



Savitribai Phule Pune University

(Formerly University of Pune)

Two Year Degree Program in Geography

(Faculty of Science & Technology)

Revised Syllabi for

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

(For Colleges Affiliated to Savitribai Phule Pune University)

Choice Based Credit System Syllabus

To be implemented from Academic Year 2019-2020

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

Introduction:

Savitribai Phule Pune University has decided to change the syllabi of various faculties from June, 2019. Taking into consideration the rapid changes in science and technology and new approaches in different areas of Geography and related subjects, Board of Studies in Geography after a thorough discussion with the teachers of Geography from different colleges affiliated to the Savitribai Phule Pune University, Pune has prepared the syllabus of M.Sc./M. A. Semester - I and Semester- II (w.e.f. 2019-20) 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.

Aims and Objectives of the new curriculum :

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

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

Sr. No.	Course Code	Core Compulsory Theory Paper (CCTP)	Choice Based Optional Paper (CBOP)	Theory / Practical	Core Compulsory Practical Paper (CCPP)		Credit
1	GGUT-111	Principles of Geomorphology	-	-	-		04
2	GGUT-112	Principles of Climatology	-	-	-		04
3	GGUT-113	Principles of Economic Geography	-	-	-		04
4			GGDT-114	Principles of Population and Settlement Geography	-		04
5					GGUP-115	Practical in Physical and Human Geography	04
					Total Credits of Semester I		20

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	GGUT-121	Geoinformatics - I					04	
One of the following according to specialization from CCTP								
2	GGUT-122	Coastal Geomorphology	-	-	04	-	04	
	GGUT-123	Synoptic Climatology	-	-	04	-		
	GGUT-124	Agricultural Geography	-	-	04	-		
	GGUT-125	Population Geography	-	-	04	-		
One of the following according to specialization from CCTP								
3	GGUT-126	Fluvial Geomorphology	-	-	04	-	04	
	GGUT-127	Monsoon Climatology	-	-	04	-		
	GGUT-128	Industrial Geography	-	-	04	-		
	GGUT-129	Geography of Rural Settlements	-	-	04	-		
Choice Based Optional Paper (CBOP) (1 Theory + 1 Practical)								
4			GGDT-130	Geography of Tourism	02		04	
			GGDP-131	Practical in Surveying	02			
			GGDT-132	Geography of Disaster Management	02			
			GGDP-133	Practical in Map Projections	02			
Core Compulsory Practical Paper (CCPP)								
5						GGUP-134	Practical of Statistical Techniques for Geography	04
Total Credits of Semester - II							20	

Semester – III

Course Code	Core Compulsory Theory Paper (CCTP)	Choice Based Optional Paper (CBOP)	Theory / Practical	Credit	Core Compulsory Practical Paper (CCPP)	Credit
GGUT-231	Geoinformatics-II	-	-	04	-	04
GGUT-232	Geographical Thoughts	-	-	04	-	04
One of the following according to specialization from CCTP						
GGUT-233	Tropical Geomorphology	-	-	04	-	04
GGUT-234	Applied Climatology	-	-	04	-	
GGUT-235	Geography of Rural Development	-	-	04	-	
GGUT-236	Urban Geography	-	-	04	-	
Choice Based Optional Paper (CBOP) (1Theory + 1Practical)						
		GGDT-237	Practical in Geoinformatics	02	-	04
		GGDP-238	Computer -aided Cartography	02	-	
		GGDT-239	Watershed Management	02	-	
		GGDP-240	Multivariate Statistics	02	-	
One of the following according to specialization from CCPP						
				GGUP-241	Practical in Geomorphology	04
				GGUP-242	Practical in Climatology	
				GGUP-243	Practical in Economic Geography	
				GGUP-244	Practical in Population and Settlement Geography	
Total Credits of Semester -III						20

Semester – IV

	Core Compulsory Theory Paper (CCTP)	Choice Based Optional Paper (CBOP)	Theory / Practical	Credit	Core Compulsory Practical Paper (CCPP)	Credit
GGUT-241	Geography of India	-	-	-	-	04
GGUT-242	Oceanography	-	-	-	-	04
GGUT-243	Biogeography	-	-	-	-	04
Choice Based Optional Paper (CBOP) (1Theory + 1Practical)						
		GGDT-244	Geography of Soils	02		04
		GGDP-245	Geostatistics	02		
		GGDT-246	Political Geography	02		
		GGDP-247	Regional Planning	02		
		GGDT-248	Tourism Geography	02		
		GGDP-249	Social Geography	02		
		GGDP-250	Interpretation of Topographical Maps & Village Survey / Project work	02		
Core Compulsory Practical Paper (CCPP)						
				GGUP-251	Dissertation / Research Project	04
Total Credits of Semester - IV						20

Semester I**Course: GGUT-111:Principles of Geomorphology****No. of Credits: 04 No. of Periods: 60**

Topic No.	Topic	Sub topics	No. of Periods
1	Introduction to Geomorphology	<ul style="list-style-type: none"> i. Definitions, Nature and Scope of Geomorphology ii. History of Geomorphology iii. Basic concepts in Geomorphology iv. Branches of Geomorphology v. Hierarchy of spatial and temporal scales in Geomorphology vi. Geologic time scale 	06
2	Geomorphology and Tectonics	<ul style="list-style-type: none"> i. Internal structure of the Earth: Layers based on physical and chemical properties ii. Seismic waves and types iii. Wegener's Continental Drift Theory iv. Theory of Plate Tectonics and associated landforms v. Holmes Convectional Current Theory vi. Gravity and Isostasy vii. Paleomagnetism viii. Folds: Types and landforms ix. Faults: Types and landforms 	12
3	Weathering and Mass Movement Processes	<ul style="list-style-type: none"> i. Weathering: Types and related landforms ii. Mass Movement: Types of mass movement 	08
4	Hillslopes	<ul style="list-style-type: none"> i. Hillslope processes and forms ii. Models of hillslope evolution 	06
5	Fluvial Processes and Landforms	<ul style="list-style-type: none"> i. Genetic classification of streams ii. Playfair's law iii. River and stream, drainage basin and drainage network patterns iv. River processes: erosion, transportation and deposition v. Fluvial landforms: erosional and depositional vi. Davisian Cycle of Erosion 	10
6	Glacial Processes and Landforms	<ul style="list-style-type: none"> i. Glacial system: Types of glaciers ii. Glacial processes: erosion, transportation and deposition iii. Glacial landforms: erosional and depositional 	06

