Rayat Shikshan Sanstha's

SADAGURU GADAGE MAHARAJ COLLEGE KARAD

Accredited By NAAC with 'A+' Grade

An Autonomous College

Department of Geography

[Affiliated to Shivaji University, Kolhapur]

Revised Syllabus (CBCS) (as per NEP 2020)

M.A./M.Sc. in Geography (2 Years) (Level 8 & 9)

Implemented From…

Part I (Level 8): Academic Year 2023-24 onwards

(i.e., from June 2023)

Choice Based Credit System with Multiple Entry and Multiple Exit Option (NEP – 2020)
M.A./M.Sc. Geography Programme Structure
M.A./M.Sc. Part – I (Level 8)

Sr. No.	Course Code	Teaching Scheme			Examination Scheme					
		Theory and Practical			University Assessment (UA)			Internal Assessment (IA)		
		Lectures (Per week)	Hours (Per week)	Credit	Maximum Marks	Minimum Marks	Exam. Hours:Min	Maximum Marks	Minimum Marks	Exam. Hours
SEMESTER-I (Duration- Six Months)										
1	N-GEOC22-21	4	4	4	80	32	3	20	8	1
2	N-GEOC22-22	4	4	4	80	32	3	20	8	1
3	N-GEOC22-23	4	4	4	80	32	3	20	8	1
4	N-GEOO22-21	4	4	4	80	32	3	20	8	1
5	N-GEOP22-21	4	8	4	100	40	5	--	--	--
6	N-GEOP22-22	2	4	2	50	20	2:30	--	--	--
Total (A)		**--**	**28**	**22**	**470**	**--**	**--**	**80**	**--**	**--**
SEMESTER-II (Duration- Six Months)										
1	N-GEOC22-24	4	4	4	80	32	3	20	8	1
2	N-GEOC22-25	4	4	4	80	32	3	20	8	1
3	N-GEOO22-22	4	4	4	80	32	3	20	8	1
4	N-GEOP22-23	4	8	4	100	40	5	--	--	--
5	N-GEOP22-24	2	4	2	50	20	2:30	--	--	--
6	N-GEOFP22-21	4**	8**	4	60	24	3	40	16	*
Total (B)		**--**	**32**	**22**	**450**	**--**	**--**	**100**	**--**	**--**
Total (A+B)				**44**	**920**	**--**	**--**	**180**	**--**	**--**

Note(s):

•Student contact hours per week : **24** / **28** Hours (Min.)	•Total Marks for M.A./M.Sc.-I: **1100**
•Theory Lectures **60** Minutes Each and Practical Lectures **120** Minutes Each	•Total Credits for M.A./M.Sc.-I (Semester I & II) : **44**
•MT- Mandatory Theory Course •ET- Elective Theory Course •MP- Mandatory Practical Course •EP- Elective Practical Course •#FP/JT- Field Project / On Job Training (**during vacation) •RP- Research Project	• Theory and Practical examination will be conducted at the end of respective semester. •Practical courses may be divided into sub-sections. •*Duration of practical examination as per respective BOS guidelines. •***Separate passing is mandatory for Theory and Practical examination as well as University and Internal assessment.***
•Requirement for Entry at Level 8: Completed all requirements of the Bachelor's Degree (Level 7) with Geography as principal / major subject.	
•Exit Option at Level 8: Students can exit after Level 8 with Post Graduate Diploma in Geography if he/she completes the course equivalent to minimum of 44 credits.	

Choice Based Credit System with Multiple Entry and Multiple Exit Option (NEP – 2020)
M.A./M.Sc. Geography Programme Structure
M.A./M.Sc. Part – II (Level 9)

Sr. No.	Course Code	Teaching Scheme			Examination Scheme					
		Theory and Practical			University Assessment (UA)			Internal Assessment (IA)		
		Lectures (Per week)	Hours (Per week)	Credit	Maximum Marks	Minimum Marks	Exam. Hours	Maximum Marks	Minimum Marks	Exam. Hours
SEMESTER-III (Duration- Six Month)										
1	N-GEOC22-26	4	4	4	80	32	3	20	8	1
2	N-GEOC22-27	4	4	4	80	32	3	20	8	1
3	N-GEOO22-23	4	4	4	80	32	3	20	8	1
4	N-GEOP22-25	4	8	4	100	40	5	--	--	--
5	N-GEOP22-26	2	4	2	50	20	2:30	--	--	--
6	N-GEORP22-21	4	8	4	80	32	4	20	8	*
Total (C)		--	**32**	**22**	**470**	--	--	**80**	--	--
SEMESTER-IV (Duration- Six Month)										
1	N-GEOC22-28	4	4	4	80	32	3	20	8	1
2	N-GEOC22-29	4	4	4	80	32	3	20	8	1
3	N-GEOO22-24	4	4	4	80	32	3	20	8	1
4	N-GEOP22-27	4	8	4	100	40	5	--	--	--
5	N-GEORP22-22	6	12	6	120	48	6	30	12	*
Total (D)		--	**32**	**22**	**460**	--	--	**90**	--	--
Total (C+D)				**48**	**930**	--	--	**170**	--	--

Note(s):

•Student contact hours per week : **32** Hours (Min.)	•Total Marks for M.A./M.Sc.-II: **1100**
•Theory Lectures **60** Minutes Each and Practical Lectures **120** Minutes Each	• Total Credits for M.A./M.Sc.-II (Semester III & IV): **44**
•MT- Mandatory Theory Course •ET- Elective Theory Course •MP- Mandatory Practical Course •EP- Elective Practical Course •FP/OJT- Field Project / On Job Training •RP- Research Project	• Theory and Practical examination will be conducted at the end of respective semester. •Practical courses may be divided into sub-sections. •*Duration of practical examination as per respective BOS guidelines. •***Separate passing is mandatory for Theory and Practical examination as well as University and Internal assessment.***
•Requirement for Entry at Level 9: **1) Completed all requirements of the relevant Post Graduate Diploma (Level 8) in Geography** **2) Bachelor's Degree (Honours / Research) (Level 8) in Geography**	
•Exit Option at Level 9: Students can exit after Level 9 with Master's Degree in Geography if he/she completes the course equivalent to minimum of 88 credits.	

