



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 -II

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 Tuljaram Chaturchand 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 Tuljaram Chaturchand 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. Aisha S. Tamboli	Member
6.	Ms. Priyanka S. Pawar	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. Komal Pote	Student Representative
12.	Mr. Sagar Lokhande	Student Representative

Anekant Education Society's
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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 Geography 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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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	: II
Course Type	: Major Mandatory
Course Code	: GEO-551-MJM (A)
Course Title	: Fluvial Geomorphology
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 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 to measure the velocity of the river flow.

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.** Analyze the role of fluvial processes in shaping landscapes, including erosion, deposition, and landform evolution.
- CO6.** Explain in detail the factors influencing the formation and evolution of river channels, such as sediment transport, channel morphology, and boundary conditions.
- CO7.** Identify different flow types within a river system and measure the velocity of the river flow, utilizing appropriate measurement techniques and tools.

Topics and Learning Points

Unit 1: Introduction to Fluvial Geomorphology	Teaching Hours
1.1 Definition and scope	12
1.2 Drainage basin and stream network	
1.3 Horton's laws of drainage composition	
1.4 Laws of Allometric Growth	
1.5 Phases of drainage network development- Glock's model	
Unit 2: Drainage Basin Hydrology	12
2.1 Runoff generation and types	
2.2 Gully and channel formation	
2.3 Channel initiation	
2.4 Discharge and magnitude/frequency of flows in river system	
Unit 3: Open Channel Hydraulics	12
3.1 Types of flows	
3.2 Flow behaviour- sub-critical, critical and supercritical flow	
3.3 Flow velocity variations and measurement methods	
3.4 Shear stress and stream power	
Unit 4: Channel Morphology	12
4.1 River categories- alluvial, bedrock and mix alluvial-bedrock	
4.2 Cross-section morphology and reach morphology	

4.3 Controls of channel morphology

4.4 Channel bed configuration

4.5 Channel patterns or plan forms

Unit 5: Fluvial Erosion, Transportation and Deposition

12

5.1 Erosion processes and associated landforms

5.2 Transportation processes and types

5.3 Depositional processes and associated landforms

5.4 Importance of fluvial landforms

References:

1. Charlton, R. (2008): Fundamentals of fluvial Geomorphology, Routledge, New York.
2. Fryirs, K.A. and Brierley, G.J. (2013): Geomorphic Analysis of River Systems: An approach to reading the landscape, Wiley-Blackwell.
3. Garde, R.J. (2006): River Morphology, New age international limited publishers New Delhi.
4. Kale, V.S. and Gupta, A. (2001): Introduction to Geomorphology, Orient Longman, Kolkata.
5. Knighton, D. (1998): Fluvial forms and processes, Arnold, an imprint of Hodder Education, and Hachette UK Company, London.
6. Education, and Hachette UK Company, London.
7. Kondolf, M.G. and Piegay, H. (2016): Tools in Fluvial Geomorphology, Wiley-Blackwell.
8. Leopold, L.B., Wolman, M.G. and Miller, P. (1954): Fluvial processes in Geomorphology, Freeman and Co. San Francisco.
9. Maithi, R. (2016): Modern approaches to Fluvial Geomorphology, Primus Books.
10. Mangelsdorf, J., Scheurmann, K. and Weib, F.H. (1989): River Morphology, Springer-Verlag.
11. Morisawa, M. (1985): Rivers: Forms and Processes, Longman, UK.
12. Richards, K. (1982): River: Forms and processes in alluvial channels. Methuen and Co. London.

Mapping of Program Outcomes with Course Outcomes

Weightage: 0= No relation, 1= Weak relation, 2= Moderate relation, 3= Strong relation

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	2	2	2	1	0	0	1	2	0
CO2	2	2	2	0	0	0	0	1	2	0
CO3	3	2	2	0	0	0	0	1	2	0
CO4	3	2	2	3	1	1	0	1	2	2
CO5	2	2	2	1	3	1	0	1	2	1
CO6	2	2	2	1	2	3	2	1	2	1
CO7	2	2	2	1	2	2	3	1	2	1

Justification

PO1 (Critical and Creative Thinking):

CO1, CO3, and CO4 are rated 3 as they involve analytical thought and critical evaluation of geological concepts and evidence. Other COs are rated lower as they may not directly involve critical and creative thinking skills.

PO2 (Communication Skill):

CO1, CO2, and CO3 are rated 2 as they require effective communication of geological concepts and theories. Other COs are rated lower as they may not directly involve communication skills.

PO3 (Multicultural Competence):

All COs are rated 2 as they involve understanding diverse geological contexts but do not specifically focus on multicultural competence.

PO4 (Research Skills):

CO1, CO3, and CO4 are rated 2 as they involve research-related skills like observation and hypothesis formulation. Other COs are rated lower as they may not directly involve research skills.

PO5 (Environmental Awareness):

CO4 and CO5 are rated 3 as they directly involve environmental awareness and knowledge of environmental processes. Other COs are rated lower as they may not directly involve environmental awareness.

PO6 (Problem-solving Abilities):

CO4, CO5, and CO6 are rated 1 as they involve identifying and addressing complex challenges related to geological processes. Other COs are rated lower as they may not directly involve problem-solving abilities.

PO7 (Collaboration and Teamwork):

CO6 and CO7 are rated 2 as they involve collaboration in analyzing geological and environmental processes. Other COs are rated lower as they may not directly involve collaboration and teamwork.

PO8 (Value Inculcation):

All COs are rated 1 as they indirectly relate to ethical research practices but do not focus on value inculcation.

PO9 (Digital and Technological Skills):

CO1 and CO2 are rated 2 for using technological tools for geological data analysis. Other COs are rated 0 as they do not directly involve digital skills.

PO10 (Community Engagement and Service):

CO4 and CO5 are rated 2 as they engage with environmental communities. Other COs are rated 0 as they do not focus on community engagement.

**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	: II
Course Type	: Major Mandatory (Theory)
Course Code	: GEO-551- MJM (B)
Course Title	: Population Geography
No. of Credits	: 04
No. of Lectures	: 60

Course Objectives:

1. To understand and explain the fundamental concepts of fertility, including fecundity, family size, and natural fertility, and their measurement techniques.
2. To analyze the social and cultural factors affecting fertility rates and assess methods of conception control.
3. To evaluate the various measures and rates of fertility, including crude birth rate, total fertility rate, and age-specific birth rate, and their trends in different regions.
4. To comprehend the concepts of mortality and morbidity, and apply measures of mortality such as crude death rate and infant mortality rate.
5. To investigate the causes of death, mortality differentials, and trends in mortality rates at both global and national levels.
6. To explore the concept of nuptiality, its measures, factors affecting age at marriage, and trends in nuptiality.
7. To examine migration concepts, measurement methods, types, and differentials, and analyze the impact of migration on population dynamics.

Course Outcomes:

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

- CO1.** Able to define and measure fertility concepts, including fecundity, family size, and natural fertility, and apply this knowledge to analyze fertility data.
- CO2.** Evaluate the social and cultural factors influencing fertility rates and assess the effectiveness of various methods of conception control.
- CO3.** Calculate and interpret different fertility rates, such as crude birth rate and total fertility rate, and analyze fertility trends globally and in India.
- CO4.** Apply measures of mortality to understand patterns and trends in death rates and analyze the impact of factors such as age, sex, and socio-economic status on mortality.
- CO5.** Identify and analyze causes of death, mortality differentials, and trends in mortality rates within different contexts.
- CO6.** Understand and apply measures of nuptiality, analyze factors affecting age at marriage, and interpret nuptiality trends in India.
- CO7.** Able to measure and analyze migration patterns, types, and differentials, and assess the implications of internal migration in India.