7	Coastal Processes and Landforms	i. Sea waves, currents and tides ii. Coastal processes: erosion, transportation and deposition iii. Coastal landforms: erosional and depositional	06
8	Aeolian Processes and Landforms	i. Aeolian environment ii. Wind processes: erosion, transportation and deposition iii. Aeolian landforms: erosional and depositional iv. Work of water in desert and landforms	06

Reference Books:

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

Semester I**Course: GGUT- 112:Principles of Climatology****No. of Credits: 04 No. of Periods: 60**

Topic No.	Topic	Sub topics	No. of Periods
1	Introduction to Climatology	<ul style="list-style-type: none"> i. Meteorology and Climatology ii. Nature and Scope of Climatology iii. Development of Climatology iv. Tropical Climatology 	06
2	Earth's Atmosphere	<ul style="list-style-type: none"> i. Evolution ii. Structure and composition of atmosphere iii. The ozone layer depletion iv. Aurora - types 	08
3	Insolation	<ul style="list-style-type: none"> i. Solar and terrestrial radiation ii. Electromagnetic spectrum iii. Factors affecting insolation iv. Latitudinal and seasonal variation v. Effect of atmosphere vi. Greenhouse effect vii. Heat budget viii. Mechanisms of heat transfer 	10
4	Temperature	<ul style="list-style-type: none"> i. Heat and temperature ii. Temperature measurements and controls iii. Lapse rate iv. Temperature inversion v. Types of inversion 	06
5	Atmospheric Pressure and Winds	<ul style="list-style-type: none"> i. Pressure measurement and distribution ii. Factors affecting distribution of pressure iii. Wind observation and measurement iv. Factors affecting wind v. Geostrophic wind and Gradient wind vi. Models of general circulation of the atmosphere vii. Eddy theory viii. Local winds ix. Jet stream x. Cyclones and Anticyclones 	12
6	Atmospheric Moisture	<ul style="list-style-type: none"> i. Atmospheric moisture ii. Hydrologic cycle iii. Evaporation and condensation iv. Forms of condensation v. Precipitation vi. Types of precipitation vii. Measurement of humidity 	06

7	Atmospheric Stability	i. Lapse Rate: normal, environmental, dry adiabatic lapse rate and wet adiabatic lapse rate ii. Stable and unstable air iii. Absolute stability iv. Absolute instability v. Conditional instability	06
8	Air Masses and Fronts	i. Introduction to air masses and fronts ii. Types of air masses iii. Types of fronts	06

Reference Books:

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

Course: GGUT-113 :Principles of Economic Geography

No. of Credits: 04 No. of Periods: 60

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

		i.	Definition and concept of economic development	
4	Economic Development	ii.	Measures of economic development	08
		iii.	Classification of countries on the basis of economic development	
		iv.	Rostow's and Myrdal's model	
5	Transport and Communication	i.	Various modes of transport	06
		ii.	Geographical factors and transportation	
		iii.	Various means of communication	
		iv.	Role of transport and communication in economy	
6	Trade	i.	Definition and types of trade	06
		ii.	Factors affecting on international trade	
		iii.	Problems and prospects of international trade with reference to India	
		iv.	E-commerce	
7	Economic Development in India	i.	Pre-and post-independence economic development in India	06
		ii.	Green revolution in India	
		iii.	Need of new green revolution in India	
		iv.	Regional disparities in India	
		v.	Impact of globalization and privatization on economic development	
8	Contemporary Issues	i.	Regional disparities in Maharashtra	10
		ii.	Role of IT industry in economic development in Maharashtra	
		iii.	A case study of one local agro-based industry: Economic analysis, problems and prospects (Sugar factory/ winery/ agro-tourist center etc.)	

Reference Books:

- **Alexander, J.W. (1977):** Economic Geography, Prentice Hall of India Pvt. Ltd., New.
- **Chorley, R.J. and Haggett, P. (1970):** Socio Economic Models in Geography, Concept publishing Company Pvt. Ltd., New Delhi.
- **Garnier, B.J. and Delobez, A. (1979):** Geography of Marketing, Longman.
- Hartshorne, T.A. and Alexander, J.W. (2010): Economic Geography, PHI Learning, New Delhi
- **KananChatterjee (2015):** Basics of Economic Geography.
- **Knox, P., Agnew, J. and McCarthy, L. (2008):** The Geography of the World Economy, Hodder Arnold, London.
- **Lloyd, P. and Dicken, B. (1972):** Location in Space: A Theoretical Approach to Economic Geography, Harper and Row, New York Methuen.
- **Mitra, A. (2002):** Resource Studies, Sreedhar publishers, Kolkata.
- **Patil, S.G., Suryawanshi, R.S., Pacharne, S. and Choudhar, A.H. (2014):** Economic Geography, AtharavPrakashan, Pune.
- **Ray, P.K. (1997):** Economic Geography, New Central Book Agency (P) Ltd., Calcutta.