Programme and Course Guidelines:

1. **Title of the Course:** M.A./M.Sc. in Geography (with multiple entry and exit option).
2. **Year of Implementation:** Revised syllabus will be implemented from academic year 2023-24.
3. **Programme Duration:** The M.A./M.Sc. programme duration is of two years comprising of four semesters. Each semester spanning for 6 months of minimum 120 working days (minimum 90 teaching days).
4. **Scheme of Examination for Internal Assessment** and Requirement before appearance for University Assessment:

Course Type	Total Internal Assessment Marks	Class Test	Seminar Presentation	Assignment	Project Reports	Study Tour Report	Supervisor's Report
Theory	20	10	10	Optional	--	--	--
Practical – 4 Credits	Nil	--	--	Required	--	--	--
Practical – 2 Credits	Nil	--	--	Required	--	--	--
Field Project / On Job Training – 4 Credits	40	--	Required	--	Required	--	40
Research Project – 4 Credits	20	--	Required	--	Required	Required	20
Research Project – 6 Credits	30	--	Required	--	Required	--	30

5. **Scheme of Examination and Nature of Question Paper for University Assessment:**

I. Nature of Theory Question Paper (80 Marks):

Question No.	Type of Question (Word limit)	Number of Questions to be Asked	Number of Questions to be Answered	Marks per Question	Total Marks
Q1.	Objective type (MCQ)	08	08	02	16
Q2.	Short Answer	04	04	04	16
Q3.	Short Notes	03	02	08	16
Q4.	Long Answer/ Essay type	02	01	16	16
Q5.	Long Answer/ Essay type	02	01	16	16
Total = 05	--	--	--	--	**80**

II(a). Nature of **Practical Question Paper** for Major Practical (**100 Marks**) Assessment:

Question No.	Type of Question/ Assessment	Marks
Q1	Practical/ Lab Assessment	20
Q2	Practical/ Lab Assessment	20
Q3	Practical/ Lab Assessment	20
Q4.	Practical/ Lab Assessment	15
Q5.	Practical Assignment/ Journal	15
Q6.	Viva-voce	10
Total = 06	--	**100**

II(b). Nature of **Practical Question Paper** for Minor Practical (**50 Marks**) Assessment

Question No.	Type of Question/ Assessment	Marks
Q1.	Practical/ Lab Assessment	20
Q2.	Practical/ Lab Assessment	15
Q3.	Practical Assignment/ Journal	8
Q4.	Viva-voce	7
Total = 04	--	**50**

III. Scheme of Examination for **Field Project / Job Training (60 Marks)**

Question No.	Type of Question/ Assessment	Marks
Q1.	Seminar Presentation	20
Q2.	Evaluation of Project Report/ Job Report	20
Q3.	Viva-voce	20
Total = 03	--	**60**

IV(a). Scheme of Examination for **Research Project –I (80 Marks)**

Question No.	Type of Question/ Assessment	Marks
Q1.	Seminar Presentation	20
Q2.	Evaluation of Project Report	25
Q3.	Evaluation of Study Tour Report	15
Q4.	Viva-voce	20
Total = 04	--	**80**

IV(b). Scheme of Examination for **Research Project –II / Dissertation (120 Marks)**

Question No.	Type of Question/ Assessment	Marks
Q1.	Seminar Presentation	30
Q2.	Evaluation of Project Report	60
Q3.	Viva-voce	30
Total = 03	--	**120**

*Nature of question paper may be different than specified here in case of online assessment.

Course Structure (CBCS): M.A./M.Sc. Geography Part-I (Leve-8) and Part – II (Level-9)

Course Type	Subject Code	Subject/ Title of Paper	Teaching Hrs/Week	Credits
		Semester - I		
Mandatory Theory	N-GEOC22-21	Geomorphology	4	4
	N-GEOC22-22	Principles of Climatology	4	4
	N-GEOC22-23	Economic Geography	4	4
Elective Theory	N-GEOO22-21	Population Geography and Human Resource Development	4	4
Mandatory Practical	N-GEOP22-21	Research Methodology in Geography	8	4
	N-GEOP22-22	Computer Applications in Geography	4	2
		Total Credits Cumulative		**22 (22)**
		Semester - II		
Mandatory Theory	N-GEOC22-24	Advanced Cartography and Surveying	4	4
	N-GEOC22-25	Climate Change and Disaster Management	4	4
Elective Theory	N-GEOO22-22	Fundamentals and Applications of GIS and GPS	4	4
Elective Practical	N-GEOP22-23	Introduction to GIS Software and GPS	8	4
Mandatory Practical	N-GEOP22-24	Advanced Surveying	4	2
Field Project / On Job Training	N-GEOFP22-21	Field Project / On Job Training (during vacation)	8	4
		Total Credit (Cumulative)		**22 (44)**
		Semester - III		
Mandatory Theory	N-GEOC22-26	Geohydrology and Oceanography	4	4
	N-GEOC22-27	Fundamentals of Remote Sensing and DIP	4	4
Elective Theory	N-GEOO22-23	Geography of Environment	4	4
Mandatory Practical	N-GEOP22-25	Photogrammetry, Remote Sensing and DIP	8	4
	N-GEOP22-26	Statistical Techniques in Geography	4	2
Research Project	N-GEORP22-21	Research Project – I	8	4
		Total Credit (Cumulative)		**22 (66)**
		Semester - IV		
Mandatory Theory	N-GEOC22-28	Regional Planning and Development	4	4
	N-GEOC22-29	Development of Geographical Thought	4	4
Elective Theory	N-GEOO22-24	Agricultural Geography	4	4
Elective Practical	N-GEOP22-27	Geographical Data Representation Methods	8	4
Research Project	N-GEORP22-22	Research Project II (Dissertation)	12	6
		Total Credit (Cumulative)		**22 (88)**

7. Program Educational Objectives (PEOs):

1. To enhance students' ability to apply their specialized knowledge in the geographical domain.
2. To develop employability skills and competencies to serve the job requirements in the society.
3. Inspire students to develop the abilities among them to offer services in the entrepreneurial environment.
4. To cultivate the interest among students to conduct research activities in the discipline of Geography.