Topics and Learning points

Unit 1: Fertility

Teaching Hours

- 1.1 Concept of fertility, fecundity, cohort, Family size, Birth order, Parity, Conception, Natural fertility 20
- 1.2 Concept and types of sterility
- 1.3 Social and Cultural factors affecting fertility
- 1.4 Rates: Crude birth rate, General birth rate, Age specific birth rate, Total fertility rate
- 1.5 Methods of Conception control for male and female
- 1.6 Levels and trends in fertility- world

Unit 2: Mortality **12**

- 2.1 Concept of mortality and morbidity
- 2.2 Measures of mortality- Crude death rate, Infant mortality rate, Age specific mortality rate, cause specific mortality rate.
- 2.3 Sex and age pattern of mortality
- 2.4 Causes of death
- 2.5 Level and trend in mortality- world and India
- 2.6 Mortality differentials (rural-urban, occupational, educational and marital status)

Unit 3: Nuptiality **12**

- 3.1 Concept of nuptiality
- 3.2 Factors affecting age at marriage.
- 3.3 Measures of nuptiality, mean age at marriage
- 3.4 Nuptiality levels and trend in India
- 3.5

Unit 4: Migration **12**

- 4.1 Concept of Migration, immigration, emigration, in-migration, out-migration, movement, migrants.
- 4.2 Methods of measuring internal migration- i) Direct measures ii) Indirect method
- 4.3 Types of Migration
- 4.4 Differential migration (age, sex, marital status and educational attainments)
- 4.5 Internal migration in India

Unit 5: Population and Resources **12**

- 5.1 Optimum population
- 5.2 Over population
- 5.3 Under population
- 5.4 Population and development planning (manpower, education need, housing need, health services and infrastructure development)
- 5.5 Life table

References:

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. **Agarwala, S.N. (1977):** India's population Problems, Tata McGraw Hill publishing Co. Ltd. , New Delhi.
8. **Bose Ashis et.al. (1974):** Population in India's Development Vikas Publishing House, New Delhi, 1974.
9. **Chandna R.C. (1986):** Geography of Population concepts, Determinants and Patterns, Kalyani Publishers, New Delhi
10. **Crook Nigel:** Principles of Population and Development, Pergamon Press New York, 1997.
11. **Garnier B.J. (1970):** Geography of Population, Longman, London
12. **Pathak, K.B. and F.Ram, (1992) :** Techniques of Demographic analysis. Bombay: Himalaya Publishing house
13. **Sundaram K.V. and Sudesh Nangia (Ed) (1986):** Population Geography, Heritage Publications, Delhi
14. **U N D P (2002) :** Human Development Report, Oxford, 2002.
15. **Woods R. (1970) :** Population Analysis in Geography, Longman, London
16. **Zelinsky Wilbur (1966) :** A Prologue to Population Geography Prentice Hall

Mapping of Program Outcomes with Course Outcomes

Weightage: 0= No relation, 1= Weak relation, 2= Moderate relation, 3= Strong relation

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	1	1	2	2	2	2	1	1
CO2	3	3	1	2	2	3	2	2	1	1
CO3	3	3	1	2	2	2	3	2	1	2
CO4	3	3	1	2	2	3	3	2	1	1
CO5	3	3	1	2	2	3	3	2	1	1
CO6	2	2	1	1	2	3	2	2	1	1
CO7	3	3	1	2	2	3	3	3	2	1

Justification

PO1 (Comprehensive Knowledge and Understanding) is strongly connected with all COs (CO1-CO7) because the course requires a deep understanding of demographic concepts such as fertility, mortality, nuptiality, and migration. This knowledge is fundamental to population geography, thus contributing directly to a comprehensive understanding of the field.

PO2 (Application of Knowledge and Skills) is also highly relevant across all COs. The ability to apply theoretical knowledge and skills in analyzing demographic data, trends, and differentials is essential, particularly in CO1 (fertility concepts), CO2 (social and cultural factors), CO3 (fertility rates), CO4-CO5 (mortality analysis), and CO7 (migration patterns).

PO3 (Ethical and Moral Values) has a weaker but relevant connection, particularly in CO2 (evaluating social and cultural factors) and CO4-CO5 (analyzing mortality), where ethical considerations in data interpretation are important.

PO4 (Employability and Job-ready Skills) is moderately related to all COs. Skills in demographic analysis, such as interpreting fertility and mortality data, understanding

nuptiality trends, and analyzing migration patterns, are valuable in public health, policy-making, and other job contexts.

PO5 (Autonomy, Responsibility, and Accountability) is moderately connected as it underpins responsible data handling and interpretation, particularly in CO1-CO3 (fertility analysis) and CO7 (migration patterns).

PO6 (Research Skills) is critical, especially in CO2 (evaluating factors influencing fertility), CO4-CO5 (analyzing mortality), and CO7 (migration). These outcomes involve significant research skills, such as data collection, analysis, and interpretation.

PO7 (Critical and Creative Thinking) is highly relevant in CO3 (interpreting fertility rates), CO4-CO5 (analyzing mortality), and CO7 (migration patterns), where analytical thinking is essential to understanding complex demographic issues.

PO8 (Problem-solving Abilities) is moderately related to most COs. Problem-solving is essential in identifying trends, addressing demographic challenges, and interpreting various demographic metrics.

PO9 (Collaboration and Teamwork) has a weaker connection but is relevant in CO7 (migration patterns), where teamwork might be necessary in research and policy development contexts.

PO10 (Digital and Technological Skills) is least connected but still relevant, particularly in CO3 (calculating fertility rates) and CO7 (analyzing migration patterns), where digital tools and data analysis software are essential.

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	: II
Course Type	: Major Mandatory (Practical)
Course Code	: GEO-552-MJM (A)
Course Title	: Practical in Fluvial Geomorphology
No. of Credits	: 02
No. of Teaching Hours	: 60

Course Objectives:

1. To familiarize students with various methods of measuring stream flow, including the velocity-area method and continuous stream flow measurement.
2. To teach students the skills necessary to construct rating curves, annual hydrographs, and storm hydrographs, which are essential for analyzing stream flow data.
3. To enable students to estimate the suspended sediment load of rivers and understand the factors influencing sediment transport.
4. To provide knowledge on computing essential channel parameters, such as bank full discharge, width, depth, and flow velocity using Manning's equation.
5. To equip students with the ability to analyze flow behavior in channels, including the calculation of Froude numbers to determine subcritical, critical, and supercritical flow conditions.
6. To introduce students to the calculation of bed shear stress, unit stream power, and the application of equations for sediment entrainment and transport.
7. To teach students how to compute sinuosity ratios and establish hydraulic geometry relationships both at-a-station and downstream.

Course Outcomes:

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

- CO 1:** Apply the velocity-area method and continuous stream flow measurement techniques to accurately measure stream flow.
- CO 2:** Construct rating curves, annual hydrographs, and storm hydrographs using stream flow data for hydrological analysis.
- CO 3:** Estimate the suspended sediment load of rivers and analyze sediment transport mechanisms.
- CO 4:** Compute critical channel parameters such as bank full discharge, hydraulic radius, and channel slope and understand their significance in river engineering.
- CO 5:** Use Manning's equation and calculate the Froude number to analyze and categorize flow behavior in channels.
- CO 6:** Understand the processes of erosion, transport, and deposition and apply relevant equations for calculating bed shear stress and sediment yield index.
- CO 7:** Compute sinuosity ratios and establish hydraulic geometry relationships to analyze river channel form and behavior.

Topics and Learning Points

Unit 1: The flow regime	Teaching Hours
1.1 The measurement of stream flow: velocity–area method	16
1.2 Continuous stream flow measurement	
1.3 Construction of rating curve	
1.4 Construction of typical annual hydrograph	
1.5 Construction of a storm hydrograph	
Unit 2: Large-scale sediment transfer and Flow in channels	14
2.1 Estimating the suspended sediment load of a river	
2.2 Computation of channel parameters (Bank full discharge, Bank full width, depth, hydraulic radius, wetted perimeter, channel slope))	
2.3 Flow velocity measurement by Manning's equation	
2.4 Flow behavior (Calculation of Froude number- Subcritical, critical and supercritical flow	

Unit 3: Erosion, Transport and Deposition **14**

- 3.1 Calculating bed shear stress and unit stream power
- 3.2 Application of William equations for sediment entrainment and transport (By using bed shear stress, unit stream power and mean velocity)
- 3.3 Calculation of sediment yield index

Unit 4: Channel form and Behaviour **16**

- 4.1 Computation of sinuosity ratio (Strait, sinuous, meandering)
- 4.2 Establishing Hydraulic geometry relationships
 - a) At-a-station b) Downstream

References:

1. Charlton, R. (2008): Fundamentals of fluvial Geomorphology, Routledge, New York.
2. Fryirs, K.A. and Brierley, G.J. (2013): Geomorphic Analysis of River Systems: An approach to reading the landscape, Wiley Blackwell.
3. Garde, R.J. (2006): River Morphology, New age international limited publishers, New Delhi.
4. Kale, V.S. and Gupta, A. (2001): Introduction to Geomorphology, Orient Longman, Kolkata.
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6. Kondolf, M.G. and Piegay, H. (2016): Tools in Fluvial Geomorphology, Wiley Blackwell.
7. Leopold, L.B., Wolman, M.G. and Miller, P. (1954): Fluvial processes in Geomorphology, Freeman and Co. San Francisco.
8. Maithi, R. (2016): Modern approaches to Fluvial Geomorphology, Primus Books.