- **Saptarshi, P.G., More, J.C. Ugale, V.R. and Musmade, A.H. (2009):** India A Geographical Analysis Diamond, Pune.
- **Saxena, H.M. (2013):** Economic Geography, Rawat publication, Jaipur.
- **Siddhartha, K. (2000):** Economic Geography: Theories, Process and Patterns, Kisalaya Publications, New Delhi
- **Smith, D.M. (1971):** Industrial Location: An Economic Geographical Analysis, John Wiley and Sons, New York
- **Pagar, Thorat & More (2015):** Agriculture Geography, (Marathi), Atharv Publication, Pune
- **More J. (2014):** Geography & Agriculture For MPSC Examination, (Marathi), Atharv Publication, Pune

Semester I

Course: GGD-114 :Principles of Population and Settlements Geography

No. of Credits: 04 No. of Periods: 60

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

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

Reference Books:

- **Bhende, A. and Kanitkar, T. (2011):** Principles of Population Studies, Himalaya Publishing House, Bombay.
- **Beaujeu, G. J. (1966):** Geography of Population, Longman Group Ltd.
- **Chandna, R.C. (Rep.2010):** Geography of Population, Concepts, Determinants and Patterns, Kalyani Publishers, New Delhi.
- **Clark, J. I. (1973):** Population Geography, Pergamon Press Ltd., Oxford.
- **Clark, J.I. (1984):** Geography and Population: Approaches and Applications, Pergamon Press Ltd., Oxford.
- **Hudson, (1970):** Geography of Settlement, Macdonald & Evans Ltd., London.
- **Khullar, D. R. (2011):** India A Comprehensive Geography, Kalyani Publication, New Delhi.
- **Michel Chisholm (1973):** Studies in Human Geography, London.
- **Mishra, R.S.(1975):** Economics of Growth and Development, Somaiya Publication Pvt. Ltd.

- **Singh R.Y. (Rep. 2010):** Geography of Settlements, Rawat Publication.
- **MusmadeArjun, SonawaneAmit and Jyotiram More,** (2015) Population & Settlement Geography (Marathi) -Diamond Publication Pune.
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Semester I

Course: GGUP-115:Practical in Physical and Human Geography

No. of Credits: 04 No. of Periods: 60

Topic No.	Topic	Sub topics	Periods (3 hours)
A Geomorphology			
1	Drainage Network	Stream ordering and Bifurcation ratio i. Strahler's method ii. Horton's method	02
2	Drainage Basin Relief Analysis	Relief analysis (for a 3 to 5 order drainage basin; based on grid method) i. Absolute relief map ii. Relative relief map iii. Hypsometric analysis iv. Basin cross profiles v. Block diagram (multiple section)	03
B Climatology			
3	Climatic Element Diagrams	i. Climatograph ii. Climograph iii. Simple wind rose iv. Hythergraph v. Water Budget	03
4	Climatic Classification	i. Koppen's classification	02
C Economic Geography			
5	Crop Combination and Crop Diversification	i. Weaver's method ii. JasbirSingh	02
6	Measures of Network Structure	i. Ratio measure ii. Alpha, beta, gamma, etc. iii. Associated number, cyclomatic number	01
D Population and Settlement Geography			
7	Population Indices and Projection	i. Age-sex pyramid ii. Infant mortality rate iii. Population growth rate iv. Population projection	02
8	Measures of Nucleation and Dispersion	i. Rank size rule ii. Nearest neighbor analysis iii. Calculation of centrality	03

9	Field Visit and Report Writing	i. One day study tour or long tour of geographical interest places anywhere in the country and excursion report	02
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Reference Books:

- **AsisSarkar (2015):** Practical Geography, A Systematic Approach, Orient Black Swan
- **Carter, H. (1977):** The study of Urban Geography, Edward Arnold, London.
- **Hans, R. (1978):** Fundamentals of Demography, Surjeet, Delhi.
- **Hudson F.S. (1976):** Geography of Settlements, Estover, Macdonald& Evans, England.
- **Liendsor, J.M. (1997):** Techniques in Human Geography, Routledge.
- **Lloyd, P. and Dicken, B. (1972):** Location in Space - A theoretical approach to economic geography, Harper and Row, New York.
- **Michael, E. and Hurse, E.(1974):** Transportation Geography, McGraw-Hill, New York.
- **Pollard, A.H. and FarhatYusu, (1974):** Demographic Techniques, Rushcutters Bay, N.S.W., Pergamon Press, Australia.
- **Singh, J. and Dhillon, (1984):** Agricultural Geography, Tata McGraw-Hill Publishing Company Limited, New Delhi.
- **Yeats, M.H. (1974):** An Introduction to Quantitative Analysis in Human Geography, McGraw-Hill, New York.

Semester II**Course: GGUT-121:Geoinformatics-I****No. of Credits: 04 No. of Periods: 60**

Topic No.	Topic	Sub topics	No. of Periods
1	Introduction to GIS	i. Definition, potential of GIS, concept of space & time ii. Spatial Information Theory iii. History of GIS iv. Objectives of GIS v. Elements of GIS, hardware & software requirements vi. GIS Applications vii. GIS Tasks- input, manipulation, management, query & analysis, visualization	14
2	Database	i. Spatial: spatial relationship, functional relationship, logical relationship ii. Non-spatial: nominal, ordinal, ratio and cyclic	08
3	Data Models	i. Spatial: Geometric primitives, Raster, Vector, Quad tree tessellation, comparative overview of raster and vector models, layers and coverage ii. Non-spatial: DBMS- Advantages, conceptual models; Implementational models- hierarchical, network and relational	12
4	Structuring of Spatial Data	i. Digitizers: manual, semi-automatic & automatic ii. Editing error: detection & correction, topology building	10
5	Data Analysis (I)	i. Attribute databases: operations from algebraic theory ii. Operations from set theory SQL: attribute query	08
6	Data Analysis (II)	i. Spatial Databases: map algebra, grid Operations: Local, Focal ii. SQL: spatial query	08

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, McGraw Hill.
- **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

Semester II**Course: GGUT-122: Coastal Geomorphology****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	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	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	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	Current coastal issues: 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	Coastal hazard management: 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.

