Mass Movement: Types of mass movement	06
4	Hill slopes 4.1 Hill slope processes and forms 4.2 Models of hill slope evolution	06
5	Fluvial Processes and Landforms 5.1 Genetic classification of streams 5.2 Playfair's law 5.3 River and stream, drainage basin and drainage network patterns 5.4 River processes: erosion, transportation and deposition 5.5 Fluvial landforms: erosional and depositional Davisian Cycle of Erosion	12
6	Glacial Processes and Landforms 6.1 Glacial system: Types of glaciers 6.2 Glacial processes: erosion, transportation and deposition 6.3 Glacial landforms: erosional and depositional	06

7	Coastal Processes and Landforms 7.1 Sea waves, currents and tides 7.2 Coastal processes: erosion, transportation and deposition 7.3 Coastal landforms: erosional and depositional	06
8	Aeolian Processes and Landforms 8.1 Aeolian environment 8.2 Wind processes: erosion, transportation and deposition 8.3 Aeolian landforms: erosional and depositional 8.4 Work of water in desert and landforms	06

Reference Books:

- **Bloom, A.L. (2012):** Geomorphology- A Systematic Analysis of Late Cenozoic Landforms, Prentice-Hall of India, NewDelhi
- **Chorley, R.J., Schumm, S. A. and Sugden, D. E. (1984):** Geomorphology, Methuen, London.
- **Gregory, K.J. and Goudie, A.S. (2014):** The SAGE Handbook of Geomorphology, SAGE, London.
- **Christiansen E.H. and Hamblin, W.K. (2008):** The Earths dynamic systems Macmillan, New York and Collier MacmillanLondon.
- **Holmes, (1944):** Principles of Physical Geology, Thomas Nelson and Sons Ltd,London.
- **Huggett, R.J. (2008):** Fundamentals of Geomorphology, Routledge, London and NewYork.
- **Goudie A.S. (2004):** Encyclopedia of Geomorphology, Routledge, London and NewYork.
- **Kale, V.S. (2014):** Landscapes and Landforms of India, Springer, London/NewYork.
- **Kale, V.S. and Gupta, A. (2010):** Introduction to Geomorphology, Universities Press, Hyderabad
- **Migon, P. (2010):** Geomorphological Landscapes of the World, Springer, London/NewYork.
- **Ollier, C.D. (1981):** Tectonics and Landforms, Longman,London.
- **Singh, S. (2011):** Geomorphology, PrayagPustakBhawan,Allahabad.
- **Siddhartha, K. (2001):** The Earth's dynamic surface, Kisalaya,Delhi.
- **Spark, B.W. (1972):** Geomorphology, Longman, NewYork.
- **Steers, A. (1958):** The Unstable Earth, Methuen,London.
- **Strahler, A.H. and Strahler, A.N. (1992):** Modern Physical Geography, John Wiley, New York.

Choice Based Credit System Syllabus (2022 Pattern)

Mapping of Program Outcomes with Course Outcomes**Class:** M.A./MS.c Geography I**Subject:** Geography**Course:** Principles of Geomorphology**Course Code:** GEO 4101**Weightage:** 1= Weak or low relation, 2= Moderate or partial relation, 3= Strong or direct relation

Program Outcomes (POs)								
Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8
CO 1				3				
CO 2		2						
CO 3				3				
CO 4				2				
CO 5		2				2	2	
CO 6						2		
CO 7						2		

Justification for the mapping**PO 2: Effective Citizenship and Ethics:**

CO2- A comprehensive understanding of fluvial processes empowers citizens to make informed decisions, promote sustainable practices, and advocate for ethical policies that safeguard water resources and the broader environment. This knowledge is essential for effective citizenship and contributing to a more sustainable and ethically responsible society.

CO5- The role of fluvial processes in effective citizenship and ethics is centered around informed decision-making, responsible behaviors, and active participation in the protection and sustainable management of river systems. By understanding and respecting fluvial dynamics, citizens contribute to a more resilient, sustainable, and ethically conscious society.

PO4: Disciplinary Knowledge:

CO1- The concept of a drainage basin and its interconnected components is fundamental to disciplines such as hydrology, geography, environmental science, and civil engineering. It provides a framework for understanding water movement, managing water resources, and making informed decisions about land use and environmental conservation.

CO3-Understanding the characteristics of drainage basin hydrology, including precipitation, runoff, and stream flow patterns, is essential for various disciplines such as hydrology, meteorology, civil engineering, and environmental science. This knowledge contributes to effective water resource management, flood prediction, and the sustainable development of watersheds.

CO4- Understanding these different flow types within a river system is crucial for disciplines such as hydrology, ecology, geology, civil engineering, and environmental science. This knowledge contributes to effective water resource management, sustainable river basin planning, and the preservation of aquatic ecosystems.

PO 6: Self-directed and life-long Course:

CO5-The role of fluvial processes in self-directed and lifelong Course is instrumental in fostering interdisciplinary knowledge, critical thinking, problem-solving skills, adaptability, and an appreciation for the environment. Individuals who engage in continuous Course about fluvial systems are better equipped to navigate a world shaped by complex interactions between human activities and natural processes.

CO6- Studying the factors influencing the formation and evolution of river channels is not only intellectually stimulating but also empowers individuals to become lifelong learners with a deep appreciation for Earth's dynamic processes and the interconnectedness of natural systems.

CO7- Utilizing measurement techniques and tools is not only instrumental in acquiring specific knowledge within a discipline but also in developing a range of transferable skills. These skills, acquired through self-directed and lifelong Course, empower individuals to navigate a dynamic and ever-changing world, fostering adaptability, critical thinking, and continuous personal and professional growth.

PO7: Environment and Sustainability:

CO7- Fluvial processes is central to environmental sustainability. Understanding and managing these processes contribute to responsible land use, the protection of ecosystems, and the sustainable use of water resources. By incorporating this knowledge into environmental policies and practices, communities can strive to achieve a balance between human needs and the preservation of natural systems, ensuring the long-term health and resilience of river ecosystems and the broader environment.

M.A./M.Sc Geography, Syllabus for Semester I**Subject: Principles of Climatology****Subject Code: PAGG112****No. of Credits: 04**

Course Objectives:

1. To make student well aware of the basic concept of climatology.
2. To understand the theories of evolution of earth and atmosphere.
3. To understand the laws of radiation and interaction with atmosphere.
4. To understand composition and structure of atmosphere.
5. To recognize factors affecting solar radiation and temperature.
6. To study global wind circulation and wind pattern.
7. To understand the types of air masses and fronts.

Course Outcomes:

After the completion of the course, Students will be able to understand the current issues in Human geography. Specifically Human geography focused on population and agriculture.

1. Understand the various concepts of climatology.
2. Understand how the atmosphere and earth evolved over a time.
3. Aware about the laws of radiation and how solar radiation does interacts with atmosphere.
4. Understand by which component atmosphere are composed and different layers of atmosphere.
5. Understand which factor affects the solar radiation distribution on earth surface.
6. Understand the global wind circulation and wind pattern.
7. Identify ideal sources region of air masses and front and weather conditions associated with fronts.

Semester-I**PAGG-112 : Principles of Climatology**

No. of credits-04 No. of lectures- 60

Unit No.	Unit Name	Lectures
1	Introduction to Climatology 1.1 Meteorology and Climatology 1.2 Nature and Scope of Climatology 1.3 Development of Climatology 1.4 Tropical Climatology	06
2	Earth's Atmosphere 2.1 Evolution 2.2 Structure and composition of atmosphere 2.3 The ozone layer depletion 2.4 Aurora -types	08
3	In solution 3.1 Solar and terrestrial radiation 3.2 Electromagnetic spectrum 3.3 Factors affecting in solution 3.4 Latitudinal and seasonal variation 3.5 Effect of atmosphere 3.6 Greenhouse effect 3.7 Heat budget 3.8 Mechanisms of heat transfer	10
4	Temperature 4.1 Heat and temperature 4.2 Temperature measurements and controls 4.3 Lapse rate 4.4 Temperature inversion 4.5 Types of inversion	06
5	Atmospheric Pressure and Winds 5.1 Pressure measurement and distribution 5.2 Factors affecting distribution of pressure 5.3 Wind observation and measurement 5.4 Factors affecting wind 5.5 Geostrophic wind and Gradient wind 5.6 Models of general circulation of the atmosphere 5.7 Eddy theory 5.8 Local winds 5.9 Jet stream Cyclones and Anticyclones	12
6	Atmospheric Moisture 6.1 Atmospheric moisture 6.2 Hydrologic cycle 6.3 Evaporation and condensation 6.4 Forms of condensation 6.5 Precipitation 6.6 Types of precipitation 6.7 Measurement of humidity	06

7	Atmospheric Stability 7.1 Lapse Rate: normal, environmental, dry adiabatic lapse 7.2 rate and wet adiabatic lapse rate 7.3 Stable and unstable air 7.4 Absolute stability 7.5 Conditional instability	06
8	Air Masses and Fronts 8.1 Introduction to air masses and fronts 8.2 Types of air masses 8.3 Types of fronts	06

Reference Books:

- **Critchfield, H.J. (Rep. 2010):** General Climatology. Prentice Hall, NewDelhi.
- **Lal, D.S. (1998):** 'Climatology', Chaitanya Publishing House,Allahabad.
- **Lutgens, Frederic K. & Tarbuck, Edward J. (2010):** 'The Atmosphere: An Introduction to Meteorology', Pearson Prentice Hall, NewJersey.
- **Oliver, John E. & Hidore, John J. (2003):** Climatology: An Atmospheric Science, Pearson Education, Delhi
- **Savindra Singh (2005):** Climatology, PrayagPustakBhawan, Allahabad.
- Trewartha: Introduction to Weather and Climate.
- **More, Pagar, Thorat (2014):** (Marathi), Elements of Climatology & Oceanography, Atharv Publication, Pune

Choice Based Credit System Syllabus (2022 Pattern)

Mapping of Program Outcomes with Course Outcomes**Class:** M.A./MS.c Geography I**Subject:** Geography**Course:** Principles of Climatology**Course Code:** GEO 4102**Weightage:** 1= Weak or low relation, 2= Moderate or partial relation, 3= Strong or direct relation

Program Outcomes (POs)								
Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8
CO 1				2			2	
CO 2							3	
CO 3							2	2
CO 4				3				
CO 5							3	
CO 6				2			2	
CO 7					2			

Justification for the mapping**PO4: Disciplinary Knowledge:**

CO1- Comprehensive understanding of climatology concepts is highly useful for disciplinary knowledge across a range of fields. It informs decision-making processes, guides sustainable practices, and contributes to addressing the complex challenges associated with climate variability and change.

CO4- Comprehensive understanding of the composition and layers of the atmosphere is essential for various disciplines. It forms the basis for studying weather patterns, climate dynamics, environmental interactions, space exploration, and more, contributing to a holistic understanding of Earth's atmospheric system.

CO6- Knowledge of global wind circulation and wind patterns is a cornerstone for various scientific disciplines. It provides insights into atmospheric dynamics, climate variability, and the interconnectedness of Earth's systems, contributing to advancements in weather forecasting, climate science, environmental management, and the sustainable use of natural resources.

