SHIVAJI UNIVERSITY, KOLHAPUR

Established: 1962
A^{++} Accredited by NAAC (2021) with CGPA 3.52

Structure and Syllabus in Accordance with

National Education Policy - 2020

(with Multiple Entry and Multiple Exit Option)

for the degree of

M.A./M.Sc. in Geography

(*with PG Diploma in Geography as an exit option*)

Department of Geography
Faculty of Science and Technology

Implemented From…

Part I (Level 6.0): Academic Year 2023-24 onwards
(i.e., from June 2023)

Part II (Level 6.5): Academic Year 2024-25 onwards
(i.e., from June 2024)

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1. Preamble:

The M.A./M.Sc. Programme in Geography is offered by the department of geography under the faculty of science and technology, Shivaji University, Kolhapur. It teaches students for post graduate degree in Geography from both social science and science stream. This programme is financially supported by the Govt. of Maharashtra. The department also receives research and infrastructure grants under various schemes of the Govt. of India. Utilizing the financial assistance received from various stakeholders the department has improved its infrastructure to provide better learning environment for the students.

It is a premier geography department in India, having a holistic academic curriculum in the discipline of Geography. The department also offers opportunities for enrolled students to participate for some discipline specific short term certificate and/or value added add on courses for upgrading their employability skills. Currently, the department is equipped with smart classroom, overhead LCD projection system, digital board, computer laboratory, Wi-Fi, state of art GIS laboratory with advanced and up-to-date mapping software, state of art instruments, a separate departmental library and meeting hall to provide students an effective learning environment.

Students enrolling for the programme are expected to have basic knowledge and understanding in Geography. This master degree course in Geography will focus to enhance students' ability to apply their specialized knowledge in the geographical domain to increase the employability skills and competencies to serve the job requirements in the society. This programme will inspire students to develop the abilities among them to offer services in the entrepreneurial environment. To cultivate the interest among students to conduct research activities in the discipline of Geography is another primary objective of the programme.

2. 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).

3. Eligibility for Admission:

For Level 6.0 (Part I):

Completed B.A./B.Sc. with Geography as principal / major subject from a recognized University/ Institution.

For Level 6.5 (Part II):

(i) Completed Post Graduate Diploma in Geography from a recognized University/ Institution. or

(ii) Completed Bachelor's Degree (Honours / Research) in Geography from a recognized University/ Institution.

4. Medium of Instruction: English

5. Programme Structure:

Structure in Accordance with National Education Policy – 2020
with Multiple Entry and Multiple Exit Options
M.A./M.Sc. (Geography) Part – I (Level 6.0)

Course Type	Course No. / Code	Teaching Scheme			Examination Scheme					
		Theory and Practical			University Assessment (UA)			Internal Assessment (IA)		
		Lectures+ Tutorial (Hours/week)	Practical (Hours/week)	Credit	Maximum Marks	Minimum Marks	Exam. Hours:Min	Maximum Marks	Minimum Marks	Exam. Hours
SEMESTER-I (Duration- Six Month)										
Major Mandatory	MMT-101	4	--	4	80	32	3	20	8	1
	MMT-102	4	--	4	80	32	3	20	8	1
	MMT-103	4	--	4	80	32	3	20	8	1
	MMPR-104	--	4	2	50	20	2:30	--	--	--
Major Elective	MET-105/106/107	4	--	4	80	32	3	20	8	1
Research Methodology	RM-108	--	8	4	100	40	5	--	--	--
Total (A)		**16**	**12**	**22**	**470**	--	--	**80**	--	--
SEMESTER-II (Duration- Six Month)										
Major Mandatory	MMT-201	4	--	4	80	32	3	20	8	1
	MMT-202	4	--	4	80	32	3	20	8	1
	MMPR-203	--	4	2	50	20	2:30	--	--	--
Major Elective	MET-204/205/206	4	--	4	80	32	3	20	8	1
	MEPR-207/208/209	--	8	4	100	40	5	--	--	--
OJT/FP	#OJT/FP-210	--	8**	4	60	24	3	40	16	*
Total (B)		**12**	**12+8****	**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**
•MMT- Mandatory Theory Course •MMPR- Mandatory Practical Course •MET- Elective Theory Course •MEPR- Elective Practical Course •RM- Research Methodology •#OJT/FP- On Job Training/ Field Project (**during vacation)	• Theory and Practical examination will be conducted at the end of respective semester. •Practical courses may be divided into sub-sections. •***Separate passing is mandatory for Theory and Practical examination as well as University and Internal assessment.***
•**Requirement for Entry at Level 6.0:** Completed B.A./B.Sc. (three year programme) with Geography as principal / major subject.	
•**Exit Option at Level 6.5: Students can exit after Level 6.5 with Post Graduate Diploma in Geography if he/she completes the course equivalent to minimum of 44 credits.**	

Structure in Accordance with National Education Policy – 2020
with Multiple Entry and Multiple Exit Options
M.A./M.Sc. (Geography) Part – II (Level 6.5)

Course Type	Course No. / Code	Teaching Scheme			Examination Scheme					
		Theory and Practical			University Assessment (UA)			Internal Assessment (IA)		
		Lectures+ Tutorial (Hours/week)	Practical (Hours/week)	Credit	Maximum Marks	Minimum Marks	Exam. Hours:Min	Maximum Marks	Minimum Marks	Exam. Hours
SEMESTER-III (Duration- Six Month)										
Major Mandatory	MMT-301	4	--	4	80	32	3	20	8	1
	MMT-302	4	--	4	80	32	3	20	8	1
	MMPR-303	--	8	4	100	40	5	--	--	--
	MMPR-304	--	4	2	50	20	2:30	--	--	--
Major Elective	MET-305/306/307	4	--	4	80	32	3	20	8	1
Research Project	RP-308	--	8	4	80	32	4	20	8	*
Total (A)		**12**	**20**	**22**	**470**	--	--	**80**	--	--
SEMESTER-IV (Duration- Six Month)										
Major Mandatory	MMT-401	4	--	4	80	32	3	20	8	1
	MMT-402	4	--	4	80	32	3	20	8	1
Major Elective	MET-403/404/405	4	--	4	80	32	3	20	8	1
	MEPR-406/407	--	8	4	100	40	5	--	--	--
Research Project	RP-408	--	12	6	120	48	6	30	12	*
Total (B)		**12**	**20**	**22**	**460**	--	--	**90**	--	--
Total (A+B)				**44**	**930**	--	--	**170**	--	--

Note(s):

•Student contact hours per week : **24** / **28** 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**
•MMT- Mandatory Theory Course •MMPR- Mandatory Practical Course •MET- Elective Theory Course •MEPR- Elective Practical Course •RP- Research Project	• Theory and Practical examination will be conducted at the end of respective semester. •Practical courses may be divided into sub-sections. •***Separate passing is mandatory for Theory and Practical examination as well as University and Internal assessment.***
•Requirement for Entry at Level 6.5: 1) Completed Post Graduate Diploma (Level 6.0) in Geography. or 2) Completed Bachelor's Degree (Honours / Research) (four year programme) in Geography.	
•Exit Option at Level 6.5: Students can exit after Level 6.5 with Master's Degree in Geography if he/she completes the course equivalent to minimum of 88 credits.	

Course Type and Credit Distribution

Course Type	Course Code	Number of Courses	Credit Per Course	Total Credits
Mandatory - Theory	MMT	09	04	36
Mandatory – Practical	MMPR	04	02/04	10
Elective - Theory	MET	04	04	16
Elective - Practical	MEPR	02	04	08
Research Methodology	RM	01	04	04
Field Project / Job Training	FP/OJT	01	04	04
Research Project	RP	02	04/06	10

6. 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.

7. Course Codes:

Sr. No.	Course No.	Course Title	Credits	Course Codes
		Semester - I		
1	MMT-101	Geomorphology	4	MSU0325MML919G1
2	MMT-102	Principles of Climatology	4	MSU0325MML919G2
3	MMT-103	Economic Geography	4	MSU0325MML919G3
4	MMPR-104	Computer Applications in Geography	2	MSU0325MMP919G1
5	MET-105	Population Geography and Human Resource Development	4	MSU0325MEL919G1
	MET-106	Settlement Geography	4	MSU0325MEL919G2
	MET-107	Geography of Health and Nutrition	4	MSU0325MEL919G3
6	RM-108	Research Methodology in Geography	4	MSU0325RMP919G
		Semester - II		
1	MMT-201	Advanced Cartography and Surveying	4	MSU0325MML919H1
2	MMT-202	Climate Change and Disaster Management	4	MSU0325MML919H2
3	MMPR-203	Advanced Surveying	2	MSU0325MMP919H1
4	MET-204	Fundamentals and Applications of GIS and GPS	4	MSU0325MEL919H1
	MET-205	Fundamentals of Soil Geography	4	MSU0325MEL919H2
	MET-206	Tourism Geography	4	MSU0325MEL919H3
5	MEPR-207	Introduction to GIS Software and GPS	4	MSU0325MEP919H1
	MEPR-208	Soil and Water Analysis	4	MSU0325MEP919H2
	MEPR-209	Practical in Tourism Geography	4	MSU0325MEP919H3
6	OJT-210	On Job Training	4	MSU0325OJP919H
	FP-210	Field Project	4	MSU0325FPP919H
		Semester - III		
1	MMT-301	Geohydrology and Oceanography	4	MSU0325MML919I1
2	MMT-302	Fundamentals of Remote Sensing and DIP	4	MSU0325MML919I2
3	MMPR-303	Photogrammetry, Remote Sensing and DIP	4	MSU0325MMP919I1
4	MMPR-304	Statistical Techniques in Geography	2	MSU0325MMP919I2
5	MET-305	Biogeography	4	MSU0325MET919I1
	MET-306	Geography of Environment	4	MSU0325MET919I2
	MET-307	Political Geography	4	MSU0325MET919I3
6	RP-308	Research Project – I	4	MSU0325RPP919I1
		Semester - IV		
1	MMT-401	Regional Planning and Development	4	MSU0325MML919J1
2	MMT-402	Development of Geographical Thought	4	MSU0325MML919J2
3	MET-403	Agricultural Geography	4	MSU0325MEL919J1
	MET-404	Geography of Resources	4	MSU0325MEL919J2
	MET-405	Social and Cultural Geography	4	MSU0325MEL919J3
4	MEPR-406	Data Representation Methods – Physical Geography	4	MSU0325MEP919J1
	MEPR-407	Data Representation Methods – Human Geography	4	MSU0325MEP919J2
5	RP-408	Research Project – II (Dissertation)	6	MSU0325RPP919J1

8. Syllabus:

M.A./M.Sc. Geography (Part I) (Level – 6.0) (Semester I)
(NEP – 2020)
(Introduced from Academic 2023-24)

Title of Course: Geomorphology
Course Code: MMT-101 (MSU0325MML919G1)
Total Credits: 04
Course Outcomes (COs): *Upon successful completion of this 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:

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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.
7. Cook, R.U. & Doornkamp, J.C.(1974): Geomorphology in Environmental Management, an Introduction. Clarendon Press. Oxford.
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13. Moor, W.G. (1949): A Dictionary of Geography, Penguin Books, England.

