Estd. 1962
"A++" Accredited by NAAC (2021)
With CGPA 3.52

SHIVAJI UNIVERSITY, KOLHAPUR - 416004, MAHARASHTRA
PHONE:EPABX-2609000, www.unishivaji.ac.in, bos@unishivaji.ac.in
शिवाजी विद्यापीठ, कोल्हापूर -४१६००४,महाराष्ट्र
दूरध्वनी-ईपीएबीएक्स -२६०९०००, अभ्यासमंडळे विभाग दुरध्वनी ०२३१—२६०९०९४
०२३१—२६०९४८७

Ref:SU/BOS/Science/435 **Date: 15/07/2025**

To,

The Principal, All Concerned Affiliated Colleges/Institutions Shivaji University, Kolhapur	The Head Department of Geography Shivaji University, Kolhapur.

Subject: Regarding minor change in syllabi of as per NEP-2020 (2.0) under the Faculty of Science and Technology.

Ref: SU/BOS/Science/556Date: 25/07/2023 Letter.

Sir/Madam,

With reference to the subject mentioned above, I am directed to inform you that the university authorities have accepted and granted approval to the minor change in syllabi of degree programme under the Faculty of Science and Technology.

1.	M.A./M.Sc. Part I Geography

This syllabus shall be implemented from the academic year 2025-2026 onwards. A soft copy containing the syllabus is attached herewith and it is also available on university website **www.unishivaji.ac.in** > Online Syllabus.

You are, therefore, requested to bring this to the notice of all students and teachers concerned.

Thanking you,

Yours faithfully,

Dy Registrar
Dr. S. M. Kubal

Copy to:

1	The Dean, Faculty of Science & Technology	7	P.G. Admission Section
2	Director, Board of Examinations and Evaluation	8	Computer Centre/ I. T. Cell
3	The Chairman, Respective Board of Studies	9	Affiliation T.1 & T.2
4	B.Sc./M.Sc. Exam	10	Establishment Section PG
5	Internal Quality Assurance Cell (IQAC Cell)	11	P.G. Seminar Section
6	Appointment A & B Section	12	Eligibility Section

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दूरध्वनी - ईपीएबीएक्स - २६०९०००, अभ्यासमंडळे विभाग दुरध्वनी ०२३१—२६०९०९३/९४

SU/BOS/Science/556 **Date: 25/07/2023**

To,

The Principal, All Concerned Affiliated Colleges/Institutions Shivaji University, Kolhapur	The Head/Co-ordinator/Director All Concerned Department (Science) Shivaji University, Kolhapur.

Subject: Regarding syllabi of as per NEP-2020 under the Faculty of Science and Technology.

Sir/Madam,

With reference to the subject mentioned above, I am directed to inform you that the university authorities have accepted and granted approval to the revised syllabi, nature of question paper and equivalence of degree programme under the Faculty of Science and Technology.

1.	M.Sc. Part I Geography	3.	Dept of Statistics Value Added Course i) Artificial Intelligence and Machine Learning -I ii) Artificial Intelligence and Machine Learning -II
2.	M.Sc. Part I Chemistry (Inorganic, Organic, Physical, Analytical, Industrial, Applied)		

This syllabus, nature of question and equivalence shall be implemented from the academic year 2023-2024 onwards. A soft copy containing the syllabus is attached herewith and it is also available on university website **www.unishivaji.ac.in** > Online Syllabus.

The question papers on the pre-revised syllabi of above-mentioned course will be set for the examinations to be held in October /November 2023 & March/April 2024. These chances are available for repeater students, if any.

You are, therefore, requested to bring this to the notice of all students and teachers concerned.