PO5: Personal and professional competence:

CO7- Identifying the ideal source regions of air masses and understanding the weather conditions associated with fronts is essential for critical thinking and problem-solving in meteorology and related disciplines. This knowledge informs weather forecasting, emergency response planning, infrastructure design, and various aspects of environmental management, contributing to informed decision-making and the development of effective solutions to weather-related challenges.

PO7: Environment and Sustainability:

CO1- A deep understanding of climatology concepts is essential for critical thinking and problem-solving in diverse fields. It enables individuals to analyze complex environmental challenges, evaluate scientific information, and develop practical solutions to address the impacts of climate variability and change.

CO2-Comprehending the Earth's evolution, particularly the changes in its atmosphere, is a cornerstone for critical thinking and problem-solving in addressing contemporary global challenges, encouraging sustainable practices, and fostering advancements across multiple disciplines.

CO3-The laws of radiation and solar radiation's interaction with the atmosphere is fundamental for critical thinking and problem-solving across various fields, from climate science and renewable energy to urban planning, agriculture, health, and beyond. It forms the basis for addressing challenges and creating innovative solutions in a wide array of disciplines.

CO5-Understanding the factors affecting solar radiation distribution empowers critical thinkers to address challenges related to energy, climate, agriculture, construction, and policy-making by considering these influences and devising innovative solutions.

CO6- Comprehending global wind circulation and wind patterns empowers critical thinkers to address challenges in weather prediction, climate modeling, renewable energy, aviation, agriculture, disaster management, urban planning, and various other fields. It provides a foundation for problem-solving and innovation by leveraging the insights derived from these wind dynamics.

PO7: Critical thinking and problem solving:

CO3- The laws of radiation and how solar radiation interacts with the atmosphere, critical thinkers can address challenges related to climate change, renewable energy, weather forecasting, environmental impact, health, technology, and design. It serves as a foundation for problem-solving and innovation in diverse fields, facilitating the development of sustainable solutions and informed decision-making.

M.A./M.Sc Geography, Syllabus for Semester I**Subject: Principles of Economic Geography****Subject Code: PAGG113****No. of Credits: 04**

Course Objectives:

1. To make students well aware of the basic concepts of economic geography.
2. To understand theories related to economic geography.
3. To acquaint the knowledge of types labours.
4. To understand economic sector available in India.
5. To recognize factors affecting location of industries.
6. To study major types of industries in India.
7. To understand the types and factors affecting agriculture and recognize the problems of Indian agriculture.

Course Outcomes:

After the completion of the course, Students will be able to understand the current issues in Human geography. Specifically Human geography focused on population and agriculture.

1. Demonstrate an understanding of the asset, cost, benefit, analysis, tax, policy, impacts and other economic aspects.
2. Understand the demand of population and availability of raw material.
3. Aware about the labor types, cost, importance and role also in industrial zone.
4. Understand the value of land it proper use.
5. Aware about factors affecting on transport and role of transport in economy of the nation.
6. Recognize factors affecting location of industries.
7. Identify major types of industries in India.

Semester I**PAGG 113: Principles of Economic Geography****No. of Credits: 04****No. of Periods: 60**

Topic No.	Topic	Sub topics	No. of Periods
1	Introduction to Economic Geography	i. Definition, nature and scope ii. Approaches :traditional and modern iii. Recent trends in Economic Geography	06
2	Economic Activities	i. Definition and classification of economic activities ii. Factors of location of economic activities: physical, social, economic and technical iii. Location of economic activities: Weber's and Von Thunen's model	10
3	Resources	i. Definition and classification of resources ii. Significance of natural and human resources in economic development iii. Importance of non-conventional energy resources for sustainable development	08

4	Economic Development	<ul style="list-style-type: none"> i. Definition and concept of economic development ii. Measures of economic development iii. Classification of countries on the basis of economic development iv. Rostow's and Myrdal's model 	08
5	Transport and Communication	<ul style="list-style-type: none"> i. Various modes of transport ii. Geographical factors and transportation iii. Various means of communication iv. Role of transport and communication in economy 	06
6	Trade	<ul style="list-style-type: none"> i. Definition and types of trade ii. Factors affecting on international trade iii. Problems and prospects of international trade with reference to India iv. E-commerce 	06
7	Economic Development in India	<ul style="list-style-type: none"> i. Pre-and post-independence economic development in India ii. Green revolution in India iii. Need of new green revolution in India iv. Regional disparities in India v. Impact of globalization and privatization on economic development 	06
8	Contemporary Issues	<ul style="list-style-type: none"> i. Regional disparities in Maharashtra ii. Role of IT industry in economic development in Maharashtra iii. A case study of one local agro-based industry: Economic analysis, problems and prospects (Sugar factory/ winery/ agro-tourist center etc.) 	10

Reference Books:

- **Alexander, J.W. (1977):** Economic Geography, Prentice Hall of India Pvt. Ltd., New.
 - **Chorley, R.J. and Haggett, P. (1970):** Socio Economic Models in Geography, Concept publishing Company Pvt. Ltd., New Delhi.
 - **Garnier, B.J. and Delobez, A. (1979):** Geography of Marketing, Longman.
 - Hartshorne, T.A. and Alexander, J.W. (2010): Economic Geography, PHI Course, New Delhi
 - **Kanan Chatterjee (2015):** Basics of Economic Geography.
 - **Knox, P., Agnew, J. and McCarthy, L. (2008):** The Geography of the World Economy, Hodder Arnold, London.
 - **Lloyd, P. and Dicken, B. (1972):** Location in Space: A Theoretical Approach to Economic Geography, Harper and Row, New York Methuen.
 - **Mitra, A. (2002):** Resource Studies, Sreedhar publishers, Kolkata.
 - **Patil, S.G., Suryawanshi, R.S., Pacharne, S. and Choudhar, A.H. (2014):** Economic Geography, Atharav Prakashan, Pune.
- Ray, P.K. (1997):** Economic Geography, New Central Book Agency (P) Ltd., Calcutta **Saxena, H.M. (2013):** Economic Geography, Rawat publication, Jaipur.
- **Siddhartha, K. (2000):** Economic Geography: Theories, Process and Patterns, Kisalaya Publications, New Delhi
 - **Smith, D.M. (1971):** Industrial Location: An Economic Geographical Analysis, John Wiley and Sons, New York
 - **Pagar, Thorat & More (2015):** Agriculture Geography, (Marathi), Atharv Publication, Pune
 - **More J. (2014):** Geography & Agriculture For MPSC Examination, (Marathi), Atharv Publication, Pune

Choice Based Credit System Syllabus (2022 Pattern)

Mapping of Program Outcomes with Course Outcomes**Class:** M.A./M.Sc. Geography I**Subject:** Geography**Course:** Principles of Economic Geography**Course Code:** GEO 4103**Weightage:** 1= Weak or low relation, 2= Moderate or partial relation, 3= Strong or direct relation

Program Outcomes (POs)								
Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8
CO 1				2	3			
CO 2		2						
CO 3		2	3					
CO 4						2		
CO 5			3					
CO 6							2	
CO 7				2				

Justification for the mapping**PO 2: Effective Citizenship and Ethics:**

CO2- By understanding the demand of the population and the availability of raw materials, individuals can actively participate in ethical decision-making, advocate for sustainable practices, and contribute to a more equitable and environmentally responsible society. It fosters a sense of global citizenship, encouraging actions that prioritize the well-being of both current and future generations.

CO3- Being aware of these factors and advocating for fair labor practices is part of effective citizenship. Citizens can contribute to ethical industrial practices by supporting companies that prioritize fair labor conditions, promoting transparency, and advocating for policies that protect workers' rights. Additionally, participating in discussions about labor practices and staying informed about industry standards can contribute to a more ethical and responsible industrial landscape.

PO 3: Social competence and communication skills:

CO3- Being aware of labor-related aspects in industrial zones enhances social competence by promoting empathy, cultural awareness, and collaboration. It also improves communication skills. An understanding of labor dynamics in industrial zones enhances social competence by fostering effective communication, promoting collaboration, and encouraging advocacy for ethical practices. These skills are valuable in a professional context and contribute to building strong relationships within and beyond the workplace.

CO5- A well-developed and efficient transportation system is integral to a nation's economic prosperity, and it also plays a crucial role in enhancing social competence and communication skills by connecting people and facilitating the exchange of ideas and resources.

PO 4: Disciplinary Knowledge:

CO1- Understanding these economic aspects in transportation is critical for making informed decisions, ensuring sustainable development, and addressing societal needs. It also highlights the interconnected nature of disciplines and the importance of a holistic approach to solving transportation challenges.

CO7- By delving into the specifics of these industries, scholars, students, and professionals can gain a holistic view of India's economy, its global connections, and the intricate dynamics shaping various sectors.

PO5: Personal and professional competence:

CO1- Competence in these economic aspects empowers individuals to make informed decisions, adapt to changes, manage resources effectively, and navigate both personal and professional landscapes with greater confidence and success.

PO6: Self-directed and Life-long Course:

CO4- Course about the value of land and its proper use enables individuals to make informed decisions about investments, lifestyle choices, environmental conservation efforts, and community development. It fosters a deeper understanding of the intersection between economics, ecology, and human activities, empowering self-directed learners to engage with their surroundings more meaningfully and sustainably.

PO7: Environment and Sustainability:

CO6- By comprehending these factors, policymakers, urban planners, and industry stakeholders can make informed decisions that promote industrial locations and practices aligned with environmental sustainability goals. This includes encouraging the adoption of cleaner technologies, promoting resource efficiency, reducing pollution, and minimizing the ecological footprint of industrial activities.

M.A./M.Sc Geography, Syllabus for Semester I**Subject:** Principles of population and settlement geography**Subject Code:** PAGG 114**No. of Credits:** 04**Course Objectives:**

1. To acquaint the students with various dimensions of population geography, and its challenges.
2. To notify the students about different structures and characteristics of population.
3. To make the students aware of the need and importance of population and policies.
4. This course gives an idea to collect the population data.
5. To aware knowledge about distribution of population in different region.
6. To aware knowledge about various types and structure of settlement.
7. To give information about growth and population density of different region of the world.

Course Outcomes:

After the completion of the course, Students will be able to understand the current issues in Human geography. Specifically Human geography focused on population and agriculture.

1. Aware the basic principles and concepts in population geography.
2. Apply demographic concepts and population theories to explain past and present population characteristics.
3. Evaluate the use of demographic concepts and population theories to understand contemporary socio-economic issues and current affairs.
4. Realize the world-wide distribution of population.
5. Knows the various theories in population geography.
6. Recognize factors affecting on settlement and population distribution.
7. Identify major types and pattern of settlements.