14. Morgan, R.S. & Wooldridge S.W (1959): Outline of Geomorphology the Physical basis of Geography, Longmans Green, London.
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.
18. Spark, B. W. (1986): Geomorphology, Longman, London.
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:

1. https://education.nationalgeographic.org/resource/core/
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
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M.A./M.Sc. Geography (Part I) (Level - 6.0) (Semester I)
(NEP – 2020)
(Introduced from Academic 2023-24)

Title of Course: Principles of Climatology
Course Code: MMT-102 (MSU0325MML919G2)
Total Credits: 04
Course Outcomes (COs): *Upon successful completion of this 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:

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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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5. **Critchfield, H.J, (2009):** *General Climatology***;** Prentice Hall, London.
6. **Das P. K. (1995):** *The Mansoon***,** Prayag pustak Bhavan, Allahabad, National Book Trust. India.
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11. **Mather J. R. (1975):** *Climatology: Fundamentals & Applications***.** Mc Graw Hills Book Co., New York.
12. **Miller A., et. al. (1983)**; *Elements of Meteorology*, Merrill, Columbus.
13. **Oliver J. E. (1973):** *Climate & Mans Environment*, John Wiley & Sons; New York.
14. **Robert V. Rohli, Anthony J. Vega, (2017):** *Climatology*, Jones & Bartlett Learning; 4 edition, 418 pp.
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16. **Singh, Savindra. (2006):** *Climatology***,** Prayag Pustak Bhavan, Allahabad.
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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/)

M.A./M.Sc. Geography (Part I) (Level - 6.0) (Semester I)
(NEP – 2020)
(Introduced from Academic 2023-24)

Title of Course: Economic Geography
Course Code: MMT-103 (MSU0325MMML919G3)
Total Credits: 04
Course Outcomes (COs): *Upon successful completion of this course, students will be able to:*

1. *Understand the concepts and basis of economic processes*
2. *Get acquainted with theories and models in economic geography*
3. *Get comprehensive knowledge of World energy resources, situation and distribution*
4. *Know about the Nature, scope and Principles of Industrial Geography*
5. *Understand transport and Trade policies of country*
6. *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.
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8. Sinha B.N.(1971): Industrial geography of India

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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.
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M.A./M.Sc. Geography (Part I) (Level - 6.0) (Semester I)
(NEP – 2020)
(Introduced from Academic 2023-24)

Title of Course: Computer Applications in Geography
Course Code: MMPR-104 (MSU0325MMP919G1)
Total Credits: 02
Course Outcomes (COs): *Upon successful completion of this 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: Dara handling and editing 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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Websites:

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

M.A./M.Sc. Geography (Part I) (Level - 6.0) (Semester I)
(NEP – 2020)
(Introduced from Academic 2023-24)

Title of Course: Population Geography and Human Resource Development
Course Code: MET-105 (MSU0325MEL919G1)
Total Credits: 04
Course Outcomes (COs): *Upon successful completion of this course, students will be able 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:

1. **Barrett** H.R. **(1992)**: Population Geography, Oliver and Boyd Longman House, Harlow.
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21. **Swanson** DA., Siegel JS. **(2004)**: Methods and Materials of Demography. Emerald Group Publishing; 2nd edition.
22. **Todaro** MP, Smith S. **(2011)**: Economic Development. 11th edition Printice Hall.
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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/

M.A./M.Sc. Geography (Part I) (Level - 6.0) (Semester I)
(NEP – 2020)
(Introduced from Academic 2023-24)

Title of Course: Settlement Geography
Course Code: MET-106 (MSU0325MEL919G2)
Total Credits: 04
Course Outcomes (COs): *Upon successful completion of this course, students will be able to:*

1. *Know the fundamentals of settlement geography*
2. *Understand the approaches to rural settlement geography; rural services; hierarchy; morphology etc.*
3. *Know the concept and processes of urban settlement studies; urban problem & their planning; concept smart cities, urban agriculture, etc.*
4. *Understand the theories and models of settlement geography to understand the structure of settlements.*

Unit-1: Fundamentals of Settlement Geography **10 Lectures**

Settlement Geography – The nature, scope and significance; origin and growth of rural and urban settlements; Definition and types of settlements; Site, situation and locational factors of settlements. Spacing, dispersion and localization. Characteristics of rural settlements.

Unit-2: Geography of Rural Settlements **15 Lectures**

Introduction to rural settlement geography, Approaches to rural settlement geography; socio-economic structure of rural settlements; Rural-service centers-nature, hierarchy, service area and interaction; Indian villages-evolution and multiplicity, regional characteristics, Rural planning and integrated development in India.

Unit-3: Geography of Urban Settlements **20 Lectures**

Introduction to urban settlement geography, Concept and processes of urbanization, suburbanization, Rural-urban fringe, urban sprawl, Functional classification of urban settlements; Conurbation, Size and spacing of cities- rank-size rule, law of primate city, urban hierarchies; Urban problems, Urban planning and challenges, Concept of smart city, Garden city movement, Urban agriculture.

Unit-4: Theories and Models in Settlement Geography **15 Lectures**

Multiple nuclei model by Harris and Ullman; Central place theory by W. Christaller; Concentric zone model by E. W. Burgees; Sector model by Homer and Hoyt. Urban poverty, Slums: Characteristics, Planning. Master plans of towns.

References:

1. Carter, H. (1975): The study of urban geography. Edward Arnold, London.
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4. Gosh, S. (1998): Introduction to Settlement Geography. Orient Longman.
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13. Northamray, M. (1975): Urban Geography, John Willey & Sons, New York.
14. Pacione, M. (2009): Urban Geography-A Global Perspective. 3rd edition. Routledge, London.
15. Ramachandran, R. (1991): Urbanization and Urban Systems in India, Oxford Uni. Press. Delhi.
16. Robinson, Brian T. (1973): Urban growth, Mathuen& Company, London.
17. Rykwert, J. (2004): Settlements. University of Pennsylvania Press, University Park, USA.
18. Sidhartha, K. and Mukherjee, S. (2000): Cities-Urbanizations & Urban Systems. Kisalaya Pub. Pvt. Ltd., New Delhi.
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20. Singh, R.L. (eds.) (1973): Rural Settlements in Monsoon Asia, National Geographical Society of India, Varanasi.
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22. Singh, R. L. and Singh, Rana P. B. (eds.) (1978): Transformation of Rural Habitat in Indian Perspective, National Geographical Society of India, Varanasi, Pub. 19.
23. Singh, R.L. and Singh, Rana P.B., (eds.) (1979): Place of Small Towns in India. National Geographical Society of India, Varanasi.
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M.A./M.Sc. Geography (Part I) (Level - 6.0) (Semester I)
(NEP – 2020)
(Introduced from Academic 2023-24)

Title of Course: Geography of Health and Nutrition
Course Code: MET-107 (MSU0325MEL919G3)
Total Credits: 04
Course Outcomes (COs): *Upon successful completion of this course, students will be able to:*

1. *Acquaint the students with the role of geographical factors, viz., physical, demographic, social and economic factors, influencing the spatial distribution of diseases;*
2. *Decipher the causes of the changing disease pattern;*
3. *Understand the WHO classification of diseases;*
4. *Get to know the food groups and food pyramid.*
5. *Highlight the relation of health with nutrition, environmental degradation and urbanization;*
6. *Be introduced with the classification and types of nutrients and their role in human body; and*
7. *Make the students abreast of existing health-care facilities, so as to train them with better health care planning for the country.*

Unit-1: Introduction to Geography of Health **10 Lectures**

Nature, scope and significance; Geographical factors affecting human health with special reference to physical, social, economic, environmental and diseases arising from them.

Unit-2: Classification of Diseases **15 Lectures**

Classification of diseases: genetic, communicable and non-communicable; occupational and nutritional deficiency diseases; WHO classification of diseases, Pattern of World distribution of major diseases; Epidemiological transition theory.

Unit-3: Human Ecology of Diseases and Human Nutrition **15 Lectures**

Ecology, etiology and transmission of major diseases: cholera, malaria, tuberculosis, hepatitis, leprosy, cardiovascular, cancer, COVID-19, AIDS and STDS; Diffusion of diseases and its causes; Food groups: balanced diet, food pyramid; Classification and types of nutrients; macro and micro nutrients; Nutrients: role of nutrients in human body; nutrient deficiencies and requirements for Indians, Deficiency disorders and problems of micro and meso nutrients, mal-nutrition in India.

Unit-4: Health Care **20 Lectures**

Health Care - International level, with special reference to WHO, UNICEF and National level, with special reference to Government and NGOs; Availability, accessibility and utilization of health care services; Primary health care; Inequalities in health care services in India; family welfare, immunization, national disease eradication, and Health for All programmes, Health care response to COVID-19.

References:

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2. **Caballero** Benjamin et. al **4th eds (2023)**: Encyclopedia of Human Nutrition, USA, Elsevier .
3. **Cliff, A**. and Haggett, P. **(1989)**: Atlas of Disease Distribution. Basil Blackwell, Oxford.
4. **Curtis, S** and Taket, A. **(1996)**: Health and Societies: Changing Perspectives, London, Arnold.
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9. **Hazra, J.** (ed.) **(1997)**: Health Care Planning in Developing Countries. University of Calcutta, Calcutta, 1997.
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Websites:

Global Nutritional Report: https://globalnutritionreport.org/reports/global-nutrition-report-2018/

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

National Health Programs, India: https://nhm.gov.in/

WHO International Classification of Diseases: https://www.who.int/classifications/icd/en/

M.A./M.Sc. Geography (Part I) (Level - 6.0) (Semester I)
(NEP – 2020)
(Introduced from Academic 2023-24)

Title of Course: Research Methodology in Geography
Course Code: RM-108 (MSU0325RMP919G)
Total Credits: 04
Course Outcomes (COs): *Upon successful completion of this course, students will be able 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, i10-index, 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

References:

1. **Ahuja,** R. **(2001)**: *Research Methods*, Rawat, New Delhi.
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21. **Stoddard,** R. H **(1982)**: *Field Techniques and Research Methods in Geography*, Kendall/Hunt.

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

M.A./M.Sc. Geography (Part I) (Level - 6.0) (Semester II)
(NEP – 2020)
(Introduced from Academic 2023-24)

Title of Course: Advanced Cartography and Surveying
Course Code: MMT-201 (MSU0325MML919H1)
Total Credits: 04
Course Outcomes (COs): *Upon successful completion of this 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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10. Kraak, M. J., & Ormeling, F. (2020). Cartography: visualization of geospatial data. CRC Press.
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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/

M.A./M.Sc. Geography (Part I) (Level - 6.0) (Semester II)
(NEP – 2020)
(Introduced from Academic 2023-24)

Title of Course: Climate Change and Disaster Management
Course Code: MMT-202 (MSU0325MMML919H2)
Total Credits: 04
Course Outcomes (COs): *Upon successful completion of this 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 **25 Lectures**

History and relevance of climate change studies; Role and impact of climate on human being, soils and agriculture; 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 **13 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.
4. **Ahrens, C.D.,** and Samson, P. **(2011)**: *Extreme Weather and Climate*, Brooks/Cole, Belmont, 508pp.
5. **Barry, R.G.,** and Chorley, R.J. **(2010)**: *Atmosphere, Weather and Climate*, Routledge, London, 516pp.

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7. **Dessler, A.E.,** and Parson, E.A. **(2009)**: *The Science and Politics of Global Climate Change – A Guide to the Debate*, Cambridge University Press, Cambridge, 190pp.
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9. **IPCC 5th Assessment report on Climate Change**: http://www.ipcc.ch/report/ar5/
10. **IPCC 6th Assessment report on Climate Change**: https://www.ipcc.ch/assessment-report/ar6/
11. **Jacobson, M.Z. (2002)**: *Atmospheric Pollution – History, Science, and Regulation*, Cambridge University Press, Cambridge, 399pp.
12. **Keller, E.A.**, and DeVecchio, D.E. **(2019)**: *Natural Hazards*, Routledge, New York, 642pp.
13. **Khan, M.Z.A.,** and Gangawala, S. **(2011)**: *Global Climate Change – Causes and Consequences*, Rawat Publications, Jaipur, 298pp.
14. **Lal, D.S. (2011)**: *Climatology*. Sharda pustak Bhavan, Allahabad, 448pp.
15. **Levin, H.L.,** and King, D.T. **(2017)**: *The Earth Through Time*. John Wiley & Sons, USA, 590pp.
16. **Lutgens, F.K.,** and Tarbuck, E.J. **(2013)**: *The Atmosphere – An Introduction to Meteorology*. Prentice Hall, Boston, 506pp.
17. **Martin, R.E., (2018)**: *Earth's Evolving Systems – The History of Planet Earth*. Jones & Bartlett Learning, Burlington, USA, 615pp.
18. **Monroe, J.S.,** and Wicander, R. **(2009)**: *The Changing Earth – Exploring Geology and Evolution*, Brooks/Cole, Belmont, 735pp.
19. **Philander, S.G. (2008)**: *Encyclopedia of Global Warming and Climate Change*, Sage, London, 1283pp.
20. **Rohli, RV.,** and Anthony, J.V. **(2018)**: *Climatology*. Jones & Bartlett Learning, Burlington, USA, 418pp.
21. **Ruddiman, W.F. (2008)**: *Earth's Climate – Past and Future*, W. H. Freeman, New York, 388pp.
22. **Singh, S. (2009)**: *Climatology*, Prayag Pustak Bhawan, Allahabad, 504pp.
23. **Stanley, S.M. (2009)**: *Earth System History*, W.H. Freeman, New York, 551pp.
24. ***World Development Report 2010: Development and Climate Change***, World Bank, Washington D.C., 417pp.