Mapping of Program Outcomes with Course Outcomes

Weightage: 0= No relation, 1= Weak relation, 2= Moderate relation, 3= Strong relation

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	1	2	1	2	1	2	1	2
CO2	3	3	1	2	1	2	1	2	1	2
CO3	3	3	1	1	1	2	1	2	1	2
CO4	3	3	1	3	1	3	2	3	2	2
CO5	3	3	1	2	1	2	2	2	2	2
CO6	3	3	1	2	1	3	2	3	2	2
CO7	3	3	1	2	1	3	2	3	2	2

Justification

PO1 (Comprehensive Knowledge and Understanding):

All COs are rated 3 as they involve a thorough understanding of stream flow measurement, sediment analysis, and river channel parameters, showcasing a deep grasp of the subject matter.

PO2 (Application of Knowledge and Skills):

CO1, CO2, and CO3 are rated 3 because they apply technical skills to analyze stream flow and sediment transport. CO4, CO5, CO6, and CO7 also demonstrate application skills but with varying complexities, hence slightly lower ratings.

PO3 (Constitutional, Humanistic, Ethical, and Moral Values):

All COs are rated 1 as they involve ethical considerations related to accurate measurement and analysis but do not directly address constitutional or broader humanistic values.

PO4 (Employability and Job-Ready Skills):

CO1 through CO3 are rated 2 as they involve practical skills relevant to the field, while CO4, CO5, CO6, and CO7 show enhanced employability skills due to their complexity and relevance to real-world applications.

PO5 (Autonomy, Responsibility, and Accountability):

COs are rated 1 as they involve independent technical tasks but do not explicitly address broader autonomy and responsibility issues.

PO6 (Research Skills):

All COs are rated 2 or 3 as they require research-related skills such as data analysis, hypothesis formulation, and problem-solving within river systems.

PO7 (Critical and Creative Thinking):

COs are rated 2 or 3 as they require analytical and creative approaches to solving complex river channel problems and interpreting data.

PO8 (Problem-Solving Abilities):

All COs are rated 2 or 3 as they involve solving complex problems related to hydrology and river engineering, demonstrating strong problem-solving capabilities.

PO9 (Collaboration and Teamwork):

All COs are rated 1 as they involve individual technical tasks rather than explicit collaboration and teamwork.

PO10 (Digital and Technological Skills):

All COs are rated 2 as they involve the use of technical tools and methods for analyzing hydrological and sediment data.

**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	: II
Course Type	: Major Mandatory (Practical)
Course Code	: GEO-552-MJM (B)
Course Title	: Practical in Population Geography
No. of Credits	: 02
No. of Teaching Hours	: 60

Course Objectives:

1. Equip students with the skills to calculate and interpret various fertility measures, including crude birth rate and total fertility rate.
2. Enable students to measure and analyze different mortality rates, such as infant mortality rate and cause-specific death rate.
3. Develop the ability to calculate and interpret nuptiality measures, including crude marriage rate and age-specific marriage rate.
4. To understand and compute indices related to human resource development, such as the Human Development Index and Gender Development Index.
5. Provide knowledge and practical skills in constructing life tables to analyze population longevity and mortality.
6. Introduce methods for collecting and managing population data for effective analysis.
7. Train students in using computer applications like Microsoft Excel or SPSS for data analysis and graphical representation of population data.

Course Outcomes:

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

- CO 1:** Calculate and interpret various fertility measures, supporting demographic research and population studies.
- CO 2:** Measure and analyze mortality rates, contributing to public health and demographic insights.
- CO 3:** Calculate and interpret different nuptiality rates, essential for understanding marriage patterns.
- CO 4:** Evaluate human development using indices like HDI and GDI, aiding in socio-economic studies.
- CO 5:** Construct and interpret life tables, crucial for demographic analysis.
- CO 6:** Collect, manage, and analyze population data using relevant tools.
- CO 7:** Represent population data graphically using software like Excel or SPSS, enhancing data visualization skills.

Topics and Learning points

Unit 1: Measurement of Fertility	Teaching Hours
1.1 Measures of Fertility	28
1.2 Measures of Mortality	
1.3 Measurement of Nuptiality	
Unit 2: Measures of Human Resource	16
2.1 Human Development Index	
2.2 Gender Development Index	
2.3 Construction of Life Table	

Unit 3: Computer Applications in Population data Representation**16**

- 3.1 Collection of data
- 3.2 Data analysis using Microsoft excel/ SPSS
- 3.3 Graphical representation of population data

References:

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.
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8. **Bose Ashis et.al. (1974):** Population in India's Development Vikas Publishing House, New Delhi, 1974.
9. **Chandna R.C. (1986):** Geography of Population concepts, Determinants and Patterns, Kalyani Publishers, New Delhi
10. **Crook Nigel:** Principles of Population and Development, Pergamon Press New York, 1997.
11. **Garnier B.J. (1970):** Geography of Population, Longman, London
12. **Pathak, K.B. and F.Ram, (1992) :** Techniques of Demographic analysis. Bombay: Himalaya Publishing house.

Mapping of Program Outcomes with Course Outcomes

Weightage: 0= No relation, 1= Weak relation, 2= Moderate relation, 3= Strong relation

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	0	1	2	3	2	2	0	2
CO2	3	3	0	1	2	3	2	2	0	2
CO3	3	2	0	1	2	3	2	2	0	2
CO4	3	3	1	2	2	3	2	2	1	2
CO5	3	3	0	2	2	3	2	2	0	2
CO6	2	3	0	2	3	3	2	2	0	3
CO7	2	3	0	2	3	3	2	2	0	3

Justification

PO1 - Comprehensive Knowledge and Understanding:

CO1 to CO7 contribute strongly as they cover key demographic concepts such as fertility, mortality, and nuptiality, providing students with a deep understanding of population geography.

Application of Knowledge and Skills:

CO1, CO2, CO3, CO6, and CO7 align directly with the application of demographic measures and data analysis, demonstrating practical relevance.

PO3 - Constitutional, Humanistic, Ethical, and Moral Values:

CO4 moderately supports this PO by engaging students in evaluating human development metrics and their socio-economic impacts.

PO4 - Employability and Job-Ready Skills:

CO6 and CO7 moderately support this PO by equipping students with data analysis and interpretation skills necessary for employment.

PO5 - Autonomy, Responsibility, and Accountability:

CO5 and CO6 show a strong relation to this PO by emphasizing the need for independent and accurate demographic analysis.

PO6 - Research Skills:

All COs strongly contribute to research skills, particularly in analyzing demographic data and constructing life tables, essential for demographic research.

PO7 - Critical and Creative Thinking:

CO1 to CO4 strongly support this PO by developing analytical skills necessary for interpreting demographic trends.

PO8 - Problem-solving Abilities:

CO1 to CO4 moderately contribute by addressing complex societal issues through demographic analysis.

PO9 - Collaboration and Teamwork:

This PO has a weak relation to the COs since the course focuses more on individual analysis.

PO10 - Digital and Technological Skills:

CO6 and CO7 strongly support this PO through the use of ICT tools for demographic data analysis and graphical representation.

**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	: II
Course Type	: Major Mandatory (Theory)
Course Code	: GEO-553-MJM (A)
Course Title	: Coastal Geomorphology
No. of Credits	: 04
No. of Teaching Hours	: 60

Course Objectives:

1. To introduce students to the fundamental concepts of coasts and coastlines.
2. To explore the importance of coastal environments in global and local contexts.
3. To provide an understanding of wave formation, types, and properties, as well as tidal dynamics.
4. To study the processes and causes of coastal erosion and sediment dynamics.
5. To examine the effects of human activities on coastal processes.
6. To develop knowledge of coastal landforms and their significance.
7. To investigate different sediment types and their classification.

