



Tuljaram Chaturchand College, Baramati

Autonomous College

Two Year Degree Program in Geography

(Faculty of Science & Technology)

Syllabus for

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

For Tuljaram Chaturchand College, Baramati

Choice Based Credit System Syllabus

To be implemented from Academic Year 2019-2020

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

Tuljaram Chaturchand College has decided to change the syllabi of various faculties from June,2022. Taking into consideration the rapid changes in science and technology and new approaches in different areas of Geography and related subjects, Board of Studies in Geography of Tuljaram Chaturchand College, Baramati - Pune has prepared the syllabus of M.Sc./M. A. Semester - I and Geography course under the Choice Based Credit System (CBCS). The model curriculum as developed by U.G.C. is used as a guideline for the present syllabi.

A Master degree in geography will provide you the knowledge and skills you need 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. Students completing human geography will analyze and describe cultural phenomenon such as population, development, agriculture, language, and religion.

. Aims and Objectives of the new curriculum:

- i) To maintain updated curriculum.
- ii) To take care of fast development in the knowledge of Geography.
- iii) To enhance the quality and standards of Geography Education.
- iv) To provide a broad common frame work, for exchange, mobility and free dialogue across the Indian Geography and associated community.
- v) To create and aptitude for Geography in those students who show a promise for higher studies and creative work in Geography.

To create confidence in others, for equipping themselves with that part of Geography which is needed for various branches of Sciences or Humanities which they have aptitude for higher studies and original work.

Programme outcomes (Pos) M.A.:

PO1	<p>Research-Related Skills and Scientific temper:</p> <p>Infer scientific literature, build a sense of enquiry and be able to formulate, test, analyse, interpret and establish hypothesis and research questions; and to identify and consult relevant sources to find answers. Able to plan and write a research paper/project while emphasizing on academics and research ethics, scientific conduct and creating awareness about intellectual property rights and issues of plagiarism.</p>
PO2	<p>Effective Citizenship and Ethics:</p> <p>Demonstrate empathetic social concern and equity centred national development and act with an informed awareness of moral and ethical issues and commit to professional ethics and responsibility</p>
PO3	<p>Social competence and communication skills:</p> <p>Demonstrate ability to accommodate the views of others and present their own opinions and complex ideas, in written or oral form, in a clear and concise manner in group settings. Exhibit thoughts and ideas effectively in writing and orally; communicate with others using appropriate media, build effective interactive and presenting skills to meet global competencies. Elicit views of others, present complex information in a clear and concise and help reach conclusion in group settings.</p>
PO4	<p>Disciplinary Knowledge: Demonstrate comprehensive knowledge and a strong theoretical grounding in their area of work.</p>
PO5	<p>Personal and professional competence:</p> <p>Perform independently and also collaboratively as a part of a team to meet defined objectives and carry out work across interdisciplinary fields. Execute interpersonal relationships, self-motivation and adaptability skills and commit to professional ethics.</p>

PO6	<p>Self-directed and Life-long Course:</p> <p>Demonstrate attitudes of being a life-long learner who passionately pursues self determined goals in the broadest context of socio-technological changes. Acquire the ability to engage in independent and life-long Course in the broadest context of socio technological changes.</p>
PO7	<p>Environment and Sustainability:</p> <p>Understand the impact of the scientific solutions in societal and environmental contexts and demonstrate the knowledge of and need for sustainable development.</p>
PO8	<p>Critical Thinking and Problem solving:</p> <p>Identify problems by closely examining the situations around them and think holistically about the phenomena and generate viable solutions to these problems. Exhibit the skill of critical thinking and understand scientific texts and place scientific statements and themes in contexts and also evaluate them in terms of generic conventions. Identify the problem by observing the situation closely, take actions and apply lateral thinking and analytical skills to design the solutions.</p>