Research Journals:

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

M.A./M.Sc. Geography (Part I) (Level - 6.0) (Semester II)
(NEP – 2020)
(Introduced from Academic 2023-24)

Title of Course: Advanced Surveying
Course Code: MMPR-203 (MSU0325MMP919H1)
Total Credits: 02
Course Outcomes (COs): *Upon successful completion of this 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:

1. Arora, K. R.(2019) Surveying Vol. I, II and III, Standard Book House.
2. Basak, N.N.(2017) Surveying and Levelling, Tata Mcgraw Hill, New Delhi
3. Brinker, R. C., and Minnick, R. (Eds.). (1995). The surveying handbook. Springer Science & Business Media.
4. Clancy, J. (2013). Site surveying and levelling. Routledge.
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6. Duggal, S. K. (2009) Surveying vol 1 and 2, The McGraw Hill Companies
7. Ghilani, C.D.(2018) Elementary Surveying: An introduction to Geomatics, Prentice Hall, Pearson. 15th Ed

8. Ghosh, J.K.(2010) Elementary Engineering Surveying, Studium Press, New Delhi.
9. Gopi, S., Sathikumar, R., and Madhu, N.(2017) Advanced Surveying: Total Station, GPS, GIS & Remote Sensing,Pearson Education India
10. Kanetkar, T. P., and Kulkarni, S. V. (1972) Surveying and Levelling, Vol-I and Vol-II, Pune Vidyarthi Griha Prakshan
11. Mikhail E.M., and Anderson J.M. (2013) Surveying: Theory and Practice, McGraw Hill
12. Punmia, B. C. (2002) Text book of Surveying, Vol I, II and III, Laxmi Publications Ltd
13. Roy, S. K. (2010). Fundamentals of surveying. PHI Learning Pvt. Ltd.
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15. W. Schofield and M. Breach(2007) Engineering Surveying, 6th Edn., CRC Press

M.A./M.Sc. Geography (Part I) (Level - 6.0) (Semester II)
(NEP – 2020)
(Introduced from Academic 2023-24)

Title of Course: Fundamentals and Applications of GIS and GPS
Course Code: MET-204 (MSU0325MEL919H1)
Total Credits: 04
Course Outcomes (COs): *Upon successful completion of this 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.
2. Bernhardensen, Tor. 1999. Geographic Information Systems: An Introduction. Toronto: John Wiley & Sons, Inc.
3. Bishop, Michael P. and Shroder, John F. (Eds.) 2004. Geographic Information Science and Mountain Geomorphology. Chichester, U.K.: Praxis Publishing (Springer).11
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7. Knowledge Presentation. New York: Wiley.
8. Chang, Kang-tsung. 2002. Introduction to Geographic Information Systems. New Delhi: Tata McGraw-Hill Publishing Company Limited.

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10. Geographic Information Systems. Upper Saddle River, NJ: Prent ice Hall, pp. 33-43.
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14. Foresman, T. (Ed.) 1998. The History of Geographic Information Systems – Perspectives from the Pioneers. Upper Saddle River, NJ: Prentice Hall.
15. Gregory, D. 1978. Ideology, Science and Human Geography. New York: St. Martin's Press.
16. Heywood, Ian; Cornelius, Sarah; and Carver, Steve. 2000. An Introduction to Geographical Information Systems (Pearson Education Asia Low Priced Edit ion). Longman.
17. Kraak, Menno-Jan and Ormeling, Ferjan. 2004. Cartography – Visualization of Geospatial Data (2n d Ed.) (Pearson Education Low Price Edition). Pearson Education.
18. Lo, C.P. and Yeung, Albert K.W. 2002. Concepts and Techniques of Geographic Information Systems (Eastern Economy Edition). New Delhi: Prentice-Hall of India, Private Limited.
19. Longley, P.A., M.F. Goodchild, D.J. Maguire, and D.W. Rhind (eds.). 2001. Geographical Information Systems and Science. New York: John Wiley & Sons, Inc.
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25. Schuurman, Nadine. 2004. GIS – A Short Introduction. Blackwell Publishing.
26. Zeiler Michael, 2002, Modeling Our World, The ESRI Guide to Geo Data Base Design, Environmental Systems Research Institute, Inc., Red Lands, California.USA- 92373 -8100.

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
https://gisgeography.com/what-gis-geographic-information-systems/
http://webhelp.esri.com/arcgisdesktop/9.3/index.cfm?TopicName=Topology%20basics
https://www.esri.com/news/arcuser/0401/topo.html
https://gisgeography.com/100-earth-remote-sensing-applications-uses/
https://www.gps.gov/systems/gps/

M.A./M.Sc. Geography (Part I) (Level - 6.0) (Semester II)
(NEP – 2020)
(Introduced from Academic 2023-24)

Title of Course: Fundamentals of Soil Geography
Course Code: MET-205 (MSU0325MEL919H2)
Total Credits: 04
Course Outcomes (COs): *Upon successful completion of this course, students will be able to:*

1. *Understand the concepts and principles of soil formation.*
2. *Study the role of essential nutrient for plant growth and development.*
3. *Determine the physical and chemical properties of soils.*
4. *Enable the students to realize the Soil and environmental problems;*
5. *Know the significance of soil conservation and methods of Soil reclamation.*

Unit-1: **15 Lectures**

Introduction to soil geography: Concepts and definitions, Process of origin of soil, pedogenesis, soil profile and categories of soil taxonomy-major groups. Soil forming processes and factors, Weathering and soils, Soil as a medium for plant growth, Managing Soil Health: Concepts and Practices, Essential nutrient elements, Plant roots and soil relations. Soil fertility and soil productivity.

Unit-2: **15 Lectures**

Physical properties of soil: Soil morphology, Soil texture, Soil Structure; Genesis and Types of structure, Soil consistence, Soil:- moisture, colour, porosity and permeability; Regulation of Air and Water in Soil; Management Practices to Improve Soil Health, Effects of tillage on structure and porosity.

Unit-3: **15 Lectures**

Chemical properties of soil: Organic soils and Mineral soils, Chemical composition of soils, Ion exchange, Cation exchange, Determination of soil pH, Management of soil pH, Soil clays, humus, Soil organic matter, and NPK.

Unit-4: **15 Lectures**

Soil and environmental problems: Classification of tropical soils, Soil erosion, Universal soil loss equation (USLE), Nature and management of saline and sodic soils. Trace metals, Soil Contamination, Micronutrients and Toxic Elements in soils: Iron, manganese, Copper and zinc. Conservation of soil, Methods of Soil reclamation.

References:

1. **Miller, R. W.** and Donahue, R. L**. (1992):** Soils: An Introduction to Soils and Plant Growth, Prentice-Hall of India, New Delhi
2. **Brady, N. C.,** and Weil, R. R**. (2008):** The Nature and Properties of Soils, Prentice Hall, New Jersey
3. **Pitty, A. F**. (**1978):** Geography and Soil Properties, Methuen and Co., London
4. **Bridges, E. M**. and Davidson, D. A. (**1982):** Principles and Applications of Soil Geography, Longman Group, London
5. **Daji, J. A. (1970**): A Textbook of Soil Science, Asia Publication House, New York
6. **Birkeland, P. W (1999):** Soils and Geomorphology, Oxford University Press, New York
7. **Backman, H.O** and Brady, N.C. **(1960),** The Nature and Properties of Soils, McMillan, New York.

8. **Bennet, Hugh H**. , Soil Conservation, McGraw Hill, New York.
9. **De, N.K**. and Ghos, P. (**1993):** India: A Study in Soil Geography, Sribhumi Publishing Co., Calcutta.
10. **Russell,** Sir Edward J. (**1961),** Soil Conditions and Plant Growth, Wiley, New York

Research Journals:

Journal of Soils and Sediments (JSS) (https://www.springer.com/journal/11368)

Soil and Sediment Contamination: An International Journal (https://www.tandfonline.com/toc/bssc20/current)

International Journal of Sediment Research (https://www.journals.elsevier.com/international-journal-of-sediment-research)

M.A./M.Sc. Geography (Part I) (Level - 6.0) (Semester II)
(NEP – 2020)
(Introduced from Academic 2023-24)

Title of Course: Tourism Geography
Course Code: MET-206 (MSU0325MEL919H3)
Total Credits: 04
Course Outcomes (COs): *Upon successful completion of this course, students will be able to:*

1. *Understand the concepts and components in tourism geography*
2. *Know about importance of geography in tourism.*
3. *Know about pattern & tourism in the world and impact of globalization*
4. *Understand different elements of marketing in tourism*
5. *Understand tour and travel agency*
6. *Get detail knowledge about planning process in tourism*
7. *Analyse the growth and development of tourism in India.*

Unit-1: **15 lectures**

Concept of Tourism, nature, scope and importance of tourism. Definition of Traveller – Tourist - Excursionist –Tourism - Basic Components of Tourism - Attraction, Geographical approach in tourism. Multidisciplinary approach. Accommodation, Amenities, Accessibility and Awareness. Types and forms of tourism, Types of accommodation and transportation. Physical, socio cultural and economical impact of tourism.

Unit-2: **15 lectures**

Geography: Meaning, features, branches, and relationship with tourism. Climatic regions of the world, latitude & longitude lines, time zones, international date line, Indian standard time. Importance of Geography in Tourism, Impacts of physiography, Climate and Weather on tourist destination. Geographical patterns of tourism and the tourism characteristics of selected world regions.

Unit-3: **15 lectures**

Marketing of tourism, STP, Marketing Mix, Tourism Product. Meaning of tour and travel agency. Types of travel agency. Types of tour operator. Characteristics of tour and travel agency. History and development of tourism in world. Different Tourism Systems- Leiper's Geospatial Model, Mill-Morrison, Mathieson & Wall, Butler's Tourism Area Life Cycle (TALC) - Doxey's Index – Demonstration Effect – Crompton's Push and Pull Theory, Stanley Plog's Allo-centric and Psycho-centric Model of Destination Preferences, Tourism Area life cycle (TALC)

Unit-4: **15 lectures**

Planning for tourism development. Tourism in India – resources for tourism in India. Growth and development of tourism in India. Problems of tourism in India. Tourism planning in India. Tourism development in Maharashtra.

References:

1. Robinson H. (1976): A Geography of Tourism. Mac Donald and Evans Ltd; London
2. Manoj Dixit & Charu Sheela, (2007) Tourism Products, 2nd Edition, New Royal Books, Lucknow.
3. Douglas, Pearce (1981): Topics in Applied Geography, Tourist Development. Longman london New York
4. Bhatia, A.K (2012), "The Business of Travel Agency and Tour Operations Management", Sterling Publications, New Delhi. 2. Bhatia, A.K (2014), "Tourism Development - Principles & Practice", Sterling Publications, New Delhi.

5. Saxena, H.M (2016), “India and World Geography”, Rawat Publications, New Delhi
6. Boniface and Coopers, (2016) Worldwide destinations: The Geography of Travel and Tourism, 7th Edition, Rutledge, New Delhi.
7. Khullar, D.R (2018) India - A comprehensive Geography, 1 st Edition, Kalyani Publications, Chennai.

M.A./M.Sc. Geography (Part I) (Level - 6.0) (Semester II)
(NEP – 2020)
(Introduced from Academic 2023-24)

Title of Course: Introduction to GIS Software and GPS
Course Code: MEPR-207 (MSU0325MEP919H1)
Total Credits: 04
Course Outcomes (COs): *Upon successful completion of this 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

References:

1. Longley, P., Goodchild, M., Maguire, D., & Rhind, D. (2015). Geographic information science and systems. John Wiley & Sons.
2. Tomlin, C. D. (1990). Geographic Information Systems and Cartographic Modeling. Prentice Hall.
3. Burrough, P. A., & McDonnell, R. A. (1998). Principles of geographical information systems. Oxford University Press.
4. Aronoff, S. (1991). Geographic information systems: A management perspective. WDL Publications.
5. Cressie, N. (1993). Statistics for spatial data (revised edition). Wiley.

6. Fotheringham, A. S., Brunsdon, C., & Charlton, M. (2000). Quantitative geography: Perspectives on spatial data analysis. Sage.
7. de Smith, M. J., Goodchild, M. F., & Longley, P. A. (2018). Geospatial analysis: A comprehensive guide to principles, techniques, and software tools. Troubador Publishing Ltd.
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Web References:

https://docs.qgis.org/2.18/pdf/en/QGIS-2.18-UserGuide-en.
https://qgis.org/en/site/
https://www.esri.com/en-us/arcgis/about-arcgis/overview
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

M.A./M.Sc. Geography (Part I) (Level - 6.0) (Semester II)
(NEP – 2020)
(Introduced from Academic 2023-24)

Title of Course: Soil and Water Analysis
Course Code: MEPR-208 (MSU0325MEP919H2)
Total Credits: 04
Course Outcomes (COs): *Upon successful completion of this course, students will be able to:*

1. *Know about the soil sample collection during the soil survey/ field work.*
2. *Analyse the physical properties of soils.*
3. *Analyse the chemical properties of soils*
4. *Determine the physical and chemical properties of water samples.*

Unit-1: Soil Survey **20 Hrs.**

Exercise 1: Field sample collection and preparation.
Exercise 2: Site selection and geomorphic considerations.
Exercise 3: Equipment/tools and reagents.
Exercise 4: Field assessment: saline soils with soluble salts and high pH soils.
Exercise 5: Laboratory sample collection and preparation.
Exercise 6: Field-Moist preparation and Air-Dry preparation.

Unit-2: Physical Analyses of Soil **30 Hrs.**

Exercise 7: Soil Profile, and Analysis of Soil morphology.
Exercise 8: Analysis of Soil colour.
Exercise 9-10: Analysis of soil Structure and Consistence.
Exercise 11-12: Particle-size distribution analysis.
Exercise 13: Determine soil textural classes using Hydrometer.
Exercise 14: Determine soil textural classes using Sieves and shakers.

