



Anekant Education Society's
Tuljaram Chaturchand College, Baramati
(Autonomous)

Two Year Degree Program in Geography
(Faculty of Science & Technology)

CBCS Syllabus
M.A. /M.Sc. (Geography) Part-I Semester -I
For Department of Geography
Tuljaram Chaturchand College, Baramati

Choice Based Credit System Syllabus (2023 Pattern)
(As Per NEP 2020)

To be implemented from Academic Year 2024-2025

Title of the Programme: M.A. /M.Sc. (Geography)**Preamble**

AES's TuljaramChaturchand College has decided to change the syllabus of various faculties from June, 2023 by taking into consideration the guidelines and provisions given in the National Education Policy (NEP), 2020. The NEP envisions making education more holistic and effective and to lay emphasis on the integration of general (academic) education, vocational education and experiential learning. The NEP introduces holistic and multidisciplinary education that would help to develop intellectual, scientific, social, physical, emotional, ethical and moral capacities of the students. The NEP 2020 envisages flexible curricular structures and learning based outcomes for the development of the students. The credit structure and the courses framework provided in the NEP are nationally accepted and internationally comparable.

The rapid changes in science and technology and new approaches in different areas of Geography and related subjects, Board of Studies in Geography of TuljaramChaturchand College, Baramati - Pune has prepared the syllabus of M. A. /M.Sc.-I Geography Semester - I under the Choice Based Credit System (CBCS) by following the guidelines of NEP 2020, NCERF, NHEQF, Prof. R.D. Kulkarni's Report, GR of Gov. of Maharashtra dated 20th April and 16th May 2023 and Circular of SPPU, Pune dated 31st May 2023.

A Master degree in geography will provide students, the knowledge and skills to begin a variety of rewarding careers. Geographers work as urban planners, GIS technicians and analysts, disaster preparedness planners, teachers, environmental scientists, remote sensing analysts, transportation planners, demographers, hydrologists and in a variety of other areas. Students who complete Master degree in Geography, courses will examine the spatial organization of physical features and human activities at a variety of spatial scales from local to global. Students will be able to locate features on the surface of the earth, explain why they are located where they are, and describe how places are similar and/or different. Students will also examine human interactions with the environment and describe how physical and cultural landscapes change through time. Students completing physical geography courses will be able to describe the processes that drive earth's climate, create landforms, and govern the distribution of plants and animals.

Programme Specific Outcomes (PSOs)

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.
2. Conduct Social Survey Project: They will be eligible for conducting social survey project, which is necessity for the assessment of development status of a particular group or section of the society.
3. Individual and teamwork: Works effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.
4. Application of modern instruments: Students will be able to apply various modern instruments for data collection and field survey.
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.
6. Critical Thinking: Students will able to understand and solve the critical problems of physical and cultural environment.
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.
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.
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.
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.
11. Ethics: Recognize different value systems including your own, understand the moral dimensions of your decisions and accept responsibility for them.
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.
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.

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

Anekant Education Society's
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(Autonomous)

Board of Studies (BOS) in Geography

From 2022-23 to 2024-25

Sr.No.	Name	Designation
1.	Dr. Arun S. Magar	Chairman
2.	Dr. Asaram S. Jadhav	Member
3.	Mr. Vinayak D. Chavan	Member
4.	Ms. Sayali B. Pawar	Member
5.	Ms. Aysha A. Mualni	Member
6.	Ms. Aisha S. Tamboli	Member
7.	Dr. Santosh Lagad	Vice-Chancellor Nominee
8.	Dr. Pravin Kokane	Expert from other University
9.	Dr.T. P. Shinde	Expert from other University
10.	Dr. Babaji Maskare	Industry Expert
11.	Mr. Ganesh Ghanawat	Meritorious Alumni
12.	Ms. Komal Pote	Student Representative
13.	Mr. Sagar Lokhande	Student Representative

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Credit Distribution Structure for (M. A./M.Sc. Geography) Part-I SEM I (2023 Pattern)

Year	Level	Sem.	Major		Research Methodology (RM)	OJT/ FP	RP	Cum. Cr.
			Mandatory	Electives				
I	6.0	Sem-I	GEO-501-MJM: Principles of Geomorphology and Climatology (Credit 04)	GEO-511-MJE: Statistical Techniques in Geography (Credit 04)	GEO-521-RM: Research Methodology in Geography (Credit 04)	--	--	20
			GEO-502-MJM: Principles of Economic and Population Geography (Credit 04)					
			GEO-503-MJM: Practical in Physical Geography (Credit 02)					
			GEO-504-MJM: Practical in Human Geography (Credit 02)					
Cum. Cr.			12	4	4		--	20

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Credit Distribution Structure for (M. A./M.Sc. Geography) Part-I SEM II (2023 Pattern)

Year	Level	Sem.	Major		Research Methodology (RM)	OJT/FP	RP	Cum. Cr.
			Mandatory	Electives				
I	6.0	Sem-II	GEO-551-MJM(A) Fluvial Geomorphology OR GEO-551-MJM (B) Population Geography (Credit 04)	GEO-561-MJE Geographical Thoughts (Credit 04)	-	GEO-581-OJT/FP On Job Training /Field Project (Credit 04)	--	20
			GEO-552-MJM (A) Practical in Fluvial Geomorphology OR GEO-552-MJM (B) Practical in Population Geography (Credit 02)					
			GEO-553-MJM (A) Costal Geomorphology OR GEO-553-MJM (B) Geography of Rural Settlement (Credit 04)					
			GEO-553-MJM (A) Practical in Costal Geomorphology OR GEO-553-MJM (B) Practical in Geography of Rural Settlement (Credit 02)					
Cum. Cr.			12	4	-	4	--	20

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Credit Distribution Structure for (M. A. /M.Sc. Geography) Part-II SEM III (2023 Pattern)