Semester I**PAGG 114: Principles of Population and Settlements Geography****No. of Credits: 04****No. of Periods: 60**

Topic No.	Topic	Sub topics	No. of Periods
1	Introduction to Population and Settlement Geography	i. Definition, Nature and scope of Population Geography ii. Development of Population Geography as discipline iii. Approaches to the study of population Geography iv. Definition, subject matter and scope v. Development of Settlement Geography vi. Approaches: genetic, spatial and ecological	08
2	Population Distribution	i. Population distribution and factors affecting distribution of population ii. Density : definition and types iii. Factors affecting density of population iv. Population density in India v. Urbanization: definition and stages vi. Trend and level of urbanization in India	08
3	Population Growth and trend	i. Concept of population growth ii. Component of population growth (Fertility, Mortality, and Migration) iii. Theory of Demographic Transition iv. Malthus Theory v. Population growth and trend in India vi. Migration: concept of migrant and migration, immigration and emigration	08

4	Population Structure and Characteristics	i. Age and sex structure ii. Concept of aging of populations, iii. Dependency ratio iv. Sex Ratio: definition and affecting factor of sex ratio v. Sex ration in India vi. Population Composition: religious, linguistics, ethnic, marital and educational vii. Literacy: definition and measures of literacy viii. Literacy in India	06
5	Fertility and Mortality	i. Concepts: fertility, fecundity, sterility, cohort ii. Crude birth rate, Total fertility rate iii. Concept of baby boom iv. Concepts: mortality and morbidity v. Death rate and its measures vi. Level and trends of mortality in India	06
6	Human Settlement	i. Classification: urban and rural ii. Rural-urban dichotomy iii. Site and situation aspect in settlement iv. Types: compact, semi-compact, hamlet and dispersed v. Patterns of settlement	08
7	Rural Settlements	i. Definition, classification of villages ii. Size and spacing of villages iii. Nearest neighbour analysis iv. Concepts of dispersion and nucleation v. Factors affecting dispersion and nucleation	08
8	Urban Settlements	i. Concept: urban place, urban agglomeration, urban sprawl ii. Urban settlement hierarchy iii. Urban-rural fringe iv. Rank-size rule v. Central Business District(CBD)	08

Reference Books:

- **Bhende, A. and Kanitkar, T. (2011):** Principles of Population Studies, Himalaya Publishing House, Bombay.
- **Beaujeu, G. J. (1966):** Geography of Population, Longman Group Ltd.
- **Chandna, R.C. (Rep.2010):** Geography of Population, Concepts, Determinants and Patterns, Kalyani Publishers, New Delhi.
- **Clark, J. I. (1973):** Population Geography, Pergamon Press Ltd., Oxford.
- **Clark, J.I. (1984):** Geography and Population: Approaches and Applications, Pergamon Press Ltd., Oxford.
- **Hudson, (1970):** Geography of Settlement, Macdonald & Evans Ltd., London.
- **Khullar, D. R. (2011):** India A Comprehensive Geography, Kalyani Publication, New Delhi.

Choice Based Credit System Syllabus (2022 Pattern)

Mapping of Program Outcomes with Course Outcomes**Class:** M.A./M.Sc. Geography I**Subject:** Geography**Course:** Principles of population and settlement Geography**Course Code:** GEO 4104**Weightage:** 1= Weak or low relation, 2= Moderate or partial relation, 3= Strong or direct relation

Program Outcomes (POs)								
Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8
CO 1				2				
CO 2					3			
CO 3			3					
CO 4					2			
CO 5						2		
CO 6			3					
CO 7						2		

Justification for the mapping**PO3: Social competence and communication skill:**

CO3- A strong foundation in demographic concepts and population theories enhances social competence by providing a deeper understanding of societal issues, fostering better communication skills across diverse audiences, and enabling more informed and empathetic engagement with contemporary socio-economic challenges.

CO6- Understanding these factors, individuals can engage in more informed and empathetic discussions, communicate effectively about social, economic, and environmental issues related to settlement patterns, and contribute meaningfully to discussions on urban development, community empowerment, and equitable resource distribution.

PO4: Disciplinary Knowledge:

CO1- By grasping these basic principles and concepts in population geography, scholars, researchers, policymakers, and students gain a comprehensive understanding of how human populations are distributed, how they evolve over time, and how these patterns shape societies, economies, and the environment. This interdisciplinary knowledge aids in addressing societal challenges, planning for sustainable development, and formulating effective policies to meet the needs of diverse populations.

PO5: Personal and professional competence:

CO2- By applying demographic concepts and population theories to explain past and present population characteristics, individuals gain insights that empower them to make informed decisions, predict trends, understand societal changes, and develop strategies that align with demographic realities in both personal and professional spheres.

CO4- Understanding the worldwide distribution of population is invaluable for personal growth, professional development, decision-making, and fostering a more globally aware and culturally sensitive approach to various aspects of life and work.

PO6: Self-directed and Life-long Course:

CO5- Course various theories in population geography fosters a range of skills and attributes that are valuable for self-directed and lifelong Course. It promotes critical thinking, interdisciplinary understanding, problem-solving, adaptability, and continual engagement with knowledge, enhancing personal and professional growth.

CO7- Comprehending the major types and patterns of settlements enriches self-directed and lifelong Course by providing a multifaceted understanding of historical, cultural, geographical, social, and environmental aspects. It encourages a deeper exploration of societal dynamics and contributes to personal and professional growth.

M.A. /M.Sc. Geography, Syllabus for Semester I**Subject: Practical in physical Geography****Subject Code: PAGG 115****No. of Credits: 04**

Course Objectives:

1. Develop a comprehensive understanding of the Earth's physical features, including landforms, climate, vegetation, and natural resources.
2. Gain insights into the processes that govern weather and climate patterns.
3. To make the students aware of the need and importance of drainage network.
4. To aware knowledge about the various relief features.
5. To aware knowledge about various methods are used in to develop drainage network.
6. To aware knowledge about atmospheric circulation, precipitation, and temperature variations.
7. Develop proficiency in reading and interpreting various types of relief analysis.

Course Outcomes:

After the completion of the course, Students will be able to understand the current issues in Human geography. Specifically Human geography focused on population and agriculture.

1. Aware the basic concept of drainage basin and its classification.
2. Students will conduct weather and climate observations in the field.
3. Student will classify the climate by various method.
4. Realize the world-wide distribution of climate and drainage network.
5. Knows the various types of drainage in worldwide distribution.
6. Recognize factors affecting on drainage network.
7. Identify major types and pattern of drainage basin.

Semester I

PAGG 115 : Practical in Physical Geography

No. of Credits: 04

No. of Periods: 60

Topic No.	Topic	Sub topics	Periods
		A Geomorphology	
1	Drainage Network	Stream ordering and Bifurcation ratio i. Strahler's method ii. Horton's method	15
2	Drainage Basin Relief Analysis	Relief analysis (for a 3 to 5 order drainage basin; based on grid method) i. Absolute reliefmap ii. Relative reliefmap iii. Hypsometric analysis iv. Basin crossprofiles v. Block diagram (multiple section)	15
		B Climatology	
3	Climatic Element Diagrams	i. Climatograph ii. Climograph iii. Simple windrose iv. Hythergraph v. Water Budget	20
4	Climatic Classification	i. Koppen's classification	10

Reference Books:

- **Ashis Sarkar (2015):** Practical Geography, A Systematic Approach, Orient BlackSwan

Choice Based Credit System Syllabus (2022 Pattern)

Mapping of Program Outcomes with Course Outcomes**Class:** M.A./ M.Sc. Geography I**Subject:** Geography**Course:** Practical in physical Geography**Course Code:** GEO 4105**Weightage:** 1= Weak or low relation, 2= Moderate or partial relation, 3= Strong or direct relation

Program Outcomes (POs)								
Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8
CO 1				2				
CO 2						3		
CO 3				3		2		
CO 4			2					
CO 5				2				
CO 6			2	2				
CO 7						2		

Justification for the mapping**PO3: Social competence and communication skill:**

CO4- knowledge about the worldwide distribution of climate and drainage networks enhances social competence by fostering empathy, improving communication skills across diverse groups, and enabling informed discussions and collaborations on global environmental issues.

CO6- Awareness of the factors influencing drainage networks contributes to social competence and communication skills by empowering individuals to engage in informed discussions, advocate for sustainable practices, collaborate effectively with communities, and address environmental challenges in a holistic manner.

PO4: Disciplinary Knowledge:

CO1- Understanding of the basic concept and classification of drainage basins is essential across disciplines. It forms the foundation for studying landscapes, managing water resources, preserving ecosystems, planning infrastructure, and formulating policies that ensure sustainable development and environmental conservation.

CO3- Climate classification is a fundamental tool that provides a framework for understanding, studying, and making informed decisions across various disciplines. It serves as a basis for research, planning, and implementing strategies that consider the diverse environmental conditions experienced across the globe.

CO5- Awareness of the various types of drainage systems is invaluable across disciplines. It contributes to understanding landscape formation, managing water resources, planning infrastructure, assessing environmental impacts, and making informed decisions in diverse fields that interact with the natural environment.

CO6- knowledge of the factors affecting drainage networks is fundamental across disciplines. It facilitates understanding landscape processes, predicting water flow, managing natural resources, planning infrastructure sustainably, assessing environmental impacts, and making informed decisions related to land use and water management.

PO6: Self-directed and Life-long Course:

CO2- Conducting weather and climate observations in the field is a powerful tool for self-directed and lifelong Course. It empowers students to explore, think critically, develop skills, and foster a genuine interest in understanding the natural world.

CO3- Course about climate classification methods promotes self-directed and lifelong Course by nurturing critical thinking, data interpretation skills, environmental awareness, interdisciplinary connections, and a passion for exploring and understanding the complexities of climates worldwide.

CO7- exploring the major types and patterns of drainage basins promotes self-directed and lifelong Course by fostering critical thinking, interdisciplinary connections, spatial visualization skills, problem-solving abilities, and an enduring curiosity to understand the complex geological processes shaping our world.

M.A./M.Sc. Geography, Syllabus for Semester I**Subject: Practical in Human Geography****Subject Code: PAGG 116****No. of Credits: 04**

Course Objectives:

1. To enable the students to use various techniques of calculating rates.
2. To acquaint the students with crop combination methods.
3. To familiar the students' different theories related to human geography.
4. To make awareness about dependency ratio and growth of population.
5. To intimate gender scenario of different countries.
6. To make knowledge about future population and age structure of different countries.
7. To make knowledge about nucleation and dispersion of settlement.

Course Outcomes:

After the completion of the course, Students will be able to understand the current issues in Human geography. Specifically Human geography focused on population and agriculture.

1. Students can understand calculation techniques of growth rates.
2. Student can able to calculate rates and apply to various state of India.
3. Study in crop combination to give knowledge of society.
4. Students can able to apply various theories in human geography to their society.
5. Students understood the dynamics of population and its role in population policies
6. Student can understand about population structure and characteristics of different countries.
7. Student can understand population growth of different countries, they can also predict future population setting of the country.