. **Unit-3: Chemical Extractions and Analysis of Soil** **40 Hrs.**

Exercise 15: Digestion Methods For Elemental Analysis.
Exercise 16: Digestion Method : Nitric-Perchloric acids.
Exercise 17: Digestion Method : Nitric- acid.
Exercise 18: Digestion Method : A mixture of Nitric-hydrochloric acids HNO3–HCl in a ratio 1:3.
Exercise 19: Determination of soil pH.
Exercise 20: Determination of soil Salinity.
Exercise 21: Soil Salinity analysis using Chlorinity Titration.
Exercise 22: Measurement of electrical conductivity (EC).
Exercise 23-24: Determination of Organic matter and Calcium carbonate.
Exercise 25-26: Determination of sodium, calcium and magnesium.

Unit-4: Analysis of Water Samples **30 Hrs.**

Exercise 27: Determination of pH.
Exercise 28: Determination of electrical conductivity.
Exercise 29-30: Determination of turbidity.
Exercise 31-32: Determination of salinity.
Exercise 33: Determination of Carbonates
Exercise 34: Determination of Bicarbonates.

References:

1. Dekker., Soil Sampling, Preparation and analysis, , Inc, New York.
2. Carter M.R. and E.G.Gregorich., 2007; Soil Sampling and methods of analysis, 2nd Ed.
3. Kuete., A.Et.at., 1986.Methods of soil analysis, Part, American society of Agronomy Inc.
4. Miller, R. W. and Donahue, R. L. (1992): Soils: An Introduction to Soils and Plant Growth, Prentice-Hall of India, New Delhi
5. Brady, N. C., and Weil, R. R. (2008): The Nature and Properties of Soils, Prentice Hall, New Jersey.
6. Pitty, A. F. (1978): Geography and Soil Properties, Methuen and Co., London.
7. Devis J. and Freitas, 1970, Calcium plus Magnesium, Physical and Chemical Methods of Soil & Water Analysis, Food and Agriculture Organization of the United Nations, Rome, Italy, Soil Bulletin – 10 : 231 -232.
8. Kadam, J. R., Shinde P. B., 2005, Practical Manual on Soil Physics – A method manual, Department of Agricultural Chemistry and Soil Science, P.G.I., Rahuri, P-29.
9. Soil Sampling & Method of Analysis – 2nd Edition, Canedian Society of Soil Science – 2008.

Websites:

https://www.horiba.com/ind/water-quality/applications/water-wastewater/measuring-salinity-of-water/

https://salinometry.com/methods-of-determination-of-salinity/

https://www.biotechnologynotes.com/soil/estimation-of-organic-carbon-and-calcium-carbonate-soil-analysis/1592

M.A./M.Sc. Geography (Part I) (Level - 6.0) (Semester II)
(NEP – 2020)
(Introduced from Academic 2023-24)

Title of Course: Practical in Tourism Geography
Course Code: MEPR-209 (MSU0325MEP919H3)
Total Credits: 04
Course Outcomes (COs): *Upon successful completion of this course, students will be able to:*

1. *To educated students in map reading for tourism activities.*
2. *To Make them expertise in tour management*
3. *To make them expertise in travel management*
4. *To create awareness about use of computer and internet for tourism and travel business.*

Exercise(s):

Unit-1: Map Reading **25 Hrs.**

1. Scale of the Map and Measurement of the Distance on Map; Understanding Contour Maps;
2. Map Reading with respect to Transport connectivity (road, rail, air and water) in International Context.
3. Location of Greenwich Mean Time and International Date Line on World Map; Calculation of Time Difference.

Unit-2: Function of Travel and Tour Agencies Collection **35 Hrs.**

1. Dissemination of Travel Information,
2. Travel Documentation, Passport, Visa, Ticketing.
3. Preparation of Itineraries, Planning and
4. Costing of Tours,
5. Ticketing,
6. Product Promotion and other Miscellaneous work
7. Types of Tour Itineraries
8. Organizational Structure of a Standard Travel Agency

Unit-3: Functions of Tour Operators ` ** **30 Hrs.

9. Assembling, Processing and dissemination of information;
10. Liaisoning with Principals;
11. Preparation of Tour Itineraries and Pricing of Tour Package;
12. Pre-tour-arrangements;
13. Tour Operation and Post-tour Management.
14. Components of Standard Tour Packages.

Unit-4: Computer Application in Tourism **30 Hrs.**

15. Ticketing,
16. Hotel booking and other services,
17. Promotion,
18. Websites, and apps.
19. Car hiring.
20. Search of services.
21. Sales promotion.
22. SWOT analysis.

References:

1. Boniface and Coopers, (2016) Worldwide destinations: The Geography of Travel and Tourism, 7th Edition, Rutledge, New Delhi.
2. D.R Khullar, (2018) India - A comprehensive Geography, 1 st Edition, Kalyani Publications, Chennai.
3. Jane Archer, Gwenda Syratt (2021): Manual of Travel Agency Practice (3rd ed.)

M.A./M.Sc. Geography (Part I) (Level - 6.0) (Semester II)
(NEP – 2020)
(Introduced from Academic 2023-24)

Title of Course: On Job Training
Course Code: OJT-210 (MSU0325OJP919H)
Total Credits: 04
Course Outcomes (COs): *Upon successful completion of this 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 summer 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: Student 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.*

M.A./M.Sc. Geography (Part I) (Level - 6.0) (Semester II)
(NEP – 2020)
(Introduced from Academic 2023-24)

Title of Course: Field Project
Course Code: FP-210 (MSU0325FPP919H)
Total Credits: 04
Course Outcomes (COs): *Upon successful completion of this 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 summer 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.*

M.A./M.Sc. Geography (Part II) (Level – 6.5) (Semester III)
(NEP – 2020)
(Introduced from Academic 2023-24)

Title of Course: Geohydrology and Oceanography

Course Code: MMT-301 (MSU0325MML919I1)

Total Credits: 04

Course Outcomes (COs): *Upon successful completion of this course, students will be able to:*

1. *Know about the development of methods of scientific observation in hydrology and Oceanography;*
2. *Understand the origin, importance and distribution of water on Earth;*
3. *Learn about the hydro-geological, coastal and marine processes, landforms and resources;*
4. *Recognize the role of oceans to deal with the vulnerability of the dynamic earth system;*
5. *Comprehend about the recent trends in research in Geohydrology and Oceanography;*

Unit-1: Groundwater and Basin Hydrology **15 Lectures**

Introduction to Geohydrology; Distribution of surface and subsurface water resources on Earth; Hydrological characteristics of aquifers; Groundwater: occurrence, movement and management; Basin hydrology and hydrological cycle: precipitation, evaporation, infiltration and run-off; Hydrograph; Groundwater regimes in India and Maharashtra.

Unit-2: Applied Geohydrology **09 Lectures**

Groundwater exploration and water pollution with special reference to India; Problems related to water use; Fresh and salt water relationship in coastal areas; Conservation and planning for the development of water resources; Watersheds and wetlands in India.

Unit-3: Geological Oceanography **14 Lectures**

Introduction to Oceanography; Origin and evolution of ocean basins; Topography of the ocean floor: continental shelf, slope, rise, submarine channels, hills, ridges, trenches and abyssal plains; Bottom relief of Pacific, Atlantic and Indian Ocean; Origin and evolution of island arcs; Estuarine & coastal processes and landforms.

Unit-4: Physical, Chemical and Biological Oceanography **22 Lectures**

Air-sea interaction and ocean circulation: currents, waves and tides; Currents of Pacific, Atlantic, & Indian Ocean; Properties of oceanic water: chemical composition, salinity, temperature, and density; Major water masses of the World's Ocean; Thermohaline circulation and the oceanic conveyor belt; Biological productivity in the Ocean; Origin and growth of coral reefs; Ocean deposits: origin, type and distribution; Sea level changes; Oceanic regions; Marine resources; Marine pollution.

References:

Books & Reports:

1. **Cech, T.V. (2009)**: *Principles of Water Resources: History, Development, Management, and Policy (3rd Ed.)*, Wiley, Hoboken, New Jersey, 576pp.
2. **Chow, V.T.,** Maidment, D.R., and Mays, L.W. **(2010)**: *Applied Hydrology*, McGraw-Hill, Chennai, 572pp.
3. **Christopherson, R.W. (2012)**: *Geosystems: An Introduction to Physical Geography (8th Ed.)*, Prentice Hall, New Jersey, 693pp.
4. **Davie, T.,** and Quinn, N.W. **(2019)**: *Fundamentals of Hydrology (3rd Ed.)*, Routledge, New York, 285pp.
5. **Davis, R.,** and Fitzgerald, D. **(2003)**: *Beaches and Coasts*, Wiley-Blackwell, Hoboken, New Jersey, 432pp.
6. **Day, T. (2008)**: *Oceans (Rev. Ed.)*, Facts on File, New York, 337pp.

7. **Fitts, C.R. (2002)**: *Groundwater Science*, Academic Press, 450pp.
8. **Garrison, T. (2009)**: *Essentials of Oceanography (5th Ed.)*, Brooks/Cole, Belmont, California, 463pp.
9. **Garrison, T.** and Ellis, R. **(2016)**: *Oceanography: An Invitation to Marine Science (9th Ed.)*, Cengage Learning, Boston, 604pp.
10. **Han, D. (2010)**: *Concise Hydrology*, Dawai Han and Ventus Publishing, 145pp.
11. **Pinder, G.F.,** and Celia, M.A. **(2006)**: *Subsurface Hydrology*, Wiley, Hoboken, New Jersey, 485pp.
12. **Pinet, P.R. (2009)**: *Invitation to Oceanography (5th Ed.)*, Jones and Bartlett Publishers, Sudbury, Massachusetts, 609pp.
13. **Raghunath, H.M. (2006)**: *Hydrology: Principles, analysis and Design (2nd Ed.)*, New age International, New Delhi, 477pp.
14. **Schwartz, F.W.,** and Zhang, H**. (2002)**: *Fundamentals of Ground Water*, Wiley, Hoboken, New Jersey, 592pp.
15. **Skinner, B.J.,** and Murck, B.W. **(2011)**: *The Blue Planet: An Introduction to Earth System Science (3rd Ed.)*, Wiley, Hoboken, New Jersey, pp. 221-319.
16. **Sverdrup, K.,** and Armbrus, V. **(2008)**: *Introduction to the World's Oceans (10th Ed.)*, McGraw-Hill, New York, 528pp.
17. **Sverdrup, K.A.,** and Kudela, R.M **(2020)**: *Investigating Oceanography (3rd Ed.)*, McGraw-Hill, New York, 511pp.
18. **Todd, D.K.,** and Mays, L.W. **(2012)**: Groundwater Hydrology (3rd Ed.), Wiley India, New Delhi, 636pp.
19. **Trujillo, A.P.,** and Thurman, H.V. **(2018)**: *Essentials to Oceanography (12th Ed.)*, Pearson, Boston, 597pp.
20. **Viessman, W.,** and Lewis, G.L. **(2002)**: *Introduction to Hydrology (5th Ed.)*, Prentice Hall, New Jersey, 612pp.

Research Journals:

Advances in Water Resources (https://www.sciencedirect.com/journal/advances-in-water-resources)
Annual Review of Marine Science (https://www.annualreviews.org/journal/marine)
Hydrology and Earth System Sciences: https://www.hydrol-earth-syst-sci.net/
Hydrogeology Journal: https://www.springer.com/journal/10040
ICES Journal of Marine Science: https://academic.oup.com/icesjms
Indian Journal of Geo-Marine Sciences: http://nopr.niscair.res.in/handle/123456789/3
Journal of Geophysical Research: https://agupubs.onlinelibrary.wiley.com/journal/21562202
Journal of Hydrology: https://www.sciencedirect.com/journal/journal-of-hydrology
Journal of Water Resource Planning and Management: https://ascelibrary.org/journal/jwrmd5
Limnology and Oceanography: https://aslopubs.onlinelibrary.wiley.com/journal/19395590
Marine and Petroleum Geology: https://www.sciencedirect.com/journal/marine-and-petroleum-geology
Nature Geoscience: https://www.nature.com/ngeo/
Oceanography: https://www.tos.org/oceanography/
Progress in Oceanography: https://www.sciencedirect.com/journal/progress-in-oceanography
Water Research: https://www.sciencedirect.com/journal/water-research
Water Resources Research: https://agupubs.onlinelibrary.wiley.com/journal/19447973

Websites:

Central Ground Water Board (CGWB), India: http://cgwb.gov.in/
Central Water Commission, India: http://cwc.gov.in/
National Ocean Service (NOAA): https://oceanservice.noaa.gov/
UN Atlas of the Oceans: http://www.oceansatlas.org/
NGDC-NOAA, Marine Geology & Geophysics: https://www.ngdc.noaa.gov/mgg/
Indian National Centre for Ocean Information Services: https://www.incois.gov.in/

M.A./M.Sc. Geography (Part II) (Level - 6.5) (Semester III)
(NEP – 2020)
(Introduced from Academic Year 2023-24)

Title of Course: Fundamentals of Remote Sensing and DIP
Course Code: MMT-302 (MSU0325MML919I2)
Total Credits: 04
Course Outcomes (COs): *Upon successful completion of this course, students will be able to:*

1. *Understand the principles and concepts of remote sensing and its role in capturing and analyzing Earth's data.*
2. *Describe the different types of remote sensing platforms, sensors, and image acquisition systems used in the field.*
3. *Interpret and analyze aerial photographs and satellite images using visual interpretation techniques.*
4. *Apply digital image processing techniques for feature extraction, including texture, shape, and spectral indices.*
5. *Explore emerging trends and technologies in remote sensing and digital image processing.*

Unit-1: Introduction & Principles of Remote Sensing **20 Lectures**

Definition and scope of remote sensing; History and development of remote sensing technology; Electromagnetic radiation (EMR) and electromagnetic spectrum; EMR interaction with atmosphere and earth surface; Atmospheric window and spectral reflectance curve; Resolutions in remote sensing; Types of remote sensing; Principles and applications of optical remote sensing.