Year	Level	Sem.	Major		Research Methodology (RM)	OJT /FP	RP	Cum. Cr.
			Mandatory	Electives				
II	6.5	III	GEO-601-MJM (A)Tropical Geomorphology OR GEO-601-MJM (B)Urban Geography (Credit 04)	GEO-611-MJE Principles of Remote sensing and GIS (Credit 04)	-	-	GEO-621-RP Research Project (Credit 04)	20
			GEO-602-MJM (A) Practical in Tropical Geomorphology OR GEO-602-MJM (B) Practical in Urban Geography (Credit 02)					
			GEO-603-MJM (A)Theoretical and Applied Geomorphology OR GEO-603-MJM (B)Geography of Migration (Credit 04)					
			GEO-604-MJM (A) Practical in Theoretical and Applied Geomorphology OR GEO-604-MJM (B) Practical in Geography of Migration (Credit 02)					
Cum. Cr.			12	4	-	-	4	20

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Credit Distribution Structure for (M. A. /M.Sc. Geography) Part-II SEM IV (2023 Pattern)

Year	Level	Sem.	Major		Research Methodology (RM)	OJT /FP	RP	Cum. Cr.
			Mandatory	Electives				
II	6.5	IV	GEO-651-MJM Watershed Management (Credit 04)	GEO-661-MJE Practical in Remote Sensing and GIS (Credit 02)	-	-	GEO-681-RP Research Project (Credit 06)	20
			GEO-652-MJM Soil Geography (Credit 04)					
			GEO-653-MJM Practical in Watershed Management (Credit 02)					
			GEO-654-MJM Practical in Soil Geography (Credit 02)					
Cum. Cr.			12	2	-	-	6	20

Anekant Education Society's
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Course Structure for (M. A. /M.Sc. Geography) Part-I (2023 Pattern)

Sem	Course Type	Course Code	Course Title	Theory/ Practical	No. of Credits
I	Major Mandatory	GEO-501-MJM	Principles of Geomorphology and Climatology	Theory	04
		GEO-502-MJM	Principles of Economic and Population Geography	Theory	04
		GEO-503-MJM	Practical in Physical Geography	Practical	02
		GEO-504-MJM	Practical in Human Geography	Practical	02
	Major Elective	GEO-511-MJE	Statistical Techniques in Geography	Theory	04
	Research Methodology	GEO-521-RM	Research Methodology in Geography	Theory	04
Total Credits Semester I					20
II	Major Mandatory	GEO-551-MJM (A)	Fluvial Geomorphology	Theory	04
		GEO-551-MJM (B)	Population Geography		
		GEO-552-MJM (A)	Practical in Fluvial Geomorphology	Practical	02
		GEO-552-MJM (B)	Practical in Population Geography		
		GEO-553-MJM (A)	Coastal Geomorphology	Theory	04
		GEO-553-MJM (B)	Geography of Rural Settlement		
		GEO-554-MJM (A)	Practical in Coastal Geomorphology	Practical	02
		GEO-554-MJM (B)	Practical in Geography of Rural Settlement		
	Major Elective	GEO-561-MJE	Geographical Thoughts	Theory	04
	On Job Training/ Field Project	GEO-581-OJT/FP	On Job Training /Field Project	Project	04
Total Credits Semester II					20

**CBCS Syllabus as per NEP 2020 for M.A./M.Sc. I
(2023 Pattern)**

Name of the Programme	: M.A. /M.Sc. Geography
Programme Code	: PAGEO
Class	: M.A. /M.Sc. I
Semester	: I
Course Type	: Major Mandatory (Theory)
Course Code	: GEO-501-MJM
Course Title	: Principles of Geomorphology and Climatology
No. of Credits	: 04
No. of Teaching Hours	: 60

Course Objectives:

1. To describe the concept of a drainage basin and stream network.
2. To understand the basic laws and models of the fluvial processes.
3. To discuss characteristics of drainage basin hydrology.
4. To apply quantitative methods to measure and assess fluvial processes and landforms.
5. To understand composition and structure of atmosphere.
6. To recognize factors affecting solar radiation and temperature.
7. To study global wind circulation and wind pattern.

Course Outcomes:

By the end of the course, students will be able to:

- CO1.** Accurately describe the concept of a drainage basin and stream network, including their components and interconnectedness.
- CO2.** Demonstrate a comprehensive understanding of the basic laws and models of fluvial processes, enabling them to explain and apply them to real-world scenarios.
- CO3.** Discuss the characteristics of drainage basin hydrology, including aspects such as precipitation, runoff, and stream flow patterns.
- CO4.** Apply quantitative methods to measure and assess fluvial processes and landforms,

allowing them to collect and analyze data related to river systems effectively.

CO5. Understand by which component atmosphere are composed and different layers of atmosphere.

CO6. Understand which factor affects the solar radiation distribution on earth surface.

CO7. Understand the global wind circulation and wind pattern.

Topics and Learning Points

UNIT 1: Introduction to Geomorphology and Climatology	Teaching Hours
1.1 Definition of Geomorphology & Climatology	12
1.2 Branches of Geomorphology & Climatology	
1.3 Geological scale	
1.4 Structure and Composition of atmosphere	
UNIT 2: The Dynamic Earth	12
2.1 Internal structure of the Earth & seismic waves	
2.3 Theory of Plate Tectonics and landforms	
2.3 Weathering: types and related landforms	
2.4 Mass movement: types and related landforms	
UNIT 3: Fluvial and Coastal Processes	12
3.1 Definition and basic concepts	
3.2 Process of erosion, transportation and deposition	
3.3 Fluvial landforms	
3.4 Coastal landforms	
UNIT 4: Insolation and Temperature	12
4.1 Solar and terrestrial radiation	
4.2 Temperature measurements and controls	
4.3 Heat Budget	
4.4 Lapse rate and temperature inversion	
4.5 Mechanism of heat transfer	
UNIT 5: Atmospheric Pressure and Moisture	12
5.1 Factors affecting horizontal distribution of pressure	
5.2 General circulation of the atmosphere	
5.3 Atmospheric moisture and measurements	

5.4 Forms of condensation

References:

1. Bloom, A.L. (2012): Geomorphology- A Systematic Analysis of Late Cenozoic Landforms, Prentice-Hall of India, New Delhi
2. Chorley, R.J., Schumm, S. A. and Sugden, D. E. (1984): Geomorphology, Methuen, London.
3. Gregory, K.J. and Goudie, A.S. (2014): The SAGE Handbook of Geomorphology, SAGE, London.
4. Huggett, R.J. (2008): Fundamentals of Geomorphology, Routledge, London and New York.
5. Kale, V.S. and Gupta, A. (2010): Introduction to Geomorphology, Universities Press, Hyderabad
6. Migon, P. (2010): Geomorphological Landscapes of the World, Springer, London/New York.
7. Singh, S. (2011): Geomorphology, Prayag Pustak Bhawan, Allahabad.
8. Siddhartha, K. (2001): The Earth's dynamic surface, Kishore, Delhi.
9. Strahler, A.H. and Strahler, A.N. (1992): Modern Physical Geography, John Wiley, New York.
10. Critchfield, H.J. (Rep. 2010): General Climatology. Prentice Hall, New Delhi.
11. Lal, D.S. (1998): Climatology, Chaitanya Publishing House, Allahabad.
12. Lutgens, Frederic K. & Tarbuck, Edward J. (2010): The Atmosphere: An Introduction to Meteorology, Pearson Prentice Hall, New Jersey.
13. Oliver, John E. & Hildreth, John J. (2003): Climatology: An Atmospheric Science, Pearson Education, Delhi
14. Savindra Singh (2005): Climatology, Prayag Pustak Bhawan, Allahabad.
15. Trewartha: Introduction to Weather and Climate.

Choice Based Credit System Syllabus (2023 Pattern)

Mapping of Program Outcomes with Course Outcomes**Class: M.A/M.Sc.I** **Subject: Geography****Course:** Principles of Geomorphology and Climatology**Course Code:** GEO-501-MJM**Weightage:** 1=Weak relation,2= Moderate or partial relation,3= Strong or direct relation

POs / COs	CO1	CO2	CO3	CO4	CO5	CO6	CO7
PO1	2	2	2	2	2	1	1
PO2	1	1	1	2	1	1	1
PO3	1	1	1	1	1	1	1
PO4	1	2	2	3	1	1	1
PO5	1	1	1	1	1	1	1
PO6	1	1	1	1	1	1	1
PO7	1	1	1	1	1	1	1
PO8	1	1	1	1	1	1	1
PO9	1	1	1	1	1	1	1

Justification**PO1 (Disciplinary Knowledge):**

CO1: Moderate relationship; knowledge of drainage basins and stream networks contributes to a deeper understanding of environmental science.

CO2: Moderate relationship; understanding fluvial processes are relevant to disciplinary knowledge in environmental science.

CO3: Moderate relationship; knowledge of hydrology is important for a comprehensive understanding of the discipline.

CO4: Moderate relationship; applying quantitative methods aligns with practical and theoretical knowledge.

CO5, CO6, CO7: Weak relationship; these COs focus more on atmospheric sciences which are less central to the core disciplinary knowledge of fluvial processes.

PO2 (Critical Thinking and Problem Solving):

CO1: Weak relationship; describing drainage basins and stream networks does not directly involve critical thinking or problem solving.

CO2: Weak relationship; understanding laws and models is foundational but does not necessarily involve problem solving.

CO3: Weak relationship; discussing hydrology characteristics involves understanding but less direct problem solving.

CO4: Strong relationship; applying quantitative methods requires critical thinking and problem-solving skills.

CO5, CO6, CO7: Weak relationship; understanding atmospheric components and wind patterns involves less critical problem solving related to core environmental science.

PO3 (Social Competence):

CO1 to CO7: Weak relationship; while understanding these concepts is important, they do not directly relate to social competence or communication skills.

PO4 (Research-related Skills and Scientific Temper):

CO1: Weak relationship; describing components of drainage basins is less related to research skills.

CO2: Moderate relationship; understanding fluvial processes supports scientific research and inquiry.

CO3: Moderate relationship; discussing hydrology supports research and scientific understanding.

CO4: Strong relationship; applying quantitative methods is crucial for research and scientific analysis.

CO5, CO6, CO7: Weak relationship; atmospheric sciences are less central to research in fluvial processes.

PO5 (Trans-disciplinary Knowledge):

CO1 to CO7: Weak relationship; while understanding various scientific concepts is beneficial, these COs are more focused on specific areas rather than integrating multiple disciplines.

PO6 (Personal and Professional Competence):

CO1 to CO7: Weak relationship; these COs focus on technical knowledge rather than personal and professional competencies.

PO7 (Effective Citizenship and Ethics):

CO1 to CO7: Weak relationship; these COs focus on technical and scientific knowledge rather than ethical and social issues.

PO8 (Environment and Sustainability):

CO1 to CO4: Weak relationship; although understanding fluvial processes is related to environmental science, it does not directly address sustainability.

CO5, CO6, CO7: Weak relationship; these COs are more about atmospheric sciences and less about environmental sustainability.

PO9 (Self-directed and Life-long Learning):

CO1 to CO7: Weak relationship; while these COs contribute to knowledge, they do not directly focus on self-directed or life-long learning aspects.

**CBCS Syllabus as per NEP 2020 for M.A./M.Sc. I
(2023 Pattern)**

Name of the Programme	: M.A./M.Sc. Geography
Programme Code	: PAGEO
Class	: M.A./M.Sc. I
Semester	: I
Course Type	: Major Mandatory (Theory)
Course Code	: GEO-502-MJM
Course Title	: Principles of Economic and Population Geography
No. of Credits	: 04
No. of Teaching Hours	: 60

Course Objectives:

1. This paper intends to acquaint the students with various dimensions of Economic Population Geography, and its challenges.
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 acquaint the students with the utility and application of Population Geography in different regions and environment.
6. To aware knowledge about distribution of population in different region.
7. To give information about growth and population density of different region of the world.

Course Outcomes:

By the end of the course, students will be able to:

- CO1.**Students are well aware about basic principles and concepts in economic and population geography.
- CO2.**Demonstrate an understanding of the asset, cost, benefit, analysis, tax, policy, impacts and other economic aspects.
- CO3.**Understand the demand of population and availability of raw material.

CO4.Aware about the labour types, cost, importance and role also in industrial zone.

CO5.Student can realize the world-wide distribution of population.

CO6.Student can understand population growth of different countries, they can also predict future population setting of the country.