Semester -I**PAGG-116 Practical in Human Geography****No. of credits:04****No. of Lectures:60**

Topic No.	Topic Name	Lectures
	A Economic Geography	
1	Crop Combination and Crop Diversification 1.1)Weaver's method 1.2)Jasbir Singh	20
2	Measures of Network Structure 2.1)Ratio measure 2.2) Alpha, beta, gamma, etc. 2.3)Associated number, cyclomatic number	10
	B Population and Settlement Geography	
3	Population Indices and Projection 3.1) Age-sex pyramid 3.2) Infant mortality rate 3.3) Population growth rate 3.4) Population projection	10
4	Measures of Nucleation and Dispersion 4.1) Rank size rule 4.2) Nearest neighbour analysis 4.3) Calculation of centrality	15
5	Field Visit and Report Writing One day study tour or long tour of geographical interest places anywhere in the country and excursion report	05

Reference Books:

- **Carter, H. (1977):** The study of Urban Geography, Edward Arnold, London.
- **Hans, R. (1978):** Fundamentals of Demography, Surjeet, Delhi.
- **Hudson F.S. (1976):** Geography of Settlements, Estover, Macdonald & Evans, England.
- **Liendsor, J.M. (1997):** Techniques in Human Geography, Routledge.
- **Lloyd, P. and Dicken, B. (1972):** Location in Space - A theoretical approach to economic geography, Harper and Row, New York.
- **Michael, E. and Hulse, E. (1974):** Transportation Geography, McGraw-Hill, New York.
- **Pollard, A.H. and Farhat Yusu, (1974):** Demographic Techniques, Rushcutters Bay, N.S.W., Pergamon Press, Australia.
- **Singh, J. and Dhillon, (1984):** Agricultural Geography, Tata McGraw-Hill Publishing Company Limited, New Delhi.
- **Yeats, M.H. (1974):** An Introduction to Quantitative Analysis in Human Geography, McGraw-Hill, New York

Choice Based Credit System Syllabus (2022 Pattern)

Mapping of Program Outcomes with Course Outcomes**Class:** M.A./M.Sc. Geography I**Subject:** Geography**Course:** Practical in Human Geography**Course Code:** GEO 4106**Weightage:** 1= Weak or low relation, 2= Moderate or partial relation, 3= Strong or direct relation

Program Outcomes (POs)								
Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8
CO 1			2	2				
CO 2						2		
CO 3			3					
CO 4			3			2		
CO 5				2	2			
CO 6			3					
CO 7			2			2		

Justification for the mapping**PO3: Social competence and communication skill:**

CO1- proficiency in growth rate calculations goes beyond numerical skills; it cultivates the ability to comprehend, analyze, and communicate data effectively. This skill set enhances social competence by enabling individuals to engage in informed discussions, advocate for evidence-based decisions, and contribute meaningfully to various societal and interdisciplinary conversations.

CO3- By studying crop combinations, individuals develop a holistic understanding of the interplay between agriculture, society, economy, and the environment. This knowledge enhances social competence by fostering empathy, promoting informed discussions, and enabling effective communication on issues related to agriculture, food systems, and societal well-being.

CO4-Applying theories from human geography to society enhances social competence by fostering critical analysis, interdisciplinary understanding, cultural sensitivity, effective communication, a global perspective, community engagement, problem-solving abilities, and empathy. These skills are invaluable in navigating and contributing to a complex and diverse society.

CO6- Understanding population structure and characteristics across different countries enhances social competence by promoting cultural sensitivity, global perspective, effective communication, empathy, analytical skills, community engagement, informed decision-making, and active participation in societal issues. These skills are crucial for fostering inclusive and respectful interactions in diverse communities and global settings.

CO7- Understanding and predicting population growth in different countries enhance social competence by promoting cultural sensitivity, global awareness, effective communication, critical thinking, community engagement, informed decision-making, and fostering empathy and social responsibility. These skills are crucial for engaging constructively in discussions and addressing societal challenges in an increasingly diverse and dynamic world.

PO4: Disciplinary Knowledge:

CO1- Understanding growth rate calculations provides a foundational skill set applicable across various disciplines. It enables individuals to analyze trends, make informed decisions, and contribute meaningfully to fields that rely on data interpretation, forecasting, and planning.

CO5- By comprehending population dynamics and their role in shaping policies, individuals gain a multidisciplinary understanding that spans various fields. This knowledge allows for informed decision-making, strategic planning, and the development of effective policies that cater to the evolving needs of societies, economies, and environments.

PO5: Personal and professional competence:

CO5-Understanding population dynamics enhances personal and professional competence by enabling informed decision-making, fostering adaptability, strengthening leadership skills, promoting cultural competence, enhancing problem-solving abilities, guiding ethical considerations, and fostering a mindset of continuous Course and adaptation. These competencies are invaluable across various professions and contribute to personal growth and professional success.

PO6: Self-directed and Life-long Course:

CO2- The ability to calculate rates and apply them to various states in India fosters self-directed and lifelong Course by promoting data analysis skills, regional understanding, research exploration, statistical proficiency, critical thinking, policy awareness, interdisciplinary Course, and a global outlook. These skills are instrumental in navigating and understanding the complexities of a diverse and dynamic society.

CO4- Applying theories in human geography to understand society promotes self-directed and lifelong Course by fostering critical analysis, interdisciplinary understanding, cultural sensitivity, research exploration, problem-solving skills, personal reflection, communication abilities, and a commitment to continuous Course. These skills are vital for navigating a complex and diverse world and contributing meaningfully to society.

CO7- Understanding population growth and predicting future settings facilitates self-directed and lifelong Course by promoting data analysis skills, understanding demographic trends, fostering research exploration, applying statistical techniques, critical thinking, policy awareness, global perspectives, and personal decision-making based on anticipated demographic changes. These skills are crucial for navigating a rapidly changing world and making informed choices across various facets of life.

M.A. / M.Sc. Geography, Syllabus for Semester II**Subject: Geoinformatics I****Subject Code: PAGG 121****No. of Credits: 04**

Course Objectives:

1. To introduce the fundamentals of Geographical information system.
2. To prepare for the practical work with GIS System.
3. They can know about concepts, components, development, platforms.
4. They understand about aerial photography and satellite remote sensing.
5. Know about GIS data structures.
6. Develop an idea about interpretation and application of remote sensing and GIS.
7. They know about the types of remote sensing and GIS.

Course Outcomes:

After the completion of the course, Students will be able to-

1. Students will understand basic concepts in Geoinformatics.
2. Students will able to carry out practical work in GIS Software's.
3. Students will able create a thematic maps and location maps of study area.
4. Understand the ethical and legal considerations associated with geoinformatics.
5. Explore and apply geoinformatics tools and techniques in different domains.
6. Gain proficiency in using Geographic Information System (GIS) software for data analysis, mapping, and visualization.
7. Develop critical thinking skills to analyze geospatial problems and propose effective solutions.

Unit No	Topic Name	Lectures
1	Introduction to GIS 1.1 Definition, potential of GIS, concept of space & time 1.2 Spatial Information Theory 1.3 History of GIS 1.4 Objectives of GIS 1.5 Elements of GIS, hardware & software requirements 1.6 GIS Applications 1.7 1.7 GIS Tasks- input, manipulation, management, query & analysis, visualization.	06
2	Database 2.1 Spatial: spatial relationship, functional 2.2 relationship, logical relationship 2.3 Non-spatial: nominal, ordinal, ratio and cyclic	06
3	Data Models 3.1 Spatial: Geometric primitives, Raster, Vector, 3.2 Quad tree tessellation, comparative overview of 3.3 raster and vector models, layers and coverage 3.4 Non-spatial: DBMS- Advantages, conceptual models; Implementational 3.5 models-hierarchical, network and relational	12
4	Structuring of Spatial Data 4.1 Digitizers: manual, semi-automatic & automatic 4.2 Editing error: detection & correction, topology building	12
5	Data Analysis (I) 5.1 Attribute databases: operations from algebraic theory 5.2 Operations from set theory SQL: attribute query	12
6	Data Analysis (II) 6.1 Spatial Databases: map algebra, grid Operations: Local, Focal 6.2 SQL: spatial query	12

Reference Books:

- **Burroughs, P. A. and McDonnell, R. A. (2002):** Principles of Geographical Information System, Oxford University Press.
- **George J. (2004):** Fundamentals of Remote Sensing, Universities Press Pvt. Ltd., Hyderabad.
- **Jensen, J. R. (2003):** Remote Sensing of Environment, An Earth Resource Perspective, Pearson Education Pvt. Ltd., New Delhi.
- **Kang- Tsung-Chang,** Introduction to Geographical Information System, 2002, McGrawHill.
- **Lillesand, T. M. and Kiefer R. W. (2002):** Remote Sensing and Image Interpretation, John Wiley and Sons, New Delhi.
- **Lo C. P. and Yeung, A. K. W. (2002):** Concepts and Techniques of Geographic Information System, Prentice Hall, India.
- **Paul A. Lonfley, Michel F. Goodchild, D J. Maguire and D W. Rhind, (2002):** Introduction to Geographic Information Systems and Science, John Wiley and Sons Ltd.
- Fundamentals of Remote Sensing, A Canada Centre for Remote Sensing Remote Sensing Tutorial.
https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/earthsciences/pdf/resource/tutor/fundam/pdf/fundamentals_e.pdf

Choice Based Credit System Syllabus (2022 Pattern)

Mapping of Program Outcomes with Course Outcomes**Class:** M.A. /M.Sc. Geography I**Subject:** Geography**Course:** Geoinformatics**Course Code:** PAGG 121**Weightage:** 1= Weak or low relation, 2= Moderate or partial relation, 3= Strong or direct relation

Program Outcomes (POs)								
Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8
CO 1				3				
CO 2						2		
CO 3				2				
CO 4		2	2					
CO 5			2					
CO 6						2		
CO 7								3

Justification for the mapping**PO 2: Effective Citizenship and Ethics:**

CO4- Understanding ethical and legal considerations associated with geoinformatics cultivates responsible citizenship by promoting ethical behavior, ensuring data integrity, protecting privacy, fostering equitable access to information, and encouraging informed decision-making based on geographic data that respects societal values and rights.

PO 3: Social competence and communication skill:

CO4- Understanding the ethical and legal considerations associated with geoinformatics enhances social competence and communication skills by fostering clear communication, conflict resolution, interdisciplinary collaboration, stakeholder engagement, cultural sensitivity, negotiation abilities, advocacy, empathy, risk communication, and public education initiatives.

These skills are essential for effective communication and responsible engagement in the geoinformatics field.

CO5- Exploring and applying geoinformatics tools in various domains contribute to social competence and communication skills by fostering problem-solving abilities, enhancing communication, promoting interdisciplinary collaboration, cultivating cultural sensitivity, engaging stakeholders effectively, improving data visualization, nurturing critical thinking, facilitating public outreach, aiding decision-making, and fostering a global perspective. These skills are valuable for effective communication and engagement across diverse fields and communities.

PO 4: Disciplinary Knowledge:

CO1- Grasping basic concepts in Geoinformatics enriches disciplinary knowledge by fostering spatial understanding, enhancing data analysis skills, facilitating interdisciplinary applications, improving problem-solving abilities, developing technological proficiency, recognizing geospatial data sources, honing visualization techniques, aiding decision-making, supporting impact assessment studies, and fostering research and innovation. These skills are foundational and applicable across numerous academic disciplines and professional fields.