Unit-2: Aerial Photography **12 Lectures**

Aerial photographs: types, scale, & resolution; Types of aerial cameras and photographic films; Geometry of aerial photographs; Parallax, relief displacement, orthophotos; Elements of visual image interpretation.

Unit-3: Satellite Remote Sensing **14 Lectures**

Satellite: types and their characteristics; Types of Sensors; Orbital and sensor characteristics of major earth resource satellites: LANDSAT, SPOT, Sentinel & Quickbard; Recent developments of Indian remote sensing satellite programme.

Unit-4: Digital Image Processing **14 Lectures**

Introduction to digital image and image processing; Sources of Errors: Geometric and radiometric; Image rectification; Image classification: supervised and unsupervised.

References:

Books & Reports:

1. Aber, J.S., Marzolff, I., and Ries, J. (2010): *Small-Format Aerial Photography: Principles,Techniques and Geoscience Applications*, Elsevier, Amsterdam, 268pp.
2. Campbell, J.B., and Wynne, R.H. (2011): *Introduction to Remote Sensing (5th Ed.)*, Guilford Press, New York, 667pp.
3. Jensen, J.R. (2006): *Remote Sensing of the Environment: An Earth Resource Perspective (2ndEd.)*, Prentice Hall, New Jersey, 608pp.
4. Konecny, G. (2003): *Geoinformation: Remote sensing, Photogrammetry and GeographicInformation Systems*, Taylor & Francis, London, 266pp.
5. Lillesand, T.M., Kiefer, R.W., and Chipman, J.W. (2007): *Remote Sensing and ImageInterpretation (6th Ed.)*. Wiley, New Jersey, 804pp.

6. Morgan, D., and Falkner, E. (2001): *Aerial Mapping: Methods and Applications (2nd Ed.)*, CRC Press, Boca Raton, Florida, 216pp.
7. Quattrochi, D.A., and Goodchild, M.F. (1997): *Scale in Remote Sensing and GIS*, CRC Press, Boca Raton, Florida, 432pp.
8. Reddy, M.A. (2008): *Textbook of Remote Sensing and Geographical Information System (3rdEd.)*, BS Publications, Hyderabad, 476p
9. Sabins, F.F. (2007): *Remote* Sensing*: Principles* and Interpretation (*3rd* Ed.*)*, Waveland Press, Long Grove, Illinois, 512pp.
10. Schowengerdt, R.A. (2006): *Remote Sensing: Models and Methods for Image Processing (3rdEd.)*, Elsevier, Amsterdam, 560pp.
11. Wolf, P., DeWitt, B., Wilkinson, B. (2012): *Elements of Photogrammetry with Applicationin GIS (4th Ed.)*, McGraw-Hill, New York, 640pp.

Research Journals:

Remote Sensing of Environment
ASPRS Photogrammetric Engineering and Remote Sensing
IJPRS Journal of Photogrammetry and Remote Sensing
International Journal of Remote Sensing
IEEE Transactions on Geosciences and Remote Sensing
IEEE Letters on Geosciences and Remote Sensing
Journal of the Indian Society of Remote Sensing

Websites:

Indian Space Research Organisation (ISRO), India: http://www.isro.org
National Remote Sensing Centre (NRSC), India: http://www.nrsc.gov.in
National Aeronautics and Space Administration (NASA), USA: http://www.nasa.gov
National Oceanic and Atmospheric Administration (NOAA), USA: http://www.noaa.gov
United States Geological Survey (USGS), USA: http://www.usgs.gov
International Society for Photogrammetry and Remote Sensing (ISPRS): http://www.isprs.org
Wikimapia: http://www.wikimapia.org
Bhuvan: http://www.bhuvan.nrsc.gov.in

M.A./M.Sc. Geography (Part II) (Level - 6.5) (Semester III)
(NEP – 2020)
(Introduced from Academic Year 2023-24)

Title of Course: Photogrammetry, Remote Sensing and DIP
Course Code: MMPR-303 (MSU0325MMP919I1)
Total Credits: 04
Course Outcomes (COs): *Upon successful completion of this course, students will be able to:*

1. *Understand the fundamental principles and concepts of photogrammetry, remote sensing, and digital image processing.*
2. *Describe the various sensors, platforms, and techniques used in photogrammetry and remote sensing.*
3. *Apply photogrammetric techniques to extract three-dimensional information from aerial photographs and digital images.*
4. *Apply digital image processing techniques for enhancing and analyzing remote sensing data.*
5. *Apply the knowledge of remote sensing and DIP in various thematic studies*

Unit-1: Practicals in Photogrammetry **60 Hrs.**

Exercise-1: Indexing of aerial photographs.
Exercise-2: Introduction to stereoscopes
- 2.1: Orientation & construction of 3-D model under Pocket stereoscope
- 2.2: Stereoscopic Vision test

Exercise-3: Determination of scale
- 3.1: By establishing relationship between Photo distance and Ground distance
- 3.2: By establishing relationship between Photo distance and Map distance
- 3.3: By establishing relationship between Focal length and Flying height
- 3.4: Determination of Average Scale of Vertical Aerial Photograph

Exercise-4: Relief Displacement
- 4.1: Calculation of Relief Displacement

Exercise-5: Parallax
- 5.1: Object height determination from Parallax

Exercise-6: Calculation of Photo Coverage Area with Drone deploy
Exercise-7: Introduction to Photogrammetry software and generation of 3D model

Unit-2: Practicals in Satellite Remote Sensing **20 Hrs.**

Exercise-8: Study of satellite image browsing system
- 8.1: USGS Earth Explorer
- 8.2: Bhuvan Data Portal
- 8.3: Copernicus Open Access Hub

` Exercise-9: Visual interpretation of satellite images (True Color, FCC and Thermal)

Unit-3: Practicals in DIP **40 Hrs.**

Exercise-10: Introduction to DIP software
Exercise-11: Loading of image data, study of histogram and layer information
Exercise-12: Layer stacking and Interpretation of FCC image
Exercise-13: Supervised Classification
Exercise-14: Unsupervised classificationExercise-15: Accuracy assessment

References:

1. American Society of Photogrammetry, (1983). Manual of Remote Sensing, (2nd edition), ASP, Falls Church, Virginia.
2. Agarwal, C.S. and Garg, P.K. 2000. Textbook of Remote Sensing in Natural Resources Monitoring and Management. New Delhi: Wheeler Publishing.

3. Avery, T.E. 1985. Interpretation of aerial Photographs. Minneapolis, Minnesota: Burgess Publishing Company.
4. Bakker, Wim H., et al. 2001. Principles of Remote Sensing – An Introductory Textbook. Enschede, The Netherlands: ITC.
5. Banerjee, R.K. and Banerjee, B. 2000. Remote Sensing for Regional Development. New Delhi: Concept Publishing Company.
6. Campbell, James B. 1996. Introduction to Remote Sensing (Second Edition). London: Taylor & Francis.
7. Colwell, Robert N. (ed.) 1983. Manual of Remote Sensing, Second Edition, Volume 1 and 2. Falls Church, Virginia: American Society of Photogrammetry.
8. Gibson, Paul J. (2000). Introductory Remote Sensing – Principles and Concepts. Rout ledge.
9. Jensen, John R. 2000. Remote Sensing of the Environment – An Earth Resource Perspective. Pearson Educat ion (First Indian Edition, 2003).
10. Hord, R. Michae l. 1986. Remote Sensing – Methods and Applications. (A Wiley-Interscience Publication). New York: John Wiley & Sons.
11. Lillesand, T.M., Kiefer, R.W., and Chipman, J.W. 2004. Remote Sensing and Image Interpretation (5th Ed.). Wiley. (Wiley Student Edition).
12. Miller, V.C. 1961. Photogeology. New York: McGraw-Hill, Book Company, Inc.
13. Moffit, H.F., and Edward, M.M., 1980. Photogrammetry, Harperand Row Publishers, New York.
14. Paine, D.P. 1981. Aerial Photography and Image Interpretation for Resource Management. John Wiley & Sons.
15. Panda, B.C. 2005. Remote Sensing – Principles and Applications. New Delhi: Viva Books Private Limited.8
16. Rampal, K.K. 1999. Handbook of Aerial Photography and Interpretation. New Delhi: Concept Publishing Company.
17. Rashid, S.M. (Ed.) 1993. Remote Sensing in Geography. Delhi: Manak Publications, Pvt. Ltd.
18. Reddy, M.A. 2006. Textbook of Remote Sensing and geographicalInformation Systems. Hyderabad: B.S. Publications.
19. Sabins F.F Jr.1987, Remote Sensing: Principles and Interpretation, W.H.Freeman& Co., New York.
20. Wolf. P .R., 1974 .Elements of Photogrammetry, McGraw Hill books Co., London.

M.A./M.Sc. Geography (Part II) (Level - 6.5) (Semester III)
(NEP – 2020)
(Introduced from Academic Year 2023-24)

Title of Course: Statistical Techniques in Geography
Course Code: MMPR-304 (MSU0325MMP919I2)
Total Credits: 02
Course Outcomes (COs): *Upon successful completion of this course, students will be able to:*

1. *Understand the importance and use of statistical techniques in geography*
2. *Examine relationship between two or more variables with correlation and regression analysis*
3. *Learn statistical methods and techniques using computer*
4. *Apply comprehensive knowledge of statistics for analysis of geographical data*

Unit-1: **40 Hrs.**

Basics of Statistics

1: Definitions of statistics and its Importance and use in geography
2: Types and sources of statistical data in geography
3: Formation of frequency distribution table and its graphical representation using Histogram, Frequency Polygon, O give curve, Cumulative percentage curve

Measures of Statistics

4: Measures of central tendency using simple, discrete and continuous data: Mean, Median and Mode.
5: Measures of position: Estimation of quartiles, deciles and percentiles.
6: Measures of dispersion: Absolute measurements- Mean deviation, Quartile deviation, and Standard deviation.
7: Relative measurements: Coefficient of mean deviation, Coefficient of quartile deviation, Coefficient of variations, Index variability and Relative variability.

Unit-2

Analysis of Statistical Relationship **20 Hrs.**

8: Skewness: Karl Pearson's and Bowley's methods
9: Kurtosis
10: Correlation analysis: Spearman's rank order correlation and Pearson product moment correlation
11: Regression analysis: Simple and Multiple Regression
12: Least square method.

References:

1. Alvi, Z. (1995): Statistical Geography: Methods and Applications, Rawat Publications, Jaipur
2. Cole, J.P. & King, C.A.M. (1968): Quantitative Techniques in Geography. John Wiley & sons Inc.New York.
3. Elhance, D.N. (1972): Fundamentals of statistics, Kitab Mahal, Allahabad.
4. Gregory, S. (1968): Statistical methods and the geographer. Longman, London.
5. Gupta, C.B. (1978); An introduction to statistical Methods, Vikas Pub.House,New Delhi.
6. Hemawati: Statistical Methods for Geographers.
7. Hoel P.G.: Elementary Statistics, Wiley, New York.
8. King, L.J. (1991): Statistical Analysis in geography. Prentice Hall, Englewood Cliff N.J.
9. Mahmood, A. (1977): Statistical Methods in Geographical Studies, Rajesh Publications, New Delhi
10. Singh R. L. (1979): Elements of Practical Geography.