Course Outcomes:

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

CO 1: Explain the basic concepts of coastal environments and the significance of coastlines.

CO 2: Evaluate the ecological, economic, and social importance of coastal regions.

CO 3: Identify and classify different types of waves and tides and their impact on coastal environments.

CO 4: Analyze the causes of coastal erosion and describe the role of sediment in shaping coastal landforms.

CO 5: Assess human impacts on coastal erosion, deposition, and overall coastal processes.

CO 6: Distinguish between erosional and depositional landforms in coastal environments.

CO 7: Classify and categorize coastal sediments based on their composition and origin.

Topics and Learning points

Unit 1: Coastal Environment and Its Importance

Teaching Hours

1.1 Introduction to Coasts and Coastlines 12

1.2 Importance of Coastal Environments

1.3 Waves: Formation, Types and Properties

1.4 Tides: Causes and Classification

1.5 Coastal Currents: Types and Importance

Unit 2 :Coastal Process and Dynamics

12

2.1 Coastal Erosion: Processes and Causes

2.2 Effects of Coastal Erosion

2.3 Sediment Dynamics in Coastal Environments

2.4 Coastal Deposition: Processes and Causes

2.5 Human Impacts on Coastal Processes

Unit 3: Coastal Landforms and Sedimentology

3.1 Landforms of Erosion

3.2 Importance of Erosional Landforms

3.3 Landforms of Deposition

3.4 Importance of Depositional Landforms

3.5 Sediment Types and Classification

Unit 4: Classification and Modeling of Coast**12**

4.1 Primary and Secondary Coasts

4.2 Coastal Geomorphology Modelling

4.3 Predicting Coastal Changes

4.4 Application of Modelling in Coastal Management

Unit 5: Coastal Hazards Management and Conservation

5.1 Coastal Hazards: Causes and Types

5.2 Mitigation Strategies for Coastal Hazards

5.3 Human Impacts on Coastal Geomorphology

5.4 Coastal Zone Management

Reference Books

1. Masselink, G., Hughes, M.G., & Knight, J., 2011. Introduction to Coastal Processes and Geomorphology. Routledge.
2. Carter, R.W.G., 1988. Coastal Environments: An Introduction to the Physical, Ecological, and Cultural Systems of Coastlines. Academic Press.
3. Bird, E.C.F., 2010. Coastal Geomorphology: An Introduction. John Wiley & Sons.
4. Davidson-Arnott, R.G.D., 2010. Introduction to Coastal Processes and Geomorphology. Cambridge University Press.
5. Komar, P.D., 1998. Beach Processes and Sedimentation. Prentice Hall.
6. Short, A.D. & Woodroffe, C.D., 2009. The Coast of Australia. Cambridge University Press.

7. Hopley, D., 2007. Encyclopedia of Modern Coral Reefs: Structure, Form, and Process. Springer.
8. Trenhaile, A.S., 2010. Coastal Environments and Global Change. John Wiley & Sons.
9. Van Rijn, L.C., 2016. Principles of Coastal Morphology. Aqua Publications.

Mapping of Program Outcomes with Course Outcomes

Weightage: 0= No relation, 1= Weak relation, 2= Moderate relation, 3= Strong relation

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	2	1	1	1	2	2	2	1	2
CO2	3	3	2	3	2	2	2	2	2	2
CO3	3	3	1	2	2	3	3	2	1	3
CO4	3	3	1	2	2	3	3	3	2	2
CO5	3	3	2	3	2	2	3	3	2	2
CO6	3	2	1	1	1	2	2	2	1	2
CO7	3	3	1	2	1	3	3	2	1	2

Justification

PO1 Comprehensive Knowledge and Understanding: CO1 through CO7 are rated 3 as they emphasize a thorough understanding of coastal environments, processes, and human impacts, reflecting the strong relevance to foundational and advanced knowledge.

PO2 Application of Knowledge and Skills: CO1 through CO7 are rated 3 due to their focus on applying technical knowledge to coastal management, including data analysis, sediment classification, and erosion assessment.

PO3 Constitutional, Humanistic, Ethical, and Moral Values: CO2 and CO5 are rated 2 for promoting ethical awareness in assessing ecological and social impacts. Other COs are rated 1 for indirectly supporting ethical practices.

PO4 Employability and Job-ready Skills: CO2 and CO5 are rated 3 for developing employability through practical skills in environmental management. CO3, CO4, and CO7 are rated 2 for contributing relevant technical skills.

PO5 Autonomy, Responsibility, and Accountability: CO2, CO3, CO4, and CO5 are rated 2 as they involve decision-making and autonomous coastal management tasks. CO1, CO6, and CO7 are rated 1 for focusing on more foundational aspects.

PO6 Research Skills: CO3, CO4, and CO7 are rated 3 for engaging in research activities like wave and erosion analysis. CO1, CO2, CO5, and CO6 are rated 2 for supporting basic research tasks such as data evaluation.

PO7 Critical and Creative Thinking: CO3, CO4, CO5, and CO7 are rated 3 for requiring critical and creative thinking to tackle complex coastal problems. CO1, CO2, and CO6 are rated 2 for their analytical aspects.

PO8 Problem-solving Abilities: CO4 and CO5 are rated 3 for addressing erosion and human impact challenges. CO1, CO2, CO3, and CO7 are rated 2 for their contributions to coastal problem-solving through analysis and evaluation.

PO9 Collaboration and Teamwork: CO2 and CO5 are rated 2 for involving collaboration in fieldwork and research. Other COs are rated 1 as they focus on individual tasks.

PO10 Digital and Technological Skills: CO3, CO4, and CO7 are rated 3 for utilizing digital tools in coastal data analysis. CO1, CO2, CO5, and CO6 are rated 2 for involving basic ICT skills in data management.

**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	: II
Course Type	: Major Mandatory (Theory)
Course Code	: GEO-553-MJM (B)
Course Title	: Geography of Rural Settlement
No. of Credits	: 02
No. of Teaching Hours	: 60

Course Objectives:

1. To introduce students to the classification of human settlements, focusing on the distinctions between urban and rural areas.
2. To analyze the factors influencing the site, situation, and growth of rural settlements.
3. To examine the patterns and types of rural settlements and the factors affecting their dispersion and nucleation.
4. To explore theories of rural land use, including Von Thunen and Ricardo's theories, and their application in rural geography.
5. To study rural economic activities, including the functional analysis of service villages, trading centers, and the concept of centrality and hierarchy.
6. To understand the causes and consequences of migration in rural areas, including seasonal migration.
7. To investigate the morphogenesis of rural settlements and the socio-economic transformation occurring within rural areas.

Course Outcomes:

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

- CO 1:** Classify and differentiate between urban and rural settlements and understand the rural-urban dichotomy.
- CO 2:** Analyze the site, situation, and location factors affecting the growth and distribution of rural settlements.
- CO 3:** Identify and explain various patterns of rural settlements and the factors leading to their dispersion or nucleation.
- CO 4:** Apply theories of rural land use, such as Von Thünen and Ricardo, to understand land use intensity, labor costs, and product marketing in rural areas.
- CO 5:** Conduct a functional analysis of rural service villages and trading centers, understanding their centrality, hierarchy, and the application of Central Place Theory.
- CO 6:** Examine and assess the impact of migration, particularly seasonal migration, on rural demographics and the economy.
- CO 7:** Evaluate the morphogenesis of rural settlements, including social, cultural, and economic transformations, and the factors affecting architectural style and building materials in rural areas.