CO3- Creating thematic and location maps enhances disciplinary knowledge by promoting spatial representation, aiding data visualization and analysis, supporting interdisciplinary applications, developing geospatial analysis skills, facilitating research and decision-making, understanding spatial context, aiding communication, supporting planning processes, and guiding fieldwork and data collection efforts. These skills are applicable across various academic disciplines and professional fields reliant on spatial data analysis and interpretation.

PO 6:Self- directed and Life-long Course:

CO2- practical work in GIS software supports self-directed and lifelong Course by enhancing technical proficiency, data analysis skills, problem-solving abilities, independent exploration, adaptability to new technologies, research capabilities, geospatial problem-solving, interdisciplinary application, professional development, and community engagement. These

skills empower individuals to continuously learn, adapt, and apply GIS knowledge across diverse contexts and throughout their lives.

CO6- Gaining proficiency in GIS software for data analysis, mapping, and visualization supports self-directed and lifelong Course by promoting technical skill development, independent exploration, problem-solving abilities, continuous skill enhancement, interdisciplinary application, research opportunities, adaptability to new technologies, professional development, community engagement, and problem-based Course. These skills empower individuals to learn continuously and apply GIS knowledge effectively across various contexts throughout their lives.

PO 8: Critical Thinking and problem solving:

CO7- Developing critical thinking skills in geospatial problem analysis and solution proposal enhances problem-solving abilities by facilitating complex problem deconstruction, data evaluation, pattern recognition, in-depth analysis, evaluation of alternatives, creative problem-solving, evidence-based decision-making, risk assessment, continuous improvement, and effective communication. These skills are crucial for addressing geospatial challenges and finding sustainable solutions in diverse fields of study and professional practice.

Subject: Synoptic Climatology**Subject Code: PAGG 122 (A)****No. of Credits: 04**

Course Objectives:

1. To introduce the fundamentals of Synoptic Climatology.
2. To learn the various weather phenomenon and their effect.
3. To gain a comprehensive understanding of the synoptic-scale atmospheric processes that influence climate patterns.
4. To understand and apply climate classification systems.
5. Explore the relationships between synoptic weather system.
6. To develop skills in applying synoptic climatology methods to research questions.
7. To observe and analyses climate data effectively through reports.

Course Outcomes:

After the completion of the course, -

1. Students will understand basic concepts in Synoptic Climatology.
2. Students will understand the weather phenomenon and their effects.
3. Students should comprehend synoptic-scale weather patterns, including their characteristics, formation with their phenomena.
4. Interpreting synoptic weather maps, satellite imagery, and meteorological data to analyze and predict weather patterns.
5. Ability to identify and analyze climate anomalies and extreme weather events linked to synoptic-scale weather systems.
6. Developing critical thinking skills to analyze and solve complex problems related to synoptic weather systems and their influence on climate variability and change.
7. Ability to communicate complex synoptic climatology concepts, observations, and analyses effectively through reports, presentations.

Unit No	Topic Name	Lectures
1	Introduction to Synoptic Climatology 1.1 Definition, Nature and Scope 1.2 Levels of Climatological Synthesis 1.3 Approaches (Analytical approach ,Synoptic approach)	06
2	Weather reporting and analysis 2.1 Observing, reporting, collecting and analysis of weather data by IMD 2.2 Synoptic charts and maps 2.3 Synoptic scale motion, laws of motion	06
3	Tropical Weather Systems 3.1 Easterly waves formation and characteristics. 3.2 Tropical cyclones (formation, life cycle, structure , dynamic) 3.3 Thunderstorm (origin, structure and stages of development) 3.4 Tornadoes-development and occurrences	12
4	Extra-Tropical Weather Systems 4.1 Air masses and fronts 4.2 Air masses of North America, Europe and Asia 4.3 Types of fronts 4.4 Frontal weather, fronto genesis and frontolysis 4.5 Principal zones of fronto genesis 4.6 Rossby waves, wave cyclone-formation, lifecycle, Idealized weather	12
5	Weather Patterns 5.1 Clouds-classification 5.2 Precipitation processes 5.3 Fog- formation and types 5.4 Heat and cold waves	12
6	Weather Forecasting 6.1 Types of weather forecasting 6.2 Methods of weather forecasting 6.3 Role of satellites	06
7	Application of Synoptic Climatology 7.1 Application in pollution studies 7.2 Marine activities 7.3 Aviation 7.4 Disaster prevention and preparedness 7.5 Agriculture	06

Reference Books:

- Barry, R.G. and Perry, A.H. (1973): Synoptic Climatology: Methods and Applications, Methuen and Co. Ltd., London.
- Lutgens, Frederic K. and Tarbuck, Edward J. (2010): The Atmosphere: An Introduction to Meteorology, Pearson Prentice Hall, New Jersey.
- Navarra, J.G. (1979): Atmosphere, Weather and Climate, W.B. Saunders Company, Philadelphia.
- Petterson, S. (1969): Introduction to Meteorology, McGraw Hill, New York.
- Rama Sastry, A.A. (1984): Weather and Weather Forecasting, Publications Division, Ministry of Information and Broadcasting, Government of India, New Delhi.
- Stringer, E.T. (1972): Foundations of Climatology, W.H. Freeman and Company, New York.

Choice Based Credit System Syllabus (2022 Pattern)

Mapping of Program Outcomes with Course Outcomes**Class:** M.A. /M.Sc Geography I**Subject:** Geography**Course:** Principles of Geomorphology**Course Code:** PAGG 122(A)**Weightage:** 1= Weak or low relation, 2= Moderate or partial relation, 3= Strong or direct relation

Program Outcomes (POs)								
Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8
CO 1				2				
CO 2							3	
CO 3			2			2		
CO 4			2		2			
CO 5								3
CO 6								2
CO 7			2					

Justification for the mapping**PO3:Social competence and communication skill:**

CO3- Comprehending synoptic-scale weather patterns and effectively communicating their characteristics, formation, and associated phenomena contributes to social competence by enhancing communication skills, educational outreach, interdisciplinary communication, risk communication, cross-cultural understanding, engagement in public discussions, collaboration in weather-related projects, public service announcements, community resilience building, and fostering empathy and understanding. These skills are vital for effectively communicating weather-related information and fostering informed and resilient communities.

CO4-Interpreting synoptic weather maps, satellite imagery, and meteorological data for weather analysis and prediction enhances social competence and communication skills by fostering effective weather communication, weather education and outreach, engagement in weather

discussions, community resilience building, interdisciplinary communication, media and public communication, supporting emergency response, crisis communication, public engagement and empowerment, and promoting environmental awareness.

CO7- The ability to communicate complex synoptic climatology concepts, observations, and analyses effectively through reports and presentations enhances social competence and communication skills by promoting clear and impactful communication, facilitating educational outreach, encouraging interdisciplinary collaboration, supporting professional presentations, aiding in public awareness campaigns, advocating for policy change, engaging communities, engaging with media, empowering decision-making, and promoting environmental advocacy. These skills contribute to informed decision-making, public engagement, and proactive measures in addressing climate-related challenges.

PO4: Disciplinary Knowledge:

CO1- Understanding basic concepts in Synoptic Climatology is foundational for disciplinary knowledge as it aids in conceptual understanding, interdisciplinary applications, data interpretation, problem-solving, weather pattern comprehension, forecasting, climate analysis, research, communication, and fosters a drive for continuous Course and specialization in climatology-related fields. These skills are crucial for further academic pursuits and professional development in climatology and related disciplines.

PO5: Personal and professional competence:

CO4- Interpreting synoptic weather maps, satellite imagery, and meteorological data for weather analysis and prediction is essential for providing accurate forecasts, understanding weather systems, identifying trends, monitoring severe weather events, predicting climate variability, supporting various industries like agriculture and aviation, aiding in resource management, facilitating scientific research, and ensuring disaster preparedness. This skill is invaluable for multiple sectors and is critical in ensuring safety, resilience, and efficient planning in the face of changing weather conditions.

PO6: Self directed and Life-long Course:

CO3- Comprehending synoptic-scale weather patterns promotes self-directed and lifelong

Course by fostering continuous education, providing foundational knowledge, facilitating adaptability to changing conditions, enhancing problem-solving and critical thinking skills, offering applied Course opportunities, improving forecasting abilities, supporting career development, enhancing communication skills, fostering environmental awareness, and encouraging a lifelong pursuit of knowledge in meteorology and related fields.

PO7: Self directed and Life-long Course:

CO2- Understanding weather phenomena and their effects is crucial for environmental sustainability. It supports disaster preparedness, climate change awareness, ecosystem health, resource management, renewable energy planning, urban infrastructure resilience, water and food security, coastal and marine conservation, environmental policy development, and community engagement in sustainable practices. This knowledge is essential for fostering a more sustainable and resilient environment for future generations.

PO8: Critical Thinking and problem solving:

CO5- The ability to identify and analyze climate anomalies and extreme weather events linked to synoptic-scale weather systems enhances critical thinking by honing pattern recognition, data analysis and synthesis, understanding cause-and-effect relationships, fostering problem-solving abilities, enabling risk assessment and management, facilitating complex decision-making, predictive analysis, environmental impact assessment, and promoting continuous improvement in problem-solving approaches. These skills are essential for addressing complex weather-related challenges and devising effective strategies for resilience and adaptation.

CO6-Developing critical thinking skills to analyze and solve complex problems related to synoptic weather systems and their influence on climate variability and change enhances critical thinking by fostering systems thinking, data analysis, pattern recognition, understanding causal relationships, predictive modeling, problem-solving in complexity, evidence-based decision-making, risk assessment, adaptation strategies, and continuous Course. These skills are crucial for comprehending and addressing the complexities of weather-related phenomena and their broader impacts on climate variability and change.

Subject: Population Geography**Subject Code: PAGG 122(B)****No. of Credits: 04**

Course Objectives:

1. To introduce the fundamentals of Population Geography.
2. To learn the various theories of population geography.
3. To make students aware of the need and importance of population and policies.
4. To aware knowledge about distribution of population in different region.
5. This course gives an idea to collect the population data.
6. To notify the students about different structures and characteristics of population.
7. To give information about growth and population density of different region of the world.

Course Outcomes:

After the completion of the course, Students will be able to-

1. Students will understand basic concepts in population geography.
2. Students will understand various theories regarding population dynamics.
3. Understood the dynamic of population and its role in population policies.
4. Realize worldwide distribution of population.
5. Understand about population structure and characteristics.
6. Understand the population growth of different countries.
7. Apply knowledge of population geography in development planning.