8. Programme Outcomes (POs):

1. Students will have comprehensive knowledge in the discipline of Geography.
2. They will have ability of making comprehensive analysis, interpret spatial problems, and suggest proper solutions by using theoretical, methodological, and instrumental knowledge of Geography.
3. Good employability skills as per current need of the society to compete in the competitive world.
4. They will have good understanding about proper utilization of natural resources through geographical knowledge.
5. Aware about the regional and national environmental issues, recent trends, and technological advancements in the discipline of Geography.
6. Develop research interest to solve critical and emerging societal issues related to geography and the surrounding environment.

N-GEOC22-21: Geomorphology

Course Outcomes (COs): *After completing the course, students will be able to*

1. *Understand the nature and scope of geomorphology and establish the relationship between the tectonism and geomorphology with the knowledge of interior of the Earth.*
2. *Look into the evolution of continents and ocean basins with continental drift theory.*
3. *Know the endogenetic and exogenetic forces controlling landform development with special reference to the denudation processes.*
4. *Verify the impact of dynamic agencies on denudation and their work.*
5. *Understand the cycle of erosion with different views with special reference to hill slope development.*
6. *See the application of geomorphology in the view of anthropogenic and environmental geomorphology.*

Unit-1: Fundamentals **15 Lectures**

Meaning nature and scope of geomorphology, Interior of the Earth, Earthquakes, Volcanoes and associated features, folding and faulting.

Unit-2: Concepts in Geomorphology **15 Lectures**

Evolution of Continents and ocean basins, Continental Drift theory of Wegener, Theory of Plate Tectonics. Geosynclinals theory of Kobber, Theory of Isostasy

Unit-3: Factors controlling landform development **20 Lectures**

Weathering, Erosion and Mass wasting. Landforms of Fluvial, Glacial, Coastal, Aeolian and Karst topography, Geographical Cycle of Davis, Hill Slope development, views of W.M. Davis, Walther Penck, Allen Wood and L.C. King.

Unit-4: Applied Geomorphology **10 Lectures**

Anthropogenic Geomorphology, Environmental Geomorphology and recent trends in Geomorphology.

Reference:

1. Allaby, Michael (2008): Oxford Dictionary of Earth Science, Oxford University Press, New York.
2. Bloom, A.L. (1991): Geomorphology, 2nd Ed Englewood Cliffs, M.J. Prentice Hall.
3. Chorley, R.J. Schumm,S.A. & Sugden, D.E. (1985): Geomorphology, Methuen & Co. Ltd., London, New York.
4. Brierley, G.J. & Fryirs, K.A. (2005): Geomorphology and River Management, Blackwell Publishing, Oxford UK.
5. Briggs, K. (1985): Physical Geography Process and System, Hodder and Stoughton, London.
6. Christopherson, R.W. (1995): Elemental Geosystems: A Foundation in Physical Geography, Prentice Hall Englewood Cliffs, New Jersey.
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12. Lobeck, A.K. (1939): Geomorphology, McGraw Hill, New York. .
13. Moor, W.G. (1949): A Dictionary of Geography, Penguin Books, England.
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15. Robinson, Harry (1969): Morphology and Landscape, University Tutorial Press Ltd. London.
16. Singh, Savindra (1998): Geomorphology, Prayag Pustak Bhavan ,Allahabad.
17. Singh, Savindra (1991): Environmental Geography, Prayag Pustak Bhavan ,Allahabad.

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19. Strahler, A.N (1969): Physical Geography. John Wiley & Sons Inc., NewYork.
20. Thomas, M.F. (1974): Tropical Geomorphology, Macmillan, London.
21. Thornbury, W.D. (1969): Principles of Geomorphology, Wiley Easterrn Ltd. New Delhi.
22. Wadia, D.N. (1993): Geology of India, Tata McGraw Hill Edition, New Delhi.
23. Worcester, P. G. (1948): Textbook of Geomorphology, Princeton, D.Van, Nortrand.

Websites:

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2. https://pubs.usgs.gov/gip/interior/
3. https://earthobservatory.sg/earth-science-education/earth-science-faqs/geology-and-tectonics/why-is-the-interior-of-the-earth-hot
4. https://www.amnh.org/exhibitions/permanent/planet-earth/why-are-there-ocean-basins-continents-and-mountains/plate-tectonics/earthquakes-and-the-earth-s-internal-structure
5. https://www.scientificamerican.com/article/why-is-the-earths-core-so/
6. https://www.sciencesfp.com/uploads/2/1/5/9/21597828/unit_8_-_external_geodynamics.pdf
7. https://ncert.nic.in/ncerts/l/kegy206.pdf
8. https://www.nsf.gov/geo/acgeo/geovision/nsf_acgeo_dynamic-earth-2015-20.pdf
9. http://epgp.inflibnet.ac.in/epgpdata/uploads/epgp_content/earth_sciences/the_dynamic_earth/17._weathering_processes/et/995_et_et17.pdf
10. https://onlinelibrary.wiley.com/doi/abs/10.1002/9781118786352.wbieg0144#:~:text=Applied%20geomorphology%20is%20a%20field,to%20problems%20of%20geomorphic%20context.
11. http://epgp.inflibnet.ac.in/epgpdata/uploads/epgp_content/S000017GE/P001786/M025400/ET/1512631234UGCModuleofAppliedGeomorphologyfinal.pdf
12. https://link.springer.com/10.1007%2F0-387-30842-3_29
13. https://www.oxfordreference.com/display/10.1093/oi/authority.20110803095420104;jsessionid=6FD16AF9431B975F3340000B3800ABDB
14. https://www.sciencedirect.com/journal/geomorphology
15. https://www.researchgate.net/publication/314239593_Applied_Geomorphology
16. https://www.nature.com/subjects/geomorphology