- **Karlekar Shrikant (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.

Semester II

Course: GGUT-123: Synoptic Climatology

No. of Credits: 04 No. of Periods: 60

Topic No.	Topic	Sub topics	No. of Periods
1	Introduction to Synoptic Climatology	i. Definition, nature and scope ii. Levels of climatological synthesis	03
2	Approaches	i. Analytical approach ii. Synoptic approach	03
3	Weather reporting and analysis	i. Observing, reporting, collecting and analysis of weather data by India Meteorological Department ii. Synoptic charts and maps, synoptic scale motion, laws of motion	04
4	Tropical Weather Systems	i. Easterly Waves- formation and characteristics ii. Tropical Cyclones (Hurricanes)- formation, life cycle, structure and dynamics iii. Thunderstorm- origin, structure and stages of development, iv. Tornadoes- development and occurrence	12
5	Extra-Tropical Weather Systems	i. Air masses and fronts ii. Air masses of North America, Europe and Asia iii. Types of fronts iv. Frontal weather, frontogenesis and frontolysis v. Principal zones of frontogenesis vi. Rossby waves, wave cyclone- formation, a. life cycle, idealized weather	12
6	Weather Patterns	i. Clouds- classification ii. Precipitation processes iii. Fog- formation and types iv. Heat and cold waves	10
7	Weather Forecasting	i. Types of weather forecasting ii. Methods of weather forecasting iii. Role of satellites	08

8	Application of Synoptic Climatology	i. Application in pollution studies ii. Marine activities iii. Aviation iv. Disaster prevention and preparedness v. Agriculture	08
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Reference Books:

- **Barry, R.G. and Perry, A.H. (1973):** Synoptic Climatology: Methods and Applications, Methuen and Co. Ltd., London.
- **Lutgens, Frederic K. and Tarbuck, Edward J. (2010):** The Atmosphere: An Introduction to Meteorology, Pearson Prentice Hall, New Jersey.
- **Navarra, J.G. (1979):** Atmosphere, Weather and Climate, W. B. Saunders Company, Philadelphia.
- **Petterson, S. (1969):** Introduction to Meteorology, McGraw Hill, New York.
- **Rama Sastry, A.A. (1984):** Weather and Weather Forecasting, Publications Division, Ministry of Information and Broadcasting, Government of India, New Delhi.
- **Stringer, E.T. (1972):** Foundations of Climatology, W. H. Freeman and Company, New York.
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Semester II**Course: GGUT- 124 :Agricultural Geography****No. of Credits: 04****No. of Periods: 60**

Topic No.	Topic	Sub topics	No. of Periods
1	Introduction to Agricultural Geography	i. Definition, nature, scope and significance ii. Approaches: systematic, commodity, regional, recent iii. Recent trends in Agriculture Geography	08
2	Significance of Agriculture	i. Significance of agriculture in world ii. Importance of agriculture in the Indian economy iii. Role of agro-based industry in regional development	06
3	Determinates of Agriculture	i. Physical factors ii. Economic factors iii. Social factor iv. Technological factors	10
4	Agricultural regionalization	i. Definition and concept ii. Views of Baker and Whittlesey iii. Crop combination techniques: Weaver and Thomas method iv. Agricultural efficiency: Kendall's ranking coefficient, Bhatia's method	10

		v. Agricultural regions of India	
		i. Intensive subsistent farming	
		ii. Mixed farming	
		iii. Horticulture	
5	Agricultural Types	iv. Plantation agriculture	08
		v. Commercial grain farming	
		vi. Shifting cultivation	
		i. Problems and prospects with reference to India	
6	Problems and Prospects of Agriculture	ii. Droughts and famines	05
		iii. Role of irrigation in agriculture development	
		iv. Agricultural productivity in India	
		i. Waste land management	
		ii. Organic farming concept	
7	Sustainable Agricultural Development in India	iii. Crop rotation	07
		iv. Group farming	
		v. Pest and weed management	
		vi. Agro-forestry	
		vii. Agro-tourism	
		i. Green revolution in India: problems associated with Indian agriculture	
8	Characteristics of Indian agriculture	ii. National agricultural policy	06
		iii. Recent changes in Indian agriculture	

Reference Books:

- **Aiyer, A.K.Y.N. (1949):** Agricultural and Allied Arts in Vedic India.
- **Bayliss Smith, T.P. (1987):** The Ecology of Agricultural Systems. Cambridge University Press, London.
- **Berry, B.J.L. et. al. (1976):** The Geography of Economic Systems. Prentice Hall, New York.
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- **Dyson, T. (1996):** Population and Food, Global Trends and Future Prospects. Routledge, London.
- **Gregor, H.P. (1970):** Geography of Agriculture. Prentice Hall, New York.
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- **Grigg, D.G. (1974):** The Agricultural Systems of the world An Evolutionary Approach.
- **Hartshorn, T.N. and Alexander, J.W. (1988):** Economic Geography. Prentice Hall, New Delhi.
- **Illbery, B.W. (1985):** Agricultural Geography, Social & Economic Analysis, Oxford University Press.
- **Mannion, A.M. (1995):** Agriculture and Environment Change. John Wiley, London.
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- **Patil S. G., Suryawanshi R. S., Pacharne S. and Choudhar A. H. (2014):** Economic Geography, AtharavPrakashan, Pune.
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- **Randhawa, M.S. (1980):** An History of Agriculture in India Vols. I, II, III, IV, ICAR, New Delhi.
- **Saptarshi P.G., More J.C., Ugale V.R., Musmade A.H. (2009):** India A Geographical Analysis, Diamond, Pune.
- **Sauer, C.O. (1969):** Agricultural Origins and Dispersals. M.I.T. Press, Mass, U.S.A.
- **Singh, J. and Dhillon, S.S. (1988):** Agricultural Geography, 2nd edition, Tata McGraw-Hill, New Delhi.
- **Singh, J. and Dhillon, S.S. (1994):** Agricultural Geography, Tata McGraw Hill, Publishing Co.
- **Symons, Leslie (1970):** Agricultural Geography, G. Belt and Sons Ltd., London.
- **Tarrent, J.R. (1970):** Agricultural Geography, David and Charles, Newton Abbot.
- **Wigley, G. (1981):** Tropical Agriculture: The Development of Production, 4th edition, Arnold, London