Topics and Learning points

Unit 1: Introduction to Rural Settlement

Teaching Hours

- | | |
|---|----|
| 1.1 Classification: urban and rural | 12 |
| 1.2 Rural-urban dichotomy | |
| 1.3 Site and situation aspect in settlement | |
| 1.4 Definition, classification of villages | |
| 1.5 Patterns of rural settlement | |

Unit 2: Growth and Distribution	12
2.1 Site, situation, location of rural settlement	
2.2 Various factors affecting on settlement site and situations	
2.3 Types: compact, semi-compact, hamleted and dispersed,	
2.4 Factors affecting dispersion and nucleation	
2.5 Factors affecting growth of settlements	
Unit 3: Theories of Rural Land Use	12
3.1 Intensity of landuse	
3.2 Labor cost	
3.3 Marketing of product	
3.4 Von Thunen Theory	
3.5 Ricardo Theory	
Unit 4: Rural Economic Activities	12
4.1 Functional analysis of service village and trading Centre	
4. 2 Centrality and hierarchy of rural service centres	
4.3 Central Place Theory	
4.4 Age-Sex, Education, Occupation, Caste	
4.5 Migration: causes &consequence of migration in rural areas	
Unit 5: Morphogenesis of Rural Settlements and Transformation	12
5.1 Morphogenesis: i) Social ii) Cultural	
5.2 Economic organization within villages	
5.3 Functional growth	
5.4 Socio-economic transformation in rural areas	
5.5 Physical, social, cultural and economic factors affecting on house built	
5.6 Size, functional use and architectural style	
5.7 Building material	

Reference Books

1. Alam, S.M. et.al. (1982): Settlement System of India, Oxford and IBH Publication Co., New Delhi.
2. Chisholm M. (1967): Rural Settlement and Land use. John Wiley, New York.
3. Clout, H.D. (1977): Rural Geography, Pergamon, Oxford.
4. Doniel, P. and Hopkinson, M. (1986): The Geography of settlement Oliver &Byod, Edinburgh.
5. Grover, N. (1985): Rural Settlement: A Cultural Geographical Analysis. Inter India Publication, Delhi.
6. Hudson, F.S. (1976): A Geography of Settlements, Macdonald and Evans, New York.
7. Ramchandran, H. (1985): Village clusters and Rural Development. Concept Publication, New Delhi.
8. Rao R. N. (1986): Strategy for Integrated Rural Development. B.R. Publication, Delhi.
9. Sen, L.K. (1972): Readings in Micro-level Planning and Rural Growth Centers, National Institute of Community Development, Hyderabad.
10. Srinivas M.N. (1968): Village India, Asia Publication House, Bombay.
11. Wanmati S. (1983): Service Centers in Rural India, B.R. Publication Corporation, Delhi.
12. Musmade A.H., Sonawane AE, More JC, (2015): Population & Settlement Geography, (Marathi), Diamond Publication, Pune.

Mapping of Program Outcomes with Course Outcomes

Weightage: 0= No relation, 1= Weak relation, 2= Moderate relation, 3= Strong relation

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	2	1	1	0	2	2	1	1	1
CO2	3	3	1	2	1	2	2	1	1	2
CO3	3	2	1	1	0	2	2	1	0	2
CO4	3	2	0	1	0	2	3	2	0	2
CO5	3	2	1	2	1	3	3	2	1	2
CO6	2	2	1	2	1	2	2	2	0	1
CO7	3	3	0	2	1	3	3	3	2	2

Justification

PO1 (Comprehensive Knowledge and Understanding):CO1, CO2, CO3, CO4, CO5, CO7: Strong alignment as these COs contribute significantly to understanding the fundamental and applied aspects of rural settlements, land use theories, and economic activities, enhancing comprehensive knowledge.

PO2 (Application of Knowledge and Skills):CO1, CO2, CO3, CO5, CO7: These COs demonstrate a strong to moderate alignment with the ability to apply theoretical and practical knowledge in analyzing rural settlements, economic activities, and land use theories.

PO3 (Constitutional, Humanistic, Ethical, and Moral Values):CO2, CO3, CO5, CO6: These COs have a weak to moderate relationship with ethical and moral considerations, especially in understanding rural demographics and socio-economic issues.

PO4 (Employability and Job-ready Skills):CO2, CO5, CO6, CO7: Moderate to strong alignment as these COs focus on the practical application of knowledge and skills in real-world scenarios, enhancing employability.

PO5 (Autonomy, Responsibility, and Accountability):CO2, CO5, CO6, CO7: Moderate alignment, particularly in tasks requiring independent analysis and responsible application of geographical and socio-economic concepts.

PO6 (Research Skills):CO1, CO2, CO3, CO4, CO5, CO7: Strong to moderate alignment, as these COs involve research-oriented tasks such as data analysis, theory application, and interpretation of settlement patterns and socio-economic factors.

PO7 (Critical and Creative Thinking):CO1, CO2, CO4, CO5, CO7: Strong alignment with the need for critical and creative thinking in understanding and analyzing rural settlements, economic activities, and the impact of socio-economic transformations.

PO8 (Problem-solving Abilities):CO4, CO5, CO6, CO7: Moderate to strong alignment with the problem-solving aspects of analyzing and addressing issues in rural settlement patterns and economic activities.

PO9 (Collaboration and Teamwork):CO5, CO7: Moderate to strong alignment, especially in collaborative tasks related to functional analysis and socio-economic transformations.

PO10 (Digital and Technological Skills):CO1, CO2, CO3, CO5, CO7: Moderate alignment with the use of digital tools and techniques for data analysis and graphical representation in rural settlement studies.

**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	: II
Course Type	: Major Mandatory (Practical)
Course Code	: GEO-554-MJM (A)
Course Title	: Practical in Coastal Geomorphology
No. of Credits	: 02
No. of Teaching Hours	: 60

Course Objectives:

1. To develop the ability to interpret coastal landforms using topographic maps and satellite images.
2. To understand the fundamental dynamics of waves, tides, and sediment movements in coastal zones.
3. To equip students with practical skills in wave analysis within the surf zone.
4. To teach methods for profiling beach, dune, and sand bar formations for coastal management.
5. To instill knowledge in collecting and analyzing coastal sediments.
6. To explore the impact of human activities on coastal processes and landforms.
7. To facilitate understanding of sediment management in coastal areas for sustainable development.

Course Outcomes:

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

- CO 1:** Identify and classify coastal landforms accurately using various geographic data sources.
- CO 2:** Perform wave and tide analysis, demonstrating a clear understanding of their role in shaping coastal regions.
- CO 3:** Apply wave measurement techniques to analyze surf zone conditions and predict coastal changes.
- CO 4:** Create detailed profiles of coastal features to support erosion monitoring and sustainable management.
- CO 5:** Collect and evaluate sediment samples effectively, understanding their significance in coastal dynamics.
- CO 6:** Assess the impacts of human interventions on coastal ecosystems.
- CO 7:** Design sediment management plans aimed at preserving coastal integrity.

Topics and Learning points**Unit 1: Coastal Landforms and Analysis Techniques** **20**

- 1.1 Wave Analysis and Recording in the Surf Zone
- 1.2 Coastal Landform Identification using Satellite Image
- 1.3 Waves Analysis in the Shurf Zone
- 1.4 Beach, Dune and Sand Bar Profiling

Unit 2: Coastal Dynamics and Human Impact **20**

- 2.1 Wave Analysis and Recording in the Surf Zone
- 2.2 Tide Data Analysis and Classification
- 2.3 Coastal Sediments: Sample Collection and Analysis
- 2.4 Human Activities and Coastal Impact

Unit 3: Coastal Landforms and Analysis Techniques**20**

- 3.1 Motoring and Managing Coastal Landforms
- 3.2 Profiling of Coastal Features for Sustainable Management
- 3.3 Sediment Management in Coastal Areas
- 3.4 Observing Human Impact and Implementing Sustainable Practices

References:

1. Bloom, A. L. (2002). *Geomorphology: A Systematic Analysis of Late Cenozoic Landforms*. New Delhi: Prentice-Hall of India.
2. Carter, R. W. G. (1988). *Coastal Environments*. London: Academic Press Ltd.
3. Dackombe, R. V., & Gardiner, V. (1983). *Geomorphological Field Manual*. London: George Allen and Unwin.
4. Goudie, A. (1990). *Geomorphological Techniques*. London: Routledge.
5. King, C. A. M. (1972). *Beaches and Coasts*. London: Edward Arnold.
6. Pethick, J. (1984). *An Introduction to Coastal Geomorphology*. London: Arnold-Heinemann.
7. Smith, M. J., Paron, P., & Griffiths, J. (2011). *Geomorphological Mapping*. Amsterdam: Elsevier.
8. Bird, E.C.F. (2008). *Coastal Geomorphology: An Introduction*. John Wiley & Sons.
9. Komar, P.D. (1998). *Beach Processes and Sedimentation*. Prentice Hall.
10. Masselink, G., & Hughes, M.G. (2003). *Introduction to Coastal Processes and Geomorphology*. Edward Arnold.
11. Haslett, S.K. (2009). *Coastal Systems*. Routledge.
12. Davidson-Arnott, R. (2010). *Introduction to Coastal Processes and Geomorphology*. Cambridge University Press.