N-GEOC22-22: Principles of Climatology

Course Outcomes (COs): *After completing the course, students will be able to*

1. *Distinguish the weather and climate with an understanding of structure and composition of Atmosphere;*
2. *Understand the variations of weather systems in terms of Stability and Instability of atmosphere;*
3. *Enable the students to understand the vertical and horizontal distribution of atmospheric air;*
4. *Get complete information about Atmospheric Disturbances in terms of cyclones and anti-cyclones;*
5. *Understand the regional and seasonal variations of weather systems in India;*
6. *Know the significance of synoptic Climatology in pollution studies and navigation*

Unit - 1: **15 Lectures**

Introduction to Climatology: Significance of Climatology, Modern Climatological studies, Origin and evolution of the earth's atmosphere, Structure and Composition of Atmosphere, Insolation, Heat transfer-Radiation, Convection and conduction, Terrestrial heat balance.

Unit - 2: **15 Lectures**

Moisture in the Atmosphere: Changes of state, Processes that cause changes of state, Humidity, Humidity measurements, Adiabatic temperature change in atmosphere, Stability and Instability of atmosphere, Condensation- Clouds and fogs, Precipitation - precipitation processes, types and forms.

Unit - 3: **15 Lectures**

Motion in the Atmosphere: Air Pressure, Pressure measurement and distribution, Factors affecting wind, Pressure belts, Classification of Wind, Planetary winds, Monsoon and Local winds, Air Masses, Classification and modifications of Air Masses.

Unit - 4: **15 Lectures**

Atmospheric Disturbances: Fronts: Characteristics and types, Tropical Cyclones, Anticyclones, Thunderstorms, Tornadoes, Hurricanes, Water spouts; Weather forecasting and application of meteorological satellites with special reference to India. Application of Synoptic Climatology in pollution studies and navigation.

References:

Books & Reports:

1. **Aguado, E.,** and Burt, J.E. **(2013)**: *Understanding Weather and Climate*, Pearson, New York, 552pp.
2. **Anderson, T. R.,** Hawkins, E., and Jones, P. D. **(2016).** CO_2, the greenhouse effect and global warming: from the pioneering work of Arrhenius and Callendar to today's earth system models. Endeavour, 40(3):178–187.
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19. **Williams Sellers, (2014): Physical Climatology,** New India Publishing Agency, 280 pp.

Journals:

Bulletin of the American Meteorological Society (https://journals.ametsoc.org/toc/bams/current)

Climate Dynamics (https://link.springer.com/journal/volumesAndIssues/382)

International journal of Climatology (https://rmets.onlinelibrary.wiley.com/journal/10970088)

Journal of Climate (https://journals.ametsoc.org/toc/clim/current)

Nature Climate Change (https://www.nature.com/nclimate/)

Weather and Climate Extremes (https://www.sciencedirect.com/journal/weather-and-climate-extremes)

Mausam (http://metnet.imd.gov.in/imdmausam/)

N-GEOC22-23: Economic Geography

Course Outcomes (COs): *After completing the course, students will be able to*

- *Understand the concepts and basis of economic processes*
- *Get acquainted with theories and models in economic geography*
- *Get comprehensive knowledge of World energy resources, situation and distribution*
- *Know about the Nature, scope and Principles of Industrial Geography*
- *Understand transport and Trade policies of country*
- *Get detail knowledge of economic power determinants of country and able to analyze the economic development of country.*

Unit-1: Basics of Economic Geography **15 Lectures**

Nature and scope; Approaches to the study of economic geography; Basis of economic processes: Production, exchange & consumption, Classification and characteristics of economic activities. Demand, supply, elasticity, Determinants of national income, investment, inflation, unemployment, risk and uncertainty, long-term investment planning, Special Economic Zones.

Unit-2: Energy Resources **10 Lectures**

Concept of resources, Classification of resources, Renewable & Non-renewable energy resources, World energy situation and distribution; Sources of Energy: Coal, Oil, Natural gas and Nuclear energy, OPEC-energy crisis.

Unit- 3: Industrial Geography **15 Lectures**

Nature and scope of Industrial Geography, Factors of Industrial Location, Principles of Industrial Location: – Profit maximization, Least cost location- A. Weber & A. Losch- industrial location theories, Rostow's model, Industrial regionalization; World industries: locational patterns and problems; New industrial policies of India.

Unit-4: Transportation & Trade **20 Lectures**

Modes of transportation, Road Network analysis, Accessibility, connectivity and Modern geospatial applications in road network, Interregional and Intraregional: Ullman's tried- Complementarily- Intervening Opportunity- Transferability, Trade Policy; Export processing zones, International Trade Characteristics, patterns of world trade, Regional Trade blocks EEC, EFTA, & WTO.