Semester II

Course: Gg. 213: Population Geography

No. of Credits: 04 No. of Periods: 60

Topic No.	Topic	Sub topics	No. of Periods
1.	Introduction	i. Definitions, nature and scope of Population Geography ii. Sources of population data: census, national sample survey, sample registration survey, NFHS, DLHS data	08
2.	Population Dynamics	i. Population distribution in the world ii. Density of population in the world iii. Determinates of population growth	06
3.	Population Theory	i. Malthus Theory ii. Optimum Population Theory iii. Demographic Transition Model	08
4.	Fertility	i. Concepts and measures of Nuptiality and fertility ii. Levels and trends of fertility in India iii. Determinants of fertility iv. Theories of fertility	08
5.	Mortality	i. Concept of mortality & morbidity ii. Measures of mortality iii. Recent mortality levels in world iv. Mortality trends in India	08
6.	Migration	i. Definition, types (Internal and International) ii. Concept: refugee, brain-drain migration iii. Determinants and consequences of migration.	06

		iv. Lee's Theory of Migration	
		v. Ravenstein's laws of migration	
		vi. Push-pull factors of migration	
7	Population Composition	Population Composition:	08
		i. Demographic	
		ii. Social	
		iii. Economic	
		iv. Cultural	
8	Population Development and Policies	Concept of Population Index:	08
		i. Human Development Index (HDI)	
		ii. Gender Development Index (GDI)	
		iii. Relation between population and development	
		iv. Population policy of India	
		v. New Population policy of China	

Reference Books:

- **Agarwala, S.N. (1977):** India's population Problems, Tata McGraw Hill publishing Co. Ltd. , New Delhi.
- **Bose Ashis et.al. (1974):** Population in India's Development Vikas Publishing House, New Delhi, 1974.
- **Chandna R.C. (1986) :**Geography of Population concepts, Determinants and Patterns, Kalyani Publishers, New Delhi
- **Clarke J.I :** Population Geography, Pergamon Press, Oxford, 1973.
- **Clarke J.I. (Ed)(1984):**Geography and Population, Approaches and Applications, Pergamon Press, Oxford
- **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
- **U N D P (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 Amit and Jyotiram More, (2015):** Population & Settlement Geography (Marathi) -Diamond Publication Pune.

Semester II

Course: GGUT-126: Fluvial Geomorphology

No. of Credits: 04

No. of Periods: 60

Topic No.	Topic	Sub topics	No. of Periods
1	Introduction to Fluvial Geomorphology	<ul style="list-style-type: none"> i. Definition and scope ii. Drainage basin and stream network iii. The drainage basin as a geomorphic unit iv. Horton's laws of drainage composition v. Laws of allometric growth vi. Phases of drainage network development- Glock's model 	4
2	Drainage Basin Hydrology	<ul style="list-style-type: none"> i. Runoff generation and types (infiltration-excess overland flow, throughflow, pipeflow and saturation-excess overland flow) ii. Channel initiation iii. Gully and channel formation iv. Discharge and magnitude/frequency of flows in river system (flood stages and hydrographs, discharge measurement methods) 	4
3	Open Channel Hydraulics	<ul style="list-style-type: none"> i. Types of flows- steady and unsteady flow, uniform and non-uniform flow, and Laminar and turbulent flow ii. Flow behaviour- sub-critical, critical and supercritical flow iii. Flow velocity variations and measurement methods iv. Shear stress and stream power 	06
4	Channel Morphology	<ul style="list-style-type: none"> i. River categories- alluvial, bedrock and mix alluvial-bedrock ii. Cross-section morphology and reach morphology- width-depth ratio, channel capacity, wetted perimeter, hydraulic radius and gradient iii. Controls on channel morphology- morphologic and hydrologic controls iv. Channel bed configuration- ripples, dunes, anti-dunes, riffle-pool sequence, steps and pools v. Channel patterns or planforms- straight, meandering, braided, anabranching and anastomosing vi. Concept of grade- long profile: below, near and above grade conditions 	10

5	Hydraulic Geometry	<ul style="list-style-type: none"> i. At-a-station hydraulic geometry ii. Downstream hydraulic geometry iii. (Relation of discharge with width, depth, velocity and gradient) 	6
6	Fluvial Erosion	<ul style="list-style-type: none"> i. Types of erosion- vertical, lateral and headword erosion ii. Erosional Processes- solution, abrasion, cavitation, attrition, impaction, hydraulic action iii. Erosionallandforms of bedrock channels-gorge, canyon, incised meanders, rapids, waterfalls, potholes, inner channels, grooves, etc. 	8
7	Sediment Transport	<ul style="list-style-type: none"> i. Types of river load- solution and particulate load ii. Capacity and competence iii. Entrainment of sediment- forces acting on a submerged particle, critical shear stress and critical velocity iv. Modes of sediment transport in rivers- dissolved load, wash load, bedload and suspended load v. Measurement of sediment load vi. Sediment yield 	8
8	Fluvial Deposition	<ul style="list-style-type: none"> i. Floodplains and associated features- meanders, point bars, ox-bow lakes, natural levees, backswamps, yazoo streams, etc. ii. River terraces- formation and classification iii. Alluvial fans and bajadas iv. Delta- formation and types v. Mid-channel and bank attached channel forms 	8
9	River Metamorphosis	<ul style="list-style-type: none"> i. Definition, environmental change ii. Evidences of metamorphism (direct observations, historical records, sedimentary evidence and dating techniques) iii. Long-term and short-term adjustments iv. Quaternary fluvial systems 	6