Tuljaram Chaturchand College, Baramati

Autonomous College

Board of Studies in Geography

From 2019-20 To 2021-22

Sr. No.	Name of Member	Designation
1.	Dr. Asaram S. Jadhav Head & Assistant Professor, Department of Geography, T. C. College, Baramati.	Chairman
2.	Dr. Arun S. Magar, Assistant Professor, Department of Geography, T. C. College, Baramati	Internal Member
3.	Mr. V. H. Madane Assistant Professor, Department of Geography, T. C. College, Baramati	Internal Member
4.	Mr. Vinayak D. Chavan Assistant Professor, Department of Geography, T. C. College, Baramati	Internal Member
5.	Mr. Prashant A. Shinde Assistant Professor, Department of Geography, T. C. College, Baramati	Internal Member
6.	Ms. Nayan D. Zagade Assistant Professor, Department of Geography, T. C. College, Baramati	Internal Member
7.	Dr. Amit Dhorade Professor, Department of Geography, Savitribai Phule Pune University, Pune.	External Member Vice-Chancellor Nominee
8.	Dr. Avinash Kadam Associate Professor, Department of Earth Science, Sant Gadagebaba University, Nanded	External Member from other University
9.	Dr. T. P. Shinde Head & Associate Professor, Dept. of Geography, Mudhoji College, Phaltan	External Member from other University
10.	Dr. Ramesh Nanware President, Geo- Solution PVT. LTD. Pune	Industrialist
11.	Dr. Jawahar L. Chaudhari Associate Professor, Department of Geography, M. S. Kakade College, Someshwarnagar, Baramati.	Meritorious Alumni

Semester – I

Sr. No.	Course Code	Core Compulsory Theory Paper (CCTP)	Choice Based Optional Paper (CBOP)	Core Compulsory Practical Paper (CCPP)	Credit
1	GEO-4101	Principles of Geomorphology	-	-	04
2	GEO-4102	Principles of Climatology	-	-	04
3	GEO-4103	Principles of Economic Geography	-	-	04
4	GEO-4104	Principles of Population and Settlement Geography	-	-	04
5	GEO-4105	-	-	Practical in Physical an Geography	04
6	GEO-4106	-	-	Practical in Human Geography	04
				Total Credits	24

Semester – II

Sr. No.	Course Code	Core Compulsory Theory Paper (CCTP)	Choice Based Optional Paper (CBOP)	Theory / Practical	Credit	Core Compulsory Practical Paper (CCPP)	Credit	
1	GEO- 4211	Geoinformatics - I					04	
One of the following according to specialization from CCTP								
2	GEO-4201	Coastal Geomorphology	-	-	04	-	04	
	GEO-4204	Population Geography	-	-	04	-		
One of the following according to specialization from CCTP								
3	GEO-4202	Fluvial Geomorphology	-	-	04	-	04	
	GEO-4205	Geography of Rural Settlements	-	-	04	-		
Optional Paper (CBOP) (1 Theory + 1 Practical)								
4		Give 4	GEO-4212	Geography of Disaster Management	04		04	
			GEO-4213	Practical in Surveying	04		04	
Core Compulsory Practical Paper (CCPP)								
5						GEO-4214	Practical of Statistical Techniques for Geography	04
Total Credits of Semester - II							24	

Semester – III

Course Code	Core Compulsory Theory Paper (CCTP)	Choice Based Optional Paper (CBOP)	Theory / Practical	Credit	Core Compulsory Practical Paper (CCPP)	Credit
GEO-5311	Geoinformatics-II	-	-	04	-	04
GEO-5312	Geographical Thoughts	-	-	04	-	04
One of the following according to specialization from CCTP						
GEO-5301	Tropical Geomorphology	-	-	04	-	04
GEO-5304	Urban Geography	-	-	04	-	04
Choice Based Optional Paper (CBOP) (1Theory + 1Practical)						
		GEO-5313	Practical in Geoinformatics	04	-	04
		GEO-5314	Watershed Management	04	-	04
One of the following according to specialization from CCPP						
				GEO-5302	Practical in Geomorphology	04
				GEO-5305	Practical in Population and Settlement Geography	04
Total Credits of Semester -III						24

Semester – IV

	Core Compulsory Theory Paper (CCTP)	Choice Based Optional Paper (CBOP)	Theory / Practical	Credit	Core Compulsory Practical Paper (CCPP)	Credit
GEO-5401	Geography of India	-	-	-	-	04
GEO-5402	Oceanography	-	-	-	-	04
GEO-5403	Biogeography	-	-	-	-	04
Choice Based Optional Paper (CBOP) (1Theory + 1Practical)						
		GEO-5411	Geography of Soils	04		08
		GEO-5412	Geostatistics	04		
		GEO-5413	Political Geography	04		
		GEO-5414	Regional Planning	04		
		GEO-5415	Tourism Geography	04		
		GEO-5416	Social Geography	02		
		GEO-5417	Interpretation of Topographical Maps & Village Survey / Project work	04		
Core Compulsory Practical Paper (CCPP)						
				GEO-5406	Dissertation / Research Project	04
Total Credits of Semester - IV						24