Mapping of Program Outcomes with Course Outcomes

Weightage: 1=Weakrelation, 2=Moderateorpartial relation, 3=Strongor directrelation

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	2	1	2	1	2	2	2	1	2
CO2	3	3	2	3	2	2	2	2	2	3
CO3	3	3	1	2	2	3	3	2	1	3
CO4	3	3	1	2	2	3	3	3	1	3
CO5	3	3	2	2	2	3	3	2	1	3
CO6	3	3	3	3	3	3	3	3	2	2
CO7	3	3	2	3	3	3	3	3	2	2

Justification

PO1 (Comprehensive Knowledge and Understanding):

CO1 through CO7 are rated 3 for their strong alignment with both foundational and advanced coastal knowledge, including landforms, processes, and management.

PO2 (Application of Knowledge and Skills):

CO2 through CO7 are rated 3, reflecting their practical application in coastal management. CO1 is rated 2 for its moderate application in landform classification.

PO3 (Constitutional, Humanistic, Ethical, and Moral Values):

CO6 is rated 3 for its focus on ethical issues in coastal ecosystems. CO2, CO5, and CO7 are rated 2 for their moderate ethical considerations. CO1, CO3, and CO4 are rated 1, with limited ethical focus.

PO4 (Employability and Job-Ready Skills):

CO2, CO6, and CO7 are rated 3 for their direct relevance to job-ready skills in coastal management. CO3 through CO5 are rated 2, and CO1 is rated 2 for its foundational job skills.

PO5 (Autonomy, Responsibility, and Accountability):

CO6 and CO7 are rated 3 for their emphasis on autonomy in coastal management. CO2 through CO5 are rated 2, while CO1 is rated 1 for its basic autonomy requirements.

PO6 (Research Skills):

CO3 through CO7 are rated 3 for their strong research components. CO1 and CO2 are rated 2, with moderate research involvement.

PO7 (Critical and Creative Thinking):

CO3 through CO7 are rated 3 for their emphasis on critical and creative thinking in coastal management. CO1 and CO2 are rated 2 for moderate analytical tasks.

PO8 (Problem-solving Abilities):

CO4 through CO7 are rated 3 for their strong focus on solving complex coastal issues. CO1 through CO3 are rated 2 for moderate problem-solving skills.

PO9 (Collaboration and Teamwork):

CO2, CO6, and CO7 are rated 2 for their collaborative aspects. CO1 and CO3 through CO5 are rated 1, focusing more on individual tasks.

PO10 (Digital and Technological Skills):

CO2 through CO5 are rated 3 for their strong use of digital tools. CO1, CO6, and CO7 are rated 2, involving basic ICT skills.

**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	: II
Course Type	: Major Mandatory (Practical)
Course Code	: GEO-554-MJM (B)
Course Title	: Practical in Geography of Rural Settlement
No. of Credits	: 04
No. of Teaching Hours	: 60

Course Objectives:

1. To understand and apply methods for measuring the concentration and dispersion of rural settlements.
2. To utilize the Nearest Neighbour Scale (Clark and Evans Method, 1954) in the analysis of rural settlement patterns.
3. To measure and interpret the shape (pattern) of rural settlements, focusing on spacing and size determinants.
4. To identify and analyze rural service centers and their functional hierarchies.
5. To apply the Rank-Size Rule in assessing the hierarchy of rural settlements.
6. To conduct comprehensive village surveys for social, economic, and cultural data collection.
7. To develop skills in GPS mapping for creating detailed village information maps and reports.

Course Outcomes:

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

- CO1:** Apply methods to analyze the concentration and dispersion of rural settlements using quantitative techniques.
- CO2:** Utilize the Nearest Neighbour Scale (Clark and Evans Method, 1954) to measure and assess the spatial distribution of rural settlements.
- CO3:** Measure and analyze the shape and spacing patterns of rural settlements, applying various size and spacing methods.
- CO4:** Identify and classify rural service centers based on functional scores, and analyze the hierarchy within rural settlements.
- CO5:** Apply the Rank-Size Rule to interpret the hierarchical structure of rural settlements.
- CO6:** Design and conduct village surveys for collecting social, economic, and cultural data, using structured questionnaires.
- CO7:** Create village information maps using GPS technology, and compile comprehensive survey reports integrating the collected data.

Topics and Learning points

Unit 1: Measurement of Methods in Rural Settlements	Teaching Hours
1.1 Methods of Concentration and Dispersion of rural settlement	20
Dispersion of rural settlements	
Nearest Neighbour Scale	
Clark and Evans Method (1954)	
1.2 Measurement of Shape (Pattern) of rural settlement	
Determinants of Spacing and Methods of Size and Spacing	
Unit 2: Rural Service Centres and Hierarchy of Settlements	20
2.1 Identification of Rural Service Centres-On the Basis of Score of Functions	
2.2 Identification of Hierarchy	
2.3 Rank- Size Rule	

Unit 3: Village Survey & GPS Mapping**20**

- 3.1 Prepare questionnaire for village survey
- 3.2 Village Information Map Using GPS
- 3.3 Prepare Village survey report

References:

1. Haggett, P. (1965). *Locational Analysis in Human Geography*. London: Edward Arnold.
2. Hall, T. (2006). *Urban Geography*. London: Routledge.
3. Mandal, R. B. (2001). *Introduction to Rural Settlement*. New Delhi: Concept Publishing
4. Pacione, M. (2009). *Urban Geography- A Global Perspective*. London: Routledge.
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6. Berry, B. J. L. (1965): *Geography of Market Centers and Retail Distribution*, Prentice Hall.
7. Carter (1972): *The Study of Urban Geography*, Edward Arnold, London.
8. Christaller, Walter (1933): *Central Places in Southern Germany* (Translated by C. W. Baskinin 1966), Prentice Hall, New Jersey. Company.
9. Ghosh, Sumita (1999): *Introduction to Settlement Geography*, Orient Longman, Kolkata.
10. Gosal, G. S. (1972): *Geography of Rural Settlement: A Survey of Research in Geography*, Indian Council of Social Science Research (New Delhi).

Mapping of Program Outcomes with Course Outcomes

Weightage: 0= No relation, 1= Weak relation, 2= Moderate relation, 3= Strong relation

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	1	1	2	3	3	3	1	2
CO2	3	3	1	1	2	3	2	2	1	2
CO3	3	3	1	1	2	3	2	2	1	2
CO4	3	3	2	2	2	2	3	3	2	2
CO5	3	3	2	2	2	2	3	3	2	2
CO6	3	3	2	2	2	3	3	3	3	2
CO7	3	3	1	2	2	3	3	2	2	3

Justification

PO1: Comprehensive Knowledge and Understanding:

The course outcomes (COs) are strongly related to PO1 as they require a thorough understanding of rural settlement concepts and methods. Applying quantitative techniques (CO1), using specific measurement methods (CO2, CO3), and identifying rural service centers (CO4, CO5) demand in-depth knowledge of the subject. Designing village surveys (CO6) and creating maps using GPS technology (CO7) also rely on a comprehensive understanding of geographical principles and methods.

PO2: Application of Knowledge and Skills:

COs strongly align with PO2, which involves applying technical and theoretical knowledge. Analyzing rural settlement patterns (CO1, CO2, CO3), classifying service centers (CO4), and interpreting hierarchical structures (CO5) demonstrate the practical application of acquired

skills. Designing and conducting surveys (CO6) and using GPS for mapping (CO7) showcase the ability to apply knowledge in real-world scenarios.

PO3: Constitutional, Humanistic, Ethical, and Moral Values:

While COs focus primarily on technical and analytical skills, PO3 is moderately related. Ethical considerations might arise in conducting surveys (CO6) and handling data, where maintaining objectivity and respect for community privacy are important.