Reference Books:

- **Charlton, R. (2008):** Fundamentals of fluvial Geomorphology, Routledge, New York.
- **Fryirs, K.A. and Brierley, G.J. (2013):** Geomorphic Analysis of River Systems: An approach to reading the landscape, Wiley-Blackwell.
- **Garde, R.J. (2006):** River Morphology, New age international limited publishers New Delhi.
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- **Knighton, D. (1998):** Fluvial forms and processes, Arnold, an imprint of Hodder Education, an

- Hachette UK Company, London.
- **Kondolf, M.G. and Piegay, H. (2016):** Tools in Fluvial Geomorphology, Wiley-Blackwell.
- **Leopold, L.B., Wolman, M.G. and Miller, P. (1954):** Fluvial processes in Geomorphology, Freeman and Co.San Francisco.
- **Maithi, R. (2016):** Modern approaches to Fluvial Geomorphology, Primus Books.
- **Mangelsdorf, J., Scheurmann, K. and Weib, F.H. (1989):** River Morphology, Springer-Verlag.
- **Morisawa, M. (1985):** Rivers: Forms and Processes, Longman, UK.
- **Richards, K. (1982):** River: Forms and processes in alluvial channels. Methuen and Co. London.
- **Robert, A. (2003):** River Processes: An Introduction to Fluvial Dynamics. Hodder Education, and Hachette UK Company, London.
- **Schumm, S. A. (1977):** Fluvial Systems. Wiley, New York.
- **Schumm, S.A., Mosley, M.P. and Weaver, W.E. (1987):** Experimental Fluvial Geomorphology, A Wiley, Inter-science Publication.

Semester II

Course: GGUT-127: Monsoon Climatology

No. of Credits: 04 No. of Periods: 60

Topic No.	Topic	Sub topics	No. of Periods
1	Monsoon	i. Introduction and scope of Monsoon Climatology	05
		ii. Historical background and economic importance of monsoon	
2	Origin of Monsoon	i. Different concepts related to origin of Monsoon – Thermal concept, Flohn’s concept, Aerological concept	12
		ii. The Asian Monsoon: East and South Asian Monsoon	
		iii. Classical Theory of Indian Monsoon	
		iv. Tibetan Plateau and Monsoon	
3	Monsoon Model	i. Driving mechanism	08
		ii. Monsoon on non-rotating and rotating Earth	
		iii. Realistic Monsoon Model	
4	Monsoon Climatology	i. Normal temperature, wind and pressure,	06
		ii. Dates of onset and withdrawal of monsoon rainfall	
5	Regional Aspects of Indian Monsoon	i. Semi-permanent systems- heat low, Monsoon trough,	06
		ii. Easterly Jet, Tibetan High	
6	Intra-seasonal Variation	i. Active and break period, depressions, trough of low Pressure	06
		ii. Mid-tropospheric disturbances, offshore and onshore vortices	
		iii. Effect of topography	
7	Interannual Variation	i. Variability of summer monsoon rainfall	10
		ii. Snow cover	
		iii. Meteorological Teleconnections: El Niño Southern Oscillation (ENSO)	
		iv. Indian Ocean Dipole (IOD)	
		v. North Atlantic Oscillation (NAO)	
		vi. Walker Circulation	
		vii. Role of ocean and upper atmosphere	
8	Forecasting of Monsoon	i. Different time scales	07
		ii. Factors for forecasting	
		iii. Power regression and parametric model	
		iv. Current monsoon forecasting system of India Meteorological Department	
		v. MONEX and IIOE	

Reference Books:

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

Semester II

Course: GGUT-128:Industrial Geography

No. of Credits: 04 No. of Periods: 60

Topic No.	Topic	Sub topics	No. of Periods
1	Introduction to Industrial Geography	i. Definition, nature and scope ii. Manufacturing and regional economies iii. Importance of industries in India's economic development	06
2	Industrial Location	i. Factors of industrial location:physical, economic, political and socio-cultural ii. Centralization and decentralization of industries iii. Agglomeration of industries iv. Industrial linkages v. Footloose industry	08
3	Models in Industrial Geography	i. Weber's model ii. Losch's model iii. Greenhut's model iv. Israd's model	08
4	Problems and Prospects of Industries in India	i. Iron and steel ii. Cotton textile iii. Sugar industries iv. Automobile v. Chemical vi. Tourism industry	10
5	Industrial Regions of India	i. Industrial regions of India ii. Characteristics of industrial regions iii. India's industrial policy iv. Agro-based industries in India v. SEZ vi. Small Scale Industries in India	06

6	Industrial Regions	Study of two industrial from each region i. Western Europe ii. Anglo-America iii. Japan iv. China	08
7	IT Industries in India	i. Currents scenario of IT Industry in India ii. Major IT hubs in India iii. Problems and prospects of IT industry in India iv. Impact of globalization on IT industry in India	08
8	Currents Scenario of Industry Sector in India	i. Role of MIDC in economic development of Maharashtra. ii. Role of FDI in development of Indian Industry iii. Problems and prospects of agro-based industries in Maharashtra	06

Reference Books:

- **Alexander, JW. (1973):** Economic Geography, Prentice Hall, New Jersey.
- **Baghla, S. (2017):** Industrial Geography, Book Enclave Publication.
- **Estall and Buchanan (1969):** Industrial Activity and Economic Geography.
- **Smith, David, M. (1971):** Industrial Location- An Economic Geographical Analysis, John Wiley and Son, New York.
- **Miller, E.C. (1977):** Manufacturing-A study of Industrial Location, Penn State University, University Park, U.S.A.
- **Shaw, E.B. (1979):** An Anglo-America- A Regional Geography.
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- **Carlo, G., Mehdi, J. and Dino, M. (2003):** Fundamentals of Software Engineering, Pearson Edu. Pte. Ltd. New Delhi.
- **Richard, E. Fairley:** Software Engineering- Concepts, Tata Mc-Graw Hill Publishing Company, New Delhi.
- **Shahid, Y. and Kaoru, N. (2010):** Changing the Industrial Geography in Asia, The Impact of China & India, World Bank Publications.
- **Robinson, H. (1996):** Geography of Tourism, Macdonald and Evans, London.