Mandatory 12 additional/ add-on credits for Post Graduate Programmes**Note:**

- 1. 6 credits from Group - 1 are compulsory**
- 2. Choose minimum 6 credits from Group - 2 to Group - 7**

Group-1	Human Rights Awareness Course (Semester-I):		02 credit
	Cyber Security Awareness Course (Semester-I)		02 credit
	Cyber Security Awareness Course (Semester-II)		02 credit
Group-2 Skill Component Courses	1. Subject Related Certificate Course (Sem. II)		02 credits
	2. Subject Related skill development courses (Sem. III)		02 credits
	3. Subject Related skill development courses (Sem. IV)		02 credits
Group-3	(a)	Representation in Sports at University Level	02 credits
	(b)	Representation in Sports at State Level / National level	02 credits
	(c)	Representation in Sports at International (overseas) Level	04 credits
Group-4	(a)	Selection in AVISHKAR at University Level	02 credits
Group-5	(a)	Research paper publication at National level	02 credits
	(b)	Research paper publication at International (overseas) level	02 credits
Group-6	(a)	Participation in Summer School/ Internship programme / Short term course (not less than 2 weeks duration)	02 credits
Group-7	(a)	Participation in cultural and co curricular activities/ extracurricular activities/competitions at University level / State Level	02 credit
	(b)	Participation in cultural and cocurricular activities / extracurricular activities/ competitions at International (overseas) level	02 credits

Note : 1) One Credit = 15 Lectures.

2) The Project should be initiated at on the onset of III Semester and submitted during IV

Semester.

3) FY/SY --> 4 Lectures per week.

4) Theory paper be covered with 70% actual teaching (3 actual lectures per week) and 30%

Component (1 lecture per week) of self-study should be further evaluated through Group

Discussion / Seminar / Open Book Test / MCQ / Essay writing / Assignment etc.

M.A. / M.Sc. Geography, Syllabus for Semester II**Subject: Geoinformatics I****Subject Code: GEO 4201****No. of Credits: 04**

Course Objectives:

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

Course Outcomes:

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

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

Topics and Course points

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

Reference Books:

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

Mapping of Program Outcomes with Course Outcomes**Class:** M.A./MS.c Geography I**Subject:** Geography**Course:** Geoinformatics**Course Code:** GEO 4201**Weightage:** 1= Weak or low relation, 2= Moderate or partial relation, 3= Strong or direct relation

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

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

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

PO 3: Social competence and communication skill:

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

CO5- Exploring and applying geoinformatics tools in various domains contribute to social competence and communication skills by fostering problem-solving abilities, enhancing communication, promoting interdisciplinary collaboration, cultivating cultural sensitivity, engaging stakeholders effectively, improving

data visualization, nurturing critical thinking, facilitating public outreach, aiding decision-making, and fostering a global perspective. These skills are valuable for effective communication and engagement across diverse fields and communities.

PO 4: Disciplinary Knowledge:

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

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

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

CO2- practical work in GIS software supports self-directed and lifelong Course by enhancing technical proficiency, data analysis skills, problem-solving abilities, independent exploration, adaptability to new technologies, research capabilities, geospatial problem-solving, interdisciplinary application, professional development, and community engagement. These skills empower individuals to continuously learn, adapt, and apply GIS knowledge across diverse contexts and throughout their lives.

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

PO 8: Critical Thinking and problem solving:

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

Subject: Coastal Geomorphology**Subject Code: GEO 4202 (A)****No. of Credits: 04**

Course Objectives:

1. To introduce the fundamentals of Coastal Geomorphology.
2. To learn the various coastal phenomenon and their effect.
3. To gain a comprehensive understanding of the coastal features.
4. To understand and apply monsoon systems.
5. Explore the relationships between coastal and human life.
6. To develop skills in applying coastal geomorphology methods to research questions.
7. To understand ocean phenomina.