M.A./M.Sc. Geography (Part II) (Level - 6.5) (Semester III)
(NEP – 2020)
(Introduced from Academic Year 2023-24)

Title of Course: Biogeography
Course Code: MET-305 (MSU0325MET919I1)
Total Credits: 04
Course Outcomes (COs): *Upon successful completion of this course, students will be able to:*

1. *Understand the concepts and historical development of biogeography*
2. *Get comprehensive knowledge of different classification of animal and plants*
3. *Know about pattern of biogeography*
4. *Understand different processes in biogeography*
5. *Get detail knowledge about influencing factors on biogeography*

Unit-1: Concepts in Biogeography **15 Lectures**

Nature, scope and significance of Biogeography, History of Biogeography – Plate tectonic and biotic change, Communities, and patterns in biogeography – Biomes, Hotspots, biodiversity, alpha beta diversity and niche.

Unit-2: Influencing Factors **15 Lectures**

Influencing factors on life- physical, climatic, and biological. Influence of humans, disturbance factors – physical and biological, changing continents and climates, conservation of biogeography, phytogeography, phylogeography.

Unit-3: Classification of Animals and Plants **15 Lectures**

Taxonomical classification of animals and plants, Wallace classification, ecological and geographical, equilibrium theory, neutral theory, species area relationship.

Unit-4: Processes in Biogeography **15 Lectures**

Processes – evolution (life of origin theory, evolution theory), dispersal and vicariance, speciation, extinction, invasion, and colonization. Biological interactions – predations, competition, mutualism, parasitism and mimicry.

References:

1. Barry C. (1977): Biogeography – An ecological & evolutionary Approach, Oxford.
2. Cole M.M. (1975): Recent developments in Biogeography, Longman,London.
3. Danserau P. (1957): Biogeography- An Ecological perspective, Renold Press, New York.
4. Darlington P.J. (1957): Zoogeography – Methew, New York.
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7. Mathur H.S. (1986): Elements of Biogeography, Pointer Jaipur.
8. Martin C. (1975): Plant Geography. Methuen, London.
9. Muller P. (1986): Biogeography; Harper & Row, New York.
10. New big in M.I. (1986): Plant & Animal Geography : Methuen, London.
11. Pears N. (1985): Basic Biogeography, Longman, London.
12. Watts, d. (1971): Principles of Biogeography, McMillan, London.
13. Simmms T. G.: Biogeography, Natural & Cultural, Arnold & Heinemann, London.

M.A./M.Sc. Geography (Part II) (Level - 6.5) (Semester III)
(NEP – 2020)
(Introduced from Academic Year 2023-24)

Title of Course: Geography of Environment
Course Code: MET-306 (MSU0325MET919I2)
Total Credits: 04
Course Outcomes (COs): *Upon successful completion of this course, students will be able to:*

1. *Know about contents and methods of Geography of Environment as an academic and professional discipline.*
2. *Understand elements of environment and acquire knowledge about biodiversity*
3. *Get knowledge about natural hazards and management*
4. *Understand the various environmental issues and policies*

Unit-1: **15 Lectures**

Concept of environment: Major elements of environment; Functioning of environmental systems: role of biotic and abiotic elements; Biodiversity: meaning, factors influencing biodiversity.

Unit-2: **15 Lectures**

Ecosystem (geographic classification) terrestrial and aquatic ecosystems - location, types and characteristics; Energy flow in an ecosystem; food chain, food web and Ecological pyramids; succession; Biogeochemical cycles (carbon, nitrogen and oxygen).

Unit-3: **15 Lectures**

Pollution and Environment Degradation, Meaning and concept- environmental degradation and pollution, sources, types, effects and measures of pollution in Air, Water, land, soil. Natural hazards and its impact on environment, Global Warming, International Programmes and Polices (Brundtland Commission, Kyoto Protocol, Agenda 21, Sustainable Development Goals, Paris Agreement).

Unit-4: **15 Lectures**

Conservation and management of environment; Concept of sustainable development; Environment impact assessment; Meaning, Importance, needs of EIA, Environmental issues and policies in India, wild life Management, solid waste Management.

References:

Books & Reports:

1. Abbott, P.L: Natural Disasters, McGraw-Hill, London.
2. Botkin, D.B., Keller, E.A. (2007): Environmental science: Earth as a Living Planet. John Wiley and Sons, New York.
3. Cunningham, W. Cunningham, Mary: Environmental Science: A Global Concern (2010). MacGraw-Hill, London.
4. Government of India (2010): Status of Environment Report. New Delhi.
5. Keller, E.A, Vecchio, D.E.de: Natural Hazards: Earth's Processes as Hazards, Disasters, and Catastrophes. Prentice Hall, New York.
6. Marsh, W.M., Grossa, J. (2005): Environmental Geography: Science, land use, and Earth Systems. John Wiley, New York.
7. McKinney, M.L., Schoch, R.M. (2003): Environmental science: Systems and Solutions. Jones & Bartlett Learning.
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12. R. B. Singh (Ed): Disaster Management, Rawat Publication, New Delhi,
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14. H. K. Gupta (2003) (Ed): Disaster Management, University Press, India
15. Chandna, R. C. (2002): Environmental Geography, Kalyani, Ludhiana
16. Cunninghum, W. P. and Cunninghum, M. A. (2004): Principles of Environmental Science: Inquiry and Applications, Tata McGraw Hill, New Delhi
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18. Miller, G. T. (2004): Environmental Science: Working with the Earth, Thomson Brooks Cole, Singapore
19. MoEF (2006): National Environmental Policy-2006, Ministry of Environment and Forests, Government of India, New Delhi
20. Singh, S. (1997): Environmental Geography, PrayagPustakBhawan, Allahabad
21. UNEP (2007): Global Environment Outlook: GEO4: Environment For Development, United Nations Environment Programme

Research Journals:

Energy & Environmental Science
Frontiers in Ecology and the Environment
Global Environmental Change-Human and Policy Dimensions
Annual Review of Environment and Resources
Environment International
Review of Environmental Economics and Policy
Environmental Research Letters

M.A./M.Sc. Geography (Part II) (Level - 6.5) (Semester III)
(NEP – 2020)
(Introduced from Academic Year 2023-24)

Title of Course: Political Geography
Course Code: MET-307 (MSU0325MET919I3)
Total Credits: 04
Course Outcomes (COs): *Upon successful completion of this course, students will be able to:*

1. *Identify the geostrategic locations and areal extent of counties in the world*
2. *Understand the correlation between geography and political actions and processes*
3. *Get familiar with the electoral system in India*
4. *Evaluate intrastate and interstate conflicts and disputes of India*

Unit-1: **15 Lectures**

Definition, nature, scope and significance of Political Geography, Approaches to Political Geography, Elements of Political Geography: Spatial elements-location, size and shape; Economic elements-food, minerals and power resources; Human elements- population, race, caste, religion and language.

Unit-2: **15 Lectures**

Concept of state, nation and nation-state, Centripetal and centrifugal forces in state formation, Federalism and other forms of Governance, Frontiers and boundaries, Classification of boundaries, Geopolitics of climate change; world resources and Indian ocean, Role of India in world politics, Geo-strategic views: Mahan, Heartland and Rimland.

Unit-3: **15 Lectures**

Citizenship, Geographic influences on voting behaviour, Electoral reforms in India, Electoral system in India. Planning, Execution and Monitoring of Elections with GIS

Unit-4: **15 Lectures**

Regional organisations of cooperation (SAARC, ASEAN, OPEC, EU), Geographical determinants of foreign policy, Geopolitical conflicts with reference to India, Reorganization of Indian states, Statehood demands and reorganization possibilities in India, Inter-state conflicts in India, Internal security threats.

References:

Books & Reports:

1. Adhikari S., 1997: Political Geography, Rawat Pub. Jaipur.
2. Blij De H.J., 1972: Systematic Political Geography. Wiley, New York.
3. Cohen S.B., 1973: Geography and Politics in a divided world. Oxford, New York.
4. Colin F., 2011: Introduction to Geopolitics, Routledge.
5. Cox K.,2008: Political geography: Territory, State and Society, Blackwell Publishers ltd, 108, Cowely Road, Oxford.
6. Dikshit R D., 1999: Political Geography – A Century of Progress, Sage, New Delhi.
7. Dikshit R D., 1996: Political Geography – A Contemporary Perspective, Tata McGraw Hill, New Delhi.
8. Dixit R. D., 1982: Political Geography. Tata McGraw Hill New Delhi.
9. Dwivedi R.L.,1996: Political Geography. Chaitanya Prakashan Allahabad.
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14. Pounds N.G., 1972: Political Geography. McGraw Hill, London.
15. Taylor P.,1998: Political Geography, Prentice Hall.
16. Taylor P., 1985: Political Geography, Longman, London.
17. Valkenberg S.U. & Stoz C., 1963: Elements of Political Geography. Prentice Hall of India, New Delhi.

Research Journals:

1. *Political Geography* (*https://www.journals.elsevier.com/political-geography)*
2. *Journal of Geography, Politics and Society* (*https:// http://www.ejournals.eu/JGPS/*)
3. *Geopolitics - Journal of Political Geography, Geopolitics and Geostrategy*

Websites:

1. *Survey of India (http://www.surveyofindia.gov.in/)*
2. *Election Commission of India (https://eci.gov.in/)*
3. *South Asian Association for Regional Cooperation (http://saarc-sec.org/)*
4. *Association of Southeast Asian Nations (https://asean.org/)*
5. *OPEC (https://www.opec.org/)*
6. *EU (https://europa.eu/)*
7. *Legislative Department, Govt. of India (http://legislative.gov.in/)*

M.A./M.Sc. Geography (Part II) (Level - 6.5) (Semester III)
(NEP – 2020)
(Introduced from Academic Year 2023-24)

Title of Course: Research Project – I
Course Code: RP-308 (MSU0325RPP919I1)
Total Credits: 04
Course Outcomes (COs): *Upon successful completion of this course, students will be able to:*

1. *Recognize the objectives and significance of research work;*
2. *Formulate research design and methods;*
3. *Organize and carry out field visits, collect field data and/or conduct review of literature;*
4. *Effective writing, maintaining research ethics and academic integrity;*
5. *Preparation and dissemination of research output having scientific and/or social relevance.*

Research Project-I
Research 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. *Projects will be in batches of students in group.*
2. *Students are required to select a research topic of geographical importance based on empirical evidences of literature.*
3. *They are expected to carry out field work and use primary and/or secondary data, analyze it and prepare / submit the dissertation / project report for evaluation.*
4. *Students are also expected to present / publish the research output.*
5. *Allotment of guides / supervisor (teaching faculty) will be made at the beginning of the semester III.*

M.A./M.Sc. Geography (Part II) (Level - 6.5) (Semester IV)
(NEP – 2020)
(Introduced from Academic Year 2023-24)

Title of Course: Regional Planning and Development
Course Code: MMT-401 (MSU0325MML919J1)
Total Credits: 04
Course Outcomes (COs): *Upon successful completion of this course, students will be able to:*

1. *Understand the basic concepts in regional planning*
2. *Understand different methods in order to compute regional development*
3. *Get acquainted with theories and models for regional development*
4. *Get a specialized knowledge of policies and experiences of regional planning in India*.

Unit-1: Concepts in Regional Planning **15 Lectures**

Region-Concept, types and hierarchy of regions - planning- concept and types, Planning region-concept and characteristics of a planning region, Delineation of planning region, Indicators for measuring development, Development- meaning, growth versus development, Measurement of regional development.

Unit-2: Theories and Models for Regional Development **15 Lectures**

Theories and models for regional development: spread and backwash concept. Core and periphery concept, Central place theory, Growth pole, Growth foci approach, Ebenezer Howard's Garden City Concept; Green Belt Concept.

Unit-3: Policies and Experiences of Regional Planning **15 Lectures**

Policies and experiences of regional planning in India, Institutional framework from national planning level to regional development plans, Tennessee valley authority (USA), Damodar valley corporation (India).

Unit-4: Regional planning in India **15 Lectures**

Regional planning in India- rural and urban planning.Regional disparities in India, Planning for tribal area, Hilly area, Command area, and Drought-prone area development. GIS based decision making process, spatial data infrastructure and spatial information system, GIS applications in planning: population estimation, identification of illegal encampments, sources of pollution.