CO7.Students are able to apply knowledge of population geography in development planning.

Topics/ Contents:

Topic Contents	Lectures
Unit 1: Introduction to Economic and Population Geography	12
1.1 Concepts and Definition of economic and population geography	
1.2 Nature and scope	
1.3 Sources of Population data	
1.4 Application of Economic and Population Geography	
Unit 2: Economic Activities	12
2.1 Definition and classification of economic activities	
2.2 Factors of location of economic activities: physical, social, economic and technical	
2.3 Location of economic activities: Weber's and Von-Thunen's model	
Unit 3: Resources	12
3.1 Definition and classification of resources	
3.2 Significance of natural and human resources in economic development	
3.3 Importance of non-conventional energy resources for sustainable development	
Unit 4: Population Distribution	12
4.1 Population distribution of World and India	
4.2 Factors affecting distribution of population	
4.3 Density: definition and types	
4.4 Factors affecting density of population	
4.5 Population density in India	
Unit 5: Population Growth and Trend	12
5.1 Concept of population growth	
5.2 Component of population growth (Fertility, Mortality, Migration and Nuptiality)	
5.3 Malthus Theory	

5.4 Demographic Transition theory

5.5 Population growth and trend in India

Reference Books & Websites:

1. **Bhende, A. and Kanitkar, T. (2011):** Principles of Population Studies, Himalaya Publishing House, Bombay.
2. **Beaujeu, G. J. (1966):** Geography of Population, Longman Group Ltd.
3. **Chandna, R.C. (Rep.2010):** Geography of Population, Concepts, Determinants and Patterns, Kalyani Publishers, New Delhi.
4. **Clark, J. I. (1973):** Population Geography, Pergamon Press Ltd., Oxford.
5. **Clark, J.I. (1984):** Geography and Population: Approaches and Applications, Pergamon Press Ltd., Oxford.
6. **Musmade Arjun, Sonawane Amit and Jyotiram More, (2015)** Population & Settlement Geography (Marathi) -Diamond Publication Pune.
7. **Alexander, J.W. (1977):** Economic Geography, Prentice Hall of India Pvt. Ltd., New.
8. **Chorley, R.J. and Haggett, P. (1970):** Socio Economic Models in Geography, Concept publishing Company Pvt. Ltd., New Delhi.
9. **Garnier, B.J. and Delobez, A. (1979):** Geography of Marketing, Longman.
10. **Hartshorne, T.A. and Alexander, J.W. (2010):** Economic Geography, PHI Learning, New Delhi
11. **Kanan Chatterjee (2015):** Basics of Economic Geography.
12. **Knox, P., Agnew, J. and McCarthy, L. (2008):** The Geography of the World Economy, Hodder Arnold, London.
13. **Lloyd, P. and Dicken, B. (1972):** Location in Space: A Theoretical Approach to Economic Geography, Harper and Row, New York Methuen.
14. **Mitra, A. (2002):** Resource Studies, Sreedhar publishers, Kolkata.
15. **Patil, S.G., Suryawanshi, R.S., Pacharne, S. and Choudhar, A.H. (2014):** Economic Geography, AtharavPrakashan, Pune.

Choice Based Credit System Syllabus (2023 Pattern)

Mapping of Program Outcomes with Course Outcomes**Class: M.A/M.Sc.I****Subject: Geography****Course: Principles of Economic and Population Geography** **Course Code: GEO-502-MJM****Weightage:** 1=Weak relation,2= Moderate or partial relation,3= Strong or direct relation

POs / COs	CO1	CO2	CO3	CO4	CO5	CO6	CO7
PO1	2	2	2	2	2	2	3
PO2	1	2	2	2	1	1	2
PO3	2	2	2	2	2	2	3
PO4	2	2	2	2	1	1	2
PO5	1	1	1	1	1	1	2
PO6	2	2	2	2	2	2	2
PO7	1	1	1	1	1	1	1
PO8	2	2	2	2	1	1	2
PO9	1	1	1	1	1	1	1

Justification**PO1 (Disciplinary Knowledge):**

CO1, CO2, CO3, CO4: These COs provide foundational knowledge and practical insights in economic and population geography, which are central to demonstrating comprehensive disciplinary knowledge.

CO5, CO6: Contribute to disciplinary understanding but are less central compared to other COs.

CO7: Directly applies knowledge in development planning, reflecting a strong grasp of the discipline.

PO2 (Critical Thinking and Problem Solving):

CO2, CO3, CO4: Involve analyzing economic aspects, resource demands, and labor issues, which support critical thinking and problem-solving skills.

CO1, CO5, CO6: Focus more on foundational knowledge and less on direct problem-solving.

PO3 (Social Competence):

CO1, CO2, CO3, CO4: Support effective communication of geographical and economic concepts, enhancing social competence.

CO5, CO6, CO7: Involve presenting and discussing complex information, further improving social skills.

PO4 (Research-related Skills and Scientific Temper):

CO1, CO2, CO3, CO4: Provide knowledge that supports research activities and scientific inquiry in economic and population geography.

CO5, CO6: Contribute to broader research understanding but are less central.

PO5 (Trans-disciplinary Knowledge):

CO7: Applies knowledge in a way that integrates multiple perspectives and approaches, reflecting trans-disciplinary understanding.

CO1, CO2, CO3, CO4, CO5, CO6: Focus more on specific areas and do not heavily integrate disciplines.

PO6 (Personal and Professional Competence):

CO1, CO2, CO3, CO4: Enhance both personal growth and professional skills through understanding and application of geographical and economic concepts.

CO5, CO6, CO7: Support professional competence by providing relevant knowledge and skills.

PO7 (Effective Citizenship and Ethics):

CO1 to CO7: Primarily focus on knowledge and application rather than explicitly addressing ethical issues or social responsibility.

PO8 (Environment and Sustainability):

CO1, CO2, CO3, CO4: Address economic and population factors relevant to environmental and sustainability issues.

CO5, CO6, CO7: Provide contextual knowledge but have limited direct impact on sustainability concerns.

PO9 (Self-directed and Life-long Learning):

CO1 to CO7: Offer knowledge relevant to specific fields but do not strongly emphasize self-directed or life-long learning beyond the course context.