References:

1. Alexander J.W. (1976): Economic Geography, Prentice Hall of India. New Delhi.
2. Alexanderson G. (1988): Geography of manufacturing, Prentice Hall of India. New Delhi.
3. Berry, Conkling & Ray (1988): Economic Geography Prentice Hall of India, New Jersey.
4. Hurst Elliott (1986): Geography of Economic Behaviour, Unwin, London.
5. Johnson R.J. & Taylor D.J. (1989): A world in crisis, Basil-Blackwell, Oxford.
6. Losch (1954): Economics of Location, Yale University Press New York.
7. Redcliff, M. (1987): Development & the environmental crisis. Methuen. London.
8. Sinha B.N.(1971): Industrial geography of India
9. Watts H.D. (1987): Industrial Geography, Longman scientific and Technical, New York.
10. Haggett, Peter: Modern Synthesis in Geography.
11. Robinson H & Bamford C. G. (1978): Geography of Transport, Macdonald & Evans USA.
12. Misra R. P.: Regional Planning, concepts, New Delhi.
13. Jones & Darkenwald : Economic geography

N-GEOO22-21: Population Geography and Human Resource Development

Course Outcomes (COs): *After completing the course, the students will develop an aptitude to:*

1. *Infer factors influencing population distribution and growth;*
2. *Compute and explore fertility, mortality and migration.*
3. *Analyse the population-resource regions and discover problems arising due to over and under population.*
4. *Understand and create awareness about provincial aspects of gender equity, status of women, social well-being and quality of life.*
5. *Acquire skill to describe regional patterns of population composition.*
6. *Obtain expertise to compute Human Development Index for micro, meso and macro regions.*

Unit-1: Introduction **20 Lectures**

Meaning, nature and scope of Population Geography; Population Geography and Demography; Sources of population data – Census, Sample surveys and vital statistics; Population dynamics: Population distribution and growth - measures, patterns and determinants with reference to World, India and States; Fertility, Mortality - Concepts; Indices, Trends and Determinants -India; Migration- Types, Determinants and consequences; Measures and methods of estimations.

Unit-2: Population Theories **10 Lectures**

Theories of population: Malthus, Marx, Sadler, Demographic Transition Model; Migration theories: Ravenstein and Everette Lee; Epidemiological Transition.

Unit-3: Characteristics of population resource **10 Lectures**

Characteristics of population composition and change: India and States – age, sex, rural-urban, occupational structure, and educational levels; Over, under & optimum population; Population resource regions of the world.

Unit-4: Human Development and Population Policies **20 Lectures**

Human development Index: Concepts, Pillars, Approaches; Human development Patterns World & India, Gender Equity, Social well-being and quality of life; Status of women – social, economic and health; Population Policies in developed and developing nations, National Population Policy of India.

References:

Books & Reports:

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Journals:

Demography: https://link.springer.com/journal/13524

International Migration Review: https://journals.sagepub.com/home/mrx

Journal of Population Research: https://link.springer.com/journal/12546

Population and Environment: https://link.springer.com/journal/11111

Population Bulletin: https://www.prb.org/population-bulletins/

Population Development Review: https://onlinelibrary.wiley.com/loi/17284457

Population, Space, and Place: https://onlinelibrary.wiley.com/journal/15448452

Population Studies: https://www.tandfonline.com/loi/rpst20

Studies in Family Planning: https://onlinelibrary.wiley.com/journal/17284465

The Professional Geographer: https://www.tandfonline.com/loi/rtpg20

Useful Websites:

Census of India: http://censusindia.gov.in/

National Commission for Women: http://ncwapps.nic.in/default.aspx

Population Council: https://www.popcouncil.org/

Population Division of United Nations: https://www.un.org/en/development/desa/population/index.asp

Population Reference Bureau: www.prb.org

The World Bank: www.worldbank.org

United Nations Development Program: http://hdr.undp.org/en/

(Practical)

MP-101: Research Methodology in Geography

Course Outcomes (COs): *After completing this course, the students will develop skill to:*

1. *Identify the objectives and significance of research in geography;*
2. *Prepare schedule and questionnaire in geography;*
3. *Collect data of physical and human elements;*
4. *Tabulate data, formulate research design and represent data by using most appropriate methods;*
5. *Effective writing, maintaining research ethics and academic integrity;*
6. *Write abstracts, thesis, project report and research papers*

Unit-I: Research Methodology: An Introduction **30 Hrs.**

Exercise(s):

1-3: Definition, meaning, objectives and significance of research, approaches in research.
4: Defining research problem
5: Meaning and Need of research design
6-7: Sampling methods and sampling size
8: Concept of hypothesis

Unit-2: Data collection and Preparation **30 Hrs.**

Exercise(s):

9-11: Data types, Data sources and data collection methods
12-13: Preparation of schedule & questionnaire
14-15: Concept of qualitative and quantitative analysis of data
16-17: Presentation and interpretation of data

Unit-3: Effective Research Writing **30 Hrs.**

Exercise(s):

18-19: Literature review; writing styles and manuals
20-22: Writing of abstracts, project report and research papers
23-24: Referencing system, references, webliography, bibliography
25-26: Footnotes, glossary, appendices

Unit-4: Recent Trends in Geographical Research and Publication **30 Hrs.**

Exercise(s):

27-28: Recent trends in Physical and Human Geographical research
29-30: Applications of Computer, Remote Sensing and GIS in Geographical research
31-32: Publication metrics: h-index, g-index, i10index, altimetric, citation and measuring impact of research
33-34: Research publishers and Open access publishing: Journal finders Elsevier, Springer
35-36: Research ethics in publication, Predatory publishers & journals

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2. **Bhattacharyya,** D. K. **(2005)**: *Research Methodology*, Excel Books, New Delhi.
3. **Bryman**, Allan **(2008)**: *Social research methods* Oxford University Press, Oxford.
4. **Dautherty**, R (**1969**): Science in Geography Data Collection (2) 2. Board, Christopher (Ed) (1969): Progress in Geography Volume 1-8. Edward, Oxford.
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6. **Denzin, N.K**. and Lincoln, Y.S. (eds.) **(2000)**: *Handbook of Qualitative Research*, Sage Publications, Thousand Oaks, CA.
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Useful Web Resources:

Elsevier Journals: https://www.elsevier.com
Google Scholar: https://scholar.google.co.in/
Web of Science: https://clarivate.com/products/web-of-science/
Scopus: https://www.scopus.com/home.uri
JSTOR: https://www.jstor.org/
Directory of Open Access Journals (DOAJ): https://doaj.org/
Science Open: https://www.scienceopen.com/
Microsoft Academic: https://academic.microsoft.com/home

MP-102: Computer Applications in Geography

(Practical)

Course *Outcomes (COs):* *After completing the course, students will be able to*

1. *Learn the representation of geographic data using various computational methods;*
2. *Develop writing, editing, and presentation skill for representation of geographical information;*
3. *Compute statistical parameters with the help of computer;*
4. *Prepare and design maps and graphs with the help of computer software;*
5. *Apply computational techniques relevant in the discipline of Geography;*
6. *Know about sources and uses of online educational resources and e-learning methods;*

Unit-1: Computer hardware and software; Writing / formatting of texts, graphs, tables, and references using MS word; Preparation of power point presentation using MS power point; Use of MS excel; Presentation and analysis of geographic data using graphs, charts, maps with the help of computer.