Topics and Course points

Unit No	Unit Name	Lectures
1	Introduction Population Geography 1.1 Definitions 1.2 Nature and scope of Population Geography 1.3 Sources of population data(Census, national sample survey, sample registration survey, NFHS, DLHS)	06
2	Population Dynamics 2.1 Population distribution in the world 2.2 Density of population in the world 2.3 Determinates of population growth	06
3	Population Theory 3.1 Malthus Theory 3.2 Optimum Population Theory 3.3 Demographic Transition Model	08
4	Fertility 4.1 Concepts and measures of Nuptiality and fertility 4.2 Levels and trends of fertility in India 4.3 Determinants of fertility 4.4 Theories of fertility	08
5	Mortality 5.1 Concept of mortality & morbidity 5.2 Measures of mortality 5.3 Recent mortality levels in world 5.4 Mortality trends in India	06
6	Migration 6.1 Definition, types (Internal and International) 6.2 Concept: refugee, brain-drain migration 6.3 Determinants and consequences of migration. 6.4 Lee's Theory of Migration 6.5 Ravenstein's laws of migration 6.6 Push-pull factors of migration	10
7	Population Composition 7.1 Demographic 7.2 Social 7.3 Economic 7.4 Cultural	06
8	Population Development and Policies 8.1 Human Development Index (HDI) 8.2 Gender Development Index (GDI) 8.3 Relation between population and development 8.4 Population policy of India 8.5 New Population policy of China	10

Reference Books:

- **Agarwala, S.N. (1977):** India's population Problems, Tata McGraw Hill publishing Co. Ltd., New Delhi.
- **Bose Ashis et.al. (1974):** Population in India's Development Vikas Publishing House, New Delhi, 1974.
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Choice Based Credit System Syllabus (2022 Pattern)

Mapping of Program Outcomes with Course Outcomes**Class:** M.A./M.Sc. Geography I**Subject:** Geography**Course:** Population Geography**Course Code:** PAGG 122(B)**Weightage:** 1= Weak or low relation, 2= Moderate or partial relation, 3= Strong or direct relation

Program Outcomes (POs)								
Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8
CO 1				2				
CO 2				2		2		
CO 3			2					
CO 4			2					
CO 5				2				
CO 6			3					
CO 7								3

Justification for the mapping**PO3:Social competence and communication skill:**

CO3- Understanding the dynamics of population and its role in population policies enhances social competence and communication skills by supporting informed discussions, policy advocacy, community engagement, education and awareness, interdisciplinary communication, policy dialogue, cultural sensitivity, ethical considerations, advocacy for social justice, and professional engagement. These skills are crucial for fostering effective communication and informed decision-making in various social and professional contexts.

CO4- Understanding the worldwide distribution of population enhances social competence and communication skills by fostering cultural awareness, providing global perspectives, aiding in contextualizing global issues, supporting interdisciplinary conversations, crisis awareness, promoting global citizenship, informing policy discussions, cultural sensitivity, and facilitating communication with diverse audiences. This knowledge is crucial for effective communication

in an increasingly interconnected and diverse world.

CO6- Understanding population growth rates in different countries enhances social competence and communication skills by fostering cultural sensitivity, providing global perspectives, aiding in cross-cultural communication, understanding socio-economic contexts, informing policy discussions, addressing global challenges, environmental awareness, promoting empathy, crisis awareness, and facilitating professional and academic engagement. This knowledge is crucial for effective communication and engagement in an increasingly interconnected world.

PO4:Disciplinary Knowledge:

CO1- By comprehending population geography, students not only gain a deeper understanding of the world's population dynamics but also develop critical thinking skills applicable across various disciplines. It's a foundation that supports informed decision-making, policy implementation, and a broader understanding of societal changes.

CO2- Understanding these theories equips students with a multidisciplinary perspective, enabling them to analyze complex societal issues and develop comprehensive solutions. It fosters critical thinking, problem-solving skills, and the ability to apply theoretical knowledge to real-world scenarios across various disciplines.

CO5- By comprehending population structure and characteristics, professionals in various fields can make informed decisions, develop tailored policies, and create targeted interventions that address specific societal needs. It serves as a fundamental tool for understanding and addressing challenges across disciplines, ensuring more effective and efficient solutions.

PO6:Self-directed and Life-long Course:

CO2- Understanding population dynamics theories not only provides knowledge about human populations but also nurtures a set of skills and attitudes essential for self-directed and lifelong Course. It promotes curiosity, critical thinking, adaptability, and a deeper understanding of the world, enabling individuals to continually learn and grow throughout their lives.

PO8: Critical Thinking and Problem solving:

CO7- Applying population geography knowledge in development planning necessitates critical thinking to analyze data, identify challenges, and devise effective solutions tailored to the needs of diverse populations. It involves problem-solving skills to address complex socio-economic issues and create sustainable, inclusive development strategies.

Subject: Monsoon Climatology**Subject Code:** PAGG 123(A)**No. of Credits:** 04**Course Objectives:**

1. To introduce the fundamentals of Monsoon Climatology.
2. To learn the mechanism of Monsoon wind and effects of monsoon .
3. To comprehend the mechanisms and dynamics that drive monsoon systems.
4. To explore the regional variations in monsoon behavior across different continents.
5. Understanding the specific characteristics and impacts in various regions.
6. To understand techniques and methodologies used in predicting and forecasting monsoon behavior.
7. To examine the relationship between climate change and monsoon variability.

Course Outcomes:

After the completion of the course, Students will be able to-

1. Students will understand basic concepts in Monsoon Climatology
2. Students will understand relationship between Monsoon wind and associated weather phenomenon.
3. Students will able to forecast and predict the weather patterns.
4. Students will develop a comprehensive understanding of the mechanisms, patterns, and variability of monsoon systems across different regions globally.
5. Students will be able to identify and compare regional variations in monsoon behavior.
6. Students will evaluate the impacts of monsoons on local climates, ecosystems, agriculture, water resources, economies, and societies in monsoon-affected regions.
7. Students will explore the relationship between climate change and monsoon variability.

Topics and Course points

Unit No	Unit Name	Lectures
1	Introduction Monsoon Climatology 1.1 Introduction and scope of Monsoon Climatology 1.2 Historical background and economic 1.3 Importance of monsoon	08
2	Origin of Monsoon 2.1 Different concepts related to origin of Monsoon (Thermal concept, Flohns concept, Aerological concept) 2.2 The Asian Monsoon : East and South Asian Monsoon 2.3 Classical Theory of Indian Monsoon 2.4 Tibetan Plateau and Monsoon	10
3	Monsoon Model 3.1 Driving mechanism 3.2 Monsoon on non-rotating and rotating Earth 3.3 Realistic Monsoon Model 3.4 Normal temperature, wind and pressure, 3.5 Dates of onset and withdrawal of monsoon rainfall	10
4	Regional Aspects of Indian Monsoon 4.1 Semi-permanent systems- heat low, Monsoon trough, 4.2 Easterly Jet, Tibetan High	06
5	Intra-seasonal Variation 5.1 Active and break period, depressions, trough of low Pressure 5.2 Mid-tropospheric disturbances ,off shore and onshore vortices Effect of topography	06
6	Interannual Variation 6.1 Variability of summer monsoon rainfall 6.2 Meteorological Teleconnections : (ENSO) 6.3 Indian Ocean Dipole (IOD) 6.4 North Atlantic Oscillation (NAO) 6.5 Walker Circulation 6.6 Role of ocean and upper atmosphere	12
7	Forecasting of Monsoon 7.1 Different time scales 7.2 Factors of forecasting 7.3 Power regression and parametric model 7.4 Current monsoon forecasting system of India Meteorological DepartmentMONEX and IIOE	08

Reference Books:

- **Das, P. K.(1991):** Monsoons,National Book Trust,NewDelhi.
- **Fein, J. S. and Stephens, P.L. (1987):**Monsoons, John Wiley and Sons, New York.
- **Keshavmurty, K.N.(1992):**The Physics of Monsoons, Allied Publishers Limited, New Delhi.
- **Pant, G. B. and Rupa Kumar,K.(1997):**Climates of South Asia, John Wileyand sons,Chichester.
- **Rao,Y.P.(1976):**Meteorological Monograph, Meteorology No.1/1976,Southwest Monsoon, India Meteorological Department.

Choice Based Credit System Syllabus (2022 Pattern)

Mapping of Program Outcomes with Course Outcomes**Class:** M.A./M.Sc Geography I**Subject:** Geography**Course:** Monsoon Climatology**Course Code:** PAGG 123(A)**Weightage:** 1= Weak or low relation, 2= Moderate or partial relation, 3= Strong or direct relation

Program Outcomes (POs)								
Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8
CO 1				2				
CO 2							2	
CO 3				3				
CO 4			2					
CO 5				2				
CO 6								3
CO 7			2					

Justification for the mapping**PO3: Social competence and communication skill:**

CO4- Comprehending the mechanisms and variability of monsoon systems globally not only deepens meteorological knowledge but also cultivates social competence and communication skills. It promotes cultural sensitivity, global awareness, effective communication across diverse audiences, and the ability to engage and collaborate within communities, all of which are essential aspects of social competence and strong communication abilities.

CO7- Exploring the relationship between climate change and monsoon variability nurtures social competence by fostering empathy, global awareness, effective communication, interdisciplinary collaboration, and a sense of responsibility towards addressing environmental challenges—a crucial skill set for contributing to a sustainable and interconnected world.

PO4: Disciplinary Knowledge:

CO1-By understanding basic concepts in Monsoon Climatology, students gain a foundational understanding of weather and climate systems, enabling them to apply this knowledge across various disciplines, fostering interdisciplinary approaches to studying and addressing challenges related to climate, environment, agriculture, and more.

CO3- Mastering the skill of weather prediction enhances disciplinary knowledge by providing practical applications in various fields. It promotes data analysis, critical thinking, and decision-making abilities, essential for addressing challenges across disciplines and industries.

CO5- By comprehending and comparing regional variations in monsoon behavior, students gain a deeper understanding of climatic diversity, socio-economic impacts, environmental dynamics, and cultural adaptations. This knowledge fosters interdisciplinary approaches and informed decision-making across various fields.

PO7: Environment and sustainability:

CO2- By comprehending the relationship between monsoon winds and associated weather phenomena, students gain insights into the intricate connections between weather patterns and environmental sustainability. This knowledge forms the basis for informed decision-making, sustainable resource management, and proactive measures to address climate-related challenges, contributing to a more sustainable and resilient environment.

PO8: Critical Thinking and Problem solving:

CO6- By evaluating the diverse impacts of monsoons on local climates, ecosystems, agriculture, water resources, economies, and societies, students develop critical thinking skills. They learn to identify problems, analyze data, consider multiple perspectives, and propose innovative solutions, preparing them to address complex challenges in diverse fields.

Subject: Geography of Rural Settlements**Subject Code: PAGG 123(B)****No. of Credits: 04**

Course Objectives:

1. To introduce the fundamentals of Geography of Rural Settlements
2. To learn hierarchy evolution types and patterns of rural settlement.
3. To examine the relationship between rural settlements and the natural environment.
4. To appreciate the cultural heritage and historical significance of rural settlements.
5. To understand the role of technology and infrastructure in rural settlement development.
6. To develop skills in spatial analysis, including interpreting maps, analyzing settlement patterns.
7. To compare and contrast rural settlement patterns across different regions or countries.