**CBCS Syllabus as per NEP 2020 for M.A./M.Sc. I
(2023 Pattern)**

Name of the Programme	: M.A./M.Sc. Geography
Programme Code	: PAGEO
Class	: M.A./M.Sc. I
Semester	: I
Course Type	: Major Mandatory (Practical)
Course Code	: GEO-503-MJM
Course Title	: Practical in Physical Geography
No. of Credits	: 02
No. of Teaching Hours	: 60

Course Objectives:

1. To 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. To develop proficiency in reading and interpreting various types of relief analysis.

Course Outcomes:

By the end of the course, students will be able to:

- CO1.**Aware the basic concept of drainage basin and its classification.
- CO2.**conduct weather and climate observations in the field.
- CO3.**classify the climate by various method.
- CO4.**Realize the world-wide distribution of climate and drainage network.
- CO5.**Knows the various types of drainage in worldwide distribution.
- CO6.**Recognize factors affecting on drainage network.
- CO7.**Identify major types and pattern of drainage basin.

Topics and Learning Points

Unit 1: Drainage Network Analysis	Teaching Hours
1.1 Stream ordering and Bifurcation ratio	10
i. Strahler's method	
ii. Horton's method	
Unit 2: Drainage Basin Relief Analysis	20
2.1 Absolute relief map	
2.2 Relative relief map	
2.3 Hypsometric analysis	
2.4 Block diagram (multiple section)	
Unit 3: Climatic Element and its Representation	30
3.1 Simple wind rose diagram	
3.2 Compound wind rose diagram	
3.3 Climatograph	
3.4 Water Budget/ Balance	

Reference Books & Websites:

1. Asis Sarkar (2015): Practical Geography, A Systematic Approach, Orient Black Swan
2. King, C. A.M (1966): Techniques in Geomorphology, Edward Arnold, London
3. Monkhouse, F. J. and Wilkinson, H. R., (1976). Maps and Diagrams, Methuen & Co.
4. Savindra Singh (2002): Geomorphology, Prayag Pustak Bhawan, Allahabad
5. Miller, Austin (1953): The skin of the Earth, Methuen & Co. Ltd. London

Choice Based Credit System Syllabus (2023 Pattern)

Mapping of Program Outcomes with Course Outcomes**Class: M.A/M.Sc.I****Subject: Geography****Course: Practical in Physical Geography****Course Code: GEO-503-MJM****Weightage:** 1=Weak relation,2= Moderate or partial relation,3= Strong or direct relation

POs / COs	CO1	CO2	CO3	CO4	CO5	CO6	CO7
PO1	2	2	2	3	3	2	3
PO2	1	2	2	2	1	2	2
PO3	2	2	2	3	2	2	3
PO4	2	2	2	2	1	2	2
PO5	1	1	1	2	1	1	2
PO6	2	2	2	2	2	2	2
PO7	1	1	1	1	1	1	1
PO8	2	2	2	2	1	2	2
PO9	1	1	1	1	1	1	1

Justification**PO1 (Disciplinary Knowledge):**

CO1: Provides a foundational understanding of drainage basins, contributing to disciplinary knowledge.

CO2, CO3: Involve fieldwork and classification methods, enhancing practical knowledge in the discipline.

CO4, CO5, CO7: Offer deeper insights into global distribution and types of drainage, which are crucial for comprehensive knowledge.

PO2 (Critical Thinking and Problem Solving):

CO2, CO3: Involve analyzing and classifying climate data, which supports problem-solving and critical thinking.

CO4, CO7: Require application of knowledge to understand global patterns and drainage types.

CO1, CO5, CO6: Focus more on basic knowledge and recognition rather than direct problem-solving skills.

PO3 (Social Competence):

CO1, CO2: Involve communicating observations and classifications, supporting effective presentation and interaction skills.

CO4, CO7: Require clear articulation of complex global patterns and drainage types, enhancing social competence.

CO3, CO5, CO6: Support communication of specialized knowledge but are less focused on interaction skills.

PO4 (Research-related Skills and Scientific Temper):

CO1, CO2, CO3: Involve scientific observation and classification, which support research skills and inquiry.

CO4, CO5, CO7: Include understanding global patterns and types, contributing to research and scientific inquiry.

PO5 (Trans-disciplinary Knowledge):

CO4, CO7: Apply knowledge of global patterns and drainage types, integrating various aspects of the discipline.

CO1, CO2, CO3, CO5, CO6: Focus more on specific areas rather than integrating multiple disciplines.

PO6 (Personal and Professional Competence):

CO1, CO2, CO3, CO4: Enhance both personal and professional skills through understanding and application of drainage and climate concepts.

CO5, CO6, CO7: Contribute to professional competence by providing relevant knowledge for fieldwork and analysis.

PO7 (Effective Citizenship and Ethics):

CO1 to CO7: Primarily focus on disciplinary knowledge and skills rather than on ethical issues or social responsibility.

PO8 (Environment and Sustainability):

CO1, CO2, CO4, CO7: Address environmental and global distribution aspects that have implications for sustainability.

CO5, CO6: Provide contextual knowledge but have limited direct focus on sustainability.

PO9 (Self-directed and Life-long Learning):

CO1 to CO7: Provide knowledge within specific contexts, but do not strongly emphasize fostering self-directed or life-long learning beyond the course material.

**CBCS Syllabus as per NEP 2020 for M.A./M.Sc. I
(2023 Pattern)**

Name of the Programme	: M.A./M.Sc. Geography
Programme Code	: PAGEO
Class	: M.A./M.Sc. I
Semester	: I
Course Type	: Major Mandatory (Practical)
Course Code	: GEO-504-MJM
Course Title	: Practical in Human Geography
No. of Credits	: 02
No. of Teaching Hours	: 60

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:

By the end of the course, students will be able to:

- CO1.**understand calculation techniques of growth rates.
- CO2.**calculate rates and apply to various state of India.
- CO3.**Study in crop combination to give knowledge of society.
- CO4.**apply various theories in human geography to their society.
- CO5.**understand the dynamics of population and its role in population policies
- CO6.**understand about population structure and characteristics of different countries.
- CO7.**understand population growth of different countries, they can also predict future population setting of the country.