Course Outcomes:

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

1. Understand the fundamentals of Coastal Geomorphology.
2. Learn the various coastal phenomenon and their effect.
3. Gain a comprehensive understanding of the coastal features.
4. understand and apply monsoon systems.
5. Explore the relationships between coastal and human life.
6. Develop skills in applying coastal geomorphology methods to research questions.
7. Understand ocean phenomena.

Topics and Course points

No. of Credits: 04

No. of Periods: 60

Topic No.	Topic	Sub topics	No. of Periods
1	Introduction: Coasts and Coastal Systems and Shore Zones	i. The coastal environment: littoral, shore, coastal zones ii. Components of coastal systems processes, sediment transport, morphology, stratigraphy iii. Spatial and temporal scales in Coastal Geomorphology iv. Coastal classification: genetic and morphological	06
2	Coastal Processes	Waves: i. Definition, wave length, amplitude, depth, period, fetch, frequency ii. Types of waves: sea waves, swell waves, capillary waves, gravity waves, long period tidal waves, storm waves, standing waves iii. Process of shoaling: wave breakers- spilling, plunging and surging, reflection, diffraction and refraction of waves Tides: i. Equilibrium theory of tides ii. Semidiurnal, diurnal, spring, and neap tides iii. Amphidromic point, co-tidal lines, coastal tides iv. Tides in bays and estuaries v. Tides and coastal landforms Currents: i. Wave induced shore normal and longshore currents, rip currents, beach drift ii. Wind induced, river induced and tide induced currents, flood and ebb currents	10
3	Sea level	i. Transgression, regression, relative and eustatic sea level change ii. Causes and consequences of sea level change iii. Quaternary sea level changes, glacial eustasy, Staircase theory, Holocene transgression iv. Future sea level changes v. Indicators of former sea levels: Fossil beach ridges, beach rocks, abandoned cliffs, caves, raised features, marine terraces	10

4	Coastal sediments	<ul style="list-style-type: none"> i. Properties of coastal sediments ii. Types: clastic and biogenic sediments iii. Grain size characteristics iv. Sources of sediments: coastline erosion and sea floor v. Pathways of sediments transport: Factors affecting transport, sediments traps and sinks 	08
5	Coastal environments-I	<ul style="list-style-type: none"> i. Fluvial-dominated: Coastal deltas: classification, formation, morphology of delta plain, delta front and pro-delta, Fan delta, braided delta, morphodynamics of deltas ii. Tide-dominated: morphology and hydrodynamics of estuaries and tidal flats 	06
6	Coastal environments-II	<ul style="list-style-type: none"> i. Wave-dominated: Process of deposition, Beaches and spits: profiles, types and sediments, barrier islands, coastal sand dunes, dune systems, sea cliffs and caves: formation and morphology, shore platforms: formation types and morphology, sea arches, stacks, stumps, geos and blow holes ii. Biotic environments: mangrove swamps and salt marshes, corals and coral reefs 	06
7	Applied coastal Geomorphology-I	<p>Current coastal issues:</p> <ul style="list-style-type: none"> i. Sea level rise ii. Storm hazard management iii. Tsunami iv. Coastal erosion and progradation v. Wetlands, kharlands, estuarine reclamation vi. Salt intrusion and subsidence of coastal aquifers 	08
8	Applied coastal Geomorphology-II	<p>Coastal hazard management:</p> <ul style="list-style-type: none"> i. Impact, vulnerability and risk ii. Shoreline erosion management iii. Coastal adaptation and resilience iv. Coastal conservation v. Coastal policies and plans vi. Coastal Regulation Zone (CRZ Notification 2018) vii. Local and international case studies 	06

Reference Books:

- Bird, E.C. (2000):** Coastal Geomorphology: An Introduction, John Wiley and Sons, Chichester.
- Bloom, A.L. (2002):** Geomorphology: A Systematic Analysis of Late Cenozoic, Landforms, Prentice-Hall of India, New Delhi.
- Davis, J.L. (1980):** Geographical variation in coastal development, Longman, New York
- Goudie, A.S. (Eds.) (2004):** Encyclopaedia of Geomorphology, Routledge, London.
- Ivan, V. (2006):** Global Coastal Change, Blackwell publishing, Oxford.
- KarlekarShrikant (2009):** Coastal processes and landforms, Diamond Publication, Pune
- King, C.A.M. (1972):** Beaches and Coasts, Edward Arnold, London.
- Masselink, G. Hughes, M. and Knight, J. (2011):** Introduction to Coastal Processes and Geomorphology Hodder Education, London.
- Pethick, J. (1984):** An Introduction to Coastal Geomorphology, Arnold-Heinemann, London.
- Tooley, M. M. and Shennan, I. (1987):** Sea level changes, Basil Blackwell, Oxford, U. K. 8.