35 Hrs.

Practical Exercise(s):

1: Demonstration of computer hardware, useful software and their uses.

2: Writing / formatting of text paragraphs.

3: Inserting, creating, and editing of text box, smart art, pictures and graphs.

4: Construction and editing of tables.

5: Reference writing styles using MS word with examples.

6: Preparation of MS power point presentation.

7: Data management using MS Excel.

8-12: Presentation and analysis of geographic data using MS Excel – preparation of graphs/charts (bar graph, line graph, pie diagram, scatter diagram and trend line).

13: Map editing and labeling.

Unit-2: Computer, email and password security; Online data storage and management using online storage facilities; Preparation and editing of google forms; Browsing of online educational resources; E-learning.

25 Hrs.

Practical Exercise(s):

14: Computer, email and password security.

15: Storing and retrieving of data/ documents using online data storage facilities (Google Drive, OneDrive etc.).

16: Preparation of online questionnaire / online survey through google forms.

17: Identification, browsing, and storing of online educational resources.

18: Comprehensive browsing and listing of useful geographical websites.

19: E-learning objectives, methods, and listing of open online e-learning websites.

20-21: E-learning through e-content and open online courses: e-PG Pathshala, digital library, MOOCS – SWAYAM.

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2. **Easttom C. (2020)**: *Computer Security Fundamentals*, Pearson, 623pp.
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5. **Mather, P.M. (1991)**: *Computer Applications in Geography*, Wiley, New York, USA, 270pp.
6. **McGrew, J.C.,** and Monroe, C.B. **(2009)**: *An Introduction to Statistical Problem Solving in Geography (2nd Ed.)*, Waveland Pr Inc, 254pp.
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e-PG Pathshala: https://epgp.inflibnet.ac.in/

MOOCS - NPTEL: https://nptel.ac.in/

MOOCS - SWAYAM: https://swayam.gov.in/

National Digital Library of India: https://ndl.iitkgp.ac.in/

Shivaji University Library (E-Resources): http://www.unishivaji.ac.in/library/E-Resources

MT-201: Advanced Cartography and Surveying

Course Outcomes (COs): *After completing the course, students will be able to*

1. *Understand basic principles of cartography and surveying*
2. *Gain understandings of various cartographic methods and techniques*
3. *Acquaint with the skills of digital cartography*
4. *Identify sources and types of errors occurs during surveying*
5. *Get familiar with the basic aspects of linear, vertical and angular measurements of surveying.*

Unit - 1: Fundamentals of Cartography **15 Lectures**

Definition, nature and scope of cartography, Basics of geodesy, Scale- definition, types & importance, Concept of datum- vertical and horizontal, Co-ordinate systems- geographical and projected, Map- definition, types and significance, Cartographic methods and techniques for representation of data.

Unit - 2: Digital Cartography **20 Lectures**

Introduction to digital cartography, Manual cartography vs. Digital cartography, Cartographic data and its sources, Cartographic database, Design principles of cartography, Map design, Symbolization, Visualization and generalization, Digital cartography- hardware and software, Advantages and disadvantages, Applications of digital cartography.

Unit - 3: Fundamentals of Surveying **10 Lectures**

Definition, classification and principles of surveying, Nature of surveying work- field work and office work, Sources and types of errors, Precision and accuracy, Units of measurements.

Unit - 4: Surveying Measurements **15 Lectures**

Linear measurement-types of ranging, Methods-approximate, direct, optical and electronic, Errors and applications, Angular measurement-types of measured angles, Compass, Meridian, Bearings and azimuths, Errors, Corrections and precautions, Vertical measurement-types and methods of leveling, Contouring- definition, characteristics, methods and interpolation.

References:

1. Bailey, T. and Gatrell, A. C. (1995): Interactive Spatial Data Analysis. Longman, Harlow.
2. Dorling, D. and Fairborn, D. (1997): Mapping. Ways of Representing the World. Longman, Harlow.
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4. Fraser Taylor, D.R. (1980): The Computer in Contemporary Cartography. John Wiley and Sons, New York.
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25. Thrower, N. (1996): Maps and Civilisation. Cartography, Culture and Society. University of Chicago Press,Chicago.
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Websites:

Indian Institute of Surveying & Mapping: http://www.iism.nic.in/
Survey of India Department of Science & Technology: http://www.surveyofindia.gov.in/
Indian National Cartographic Association: https://incaindia.org/
Bhuvan Indian Geo Platform of ISRO: https://bhuvan.nrsc.gov.in/

MT-202: Climate Change and Disaster Management

Course Outcomes (COs): *After completing the course, students will be able to*

1. *Recognize the importance of climate on human life;*
2. *Identify and categorize climate types and climatic regions of the world;*
3. *Get comprehensive knowledge about causes and impacts of atmospheric pollution, GHGs emission, ozone layer depletion, acid rain and el-nino;*
4. *Know about the history, recent trends, impacts and dynamics of climate change on earth;*
5. *Assess future risks of climate change and the adaptation and mitigation options;*
6. *Understand causes, consequences and vulnerabilities of various natural and man-made disasters;*
7. *Plan for prevention, preparation and mitigation of disasters;*

Unit - 1: Global Climate Change Issues and Impacts **24 Lectures**

History and relevance of climate change studies; Role and impact of climate on human being and environment; Global climatic regions; Climatic classification of Koppen and Thornthwaite; World pattern of temperature and precipitation; Causes, impacts and society's response to change in air quality and atmospheric pollution; Causes and impacts of greenhouse gas (GHGs) emission, ozone layer depletion, acid rain; El-nino and southern oscillation (ENSO).