Topics and Learning Points

Unit 1: Techniques in Agricultural Geography	Teaching Hours
1.1 Weaver's method of crop combination	20
1.2 Jasbir Singh method of crop concentration	
1.3 Crop Diversification: Bhatia method	
Unit2: Population growth rates and Projection	20
2.1 Population growth rate	
2.2 Decadal growth rate	
2.3 Population projection using linear equation regression	
2.4 Age-sex pyramid	
2.5 Dependency ratio	
UNIT3: Demographic Indices / Measures	20
3.1 Fertility	
3.2 Mortality	
3.3 Migration	
3.4 Nuptiality	

Reference:

1. C. P. Lo and Albert, K. W. Yeung (2002): Concepts and Techniques of Geographic Information System, 2002Prentice –Hall, India.
2. Kansky, N. T. (1965): Structure of Transport Network
3. Liendsor, J. M. (1997): Techniques in Human Geography, Routledge
4. Lloyd, P. and B. Dicken (1972): Location in Space - A theoretical approach to economic geography. Harper and Row, New York.
5. Majid Hussein, "Agricultural Geography", Rawat Publication. M.A./M. Sc. [II] Geography Savitribai Phule Pune University 27
6. Monkhouse, F. J. and Wilkison, H. R. (1976): Map and Diagrams, Methuen and Co.

7. P. A. Burrough and R. A. McDonnell, (2000): Principles of Geographical Information System, Oxford University Press.
8. Paul A. Longley, Michel F. Goodchild, D J. Maguire and D.W. Rhind (2002): Introduction to Geographic Information Systems and Science, John Wiley and Sons Ltd.
9. Singh & Kanujia : Map work and Practical Geography
10. Singh. J. and Dhillon S.S. (1994): Agricultural Geography. Tata McGraw Hill, Publishing Co. Ltd.

Choice Based Credit System Syllabus (2023 Pattern)

Mapping of Program Outcomes with Course Outcomes**Class:** M.A/M.Sc.I**Subject:** Geography**Course:** Practical in Human Geography**Course Code:** GEO-504-MJM**Weightage:** 1=Weak relation,2= Moderate or partial relation,3= Strong or direct relation

POs / COs	CO1	CO2	CO3	CO4	CO5	CO6	CO7
PO1	2	2	2	3	3	3	3
PO2	2	2	2	2	3	3	3
PO3	2	2	2	2	2	2	2
PO4	2	2	2	2	3	3	3
PO5	1	1	1	2	2	2	2
PO6	2	2	2	2	2	2	2
PO7	1	1	1	1	2	2	2
PO8	2	2	2	2	2	2	2
PO9	2	2	2	2	2	2	2

Justification**PO1 (Disciplinary Knowledge):**

CO1: Provides foundational knowledge in calculating growth rates, essential for understanding population dynamics.

CO2: Applies growth rates in specific contexts, deepening theoretical and practical knowledge.

CO3: Relates crop combinations to societal impacts, contributing to understanding population interactions.

CO5, CO6, CO7: Offer detailed insights into population dynamics and policies, reflecting strong disciplinary knowledge.

PO2 (Critical Thinking and Problem Solving):

CO1, CO2: Involve applying calculation techniques and interpreting data, which require critical thinking and problem-solving.

CO3, CO4: Apply theories and knowledge to societal contexts, enhancing problem-solving skills.

CO5, CO6, CO7: Understanding population policies and predicting future trends involves significant critical analysis and problem-solving.

PO3 (Social Competence):

CO1 to CO7: Focus primarily on individual knowledge and application rather than directly enhancing social and communication skills.

PO4 (Research-related Skills and Scientific Temper):

CO1, CO2: Involve scientific techniques for calculations and their application, supporting research skills.

CO3, CO4: Apply theories and knowledge in practical contexts, relevant to research and scientific inquiry.

CO5, CO6, CO7: Study population dynamics and future predictions, essential for research and developing scientific understanding.

PO5 (Trans-disciplinary Knowledge):

CO4: Applying human geography theories to societal contexts integrates multiple aspects of the discipline.

CO1, CO2, CO3, CO5, CO6, CO7: Focus on specific knowledge areas without significant integration of multiple disciplines.

PO6 (Personal and Professional Competence):

CO1 to CO7: Enhance personal and professional skills through understanding and application of population and growth concepts, supporting career development.

PO7 (Effective Citizenship and Ethics):

CO5, CO6, CO7: Understanding population dynamics and policies involves ethical considerations and impacts on society.

CO1, CO2, CO3, CO4: Primarily focused on knowledge application rather than explicitly addressing ethical concerns.

PO8 (Environment and Sustainability):

CO1, CO2, CO3, CO4: Knowledge about population growth and dynamics has implications for environmental and sustainability issues.

CO5, CO6, CO7: Provide contextual understanding relevant to sustainable development and environmental impact.

PO9 (Self-directed and Life-long Learning):

CO1 to CO7: Provide knowledge applicable to specific contexts, supporting continued learning and adaptation in the field.

**CBCS Syllabus as per NEP 2020 for M.A./M.Sc. I
(2023 Pattern)**

Name of the Programme	: M.A./M.Sc. Geography
Programme Code	: PAGEO
Class	: M.A./M.Sc. I
Semester	: I
Course Type	: Major Elective (Theory)
Course Code	: GEO-511-MJE
Course Title	: Statistical Techniques in Geography
No. of Credits	: 04
No. of Teaching Hours	: 60

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:

By the end of the course, students will be able to:

CO1: Students will understand the different techniques used in geography.

CO2: Students will be able to apply various statistical techniques for geographical problems in their research work.

CO3: Gain practical experience and awareness of some skills of field visits and data collection.

CO4: Develop skills by problem-solving, field and/or primary and secondary data collection, analysis and interpretation

CO5: Develop communication and interactive skills through group work.

CO6: Enhance ability to work as part of a team.

CO7: Students will be able to identify and understand various statistical tools commonly used in data analysis.