PO4: Employability and Job-Ready Skills: COs align with PO4 as they enhance employability through practical skills. Analyzing and measuring settlement patterns (CO1, CO2, CO3), identifying service centers (CO4), and using GPS technology (CO7) prepare students for careers in geography and related fields. Conducting surveys (CO6) also builds skills relevant to fieldwork and data analysis.

PO5: Autonomy, Responsibility, and Accountability:

COs relate to PO5 as they require students to demonstrate independence in applying methods (CO1, CO2, CO3), conducting surveys (CO6), and creating maps (CO7). Responsibility and accountability are crucial in ensuring accurate data collection and analysis.

PO6: Research Skills:

Strongly connected with PO6, COs emphasize research skills such as applying quantitative techniques (CO1), using specific measurement methods (CO2, CO3), and conducting surveys (CO6). Creating and analyzing maps (CO7) also involves formulating hypotheses and interpreting data.

PO7: Critical and Creative Thinking:

COs support PO7 by fostering critical thinking through the analysis of rural settlement patterns (CO1, CO2, CO3), hierarchical structures (CO4, CO5), and the use of GPS

technology (CO7). Designing surveys (CO6) and interpreting data require creative approaches to problem-solving.

PO8: Problem-Solving Abilities:

COs relate to PO8 by addressing complex challenges in rural settlement analysis. Applying measurement methods (CO1, CO2, CO3), identifying service centers (CO4), and using GPS technology (CO7) involve solving practical problems and finding innovative solutions.

PO9: Collaboration and Teamwork:

COs are moderately related to PO9. While individual skills are emphasized, conducting surveys (CO6) and working on mapping projects (CO7) often involve collaboration, requiring effective teamwork and coordination.

PO10: Digital and Technological Skills:

COs strongly align with PO10, as they involve using digital tools and technology. Analyzing settlement patterns (CO1, CO2, CO3), utilizing GPS for mapping (CO7), and handling data require proficiency in digital and technological skills.

**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	: II
Course Type	: Major Elective (Theory)
Course Code	: GEO-561-MJE
Course Title	: Geographical Thoughts
No. of Credits	: 04
No. of Teaching Hours	: 60

Course Objectives:

1. To make students well aware about historical development of geography as subject.
2. To understand evolutionary theories of universe and earth given by different scholars
3. To acquaint the knowledge of mathematical and geometrical theorems given by Greeks scholars.
4. To understand the impact of exploration in the matter in subject of geography.
5. To understand the dualism in geography and the correlation of different branches of geography to each other.
6. To study different paradigm, approaches and models in geography.
7. To understand the recent trend and new technologies in geography.

Course Outcomes:

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

CO1. Understand about historical development of geography as subject.

CO2. Understand the evolutionary theories of universe and earth given by different scholars.

CO3. Acquaint with the knowledge of mathematical and geometrical theorems given by

Greeks scholars

CO4. Understand the impact of exploration in the matter of subject geography.

CO5. Understand about dualism in geography and the correlation of different branches of geography to each other.

CO6. Understand the paradigm, approaches and models in geography.

CO7. Understand the recent trend and new technologies in geography such as Remote sensing and GIS.

Topics and Learning points

Unit 1: Historical Development of Geographical Thoughts	Teaching Hours
1.1 Greek contribution to Physical and Mathematical Geography	16
1.2 Roman contribution to Geography	
1.3 Arab contribution to Geography	
1.4 Indian contribution to Geography	
1.5 Contributions of Explorers and its impact	
Unit 2: Dualism in Geography	10
2.1 Concept and Meaning of Dualism	
2.2 Determinism and Possibilism	
2.2 Systematic versus Regional Geography	
2.3 Physical versus Human Geography	
Unit 3: Paradigms, approaches and Models in Geography	10
3.1 Concept and Meaning of Paradigms	
3.2 Paradigms in Geography	
3.3 Evolutionary approach and its impact on Geography	
3.4 Types of Models used in Geographical Studies	
Unit 4: Conceptual Development and Major Revolutions	12
4.1 Areal Differentiation	
4.2 Regional Synthesis	

4.3 Locational and Spatial Analysis,

4.4 System analysis

4.5 Geo-informatics revolution

Unit 5: Trends in Geography

12

5.1 Humanistic and Welfare Geography

5.2 Marxist Geography,

5.3 Radical Geography,

5.4 Geography of Gender

Reference:

1. Cooke, R. U. and Doornkamp, J. C. (1974): Geomorphology in Environmental Management, Clarendon Press, Oxford.
2. Coffey, W. J. (1981): Geography : Towards a general spatial systems approach, Mathuen, London
3. Dikshit, R. D. (1997): Geographical Thought: A Contextual History of Ideas, Pub. By A.K. Ghosh, Prentice – Hall of India Pvt. M 97, New Delhi.
4. Frazire, J. W. (1982): Applied Geography, Prentice Hall, Englewood Cliffs.
5. Hershner, R. (1959): Perspectives of Nature of Geography, Rand Mac Nally and Co.
6. Hussain, M. (1995) : Evolution of Geographical Thought, Rawat Pub., Jaipur
7. Singh I. (2006): Diverse aspect of Geographical Thought, ALFA Publications, New Delhi

Mapping of Program Outcomes with Course Outcomes**Course Code and Title - GEO-561-MJE Geographical Thoughts****Weightage: 0= No relation, 1= Weak relation , 2= Moderate relation, 3= Strong relation**

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	2	1	1	0	1	1	1	1	1	1
CO2	2	2	1	0	1	2	1	1	1	1
CO3	2	1	1	0	1	1	2	1	1	1
CO4	1	2	1	1	1	1	1	2	1	1
CO5	2	2	1	0	2	1	1	2	1	1
CO6	2	2	1	0	1	2	2	2	1	2
CO7	1	2	1	0	1	1	1	1	1	3

Justification**PO1: Comprehensive Knowledge and Understanding**

CO1 and CO4 provide a foundational understanding of geography through historical context and exploration impacts. CO2 and CO6 build on this by offering theoretical insights and geographical models, while CO3 and CO7 integrate mathematical knowledge with technologies like Remote Sensing and GIS, enriching overall geographical knowledge.

PO2: Application of Knowledge and Skills

CO1 and CO4 apply historical and exploratory insights to geographical analysis, enhancing practical understanding. CO2's theoretical foundations and CO6's models are used to address geographical problems, while CO3's mathematical skills are applied in CO7's technological analysis.

PO3: Constitutional, Humanistic, Ethical, and Moral Values

CO1 and CO4 emphasize ethical considerations in geography through historical and exploratory perspectives. CO2 and CO6 ensure responsible application of theories and models, integrating ethical perspectives into research.

PO4: Employability and Job-Ready Skills

CO4 and CO7 prepare students for geographical roles by providing knowledge of exploration and proficiency in technologies like Remote Sensing and GIS, enhancing job readiness.

PO5: Autonomy, Responsibility, and Accountability

CO1 and CO4 support responsible application of geographical knowledge through historical and exploratory contexts. CO2 and CO6 encourage independent, accountable use of theoretical insights and models in research and practice.

PO6: Research Skills

CO2 and CO6 provide a basis for research with theoretical knowledge and methodological models. CO3 and CO7 support effective research through mathematical skills and technological tools for data analysis.

PO7: Critical and Creative Thinking

CO5 and CO6 foster critical and creative approaches to geographical issues through dualism and theoretical models. CO2 and CO7 promote innovative thinking with foundational theories and advanced technologies.

PO8: Problem-Solving Abilities

CO4 and CO7 contribute to solving complex geographical problems by offering historical context and technological tools for effective analysis.

PO9: Collaboration and Teamwork

CO1 and CO4 enhance collaborative efforts in geographical research with shared historical and exploratory knowledge. CO2 and CO6 promote teamwork through common theoretical frameworks and models.

PO10: Digital and Technological Skills

CO3 and CO7 are crucial for developing digital and technological skills, with CO3 providing mathematical expertise and CO7 focusing on advanced tools like Remote Sensing and GIS.