Semester II

Course: GGUT-129: Geography of Rural Settlements

No. of Credits: 04 No. of Periods: 60

Topic No.	Topic	Sub topics	No. of Periods
1	Introduction to Geography of Rural Settlements	i. Definition ii. Evolution of settlements iii. Sequence of occupancy from Neolithic to modern period iv. Historical, cultural and geographical aspects of settlements reflected in place names	07
2	Growth and Distribution	i. Site, situation, location ii. Various factors affecting on settlement site and situations iii. Dispersion and nucleation iv. Factors affecting dispersion and nucleation v. Methods of the measuring degree of dispersion vi. Factors affecting growth of settlements vii. System of land division viii. Water rights system of agriculture ix. Land tenancy system	12
3	Theories of Rural Land Use	i. Intensity of land use ii. Labour cost iii. Marketing of product iv. Von Thunen Theory v. Ricardo Theory	10
4	Rural Economic Activities	i. Functional analysis of service village and a. trading Center ii. Centrality and hierarchy of rural service centers iii. Central Place Theory	06
5	Morphogenesis of Rural Settlements and Transformation	Morphogenesis: i. Social ii. Cultural iii. Economic organization within villages iv. Functional growth v. Socio-economic transformation in rural areas	06

6	Demographic Characteristics of Rural Settlement	i. Age-Sex, Education, Occupation, Caste ii. Migration: causes & consequence of migration in rural areas iii. Seasonal migration iv. Commuting patterns	07
7	Rural House Types	i. Primitive, vernacular and modern high rise ii. Physical, social, cultural and economic factors iii. Size, functional use and architectural style iv. Building material	06
8	Rural Settlements in Maharashtra	i. Various patterns ii. House types and settlement patterns in the Maharashtra iii. Modern forms of rural settlements	06

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, Edinburgh.
- **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 of Community 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 AH, Sonawane AE, More JC, (2015):** Population & Settlement Geography, (Marathi), Diamond Publication, Pune

Semester II

Course: GGDT-130: Geography of Tourism

No. of Credits: 02 No. of Periods: 30

Topic No.	Topic	Sub topics	No. of Periods
1	Introduction to Geography of tourism	i. Definition: tourist and tourism ii. Concept of recreation and leisure iii. Importance of tourism iv. Impact of tourism on economy of nation	02
2	Classification and Recent Concepts of Tourism	i. Classification on the basis of: nationality time of travel, number of tourist and purpose ii. Recent concepts: agro-tourism, eco-tourism, heritage tourism and adventure tourism	10
3	Factors of Tourism	i. Physical factors: relief, climate, vegetation, wild life and water bodies ii. Socio-cultural factors: religious, historical and cultural, economic, transportation and accommodation	08
4	Role of Accommodation in Tourism	i. Hotels, motels, inn, saraies, dharmashalas ii. Government accommodation, tourist homes iii. Youth hostels, cottages, tents, caravans iv. Rail yatribhavan, house boats v. Private accommodations and unrecognized accommodations	06
5	Indian Tourism	Case studies i. Hill stations: Manali, Mahabaleshwar ii. Beaches: Kalangut (Goa), Ganpatipule iii. Historical centres: Agra, Pratapgad iv. Caves : Badami, Ajanta v. Religious Centres: Prayagraj (Allahabad), Shirdi vi. National Parks: Kaziranga, Tadoba vii. Dams: Sardar Sarovar, Koyna viii. Waterfalls: Nohkalikai Fall, Thoseghar	04

Reference books

- **Bhatia A.K. (1996):** Tourism Development: Principles and Practices, Sterling Publishers, New Delhi
- **Bhatiya, A.K.(1991):** International Tourism - Fundamentals and Practices, Sterling, New Delhi,

- **Chandra, R.H.(1998):** Hill Tourism: Planning and Development, Kanishka Publishers, New Delhi,
- Hunter, C and Green, H.(1995): Tourism and the Environment: A Sustainable Relationship, Routledge, London,
- **Inskip, E. (1991):** Tourism Planning: An Integrated and Sustainable Development Approach, Van Nostrand and Reinhold, New York,
- **Kaul, R.K.(1985):** Dynamics of Tourism & Recreation. Inter-India, New Delhi.
- **Kaur, J.(1985):** Himalayan Pilgrimages & New Tourism Himalayan Books, New Delhi,
- **Lea, J.(1988):** Tourism and Development in the Third World, Routledge, London,
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- **Robinson, H.A.(1996):** Geography of Tourism. Macdonald and Evans, London,
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- **Sinha P. C. (ed.)(1998):** Tourism Impact Assessment, Anmol Publishers, New Delhi,
- **Theobald, W. (ed.)(1994):** Global Tourism: The Next decade, Oxford, Butterworth, Heinemann, Oxford,
- **Voase, R.(1995):** Tourism: The Human Perspective Hodder& Stoughton, London

Semester II

Course: GGDP-131: Practical in Surveying

No. of Credits: 02 No. of Periods: 30

Topic No.	Topic	Sub topics	Periods (3 hours)
1	Introduction to Surveying	i. Definitions and methods ii. Benchmarks iii. Spot heights iv. Reduced levels v. Interpolation and contouring	01
2	Dumpy/Auto level	i. Various components and common terms used in dumpy level survey ii. Collimation method and Rise and Fall method iii. Profile drawing and block contouring	02
3	Transit Theodolite	i. Various components and common terms used in Theodolite ii. Intersection method and Tachometric method	02
4	Total Station	i. Various components and common terms used in Total Station ii. Area and profile drawing	03
5	Field Visit	i. Dumpy level/Theodolite /Total Station Survey of a Beach, River Profiles and Slope	02

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.