Course Outcomes:

After the completion of the course, Students will be able to-

1. Students will understand basic concepts in rural settlement.
2. Students will know different types and pattern of rural settlement.
3. Students will develop a comprehensive understanding of rural settlement patterns in different region.
4. Students will critically evaluate the relationship between human activities and the natural environment in rural areas.
5. Students will compare and contrast rural settlement patterns across different regions or countries.
6. Student will be able to identifying similarities, differences, and the underlying reasons for variations, showcasing their analytical skills.
7. Students will gain an appreciation for the cultural diversity and historical significance of rural settlements.

Unit No	Unit Name	Lectures
1	Introduction to Geography of Rural Settlements 1.1 Definition 1.2 Evolution of settlements 1.3 Sequence of occupancy from Neolithic to modern period 1.4 Historical, cultural and geographical aspects of settlements reflected in place names	05
2	Growth and Distribution 2.1 Site, situation, location 2.2 Various factors affecting on settlement site and situations 2.3 Dispersion and nucleation 2.4 Factors affecting dispersion and nucleation 2.5 Methods of the measuring degree of dispersion 2.6 Factors affecting growth of settlements 2.7 System of land division 2.8 Water rights system of agriculture	10
3	Theories of Rural Land Use 3.1 Intensity of land use 3.2 Labour cost 3.3 Marketing of product 3.4 Von Thunen Theory 3.5 Ricardo Theory	10
4	Rural Economic Activities 4.1 Functional analysis of service village and trading Center 4.2 Centrality and hierarchy of rural service centers 4.3 Central Place Theory	05
5	Morphogenesis of Rural Settlements and Transformation 5.1 Social 5.2 Cultural 5.3 Economic organization with in villages 5.4 Functional growth 5.5 Socio-economic transformation in rural areas	10
6	Demographic Characteristics of Rural Settlement 6.1 Age, Sex, Education, Occupation, Caste 6.2 Migration: causes & consequence of migration in rural areas 6.3 Seasonal migration 6.4 Commuting patterns	10
7	Rural House Types 7.1 Primitive, vernacular and modern high rise 7.2 Physical, social, cultural and economic factors 7.3 Size, functional use and architectural style 7.4 Building material	05
8	Rural Settlements in Maharashtra 8.1 Various patterns 8.2 House types and settlement patterns in the Maharashtra 8.3 Modern forms of rural settlements	05

Reference Books:

- **Alam,S.M.et.al.(1982):**SettlementSystemofIndiaOxfordandIBHPublicationCo.,New Delhi.
- **ChisholmM.(1967):** RuralSettlementandLanduse.JohnWiley,NewYork.
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- **Doniel,P.andHopkinson,M.(1986):**TheGeographyofsettlementOliver&Byod,Edinb urgh.
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Choice Based Credit System Syllabus (2022 Pattern)

Mapping of Program Outcomes with Course Outcomes**Class:** M.A. /M.Sc. Geography I**Subject:** Geography**Course:** Geography of Rural Settlement**Course Code:** PAGG 123(B)**Weightage:** 1= Weak or low relation, 2= Moderate or partial relation, 3= Strong or direct relation

Program Outcomes (POs)								
Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8
CO 1				3				
CO 2				2				
CO 3			2					
CO 4							3	
CO 5	2							
CO 6			2		2			
CO 7				2				

Justification for the mapping**PO1 Research-Related Skills and Scientific Temper**

CO5- The role of technology and infrastructure in rural settlement development will increase the research capability of students in terms of urban planning and development.

PO3: Social competence and communication skill:

CO3- By developing a comprehensive understanding of rural settlement patterns, students enhance their social competence through improved communication, empathy, cultural awareness, and engagement with diverse communities. These skills are essential for effective interaction, collaboration, and problem-solving in various social and professional contexts.

CO6- By showcasing analytical skills in identifying similarities, differences, and underlying reasons for variations, students enhance their social competence. They develop strong communication abilities, empathy, critical thinking, and problem-solving skills, preparing them for successful interactions and engagements in a globally interconnected world.

PO4: Disciplinary Knowledge:

CO1- By understanding basic concepts in rural settlement, students acquire a multidisciplinary perspective. This knowledge facilitates interdisciplinary collaboration, fosters a holistic understanding of societal dynamics, and enables comprehensive problem-solving approaches spanning various fields.

CO2- By comprehending the various types and patterns of rural settlements, students gain an interdisciplinary perspective. This knowledge integrates geographical, social, economic, environmental, and cultural aspects, fostering a holistic understanding of rural dynamics and facilitating interdisciplinary collaboration and problem-solving approaches across multiple fields.

CO7- By gaining an appreciation for the cultural diversity and historical significance of rural settlements, students develop a multidimensional understanding that integrates cultural, historical, geographical, environmental, and societal perspectives. This holistic view fosters interdisciplinary connections and enriches their knowledge base, enabling them to approach complex issues with a more comprehensive and inclusive mindset.

PO5: Personal and professional competence:

CO6- By showcasing analytical skills through the identification of similarities, differences, and underlying reasons for variations, individuals enhance their personal and professional competence. These skills are transferable and applicable across various aspects of life, empowering individuals to thrive in diverse environments and excel in their professional endeavors.

PO7:Environment and sustainability:

CO4- By critically evaluating the relationship between human activities and the natural environment in rural areas, students gain insights into the intricacies of sustainability. This knowledge empowers them to become advocates for responsible environmental stewardship, fostering a more sustainable future for rural communities and ecosystems.

Subject: Geography of Disaster Management**Subject Code: PAGG 124****No. of Credits: 04**

Course Objectives:

1. To introduce the fundamentals of Disaster Management.
2. To learn the role of geographical factors in Disaster Management.
3. To introduce various mitigation strategies for disaster management.
4. To make students well aware of the basic concepts and nature of preparedness.
5. To understand disaster risk reduction strategies.
6. To understand procedure on government level.
7. To make students well aware of international disaster response and cooperation

Course Outcomes:

After the completion of the course, Students will be able to-

1. Students will understand basic concepts in disaster management
2. Students will know relationship between geographical condition and disaster management
3. Students will get acquainted with standard operating procedure of disaster management.
4. Understand the value of preparedness of disaster.
5. Understand disaster risk reduction strategies.
6. Aware about international organizations involved in disaster management.
7. Aware about international disaster response and cooperation.

Unit No	Unit Name	Lectures
1	Introduction to Disaster Management 1.1 Concept and definition 1.2 Difference between hazard and disaster 1.3 Geographical Conditions and disasters 1.4 Classification of disasters	10
2	Basic Concepts in Disaster Management 2.1 Concept of Management 2.2 Aims and Objectives 2.3 Pre-Disaster Management 2.4 Post-Disaster management	10
3	Disaster management and measures 3.1 Phases of disaster management cycle 3.2 Importance of first aid 3.3 standard operating procedure of management on governmental level 3.4 Role of media in disaster management	10
4	Natural Disaster and management (Causes, effects and mitigation) 4.1 Earthquake 4.2 Volcano 4.3 Landslide 4.4 Tsunami 4.5 Cyclone 4.6 Flood	10
5	Man-made Disaster and management (Causes, effects and mitigation) 5.1 Deforestation 5.2 Forest fire 5.3 Soil Degradation 5.4 Terrorism 5.6 Major man-made disaster examples in India	10
6	Technologies for Disaster Management 6.1 Application of Modern Technologies for the emergency communication 6.2 Application of remote sensing, GIS and GPS in disaster management	10

Reference books

- Agarwal, A. and Narain S. (Ed) (1999): State of India's Environment. The Citizens Report, Centre for Science and Environment, New Delhi
- Bryant Edward (2000): Natural Hazards, Cambridge University Press
- Daly, H.E. (1996): Beyond Growth, Beacon Press, Boston
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Choice Based Credit System Syllabus (2022 Pattern)

Mapping of Program Outcomes with Course Outcomes**Class:** M.A./M.Sc. Geography I**Subject:** Geography**Course:** Geography of Disaster Management**Course Code:** PAGG 124**Weightage:** 1= Weak or low relation, 2= Moderate or partial relation, 3= Strong or direct relation

Program Outcomes(POs)								
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1		.						3
CO2		2	2					
CO3				3				
CO4			2					2
CO5			3				2	
CO6			3				2	
CO7			3				2	

PO 2: Effective Citizenship and Ethics:

CO2- Student will be active advocates for policies that promote disaster resilience and social welfare. They can engage with policymakers, raise awareness about necessary regulations and standards, and hold authorities accountable. By participating in advocacy efforts, citizens contribute to the development of ethical and responsible policies that prioritize disaster risk reduction.

PO 3: Social Competence:

CO2: Students can effectively engage with their peers, teachers, and communities to raise awareness about disaster risks and preparedness measures. They can organize workshops, seminars, or awareness campaigns to educate others, promoting a culture of safety and preparedness in schools and beyond.

CO4: Understanding the role of international organizations in disaster management is important for student as it provides valuable insight into the global effort aimed as disaster preparedness, response and recovery.

CO5:Students will be aware of global issues including natural disasters and humanitarian crises in different parts of the world. Being informed about international disasters helps students appreciate the interconnectedness of the world and understand the need for global cooperation in disaster response.

CO6: Students learn to work together effectively, understanding the importance of each team member's role. They develop the ability to communicate, coordinate, and support one another during high-pressure situations, fostering a sense of camaraderie and mutual respect.

CO7: by increasing social awareness, students develop a strong foundation for social competence. These skills empower them to navigate complex social situations, build meaningful relationships, and positively influence their communities and the broader world

PO4:Disciplinary Knowledge:

CO3: Disaster risk reduction (DRR) strategies for students are essential to prepare them for potential emergencies and empower them to contribute to a safer environment.

PO7:Environmentand Sustainability:

CO5: Students can study how disaster risk reduction strategies align with the United Nations Sustainable Development Goals (SDGs). Understanding the interconnection between disaster resilience and goals such as clean water and sanitation, zero hunger, and life on land can help students appreciate the importance of these initiatives for environmental sustainability.

CO6: Participating in a rescue team within the context of environment and sustainability equips students with valuable skills and knowledge to respond to disasters while considering the environmental impact and promoting sustainability.

CO7: Encourage students to organize awareness campaigns within their schools and communities. They can create posters, videos, or presentations to educate others about environmental issues, such as deforestation, pollution, and endangered species.

PO8: Critical Thinking and Problem solving:

CO1: Critical thinking enables students to engage in scenario planning. By considering different disaster scenarios, students can analyze the potential consequences and develop strategic plans. They learn to anticipate challenges, identify resources, and formulate proactive strategies, fostering strategic thinking skills essential for effective disaster preparedness.

CO4: By engaging students in critical analysis and problem-solving activities related to international organizations in disaster management, educators can enhance their ability to think critically, evaluate information, and propose innovative solutions. These skills are invaluable, preparing students to address complex challenges and contribute meaningfully to disaster management efforts in the future.