Choice Based Credit System Syllabus (2019 Pattern)

Mapping of Program Outcomes with Course Outcomes

Class: M.A./MS.c Geography I

Subject: Geography

Course: Coastal Geomorphology

Course Code: GEO 4202(A)

Weightage: 1= Weak or low relation, 2= Moderate or partial relation, 3= Strong or direct relation

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

Justification for the mapping

PO3: Social competence and communication skill:

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

CO4-Interpreting synoptic weather maps, satellite imagery, and meteorological data for weather analysis and prediction enhances social competence and communication skills by fostering effective weather communication, weather education and outreach, engagement in weather discussions, community resilience building, interdisciplinary communication, media and public communication, supporting emergency response, crisis communication, public engagement and empowerment, and promoting environmental awareness. These skills contribute to informed decision-making, public safety, and increased weather literacy among diverse audiences.

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

PO4: Disciplinary Knowledge:

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

PO5: Personal and professional competence:

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

PO6: Self directed and Life-long Course:

CO3- Comprehending synoptic-scale weather patterns promotes self-directed and lifelong Course by fostering continuous education, providing foundational knowledge, facilitating adaptability to changing conditions, enhancing problem-solving and critical thinking skills, offering applied Course opportunities, improving forecasting abilities, supporting career development, enhancing communication skills, fostering environmental awareness, and encouraging a lifelong pursuit of knowledge in meteorology and related fields.

PO7: Self directed and Life-long Course:

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

PO8: Critical Thinking and problem solving:

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

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

Subject: Population Geography**Subject Code:** GEO 4202 (B)**No. of Credits: 04**

Course Objectives:

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

Course Outcomes:

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

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

Topics and Course points

Unit No	Unit Name	Lectures
1	Introduction Population Geography 1.1 Definitions 1.2 Nature and scope of Population Geography 1.3 Sources of population data(Census, national sample survey, sample registration survey, NFHS, DLHS)	06
2	Population Dynamics 2.1 Population distribution in the world 2.2 Density of population in the world 2.3 Determinates of population growth	06
3	Population Theory 3.1 Malthus Theory 3.2 Optimum Population Theory 3.3 Demographic Transition Model	12
4	Fertility 4.1 Concepts and measures of Nuptiality and fertility 4.2 Levels and trends of fertility in India 4.3 Determinants of fertility 4.4 Theories of fertility	12
5	Mortality 5.1 Concept of mortality & morbidity 5.2 Measures of mortality 5.3 Recent mortality levels in world 5.4 Mortality trends in India	06
6	Migration 6.1 Definition, types (Internal and International) 6.2 Concept: refugee, brain-drain migration 6.3 Determinants and consequences of migration. 6.4 Lee's Theory of Migration 6.5 Ravenstein's laws of migration 6.6 Push-pull factors of migration	12
7	Population Composition 7.1 Demographic 7.2 Social 7.3 Economic 7.4 Cultural	06
8	Population Development and Policies 8.1 Human Development Index (HDI) 8.2 Gender Development Index (GDI) 8.3 Relation between population and development 8.4 Population policy of India 8.5 New Population policy of China	12

Reference Books:

- **Agarwala, S. N. (1977):** India's population Problems, Tata Mc Graw Hill publishing Co. Ltd. New Delhi.
- **Bose Ashiset. al. (1974):** Population in India's Development Vikas Publishing House, New Delhi, 1974.
- **Chandna R. C. (1986):** Geography of Population concepts, Determinants and Patterns, Kalyani Publishers, New Delhi
- **Clarke J. I:** Population Geography, Pergamon Press, Oxford, 1973.
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- **Crook Nigel:** Principles of Population and Development, Pergamon Press New York, 1997.
- **Garnier B. J. (1970):** Geography of Population, Longman, London
- **Pathak, K. B. and F. Ram, (1992):** Techniques of demographic analysis. Bombay: Himalaya Publishing house
- **Sundaram K. V. and Sudesh Nangia (Ed) (1986):** Population Geography, Heritage Publications, Delhi
- **UNDP(2002):** Human Development Report, Oxford, 2002.
- **Woods R. (1970):** Population Analysis in Geography, Longman, London
- **Zelinsky Wilbur (1966) :** A Prologue to Population Geography Prentice Hall
- **Musmade Arjun, Sonawane Amitand Jyotiram More, (2015):** Population & Settlement Geography (Marathi)-Diamond Publication Pune.

Choice Based Credit System Syllabus (2019 Pattern)

Mapping of Program Outcomes with Course Outcomes**Class:** M.A./MS.c Geography I**Subject:** Geography**Course:** Population Geography**Course Code:** GEO4202 (B)**Weightage:** 1= Weak or low relation, 2= Moderate or partial relation, 3= Strong or direct relation

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

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

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

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

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

PO4:Disciplinary Knowledge:

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

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

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

PO6:Self-directed and Life-long Course:

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

PO8: Critical Thinking and Problem solving:

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

Subject: Geography of Rural Settlements**Subject Code:** GEO 4203 (B)**No. of Credits: 04**

Course Objectives:

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

Course Outcomes:

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

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

Topics and Course points

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

Reference Books:

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

Choice Based Credit System Syllabus (2019 Pattern)

Mapping of Program Outcomes with Course Outcomes**Class:** M.A./MS.c Geography I**Subject:** Geography**Course:** Geography of Rural Settlement**Course Code:** GEO 4203(B)**Weightage:** 1= Weak or low relation, 2= Moderate or partial relation, 3= Strong or direct relation

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

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

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

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

PO4: Disciplinary Knowledge:

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

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

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

PO5: Personal and professional competence:

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

PO7:Environment and sustainability:

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

Subject: Geography of Disaster Management**Subject Code:** GEO 4204**No. of Credits:** 04**Course Objectives:**

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

Course Outcomes:

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

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

Topics and Course points

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

Reference books

- Agarwal, A. and Narain S. (Ed) (1999): State of India's Environment. The Citizens Report, Centre for Science and Environment, New Delhi
- Bryant Edward (2000): Natural Hazards, Cambridge University Press
- Daly, H.E. (1996): Beyond Growth, Beacon Press, Boston
- Daly, H.E and Twonseed K.N. (Ed) (1993): Valuing the earth – Economics, Ecology and Ethics, MIT Press, London
- Dupont, R.R. Baxter, T.E. and Theodore, L. (1998): Environmental Management: - Problems and Solutions, CRC Press
- Hart M. G. (1986): Geomorphology, Pure and Applied, George Allen and Unwin, London
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- Singh Savindra (2000): Environmental Geography, Parag Pustak Bhavan, Allahabad
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- Turk J. (1985): Introduction to Environmental Studies, Saunders, College Publication, Japan
- Saptarshi PG, More JC, Ugale VR, (2009): Geography and Natural Hazards, (Marathi), Diamond Publishing
- Musmade AH, More JC (2014): Geography of Disaster Management, (Marathi), Diamond Publication, Pune.

Choice Based Credit System Syllabus (2019 Pattern)

Mapping of Program Outcomes with Course Outcomes**Class:** M.A./MS.c Geography I**Subject:** Geography**Course:** Geography of Disaster Management**Course Code:** GEO 4204**Weightage:** 1= Weak or low relation, 2= Moderate or partial relation, 3= Strong or direct relation

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

PO 2: Effective Citizenship and Ethics:

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

PO 3: Social Competence:

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

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

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

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

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

PO4: Disciplinary Knowledge:

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

PO7: Environment and Sustainability:

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

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

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

PO8: Critical Thinking and Problem solving:

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

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

Subject: Practical in Surveying

Subject Code: GEO 4205

No. of Credits: 04

Course Objectives:

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

Course Outcomes:

After the completion of the course, -

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

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

Reference books

- **Asis Sarkar (2015):** Practical Geography, A Systematic Approach, Orient Black Swan
- **Duggal, S.K. (2013):** Surveying Vol. 2, McGraw Hill Publication, New York.
- **Kanetkar, T.P. and Kulkarni, S.V. (2010):** Surveying and Leveling Vol. II, Pune Vidyarthi Publication, Pune.
- **Maslov, A.V., Gordeev, A.V. and Batrakov, Yu.G. (1984):** Geodetic surveying, Mir Publishers, Moscow.
- **Rangwala, S.C. (2011):** Surveying and Leveling, Charotar Publishing House Pvt. Ltd. Anand, (Gujarat), India.
- **Punmia, B.C., Jain A. and Jain A. (2011):** Surveying, Vol. II. and III, Laxmi Publication – New Delhi.

Choice Based Credit System Syllabus (2019 Pattern)

Mapping of Program Outcomes with Course Outcomes**Class:** M.A./MS.c Geography I**Subject:** Geography**Course:** Practical in surveying**Course Code:** GEO4205**Weightage:** 1= Weak or low relation, 2= Moderate or partial relation, 3= Strong or direct relation

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

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

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

PO3: Social competence and communication skill:

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

PO4: Disciplinary Knowledge:

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

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

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

PO8: Critical Thinking and Problem solving:

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

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

Subject: Practical of Statistical Techniques for Geography**Subject Code:** GEO4206**No. of Credits:** 04**Course Objectives:**

To introduce various techniques used in geography.

To learn and apply various statistical techniques for geographical problems .

Students will also learn how to plan a small group field visit and work in small groups in the field.

The goal to enhance the students Course experience with field visits and digital techniques.

The overall aim of the course is to provide an introduction to fundamental statistical methods used in geography.

Students will create clear and informative data visualizations to represent statistical findings

Students will learn exhibit proficiency in using statistical software to conduct data analysis.

Course Outcomes:

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

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

Topics and Course points

Unit No	Unit Name	Lectures
1	Introduction to Statistical Techniques in Geography 1.1 Introduction and applications of statistical techniques in Geography 1.2 Types of statistics: descriptive and inferential statistics Geographical data a) Primary and secondary data b) Spatial and temporal data c) Discrete and continuous data d) Grouped and ungrouped data 1.3 Scales of measurement: nominal, ordinal, interval and ratio	10
2	Descriptive Statistics 1.1 Introduction to descriptive statistics 1.2 Central tendency: mean, mode, median 1.3 Dispersion: variance and standard deviation Skewness and kurtosis 1.4 (Calculations of above parameters for ungrouped and grouped data)	12
3	Probability and Probability Distributions 3.1 Introduction to probability 3.2 The Normal Probability Distribution 3.3 The Binomial Probability Distribution 3.4 The Poisson Probability Distribution	12
4	Inferential Statistics 4.1 Introduction to inferential statistics 4.2 Population and sample 4.3 Hypothesis testing: Null and alternate hypothesis 4.4 The Chi-square test (Two sample case) 4.5 Student's 't' test (Two sample tests) 4.6 ANOVA (Analysis of variance)/ F ratio test	12
5	Correlation and Regression Analysis 5.1 Introduction to bi-variate correlation and regression 5.2 The product-moment correlation coefficient 5.3 Significance testing in correlation analysis 5.4 Linear regression equation 5.5 Exponential regression equation 5.6 Power-law regression equation 5.7 Concept of residuals and explained variance	10
6	Time Series Analysis 6.1 Introduction and definition of time series 6.2 Applications of time series analysis 6.3 Components of time series 6.4 Calculation and plotting of moving averages (3 and 5) 6.5 Curve fitting by method of least squares	10

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

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

Yeats, M. H. (1974): An Introduction to Quantitative Analysis in Human Geography

Choice Based Credit System Syllabus (2019 Pattern)

Mapping of Program Outcomes with Course Outcomes**Class:** M.A./MS.c Geography I**Subject:** Geography**Course:** Practical in statistical Techniques for geography**Course Code:** GEO4206**Weightage:** 1= Weak or low relation, 2= Moderate or partial relation, 3= Strong or direct relation

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

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

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

PO3: Social competence and communication skill:

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

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

PO4: Disciplinary Knowledge:

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

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

PO8: Critical Thinking and Problem solving:

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

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