Topics and Learning Points

Unit 1: Introduction to Statistical Techniques in Geography **Teaching Hours**

1.1 Introduction and applications of statistical techniques in Geography **12**

1.2 Types of statistics: descriptive and inferential statistics

1.3 Geographical data

- i. Primary and secondary data
- ii. Spatial and temporal data
- iii. Discrete and continuous data
- iv. Grouped and ungrouped data

1.4 Scales of measurement: nominal, ordinal, interval and ratio

Unit 2: Descriptive Statistics **12**

2.1 Introduction to descriptive statistics

2.2 Central tendency: mean, mode, median

2.3 Dispersion: variance and standard deviation, Skewness and kurtosis

2.4 Calculations of above parameters for ungrouped and grouped data

Unit 3: Inferential Statistics **12**

3.1 Introduction to inferential statistics

3.2 Hypothesis testing: Null and alternate hypothesis

3.3 The Chi-square test (Two sample case)

3.4 Student's 't' test (Two sample tests)

3.5 ANOVA (Analysis of variance) / F ratio test

Unit 4: Correlation and Regression Analysis**12**

- 4.1 Introduction to bi-variate correlation and regression
- 4.2 Linear regression equation
- 4.3 Exponential regression equation
- 4.4 Logarithmic regression equation
- 4.5 Power-law regression equation
- 4.6 Concept of residuals and explained variance

Unit 5: Time Series Analysis**12**

- 5.1 Introduction and definition of time series
- 5.2 Applications of time series analysis
- 5.3 Components of time series
- 5.4 Calculation and plotting of moving averages (3 and 5)
- 5.5 Curve fitting by method of least squares

Reference:

1. Asis Sarkar (2015): Practical Geography, A Systematic Approach, Orient Black Swan
2. David, E. (1989): Statistics for Geographers.
3. Elhance, D.L., Elhance, V. and Aggarwal B.M. (2014): Fundamentals of Statistics, Kitab Mahal, Allahabad.
4. Hammond, R. and McCullagh, P. (1978): Quantitative Techniques in Geography, Clarendon Press. Oxford, London.
5. Jadhav, A. (2022) Statistical Techniques for Geography, Pritam Publication, Jalgaon
6. Karlekar, S. and Kale, M. (2006): Statistical Analysis of Geographical Data, Diamond Publication, Pune.
7. Liendsor, J.M. (1997): Techniques in Human Geography, Routledge.
8. Norcliffe, G.B. (1977): Inferential Statistics for Geographers, Hutchinson, London.
9. Wheller, D., Shaw, G. and Barr, S. (2010): Statistical Techniques in Geographical Analysis, David Fulton, Routledge, New York.
10. Yeats, M.H. (1974): An Introduction to Quantitative Analysis in Human Geography

Choice Based Credit System Syllabus (2023 Pattern)

Mapping of Program Outcomes with Course Outcomes**Class:** M.A/M.Sc.I**Subject:** Geography**Course:** Statistical Techniques in Geography**Course Code:** GEO-511-MJE**Weightage:** 1=Weak relation,2= Moderate or partial relation,3= Strong or direct relation

POs	CO1	CO2	CO3	CO4	CO5	CO6	CO7
PO1	3	3	2	2	1	1	3
PO2	2	3	2	3	1	1	3
PO3	1	2	2	2	3	3	1
PO4	2	3	2	3	2	1	3
PO5	2	2	2	2	2	1	2
PO6	1	1	2	3	3	3	1
PO7	1	1	1	2	3	3	1
PO8	2	2	3	3	2	2	2
PO9	2	2	2	3	2	2	2

Justification :**PO1: Disciplinary Knowledge**

CO1, CO2, CO3, CO4, and CO7 directly enhance the theoretical and practical understanding of the discipline, ensuring a comprehensive knowledge of geographical techniques, statistical applications, and data analysis.

PO2: Critical Thinking and Problem Solving

CO1, CO2, CO3, CO4, and CO7 involve significant critical thinking and problem-solving skills, as they require the application of geographical and statistical techniques, practical problem-solving in fieldwork, and data analysis.

PO3: Social Competence

CO2, CO3, CO4, CO5, and CO6 require and enhance social competence by involving communication of techniques, interaction during fieldwork, data interpretation, and teamwork, all of which are essential for effective social interactions and presentations.

PO4: Research-related Skills and Scientific Temper

CO1, CO2, CO3, CO4, and CO7 are central to building research skills and scientific temper as they involve understanding and applying techniques, conducting fieldwork, solving problems, and utilizing statistical tools for research purposes.

PO5: Trans-disciplinary Knowledge

CO1, CO2, CO3, CO4, CO5, and CO7 can be applied across different disciplines, contributing to trans-disciplinary knowledge by integrating various techniques, methods, and communication skills useful in multiple fields.

PO6: Personal and Professional Competence

CO3, CO4, CO5, and CO6 are essential for personal and professional competence as they involve fieldwork, problem-solving, communication, and teamwork, all of which are crucial for personal growth and professional development.

PO7: Effective Citizenship and Ethics

CO4, CO5, and CO6 are crucial for demonstrating citizenship and ethical responsibility by involving ethical considerations in data interpretation, developing communication skills, and promoting ethical behavior in teamwork.

PO8: Environment and Sustainability

CO1, CO2, CO3, CO4, CO6, and CO7 contribute to knowledge and need for sustainable development by involving techniques, statistical tools, fieldwork, problem-solving, and teamwork in environmental studies.

PO9: Self-directed and Life-long Learning

CO1, CO2, CO3, CO4, CO5, CO6, and CO7 all foster independent and life-long learning by encouraging the understanding and application of techniques, conducting fieldwork, problem-solving, effective communication, teamwork, and continuous learning of statistical tools.

**CBCS Syllabus as per NEP 2020 for M.A./M.Sc. I
(2023 Pattern)**

Name of the Programme	: M.A./M.Sc. Geography
Programme Code	: PAGEO
Class	: M.A./M.Sc. I
Semester	: I
Course Type	: Research Methodology (Theory)
Course Code	: GEO-521-RM
Course Title	: Research Methodology in Geography
No. of Credits	: 04
No. of Teaching Hours	: 60

Course Objectives:

1. To provide an introduction to research methods and the research process.
2. To learn the principles of research design, data collection, data analysis.
3. To provide students with the skills necessary to design and conduct research studies.
4. To understand the methods of data collection and data analysis.
5. To aware the students with the research ethics and plagiarism.
6. To introduce with the new trends and approaches in research methodology.
7. To develop the research aptitude among students.