Semester II

Course: GGDT-132: Geography of Disaster Management

No. of Credits: 02 No. of Periods: 30

Topic No.	Topic	Sub topics	No. of Periods
1	Introduction	Concepts and definitions i. Disaster, Hazard, Vulnerability, Resilience, Risks ii. Classification of disasters	02
2	Natural Disasters	Causes and effects: i. Earthquake, Volcano, Landslide, Tsunami ii. Cyclone, Flood, Drought	10
3	Man-made disaster	Causes and effects: i. Fire, Terrorism, Food poisoning ii. Strike and lockouts, accidents, stampedes iii. Major man-made disaster examples in India	08
4	Disaster management	i. Phases of disaster cycle ii. First aid iii. Role of Armed forces, police forces and NGO'S in disaster management	06
5	Technologies for Disaster Management	i. Application of Modern Technologies for the emergency communication ii. Uses of remote sensing, GIS and GPS in disaster management	04

Reference books

- **Agarwal, A. and Narain S. (Ed) (1999):** State of India's Environment. The Citizens Report, Centre for Science and Environment, New Delhi
- **Bryant Edward (2000):** Natural Hazards, Cambridge University Press
- **Daly, H.E. (1996):** Beyond Growth, Beacon Press, Boston
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- **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
- **Morrisawa M (Ed) (1994):** Geomorphology and Natural Hazards, Elsevier, Amsterdam
- **Singh Savindra (2000):** Environmental Geography, ParagPustakBhavan, Allahabad
- **Smith, K. (2001):** Environmental Hazards: Assessing Risk and Reducing Disaster, Routledge
- **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

Semester II

Course: GGDP-133: Practical in Map Projections

No. of Credits: 02 No. of Periods: 30

Topic No.	Topic	Sub topics	Periods (3 hours)
1	Map projections	iv. Definition and necessity of projections v. Types- Perspective and non- perspective, conventional vi. Classification based on a) Developable surfaces used b) Position of source of light c) Properties	01
2	Zenithal Projections	iii. Zenithal Polar Gnomonic Projection iv. Zenithal Polar Stereographic Projection	03
3	Conical Projections	vi. Polyconic Projection vii. International Map Projection (Modified Polyconic)	02
4	Cylindrical Projections	i. Mercator's Projection ii. Universal Transverse Mercator (UTM) Projection	02
5	Conventional Map Projections	i. Mollweide Projection ii. Sinusoidal Projection	02

Graphical construction, properties and uses of following projections (2 exercise of each)

Reference books

- **Asis Sarkar (2015):** Practical Geography, A Systematic Approach, Orient Black Swan
- **Maling, DH. (1973):** Coordinate systems and map projections, George Philip, London.
- **Richardus, P. and Adler Ron, K. (1972):** Map projections, North Holland publ. Co., Amsterdam.
- **Saha, P. and Basu, P. (2007):** Advanced Practical Geography, Books and Allied (P) Ltd. Kolkatta.
- **Steers, J.A. (1970):** An Introduction to Study of Map Projections. University of London Press Ltd., London.

Semester II

Course: GGUP-134:Practical of Statistical Techniques for Geography

No. of Credits: 04 No. of Periods: 60

Topic No.	Topic	Sub topics	Periods (3 hours)
1	Introduction to Statistical Techniques in Geography	i. Introduction and applications of statistical techniques in Geography ii. Types of statistics: descriptive and inferential statistics iii. Geographical data a) Primary and secondary data b) Spatial and temporal data c) Discrete and continuous data d) Grouped and ungrouped data iv. Scales of measurement: nominal, ordinal, interval and ratio	01
2	Descriptive Statistics	i. Introduction to descriptive statistics ii. Central tendency: mean, mode, median iii. Dispersion: variance and standard deviation iv. Skewness and kurtosis (Calculations of above parameters for ungrouped and grouped data)	03
3	Probability and Probability Distributions	i. Introduction to probability ii. The Normal Probability Distribution iii. The Binomial Probability Distribution iv. The Poisson Probability Distribution	03
4	Inferential Statistics	i. Introduction to inferential statistics ii. Population and sample iii. Hypothesis testing: Null and alternate hypothesis iv. The Chi-square test (Two sample case) v. Student's 't' test (Two sample tests) vi. ANOVA (Analysis of variance)/ F ratio test	05
5	Correlation and Regression Analysis	i. Introduction to bi-variate correlation and regression ii. The product-moment correlation coefficient iii. Significance testing in correlation analysis iv. Linear regression equation v. Exponential regression equation vi. Power-law regression equation vii. Concept of residuals and explained variance	05
6	Time Series Analysis	i. Introduction and definition of time series ii. Applications of time series analysis iii. Components of time series iv. Calculation and plotting of moving averages (3 and 5) v. Curve fitting by method of least squares	02

		i. Collection of primary and/or secondary data by fieldwork or field visit	01
7	Fieldwork and Data Collection	ii. Analysis of data by using appropriate statistical technique(s)	
		iii. Report writing	

Reference Books:

- **AsisSarkar (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.
- **Norcliffe, G.B. (1977):** Inferential Statistics for Geographers, Hutchinson, London.
- **Rogerson, P.A. (2015):** Statistical Methods for Geography, SAGE Publication, London.
- **Wheller, D., Shaw, G. and Barr, S. (2010):** Statistical Techniques in Geographical Analysis, David Fulton, Routledge, New York.
- **Yeats, M. H. (1974):** An Introduction to Quantitative Analysis in Human Geography.