References:

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2. Alden, J. and Morgan, (1974): Regional Planning: A Comprehensive View, Leonard Hill Books, Beds.
3. Berry, BJ.L. and Horton, F.F. (1970): Geographic Perspectives on Urban
4. Bhat L.S. (1972): Regional Planning In India, Statistical Publishing Society
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10. Dickinson, R.E. (1964): City and Region, Rutledge, London.
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12. Friedmann J. and Alonso W. (1975): Regional Policy - Readings in Theory and Applications, MIT Press, Massachusetts.
13. Galasson, John (1974): An Introduction to Regional Planning Hutchinson. Educational London.
14. Gore C. G., 1984: Regions in Question: Space, Development Theory and Regional Policy, Methuen, London.
15. Gore C. G., Köhler G., Reich U-P. andZiesemer T., 1996: Questioning Development; Essays on the Theory, Policies and Practice of Development Intervention, Metropolis- Verlag, Marburg.
16. Hall, P. (1992): Urban and Regional Planning, Routledge, London.
17. Haynes J., 2008: Development Studies, Polity Short Introduction Series.
18. Hilborot, J.G.M (1971): Regional Planning. Rotterdam University Press, Rotterdam.
19. Johnson E. A. J., 1970: The Organization of Space in Developing Countries, MIT Press, Massachusetts.
20. Kulshetra ,S.K,(2012) : Urban and Regional Planning in India : A hand book for Professional Practioners , Sage Publication , New Delhi
21. Kundu, A. (1992): Urban Development Urban Research in India, Khanna Publ. New Delhi.
22. Misra , R.P, Sundaram K.V, PrakashRao , VLS(1974): Regional Development Planning in India , Vikas Publication , New Delhi
23. Misra, R.P (1992): Regional Planning: Concepts , techniques , Policies and Case
24. Misra, R.P. (1992): Regional Planning. Concept Publishing Company. New Delhi.
25. Reddi, K. V. (1988): Rural Development in India, Himalaya Pub, Mumbai.
26. Singh, R.L.(2008): Fundamentals of Human Geography, SharadaPustakBhawan, Allahabad, Studies , Concept, New Delhi
27. Sundran, K.V. (1977): Urban and Regional Planning in India, Vikas Publishing, New Delhi.
28. Swawy, M.C.K., Bhaskara, R. Hegde, V.M. (eds.) (2008): Urban Planning and Development at Cross Roads, BC Books for Change, Bangalore.
29. Whynnes, Charles &Hammand (1979): Elements of Human Geography, George Aflen& Unwin, London.

Web Sites

1. http://planningcommission.gov.in/
2. https://plan.maharashtra.gov.in/
3. https://dtp.maharashtra.gov.in/en
4. http://planningcommission.nic.in/
5. http://ncrpb.nic.in/
6. http://dda.org.in/ddaweb/index.aspx
7. https://mmrda.maharashtra.gov.in/home/
8. http://www.cmdachennai.gov.in/
9. http://www.kmdaonline.org/
10. http://www.bmrda.kar.nic.in/

M.A./M.Sc. Geography (Part II) (Level - 6.5) (Semester IV)
(NEP – 2020)
(Introduced from Academic Year 2023-24)

Title of Course: Development of Geographical Thought
Course Code: MMT-402 (MSU0325MML919J2)
Total Credits: 04
Course Outcome (COs): *Upon successful completion of this course, students will be able to:*

1. *Acquire knowledge about the historical development of the subject during different time scales.*
2. *Apprehend the place of geography in the field of science, social science and natural science.*
3. *Acquire knowledge about the historical development of the subject during different time scales.*
4. *Understand all the concepts of philosophy in geography.*
5. *Recognize different types of dualism and find solutions to terminate them by applying various types of scientific explanations.*
6. *Become acquainted with the variety of perspectives in Geography.*

Unit-1: Field of Geography **10 Lectures**

Definition and meaning of Geography; Field of Geography: its place in social and natural science; concepts and philosophy of geography: distributions, relationships, interactions, areal differentiation and spatial organization; Changes in major geographic traditions: Earth science, man-environment relationship, area studies, spatial analysis.

Unit-2: Evolution of Geographical Thought **20 Lectures**

Ancient Period: Contributions of Greeks, Romans, Arabs, Chinese and Ancient Indian scholars, Dark age: Medieval period; Impact of Explorations and Discoveries; Modern Geographical Thought - Contributions of: Bernhardus Varenius, Immanuel Kant, Alexander Von Humboldt, Carl Ritter, Schaefer and Richard Hartshorne, William Morris Davis, Ellen Chruchill, Semple and Ellsworth Huntington, Halfornd J Mackindel, Herbertson. Impact of Darwinian theory on geographical thought.

Unit-3: Dualism in Geography **10 Lectures**

Systematic and regional; physical and human; idiographic and nomothetic; qualitative and quantitative; concept of determinism and possibilism.

Unit-4: Scientific Explanations and paradigm shift and perspectives in geography **20 Lectures**

Scientific Explanations: routes to scientific explanations (inductive / deductive); types of explanations (cognitive description, cause and effect, temporal); theories, laws and models; quantitative revolution; Perspectives: Positivism, Behaviouralism, Humanism, Structuralism, Feminism, and Post modernism; Recent trends in Geography.

References:

1. Abler, Adms, J. & Gould, P. (1971): Spatial Organization. The Geographer's View of the World, Prentice Hall, New Jersey.
2. Adhikari, Sudeepta (2015): Fundamentals of Geographical Thought, Orient BlackSwan, New Delhi.
3. Ali S M : The Geography of Puranas, Peoples Publishing House, Delhi, 1966.
4. Amedeo, Douglas (1971): An Introduction to Scientific Reasoning in Geography, John Wiley,U.S.A.,1971.
5. Braithwaite, E.B (1960): Scientific Explanation, Harper Toreh Books, New York.
6. Dikshit, R. D. (2018): Geographical Thought: A Contextual History Of Ideas. PHI Learning, New Delhi.
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14. Gold, J.R. (1980): An Introduction to Behavioural Geography, Oxford University Press, Oxford.
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16. Harvey, D (1989): The Condition of Postcolonial, Blackwell.
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23. Johnston, R.J. (1988): The Future of Geography, Methuen, London.
24. Johnston, R.J. and Sidaway, J.D. (2004): Geography and Geographers. 6th edition, Edward Arnold, London.
25. Kapur, A. (ed.) (2001): Indian Geography – Voice of Concern. Concept Publishing. Company, New Delhi.
26. Lefebvre, H. (1991): The Production of Space, Blackwell (Translated By D. Nicholson- Smith).
27. Ley, D Samuel, M.S. (ed.) (1978): Humanistic Geography: Prospects and Problems, Croom Helm.
28. Majid, Hussain (1999): Geographic Thought, Rawat Publishing House, Jaipur.
29. Minshull, R.: The Changing Nature of Geography, Hutchinson University Library, London, 1970.
30. Nayak, Anoop and Jeffrey Alex (2011),"Geographical Thought : An Introduction to Ideas in Human Geography", Prentice Hall, Harlow
31. Peet R. And Thirft, N. (Eds.): New Models in Geography, Vo.I&II Unwin Hyman.
32. Peet, R. (Ed) (1977): Radical Geography: Alternative Viewpoints on Contemprary Social Issues, Methuen, London.
33. Peet, R. (1998): Modern Geographical Thought, Blackwell Publishers Inc. Massachusetts.
34. Singh, R. L. and Singh, Rana P.B. (eds.) (1992): The Roots of Indian Geography: Search and Research. National Geographical Society of India, B.H.U., Varanasi, Publication number 39.
35. Soja, E.W. (1977): Postmodern Geographies, Rawat Publications, Jaipur.
36. Taylor, G. (ed.) (1953): Geography in the Twentieth Century. Methuen and Company Ltd. and Company, London.
37. Unwin, T. (1992): The Place of Geography, Longman, UK.

Journal Articles:

1. Bunge, W. (1968): Fred K. Shaeffer and The Science of Geography, Harvard Papers in Theoretical Geography, Harvard University, Harvard.

2. Bunge, W. (1979): Fred K. Schaefer and the science of Geography, Annals, Association of American Geographers, 69:128-32.

3. Bunting, T.E, Guelke, L. (1979): Behavioral and Perception Geography: A Critical Appraisal, Annals, Association of American Geographers, 69:448-62.

4. Burton, I (1963): The Quantitative Revolution And Theoretical Geography, The Canadian Geographer 7:151-62.

M.A./M.Sc. Geography (Part II) (Level - 6.5) (Semester IV)
(NEP – 2020)
(Introduced from Academic Year 2023-24)

Title of Course: Agricultural Geography
Course Code: MET-403 (MSU0325MEL919J1)
Total Credits: 04

Course Outcomes (COs): *Upon successful completion of this course, students will be able to:*

1. *Know about nature, scope and significance of agricultural geography as an academic and professional discipline.*
2. *Understand the fundamental concept, crop combination, diversification, agricultural productivity and study the determinants of agricultural patterns.*
3. *Get knowledge about agricultural systems of the world.*
4. *Understand the agrarian revolution, socio-economic constraints, agricultural problems and policies*

Unit-1: **15 Lectures**

Definition, nature, scope and significance of agricultural geography; Origin and dispersion of agriculture; Approaches to the study of agricultural geography.

Unit-2: **15 Lectures**

Determinants of agricultural patterns-physical, economic and technological; Agricultural systems of the world - location, distribution, types & characteristics of agriculture.

Unit-3: **15 Lectures**

Concept & techniques of delimitation of agricultural regions- Crop combination, Crop diversification; Measurement and determinants of agricultural Productivity, Agricultural land use theory- Von Thunen's model of Land Use planning.

Unit-4: **15 Lectures**

Agricultural Revolution in India (Green, White) Nature, Socio-economic constraints in the adoption, performance, Problems & prospects. Land use survey, Land classification and land capability, Dry land Agriculture, Food Security, Organic farming. Impact of climate change on agriculture. Agricultural Policies in India.

References:

1. AlkaGautam (2012): Agricultural Geography, Sharda PustakBhawan, Allahabad.
2. Brown, L.R. (1990): The Changing World Food Prospects - The Nineties and Beyond. World Watch Institute, Washington D.C.,
3. Dyson, T. (1996): Population and Food - Global Trends and Future Prospects. Routledge, London,.
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5. Ilbury, B.W. (1983): Agricultural Geography. Oxford University Press, London.
6. Bhatt, M.S (ed.) 2004: Poverty and Food Security in India Problems and Policies. Akkar Books, New Delhi.
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10. Bhatia B.M. (1977): Poverty Agriculture & Economic Growth, Vikas New Delhi.
11. Chorley, R. &Haggett P (1971): Socio-Economic Models in Geography, Methuen, London.

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13. Hagerstrand, T (1968): Innovation Diffusion as a spatial process, University of Chicago Press.
14. Hussain, M. (1999): Systematic Agricultural Geography, Rawat publications, Jaipur.(India)
15. Shafi M. (1983): Agricultural Productivity and Regional Imbalances a Study of Uttar Pradesh, Concept, New Delhi.
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18. Sharma, T.C., Coutinho, O. (1989): Green Revolution Gaps: A Geographical Analysis, Indian Council of Social Science Research, New Delhi.

Research Journals:

1. *Global Food Security - Agriculture Policy Economics and Environment*
2. *Agriculture Ecosystems & Environment*
3. *Journal of the Science of Food and Agriculture*
4. *Agricultural Systems*
5. *Journal of Agricultural and Food Chemistry*
6. *Agricultural Water Management*
7. *Journal of Agricultural Economics*
8. *Agricultural Economics*
9. *International Journal of Agricultural Sustainability*
10. *Journal of Agricultural & Environmental Ethics*

M.A./M.Sc. Geography (Part II) (Level - 6.5) (Semester IV)
(NEP – 2020)
(Introduced from Academic Year 2023-24)

Title of Course: Geography of Resources
Course Code: MET-404 (MSU0325MEL919J2)
Total Credits: 04

Course Outcomes (COs): *Upon successful completion of this course, students will be able to:*

1. *Establish the relationship between the regional geography and natural resources as a whole.*
2. *Assess the major natural resources and source regions of the world. .*
3. *Assess the impact of exploitation on conservation of resources.*
4. *Understand the qualitative and quantitative aspects of human resource development.*
5. *Look into the national policy of India on natural resources and human resources.*

Unit: 1 **15 Lectures**

Definition, Nature and Scope, Concept and Classification of Resources. Distribution and Characteristics of Major Natural Resources and source regions of the World: Soils, Forest, Water. Power and Minerals – petroleum, coal, Iron ore, Bauxite, Copper, Tin.

Unit: 2 **15 Lectures**

Exploitation, uses and conservation of resources: forest, water, soil, fisheries, minerals and energy resources (coal, petroleum), and non –conventional energy resources.

Unit: 3 **20 Lectures**

Human Resources: Quantitative and Qualitative aspects, population growth, distribution and density pattern, causes of inequalities. Population and resources relationship-carrying capacity of land under different environment.

Unit: 4 **10 Lectures**

National and global Policies on Natural Resources. Global organizations for sustainable development of resources. Population Policy and Programmes in India.