Course Outcomes:

By the end of the course, students will be able to:

- CO1.** Understand the research process and different types of research designs
- CO2.** Identify research problems and formulate research questions
- CO3.** Choose appropriate research methods and data collection techniques
- CO4.** Analyze and interpret research data
- CO5.** Write research reports and communicate research findings effectively
- CO6.** Understand the new trends and approaches in research methodology.

CO7. Analyse and apply the research aptitude in their research work.

Topics and Learning Points

Unit 1: Introduction to Research Methodology	Teaching Hours
1.1 Meaning and objectives of research	12
1.2 Characteristics of Research	
1.3 Types of Research	
1.4 Various steps in Research Process	
1.5 Research Methods versus Methodology	
Unit 2: Research Problem and Research Design	12
2.1 Definition and identification of the Research Problem	
2.2 Technique involved in defining a problem	
2.3 Definition and purpose of Research Design	
2.4 Characteristics of Good Research Design	
Unit 3: Sampling Design	12
3.1 Sampling Design – Definition of Population, Sample and Sampling Design	
3.2 Advantages and disadvantages of Sampling	
3.3 Characteristics of a good sample	
3.4 Types or method of sampling	
Unit 4: Methods of data collection and data analysis	12
4.1 Primary data: Questionnaire, Interview and Observation /Field Work	
4.2 Sources of Secondary data	
4.3 Hypothesis- definition and types	
4.4 Measure for Central Tendency and Dispersion	
4.5 Correlation and Regression and Time series Analysis	
4.6 Parametric and non-parametric tests	
Unit 5: Report writing and research ethics	12

5.1 Dissertation and thesis, research paper, review article, short communication, conference presentation, meeting report, etc.

5.2 Structure and organization of research reports; literature review

5.3 Research ethics and plagiarism

5.4 Use of plagiarism detection software's

5.5 Research opportunities and funding agencies

Reference Books:

1. Gaum, Carl G., Graves, Harold F., and Hoffman, Lyne, S.S., (1950): Report Writing, 3rd ed., New York: Prentice-Hall.
2. Kothari, C.R. (2004): Research Methodology: Methods and Techniques, New Age International (P) Ltd., New Delhi – 110002.
3. Kothari, C.R., (1984): Quantitative Techniques, 2nd ed., New Delhi: Vikas Publishing House Pvt. Ltd.
4. Mishra Shanti Bhushan and Shashi A. (2011): Handbook of Research Methodology, Educreation Publishing, New Delhi – 110075
5. Pandey, P. and Pandey, M.M. (2015): Research Methodology: Tools and Techniques,, Romania, European Union.
6. Tandon, B.C., (1979): Research Methodology in Social Sciences. Allahabad, Chaitanya Publishing House.
7. Ullman, Neil R. (1978): Elementary Statistics, New York: John Wiley & Sons, Inc.
8. Yamane, T., Statistics (1973): An Introductory Analysis, 3rd ed., New York: Harper and Row.

Choice Based Credit System Syllabus (2023 Pattern)

Mapping of Program Outcomes with Course Outcomes**Class: M.A/M.Sc.I****Subject: Geography****Course: Research Methodology in Geography****Course Code: GEO-521-RM****Weightage:** 1=Weak relation,2= Moderate or partial relation,3= Strong or direct relation

POs	CO1	CO2	CO3	CO4	CO5	CO6	CO7
PO1	3	3	3	3	2	2	3
PO2	2	3	3	3	2	3	3
PO3	1	2	2	2	3	2	2
PO4	3	3	3	3	3	3	3
PO5	2	2	2	2	2	2	2
PO6	1	1	2	2	3	2	2
PO7	1	1	1	2	3	2	2
PO8	2	2	2	3	2	2	3
PO9	2	3	3	3	3	3	3

Justifications**PO1: Disciplinary Knowledge**

CO1, CO2, CO3, CO4, CO7: Enhance the theoretical and practical understanding of the discipline, ensuring comprehensive knowledge of geographical techniques, statistical applications, and data analysis.

CO5, CO6: Involve writing research reports and understanding new trends.

PO2: Critical Thinking and Problem Solving

CO2, CO3, CO4, CO6, CO7: Involve significant critical thinking and problem-solving skills, requiring the application of geographical and statistical techniques, practical problem-solving in fieldwork, and data analysis.

CO1, CO5: Involve understanding the research process and communicating findings.

PO3: Social Competence

CO5: Involves writing reports and communicating findings effectively.

CO2, CO3, CO4, CO6, CO7: Require effective communication and presentation of research.

CO1: Focuses on understanding the research process.

PO4: Research-related Skills and Scientific Temper

CO1, CO2, CO3, CO4, CO5, CO6, CO7: Directly contribute to understanding, conducting, and communicating research, as well as applying scientific inquiry.

PO5: Trans-disciplinary Knowledge

CO1, CO2, CO3, CO4, CO5, CO6, CO7: Can be applied across various disciplines to address common research problems.

PO6: Personal and Professional Competence

CO5: Involves effective communication in professional settings.

CO3, CO4, CO6, CO7: Involve teamwork, data analysis, and understanding new trends, essential for professional competence.

CO1, CO2: Focus more on understanding and identifying research problems.

PO7: Effective Citizenship and Ethics

CO5: Involves ethical considerations in communicating research findings.

CO4, CO6, CO7: Involve ethical research practices and application of research aptitude.

CO1, CO2, CO3: Focus more on the research process.

PO8: Environment and Sustainability

CO4, CO7: Involve analyzing data and applying research aptitude to understand environmental impacts.

CO1, CO2, CO3, CO5, CO6: Contribute to understanding and communicating the impact of research on sustainability.

PO9: Self-directed and Life-long Learning

CO2, CO3, CO4, CO5, CO6, CO7: Foster independent learning and application of research skills throughout life.

CO1: Provides a foundation for self-directed learning in research.