Unit - 2: Paleoclimatology and Climate Change Observations **14 Lectures**

Paleoclimatology - climate dynamics and water balance with reference to evolution of the earth systems; General overview of the climate change – observed changes and its impacts; Recent trends of climate change and its impact on natural and human subsystems; Significant climate anomalies and extreme weather events; Future climate changes – risks and impacts; Adaptation and mitigation options of climate change.

Unit - 3: Natural Hazards and Disasters **12 Lectures**

Meaning and types of hazards and disasters; Causes and impacts of natural and man-made disasters (earthquake, volcanic eruption, landslides, avalanches, cyclones, floods, droughts, tsunamis, forest fire, nuclear, biological and chemical disasters); Disaster exposure and vulnerabilities in Maharashtra, India and the world.

Unit - 4: Disaster Management **10 Lectures**

Prevention and mitigation of disasters; Disaster preparedness and response plan; Disaster management cycle; Administration and multiple stakeholders' response to disaster management; Disaster management acts and regulations; Use of modern technologies for disaster management.

References:

Books & Reports:

1. **Abott, P.L. (2020)**: *Natural Disasters*. McGraw-Hill Education, USA, 560pp.
2. **Aguado, E.,** and Burt, J.E. **(2013)**: *Understanding Weather and Climate*, Pearson, New York, 552pp.
3. **Ahrens, C.D. (2008)**: *Essentials of Meteorology – An Invitation to the Atmosphere*, Thomson Learning, Belmont, 485pp.
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17. **Lutgens, F.K.,** and Tarbuck, E.J. **(2013)**: *The Atmosphere – An Introduction to Meteorology*. Prentice Hall, Boston, 506pp.
18. **Martin, R.E., (2018)**: *Earth's Evolving Systems – The History of Planet Earth*. Jones & Bartlett Learning, Burlington, USA, 615pp.
19. **McConnell, D.,** Steer, D., Knight, C., Owens, K., and Park, L. **(2008)**: *The Good Earth – Introduction to Earth Science*, McGraw Hill, New York, 536pp.
20. **Monroe, J.S.,** and Wicander, R. **(2009)**: *The Changing Earth – Exploring Geology and Evolution*, Brooks/Cole, Belmont, 735pp.
21. **Philander, S.G. (2008)**: *Encyclopedia of Global Warming and Climate Change*, Sage, London, 1283pp.
22. **Rohli, RV.,** and Anthony, J.V. **(2018)**: *Climatology*. Jones & Bartlett Learning, Burlington, USA, 418pp.
23. **Ruddiman, W.F. (2008)**: *Earth's Climate – Past and Future*, W. H. Freeman, New York, 388pp.
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26. **Strahler, A**. **(2011)**: *Introducing Physical Geography*, Wiley, New Jersey, 632pp.
27. ***World Development Report 2010: Development and Climate Change***, World Bank, Washington D.C., 417pp.

Research Journals:

Atmospheric Chemistry and Physics (https://www.atmospheric-chemistry-and-physics.net/index.html)
Atmospheric Environment (https://www.sciencedirect.com/journal/atmospheric-environment)
Bulletin of the American Meteorological Society (https://journals.ametsoc.org/toc/bams/current)
Climatic Change (https://link.springer.com/journal/volumesAndIssues/10584)
Climate Dynamics (https://link.springer.com/journal/volumesAndIssues/382)
Global Environmental Change (https://www.sciencedirect.com/journal/global-environmental-change)
International journal of Climatology (https://rmets.onlinelibrary.wiley.com/journal/10970088)
Journal of Climate (https://journals.ametsoc.org/toc/clim/current)
Mausam (http://metnet.imd.gov.in/imdmausam/)
Nature Climate Change (https://www.nature.com/nclimate/)
Nature Geoscience (https://www.nature.com/ngeo/)
Weather and Climate Extremes (https://www.sciencedirect.com/journal/weather-and-climate-extremes)
WIREs Climate Change (https://onlinelibrary.wiley.com/journal/17577799)

Websites:

India Meteorological Department: http://www.imd.gov.in
Intergovernmental Panel on Climate Change: https://www.ipcc.ch/
NASA-Climate Change and Global Warming: https://climate.nasa.gov/
NCDC-NOAA: https://www.ncdc.noaa.gov/sotc/
World Meteorological Organization: https://public.wmo.int/en

ET-201: Fundamentals and Applications of GIS and GPS

Course Outcomes (COs): *After completing the course, students will be able to*

1. *Understand the basic concepts of Geographical Information System and GPS.*
2. *Know various applications of GIS and GPS in various fields.*
3. *Familiar with modern techniques of geography.*
4. *Apply these skills in professional careers.*

Unit 1: Introduction to GIS **20 Lectures**

Definition of GIS, History and development of GIS, Components and Future of GIS, Types of Geographic data; Raster and Vector data model; Spatial data input: Digitization and Conversion; Point, line and polygon; Concept of Arc, node and vertices; Digitization errors; Topology and topological relationship.

Unit 2: GIS Analysis **12 Lectures**

Spatial analysis: Overlay and Buffer Analysis, Interpolation techniques in GIS; Network analysis; Terrain analysis: DEM, DTM and TIN; Data quality issues; Database Management system (DBMS); Types of attribute data, Relational Model, Normalization and SQL.