Subject: Practical in Surveying**Subject Code: PAGG 125****No. of Credits: 04****Course Objectives:**

1. To introduce the fundamentals of Practical in Surveying.
2. To prepare the plans and maps that is for the representation of the measured plot of the area.
3. To become proficient in handling and using surveying equipment such as theodolite, total stations, levels, and GPS devices.
4. To develop skills in conducting field surveys, including setting up equipment, measuring distances, angles, elevations, and taking accurate readings.
5. To learn how to process survey data using software tools for analysis, interpretation, and presentation.
6. To develop problem-solving abilities by encountering and resolving real-world challenges faced during field surveys.
7. Gain proficiency in creating topographic maps using survey data, contour lines, and elevation measurements.

Course Outcomes:

After the completion of the course, -

1. Students will understand basic concepts in Practical in Surveying
2. Students will be able to prepare the plans and maps of the measured area.
3. Students will acquire the skills required to conduct field surveys independently, accurately measuring distances, angles, elevations, and collecting reliable data.
4. Students will demonstrate the ability to ensure accuracy and precision in survey measurements.
5. Students will be able to create topographic maps using survey data, contour lines, and elevation measurements.
6. Students will demonstrate problem-solving skills by effectively addressing challenges encountered during field surveys.
7. Students will understand creating topographic maps using survey data, contour lines, and elevation measurements.

Unit No	Unit Name	Lectures
1	Introduction to surveying 1.1 Definitions and methods 1.2 Benchmarks 1.3 Spot heights 1.4 Reduced levels 1.5 Interpolation and contouring	15
2	Dumpy Level Survey 2.1 Various components and common terms used in dumpy level survey 2.2 Collimation method and Rise and Fall method 2.3 Profile drawing and block contouring	15
3	Theodolite Survey 3.1 Various components and common terms used in Theodolite 3.2 Intersection method and Tachometric method	15
4	Total Station 4.1 Various components and common terms used in Total Station 4.2 Area and profile drawing	15

Reference books

- **AsisSarkar (2015):** Practical Geography, A Systematic Approach, Orient BlackSwan
- **Duggal, S.K. (2013):** Surveying Vol. 2, McGraw Hill Publication, NewYork.
- **Kanetkar, T.P. and Kulkarni, S.V. (2010):** Surveying and Leveling Vol. II, Pune Vidyarthi Publication,Pune.
- **Maslov, AV., Gordeev, A.V. and Batrakov, Yu.G. (1984):** Geodetic surveying, Mir Publishers,Moscow.
- **Rangwala, S.C. (2011):** Surveying and Leveling, Charotar Publishing HousePvt. Ltd. Anand, (Gujarat),India.
- **Punmia, B.C., Jain A. and Jain A. (2011):** Surveying, Vol. II. and III, Laxmi Publication - NewDelhi.

Choice Based Credit System Syllabus (2022 Pattern)

Mapping of Program Outcomes with Course Outcomes**Class:** M.A. /M.Sc. Geography I**Subject:** Geography**Course:** Practical in surveying**Course Code:** PAGG 125**Weightage:** 1= Weak or low relation, 2= Moderate or partial relation, 3= Strong or direct relation

Program Outcomes (POs)								
Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8
CO 1				2				
CO 2			2					
CO 3				2				
CO 4	2							
CO 5				2				
CO 6								3
CO 7								2

Justification for the mapping**PO1: Research-Related Skills and Scientific temper:**

CO4- By honing accuracy and precision in survey measurements, students cultivate a set of research-related skills that are essential for conducting high-quality research across diverse disciplines. These skills form the basis for conducting rigorous and impactful research studies.

PO3: Social competence and communication skill:

CO2- By engaging in the creation of plans and maps for measured areas, students develop communication skills necessary for conveying technical information effectively, collaborating across disciplines, engaging stakeholders, and presenting findings in a clear, accessible manner—essential skills for successful communication in both academic and professional settings.

PO4: Disciplinary Knowledge:

CO1- By understanding the basic concepts in practical surveying, students build a solid foundation for deeper disciplinary knowledge in surveying techniques, methodologies, and applications. This foundational understanding sets the stage for further exploration, specialization, and advancement within the field of surveying.

CO3- By acquiring the skills necessary for independent field surveys and accurate data collection, students enhance their disciplinary knowledge in surveying by bridging theoretical concepts with practical applications, enabling them to excel in their field with hands-on expertise.

CO5- By creating topographic maps using survey data, contour lines, and elevation measurements, students deepen their disciplinary knowledge in surveying by honing spatial interpretation, data visualization, problem-solving, and communication skills essential for comprehensive surveying practices.

PO8: Critical Thinking and Problem solving:

CO6- Demonstrating problem-solving skills during field surveys nurtures critical thinking abilities by promoting analytical thinking, creative problem-solving, effective decision-making, adaptability, and continuous improvement. These skills are crucial not only in surveying but in various professional settings requiring adaptive and innovative problem-solving approaches.

CO7- By engaging in the process of creating topographic maps using survey data, contour lines, and elevation measurements, students apply critical thinking and problem-solving skills, fostering a deeper understanding of surveying principles, spatial representation, and the complexities of landscape interpretation.

Subject: Practical of Statistical Techniques for Geography**Subject Code: PAGG 126****No. of Credits: 04**

Course Objectives:

1. To introduce various techniques used in geography.
2. To learn and apply various statistical techniques for geographical problems.
3. Students will also learn how to plan a small group field visit and work in small groups in the field.
4. The goal to enhance the students Course experience with field visits and digital techniques.
5. The overall aim of the course is to provide an introduction to fundamental statistical methods used in geography.
6. Students will create clear and informative data visualizations to represent statistical findings
7. Students will learn exhibit proficiency in using statistical software to conduct data analysis.

Course Outcomes:

After the completion of the course, Students will be able to-

1. Students will understand the different techniques used in geography.
2. Students will able to apply various statistical techniques for geographical problems intheir research work.
3. Gain practical experience and awareness of some skills of field visits and data collection.
4. Develop skills by problem-solving, field and/or primary and secondary data collection, analysis and interpretation
5. Develop communication and interactive skills through group work.
6. Enhance ability to work as part of a team.
7. Students will be able to identify and understand various statistical tools commonly used in data analysis.

Unit No	Unit Name	Lectures
1	Introduction to Statistical Techniques in Geography 1.1 Introduction and applications of statistical techniques in Geography 1.2 Types of statistics: descriptive and inferential statistics Geographical data a) Primary and secondary data b) Spatial and temporal data c) Discrete and continuous data d) Grouped and ungrouped data 1.3 Scales of measurement: nominal, ordinal, interval and ratio	10
2	Descriptive Statistics 1.1 Introduction to descriptive statistics 1.2 Central tendency: mean, mode, median 1.3 Dispersion: variance and standard deviation Skewness and kurtosis 1.4 (Calculations of above parameters for ungrouped and grouped data)	08
3	Probability and Probability Distributions 3.1 Introduction to probability 3.2 The Normal Probability Distribution 3.3 The Binomial Probability Distribution 3.4 The Poisson Probability Distribution	10
4	Inferential Statistics 4.1 Introduction to inferential statistics 4.2 Population and sample 4.3 Hypothesis testing: Null and alternate hypothesis 4.4 The Chi-square test (Two sample case) 4.5 Student's 't' test (Two sample tests) 4.6 ANOVA (Analysis of variance)/ F ratio test	08
5	Correlation and Regression Analysis 5.1 Introduction to bi-variate correlation and regression 5.2 The product-moment correlation coefficient 5.3 Significance testing in correlation analysis 5.4 Linear regression equation 5.5 Exponential regression equation 5.6 Power-law regression equation 5.7 Concept of residuals and explained variance	10
6	Time Series Analysis 6.1 Introduction and definition of time series 6.2 Applications of time series analysis 6.3 Components of time series 6.4 Calculation and plotting of moving averages (3 and 5) 6.5 Curve fitting by method of least squares	10

7	Fieldwork and Data Collection 7.1 Collection of primary and/or secondary data by fieldwork or field visit 7.2 Analysis of data by using appropriate statistical technique 7.3 Report writing	04
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Reference Books:

- **AsisSarkar (2015):** Practical Geography, A Systematic Approach, Orient BlackSwan
 - **David, E. (1989):** Statistics for Geographers.
 - **Elhance, D.L., Elhance, V. and Aggarwal B.M. (2014):** Fundamentals of Statistics, KitabMahal, Allahabad.
 - **Hammond, R. and McCullagh, P. (1978):** Quantitative Techniques in Geography, Clarendon Press. Oxford, London.
 - **Karlekar, S. and Kale, M. (2006):** Statistical Analysis of Geographical Data, Diamond Publication, Pune.
 - **Liendsor, J. M. (1997):** Techniques in Human Geography, Routledge.
 - **Norcliffe, G.B. (1977):** Inferential Statistics for Geographers, Hutchinson, London.
 - **Rogerson, P.A. (2015):** Statistical Methods for Geography, SAGE Publication, London.
 - **Wheller, D., Shaw, G. and Barr, S. (2010):** Statistical Techniques in Geographical Analysis, David Fulton, Routledge, New York.
- Yeats, M. H. (1974):** An Introduction to Quantitative Analysis in Human Geography

Choice Based Credit System Syllabus (2022 Pattern)

Mapping of Program Outcomes with Course Outcomes**Class:** M.A./M.Sc. Geography I**Subject:** Geography**Course:** Practical in statistical Techniques for geography**Course Code:** PAGG 126**Weightage:** 1= Weak or low relation, 2= Moderate or partial relation, 3= Strong or direct relation

Program Outcomes (POs)								
Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8
CO 1				2				
CO 2	2							
CO 3			2					
CO 4								3
CO 5			2					
CO 6				2				
CO 7								2

Justification for the mapping**PO1: Research-Related Skills and Scientific temper:**

CO2- By applying various statistical techniques in geographical research, students not only enhance their statistical and analytical skills but also develop a broader skill set encompassing research design, hypothesis testing, critical evaluation, and interdisciplinary integration. These skills are invaluable for conducting high-quality and impactful research in the field of geography.

PO3: Social competence and communication skill:

CO3- By gaining practical experience through field visits and data collection, students not only develop technical competencies but also nurture social competence and communication skills crucial for effective interaction, collaboration, and engagement in diverse settings.

CO5- Group work serves as a platform for students to practice and refine their social competence and communication skills, preparing them for effective collaboration, communication, and interaction in various personal, academic, and professional settings.

PO4:Disciplinary Knowledge:

CO1- By comprehending and embracing various techniques used in geography, students deepen their disciplinary knowledge, becoming adept at selecting, applying, and critically evaluating methodologies best suited to address geographical inquiries and challenges.

CO6-By fostering teamwork skills, individuals in geography can leverage collective expertise, diverse perspectives, and collaborative efforts to advance the discipline's knowledge base, solve complex geographical problems, and make substantial contributions to the field.

PO8: Critical Thinking and Problem solving:

CO4- By actively participating in problem-solving, fieldwork, and data collection, analysis, and interpretation, individuals in geographical research cultivate critical thinking skills essential for evaluating, synthesizing information, making informed decisions, and addressing complex issues within the discipline.

CO7- By comprehensively understanding and identifying various statistical tools, students cultivates critical thinking skills essential for methodological rigor, problem-solving in data analysis, and the ability to make informed decisions based on statistical evidence within the field of geography.