**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	: II
Course Type	: On Job Training /Field Project
Course Code	: GEO-581-OJT/FP
Course Title	: On Job Training /Field Project
No. of Credits	: 02
No. of Teaching Hours	: 60

Course Objectives:

1. To develop proficiency in applying geographical theories and methodologies to real-world scenarios through hands-on experience in professional settings.
2. To enhance practical skills in data collection, analysis, and interpretation relevant to geographical research and decision-making processes.
3. To gain experience in utilizing geographical tools and technologies, including GIS, remote sensing, and spatial analysis software, within a professional context.
4. To understand and contribute to the practical applications of geography in various sectors such as urban planning, environmental management, and transportation.
5. To prepare problem-solving skills by addressing real-world geographical issues and developing actionable solutions during the training period.
6. To improve communication and reporting skills by preparing and presenting detailed reports on geographical data and findings from the on-job training experience.
7. To build professional networks and gain insights into the career opportunities and requirements in the field of geography through active engagement with industry professionals.

Course Outcomes:

After completion of this on job training, students will

- CO1:** Effectively apply geographical theories and methodologies in a professional context, demonstrating practical experience gained through on-the-job training.
- CO2:** Proficiently collect, analyze, and interpret geographical data using the appropriate tools and techniques acquired during the training period.
- CO3:** Utilize GIS, remote sensing, and other geographical technologies to address real-world problems, showcasing both practical knowledge and technical skills.
- CO4:** Address and solve practical geographical issues in diverse sectors, demonstrating an understanding of geography's influence on urban planning, environmental management, and other areas.
- CO5:** Develop and execute problem-solving strategies for real-world geographical challenges, highlighting the ability to create and implement effective solutions.
- CO6:** Prepare and present detailed reports on geographical data and findings, showcasing strong communication and reporting skills honed during the training.
- CO7:** Build and use professional relationships within the geography field to gain insights into career paths and industry practices, enhancing career development and industry understanding.

Standard Operating Procedure (SOP) for On-Job Training in Geography:

1. The National Education Policy 2020 emphasizes the importance of practical assignments and skill development for students across various higher education institutes. In alignment with this, the Department of Geography at Tuljaram Chaturchand College, Baramati, has introduced an On-Job Training Program for all students enrolled in PG programs during Semester II, earning a total of 4 credits.
2. Students admitted to the Postgraduate Program (First Year, Semester II) under NEP 2020 (2023 Pattern) are required to complete a compulsory 'Field Project or On-Job Training Program.'

3. Each student must complete 120 hours of practical training at an approved establishment, coordinated with the relevant teacher or authority.
4. The On-Job Training Program should be completed during the vacation period between Semester II and Semester III.
5. Completion of the On-Job Training Program is mandatory. If a student fails to meet the prescribed standards, they must repeat the program at a different establishment.
6. Upon successful completion of the On-Job Training Program, students will receive a 'Completion Certificate.'
7. The hosting establishment may consider the student for regular employment based on their skills and performance during the training.
8. Students are responsible for their conduct within the business establishment throughout the On-Job Training Program.
9. The On-Job Training Program provides valuable work experience, helping students explore career paths, and develop and refine skills that will give them a competitive edge in the job market.
10. Potential establishments for geography students include GIS-based companies, Bhumi Abhilekh Karyalaya at the tahsil or district level, tour and travel agencies, and surveying organizations (both government and non-government).
11. At the end of the On-Job Training Program, students must obtain a work experience certificate from the relevant authorities and submit a detailed report (2 to 5 pages) outlining the nature of the work, work experience, acquired skills, and future career opportunities in the field.
12. Students must adhere to ethical principles and standards throughout all stages of their training.

Topics and Learning points

Unit 1: Preparation Phase

- 1.1 Identify potential training organizations and roles relevant to geographical studies.
- 1.2 Develop a clear understanding of the organization's objectives, projects, and requirements related to geography.

1.3 Prepare a resume and cover letter tailored to the geographical skills and knowledge.

Unit 2: Application and Placement:

2.1 Apply for on-job training positions with a focus on geographical tasks.

2.2 Attend interviews and secure a placement in an organization that aligns with the training objectives.

2.3 Establish clear training objectives and goals with the supervisor or mentor.

2.4 Discuss the expected outcomes, tasks, and responsibilities during the training period.

Unit 3: Execution Phase:

3.1 Engage in daily tasks and responsibilities as assigned, including data collection, analysis, and report preparation.

3.2 Utilize geographical tools and technologies as required by the job role.

3.3 Participate in meetings and discussions to understand project requirements and contribute to problem-solving.

3.4 Documentation and Reporting:

3.5 Maintain a detailed log of activities, tasks, and learning experiences.

3.6 Prepare periodic reports summarizing work completed, skills gained, and challenges encountered.

3.7 Present findings and progress to supervisors or mentors.

Unit 4: Evaluation and Feedback:

4.1 Receive feedback from supervisors on performance, skills, and areas for improvement.

4.2 Reflect on the feedback and identify areas of strength and growth.

Unit 5: Completion and Reflection:

5.1 Complete all training tasks and responsibilities as outlined.

5.2 Prepare a final report summarizing the overall training experience, key learnings, and professional development.

5.3 Discuss the experience with the supervisor and seek recommendations or potential career opportunities.

5.4 Submit experience certificate and detail report of on-job training programme to department of Geography, TuljaramChaturchand College, Baramati.

Mapping of Program Outcomes with Course Outcomes

Weightage: 0= No relation, 1= Weak relation, 2= Moderate relation, 3= Strong relation

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	2	1	3	2	1	1	2	1	2
CO2	2	3	1	2	2	3	2	2	1	3
CO3	2	3	1	3	2	3	2	2	1	3
CO4	2	2	1	3	3	2	2	3	1	2
CO5	2	3	1	3	3	2	3	3	1	3
CO6	1	2	2	2	2	2	2	2	2	2
CO7	1	1	3	3	3	1	2	1	3	1

Justification:

PO1: Comprehensive Knowledge and Understanding: This PO connects strongly to CO1, CO3, CO4, and CO5, as these outcomes emphasize applying geographical theories, methodologies, and technologies like GIS and remote sensing. Students demonstrate a thorough understanding of geographical principles in professional settings, which aligns with PO1's emphasis on comprehensive knowledge.

PO2: Application of Knowledge and Skills: CO2, CO3, and CO5 align strongly with PO2 because these outcomes focus on data collection, analysis, and problem-solving using geographical techniques. The hands-on application of advanced knowledge in real-world tasks, such as using GIS or analyzing geographical data, fits well with PO2.

PO3: Constitutional, Humanistic, Ethical, and Moral Values: PO3 has moderate links with CO6 and CO7, as these outcomes involve ethical practices in communication, reporting, and professional collaboration. While ethics isn't the central focus of the COs, it plays a role in responsible professional practices.

PO4: Employability and Job-Ready Skills: PO4 is strongly related to CO1, CO3, CO4, and CO5, as these outcomes develop practical skills required for employment. These COs focus

on applying geographical knowledge and problem-solving in real-world scenarios, ensuring job readiness and adaptability.

PO5: Autonomy, Responsibility, and Accountability: CO4, CO5, and CO7 are closely tied to PO5 because these COs emphasize independent problem-solving and professional responsibility. Students are trained to address real-world geographical challenges autonomously and responsibly.

PO6: Research Skills: CO2, CO3, and CO5 are strongly related to PO6 because they involve conducting research, analyzing data, and applying advanced technologies. This aligns with the development of research skills and decision-making based on data-driven insights.

PO7: Critical and Creative Thinking: PO7 shows strong connections to CO5 and moderate links to CO6, as these COs focus on innovative problem-solving and analytical thinking. These skills are essential for tackling geographical challenges and delivering comprehensive reports.

PO8: Problem-solving Abilities: CO4 and CO5 are strongly linked to PO8, as they focus on identifying and solving complex geographical issues. These COs align well with PO8's emphasis on interdisciplinary approaches to solving real-world problems.

PO9: Collaboration and Teamwork: CO7 is strongly connected to PO9, as it involves building professional relationships and teamwork. Collaboration is also moderately relevant in CO6, where students prepare reports that often require working with various stakeholders.

PO10: Digital and Technological Skills: PO10 is strongly linked to CO3 and CO2, as these COs focus on using GIS, remote sensing, and other digital tools to solve geographical problems and analyze data. This ensures that students are equipped with the technological skills needed for modern geographical work.