Unit 3: Introduction to GPS **12 Lectures**

Introduction to GPS; types of GPS System; Space, Control and User Segment; GPS satellite; Working principle of GPS; Source of GPS errors; Differential GPS; GNSS & GIS Integration, Applications of GPS.

Unit 4: Applications of Geospatial Technology **16 Lectures**

Geospatial Technology in Urban and Regional planning, Water resource management, Soil resource Management, Agricultural Management, Forestry and Environment, Land use/ and Land cover mapping, Natural hazards assessment.

References:

Books and Reports:

1. Adriaans, P., and D. Zantinge. 1996. Data Mining. New York: Addison-Wesley.
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Research Journals:

GeoInformatica
Journal of Geographic Information System
Journal of Geographical Sciences.
Geo-environmental Disasters
Geo- spatial Information Science
Agricultural Water Management
Land Use Policy

Websites:

https://www.esri.com/en-us/what-is-gis/overview
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http://webhelp.esri.com/arcgisdesktop/9.3/index.cfm?TopicName=Topology%20basics
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(Practical)

EP-201: Introduction to GIS Software and GPS

Course Outcomes (COs): *After completing the course, students will be able to*

1. *Familiarize with QGIS software and tools.*
2. *Apply Comprehensive knowledge of GIS software and GPS for analysis of geographical data and to solve real world problems*
3. *Understand the role of GIS as decision support system and to develop various model for GIS spatial analysis.*
4. *Examine the various functions of GPS for surveying and mapping.*
5. *Develop practical skills in spatial data acquisition, management, and analysis.*
6. *Learn to create and visualize maps using GIS techniques.*

Unit-1: Introduction to QGIS **30 Hrs.**

Exercise 1: Interface of QGIS
Exercise 2: Working with Projections
Exercise 3: Online GIS Data Sources

Unit-2: Basics of QGIS **30 Hrs.**

Exercise 4: Georeferencing: Toposheet & Image Registration
Exercise 5: Digitization of Map Data
Exercise 6: Working with WMS Data
Exercise 7: Working with Google Earth
Exercise 8: Making a Map Layout

Unit-3: Data Exploration **30 Hrs.**

Exercise 9: Data query: Spatial and Attribute
Exercise 10: Animating Time Series Data
Exercise 11: Interpolating Point Data
Exercise 12: Travel Time Analysis with Traffic Movement
Exercise 13: Service Area Analysis using Open Route Service

Unit-4: Introduction to GPS instrument **30 Hrs.**

Exercise 14: GPS instrument
Exercise 15: Basic functions
Exercise 16: GPS surveying: Setting of GPS coordinates, Waypoints demarcation, Area Calculation through GPS, Navigation by Mobile GPS application.
Exercise 17: Transfer of data in GIS software

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Web References:

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http://downloads.esri.com/support/documentation/ao_/698What_is_ArcGis.p
https://academy.autodesk.com/explore-and-learn
http://downloads.esri.com/support/documentation/ao_/698What_is_ArcGis

MP-203: Advanced Surveying

Course Outcomes (COs): *After completing the course, students will be able to*

1. *Familiar with various advance surveying methodologies*
2. *Develop practical skills as well as organisational and interpersonal abilities*
3. *Perform survey using advanced surveying instruments like theodolite, total station, DGPS and drone*
4. *Create a map based on a survey*

Practical Exercise(s):

Unit-I: **30 Hrs.**

Introduction to Levelling,

1. Concept and Mechanism.
2. Types of levelling instrument.
3. Dumpy level- parts of instrument- temporary and permanent adjustment.
4. Measurement, survey data collection and processing.
5. Preparation of contour map.

Introduction to Theodolite

6. Concept and mechanism.
7. Types of theodolite.
8. Components of theodolite, temporary and permanent adjustment.
9. Survey data collection, processing and mapping.

Unit-II: **30 Hrs.**

Introduction to Total station

10. Concept and mechanism.
11. Components of total station, adjustment and setting of instrument.
12. Survey data collection, processing and mapping.

Introduction to Differential GPS (DGPS)

13. Concept and mechanism.
14. Components of DGPS, adjustment and setting of instrument.
15. Survey data collection, processing and mapping.

Introduction to Drone surveying

16. Concept and mechanism.
17. Field planning, data collection, processing and mapping.

References:

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FP-201: Field Project

Course Outcomes (COs): *After completing the course, students will be able to*

1. *Carry out field project on their own;*
2. *Formulate project design and methodologies;*
3. *Organize and carry out field visits, collect field data and/or conduct review of literature;*
4. *Effective writing and dissemination of project output having scientific and/or social relevance.*

Duration: One month during vacation

Topic: Project topic should be related to finding, reporting and/or disseminating geographical knowledge having scientific and/or social relevance.

Total Contact Hours: 120 Hrs.

Note (s):

1. *Field project is applicable only to those students who are unable to find placement for on job training.*

2. *They have to work under the guidance of a supervisor to carry out the field project.*

3. *Students are expected to carry out field work and use primary data, analyse it and prepare / submit the project report for evaluation.*

4. *They are also expected to make a presentation on the project work details.*

(Project)

OJT-201: On Job Training

Course Outcomes (COs): *After completing the course, students will be able to*

1. *Improve their professional skills related to their employability;*
2. *Effectively manage the assigned workload and complete given tusk;*
3. *Learn new concept and improve their knowledgebase;*
4. *Do team work and manage on job practical difficulties.*

Duration: One month during vacation

Joining Report of On Job Training: Students are expected to join for their on job training with prior intimation to the department. They are expected to carry out work under the guidance of job supervisor.

On Job Training Placement: Students can join any institution/ corporation/ industry as per their choice but within the scope of the subject area.

Total Contact Hours: 120 Hrs.

Note (s):

1. *Students need to submit report of their work in prescribed format.*
2. *Internal assessment while on job training will be done by the job supervisor and need to be forwarded to the Department/ University.*