Reference:

1. Asthana, D. K. (2018), A Textbook of Environmental Studies, S Chand Publishers, New Delhi.
2. Bruntland, G. (1987). *Our Common Future, World Commission on Environment & Development.* Oxford: Oxford University Press
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M.A./M.Sc. Geography (Part II) (Level - 6.5) (Semester IV)
(NEP – 2020)
(Introduced from Academic Year 2023-24)

Title of Course: Social and Cultural Geography
Course Code: MET-405 (MSU0325MEL919J3)
Total Credits: 04
Course outcomes (Cos): *Upon successful completion of this course, students will be able to:*

1. *Study and identify the philosophical base, problems associated with society & its culture.*
2. *Know about the culture, cultural regions, hearths and their diffusion, realms, and distribution of races.*
3. *Study and knowing of socio-cultural diversity of India, and processes of social changes.*
4. *Understand the social justice and well-being of society, to find out the level of well-being in India.*

Unit-1: Social Geography **15 Lectures**

Conceptual and methodological approaches in Social and Cultural Geography. Definition, scope, and significance of Social and Cultural Geography. Roots of Social Geography and social problem, housing space and society, Spatial Interaction and Social relations, and geography of poverty.

Unit-2: Races and Culture **15 Lectures**

Concept of race. Basis of racial classification and their physical characteristics. Races of India. Griffith Taylor and C.S. Coon's Theories of distribution of races of mankind in the world. Concept of culture, culture areas and culture regions, Cultural hearths and their diffusion, World Culture Realms.

Unit-3: Socio-cultural Diversity **15 Lectures**

Concept of Dialects and ethnicity. Distribution of Religion, Caste, Tribe, Languages in India. Concept of social areas, North-South Socio-Cultural diversity of India, Processes of Social changes: Modernization, Sanskritization and Globalization.

Unit-4: Social Justice and Well-being **15 Lectures**

Concept of social Justice and fair society, Equality and welfare, social development and well-being, Concepts, Components and Indicators of measurement of social wellbeing. Patterns of social wellbeing in world and India. Women empowerment, Social status of women in India.

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M.A./M.Sc. Geography (Part II) (Level - 6.5) (Semester IV)
(NEP – 2020)
(Introduced from Academic Year 2023-24)

Title of Course: Data Representation Methods: Physical Geography
Course Code: MEPR-406 (MSU0325MEP919J1)
Total Credits: 04
Course Outcomes (COs): *Upon successful completion of this course, students will be able to:*

1. *Know the methods of representation of relief.*
2. *Understand the topographical maps.*
3. *Identify and map relief features.*
4. *Analyse drainage basin morphometry.*
5. *Understand the formats of Indian daily weather report and reading of weather signs and symbols*
6. *Represent meteorological elements diagrammatically and interpretation of results.*
7. *Know methods of measurement of meteorological elements*
8. *Analyse interrelationship between various meteorological elements*
9. *Analyse present and future trends of meteorological elements.*

Unit-1: Relief Representation and Mapping of Landforms **30 Hrs.**
Practical Exercise(s):

1-3: Relief representation method: Pictorial and Mathematical.
4-5: Map: Definition and types.
6: Indexing of Topographical sheets.
7-9: Identification and Mapping of Landforms from Topographical Maps: Ridge, Saddle, Col., Pass, Spur, Plateau, Escarpment, Cliff, Waterfall, River Terraces, 'U' shaped Valley, 'V' shaped Valley.

Unit-2: Drainage Basin Analysis **30 Hrs.**
Practical Exercise(s):

10-12: Quantitative Analysis of Channel Planform: Sinuosity Index of Straight, Sinuous and meandering channel.
13: Drainage Basin Morphometry.
14-15: Calculation of Bifurcation Ratio, Drainage Density and Stream Frequency.
16-17: Analysis of Cross Profiles & Longitudinal Profile of River; projected, superimposed and composite profile.

Unit-3: Diagrammatic Depiction of Meteorological Elements **30 Hrs.**
Practical Exercise(s):

18: Weather details: Weather Signs & symbols
19-21: Reading and interpretation of weather maps of representative seasons.
22: Interpolation of Isopleth
23-25: Depiction and Interpretation of Comfort diagrams- Climograph, Hythergraph, Climatograph

Unit-4: Analysis of Interrelationship: Meteorological Elements **30 Hrs.**
Practical Exercise(s):

26: Spatial correlation of climatic variables: Graphical analysis
27: Water budget: Graphical analysis
28: Analysis of upper air data- Tephigram (Temperature Height diagram)

29: Ergographs (Crop Calendar)

30-31: Dispersion graphs: Temperature and rainfall dispersion Diagram

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Websites:

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- *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: http://worldweather.wmo.int*
- *India water portal: https://www.indiawaterportal.org*

M.A./M.Sc. Geography (Part II) (Level - 6.5) (Semester IV)
(NEP – 2020)
(Introduced from Academic Year 2023-24)

Title of Course: Data Representation Methods – Human Geography
Course Code: MEPR-407 (MSU0325MEP919J2)
Total Credits: 04
Course Outcomes (COs): *Upon successful completion of this course, students will be able to:*

1. *Know basic cartographic techniques of human geography*
2. *Make graphical representation of geographical data*
3. *Analyse demographic, social, economic, agricultural and industrial data*
4. *Prepare suitable maps and diagrams for effective visual representation*

Practical Exercise(s):

Unit-1: **30 Hrs.**

1-2: Measures of population growth (absolute, arithmetic and exponential).

3-6: Graphical representation of population distribution and composition of age, sex, rural-urban and occupational structure.

7-9: Calculation and representation of fertility (crude birth rate, general fertility rate); mortality (crude death rate, infant mortality rate) and literacy rate (crude literacy rate, specific literacy rate).

Unit-2: **30 Hrs.**

10: Computation of human development index.

11-13: Calculation and representation of health, social and economic wellbeing indicators.

14-15: Calculation and representation of wealth inequality: Lorenz curve and Gini Co-efficient.

16-17: Measurement of agricultural efficiency and intensity; methods of delineating crop combination regions (Weaver, Doi, Raifulla method).

18: Calculation of food security index (composite method of availability & accessibility).

Unit-3: **30 Hrs.**

19-20: Analysis of industrial intensity: location quotient, index of similarity, location co-efficient, location curve.

21: Measurement of industrial development.

22-24: Road accessibility matrix, gravity model showing transport interaction, traffic flow analysis.

Unit-4: **30 Hrs.**

25: Nearest Neighbor Analysis.

26: Density functions and pattern analysis of distribution of settlement (randomness and spacing indices).

27-28: Breaking point analysis (Losch), measures of centrality (Christaller), connectivity (Pitts).

29: Rank size distribution of towns (Zipf and Berry-Garrison).

30: Functional classification of towns (Harris and Nelson).

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M.A./M.Sc. Geography (Part II) (Level - 6.5) (Semester IV)
(NEP – 2020)
(Introduced from Academic Year 2023-24)

Title of Course: Research Project – II (Dissertation)
Course Code: RP-408 (MSU0325RPP919J1)
Total Credits: 06
Course Outcomes (COs): *Upon successful completion of this course, students will be able to:*

1. *Recognize the objectives and significance of research work;*
2. *Formulate research design and methods;*
3. *Organize and carry out field visits, collect field data and/or conduct review of literature;*
4. *Effective writing, maintaining research ethics and academic integrity;*
5. *Preparation and dissemination of research output having scientific and/or social relevance;*
6. *Assimilate cultural, economic and environmental diversity encountered during study tour / Geographical Excursion.*

Unit-1: Research Project – II **150 Hrs.**

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

Unit-2: Study Tour / Geographical Excursion **30 Hrs.**

Study tours and visits to places having important geographical features/ landforms and/or social & cultural relevance.

Total Contact Hours: 180 Hrs.

Note (s):

1. *Research topic and work for Research Project- II (Dissertation) preferably should be different for each student.*
2. *Students are required to select a research topic of geographical importance based on empirical evidences of literature.*
3. *They are expected to carry out field work and use primary and/or secondary data, analyze it and prepare / submit the dissertation / project report for evaluation.*
4. *Students are also expected to present / publish the research output.*
5. *Allotment of guides / supervisor (teaching faculty) will be made at the end of the semester III.*

9. Scheme of Teaching: Scheme of teaching and time table for lectures, tutorials and practicals will be notified before start of every semester.

10. Examination Pattern and Requirement before appearance for University Assessment:

Course Type	University Assessment Marks (pl. check scheme of marking)	Internal Assessment Marks (Class Test + Seminar/ Assignment)	During University Assessment				Supervisor's Report (for Internal Marks)
			Seminar Presentation	Assignment /Journal	Project Reports	Study Tour Report	
Theory	**80**	**20**	Required	--	--	--	--
Practical – 4 Credits	**100**	**Nil**	--	Required	--	--	--
Practical – 2 Credits	**50**	**Nil**	--	Required	--	--	--
Field Project / On Job Training – 4 Credits	**60**	**40**	Required	--	Required	--	40
Research Project – 4 Credits	**80**	**20**	Required	--	Required	--	20
Research Project – 6 Credits	**120**	**30**	Required	--	Required	Required	30

11. Nature of Question Paper and Scheme of Marking 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	25
Q2.	Evaluation of Project Report	30
Q3.	Viva-voce	25
Total = 03	--	**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	40
Q3.	Evaluation of Study Tour Report	20
Q4.	Viva-voce	30
Total = 04	--	**120**

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

12. Equivalence of Courses

M.A./M. Sc. Geography Part I & Part II (Semester I, II, III, and IV)

Old Course			Equivalent Course		
Course No.	**Course Title**	**Credits**	**Course No.**	**Course Title**	**Credits**
CC-101, CC-401	Fundamentals of Geomorphology Applied Geomorphology	4	MMT-101	Geomorphology	4
CC-102	Principles of Climatology	4	MMT-102	Principles of Climatology	4
CC-103	Economic Geography	4	MMT-103	Economic Geography	4
CCPR-205.1	Computer Applications in Geography	*	MMPR-104	Computer Applications in Geography	2
CC-104	Geography of Population and Human Resource Development	4	MET-105	Population Geography and Human Resource Development	4
DSE-304(1)	Settlement Geography	4	MET-106	Settlement Geography	4
DSE-404(3)	Geography of Health and Nutrition	4	MET-107	Geography of Health and Nutrition	4
CCPR-305.1	Research Methodology and Geographical Excursion	*	RM-108	Research Methodology in Geography	4
CCS-203	Advanced Cartography and Surveying	4	MMT-201	Advanced Cartography and Surveying	4
CC-301	Applied Climatology and Climate Change	4	MMT-202	Climate Change and Disaster Management	4
CCPR-105.1	Practicals in Geomorphology and Surveying (1)	*	MMPR-203	Advanced Surveying	2
DSE-403(1)	Fundamentals and Applications of GIS and GPS	4	MET-204	Fundamentals and Applications of GIS and GPS	4
DSE-403(2)	Fundamentals of Soil Geography	4	MET-205	Fundamentals of Soil Geography	4
DSE-404(2)	Tourism Geography	4	MET-206	Tourism Geography	4
CCPR-405.2	Introduction to GIS Software and GPS	4	MEPR-207	Introduction to GIS Software and GPS	4
CCPR-405.2	Soil and Water Analysis	4	MEPR-208	Soil and Water Analysis	4
--	--	--	MEPR-209	Practical in Tourism Geography	4
--	--	--	OJT-210	On Job Training	4
--	--	--	FP-210	Field Project	4
CC-202	Geohydrology and Oceanography	4	MMT-301	Geohydrology and Oceanography	4
CCS-302	Fundamentals of Remote Sensing and DIP	4	MMT-302	Fundamentals of Remote Sensing and DIP	4
CCPR-405.1	Photogrammetry, Remote Sensing and DIP	4	MMPR-303	Photogrammetry, Remote Sensing and DIP	4
CCPR-205.2	Statistical Techniques in Geography	*	MMPR-304	Statistical Techniques in Geography	2
DSE-303(2)	Biogeography	4	MET-305	Biogeography	4
DSE-303(1)	Geography of Environment	4	MET-306	Geography of Environment	4
DSE-304(3)	Political Geography	4	MET-307	Political Geography	4
--	--	--	RP-308	Research Project – I	4
CCS-402	Regional Planning and Development	4	MMT-401	Regional Planning and Development	4
CC-201	Development of Modern Geographical Thought	4	MMT-402	Development of Geographical Thought	4
DSE-404(1)	Agricultural Geography	4	MET-403	Agricultural Geography	4
--	--	--	MET-404	Geography of Resources	4
CCS-204	Social and Cultural Geography	4	MET-405	Social and Cultural Geography	4
CCPR-105.1, CCPR-105.2	Practicals in Geomorphology and Surveying (2) Analysis of Climatic Data	*	MEPR-406	Data Representation Methods – Physical Geography	4
CCPR-105.3, CCPR-205.3	Analysis of Socio-economic Data Quantitative Techniques in Geography	*	MEPR-407	Data Representation Methods – Human Geography	4
CCPR-305.2	Dissertation/ Project	*	RP-408	Research Project – II (Dissertation)	6
DSE-304(2)	Geography of India	4	--	--	--

* These courses were part of combined practical courses (8 credits)