Thanking you,

Dy Registrar
Dr. S. M. Kubal

Copy to:

1	The Dean, Faculty of Science & Technology	5	P.G. Admission/Seminar Section
2	Director, Board of Examinations and Evaluation	6	Computer Centre/ Eligibility Section
3	The Chairman, Respective Board of Studies	7	Affiliation Section (U.G.) (P.G.)
4	B.Sc. Exam/ Appointment Section	8	Centre for Distance Education

SHIVAJI UNIVERSITY, KOLHAPUR

Established: 1962
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Revised Syllabus

for the degree of

M.A./M.Sc. in Geography

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

Structure and Syllabus in Accordance with National Education Policy - 2020

(with Multiple Entry and Multiple 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)

Phone: +91-0231-2609194
Fax: +91-0231-2691533
Email: geography@unishivaji.ac.in
Web: http://www.unishivaji.ac.in/dptgoe/

INDEX

1. Preamble:

The M.A./M.Sc. Programme in Geography is offered by the Department of Geography, under the Faculty of Science and Technology at Shivaji University, Kolhapur. This interdisciplinary programme is designed for postgraduate students from both Geography and science backgrounds, offering a comprehensive curriculum that integrates theoretical knowledge with practical applications in the field of Geography. The programme receives financial support from the Government of Maharashtra, and the Department also benefits from research and infrastructure grants provided through various schemes of the Government of India.

With the support of these funding agencies, the Department has significantly enhanced its infrastructure to foster an enriched and dynamic learning environment. Recognized as one of the premier geography departments in India, it offers a holistic academic curriculum that aligns with contemporary developments in the discipline. In addition to core academic training, the Department provides enrolled students opportunities to pursue discipline-specific short-term certificates and value-added courses aimed at improving employability and professional competencies.

The Department is equipped with modern teaching and learning facilities including smart classrooms, overhead LCD projectors, digital boards, a computer laboratory, Wi-Fi access, a state-of-the-art GIS laboratory with advanced mapping software, sophisticated instruments, a dedicated departmental library, and a conference/meeting hall, creating an environment conducive to academic excellence.

Students admitted to the programme are expected to possess foundational knowledge in Geography. The master's programme aims to strengthen students' abilities to apply specialized geographic knowledge in addressing real-world challenges, enhancing their skills and competencies to meet societal and professional demands. Additionally, the programme seeks to nurture entrepreneurial capacities and foster a strong research orientation among students, thereby contributing to the advancement of the discipline.

1. **Duration:** The programme duration is two years, comprising four semesters. Each semester spans a minimum of 6 months / minimum of 120 working days (minimum 90 teaching days).

2. **Eligibility for Admission:**

   For Level 6.0 (Part I):

   Candidates must possess a Bachelor of Arts (B.A.) or Bachelor of Science (B.Sc.) degree with Geography as a principal or major subject from a recognized university or institution. or candidates holding a bachelor's degree in any discipline of science from a recognized university or institution are also eligible for admission.

   For Level 6.5 (Part II):

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

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

3. **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	4	--	4	80	32	3	20	8	1
	MEPR-206/207	--	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 examinations 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: Bachelor's degree in Geography (preferred) or any Science discipline from a recognized university	
•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.	

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):

After the successful completion of M.A./ M.Sc. Geography, the student will be able to

1. Demonstrate in-depth knowledge of physical and human geography, including its foundational theories, principles, and emerging subfields.
2. Develop the ability to make comprehensive analysis, interpret spatial problems, and suggest proper solutions by using theoretical, methodological, and instrumental knowledge of Geography.
3. Apply geographic knowledge and skills to meet contemporary societal and professional needs, enhancing employability in education, research, planning, geospatial technology, and allied sectors.
4. Understand and promote sustainable management of natural resources by integrating ecological awareness with geographical perspectives.
5. Critically evaluate regional, national, and global environmental challenges, and stay updated with recent developments, geospatial innovations, and policy frameworks.
6. Design and undertake independent research to address emerging issues in society and the environment, fostering analytical thinking, ethical research practices, and community engagement.

7. Course Codes:

Sr. No.	Course No.	Course Title	Credits	Course Codes
		Semester - I		
1	MMT-101	Geomorphology	4	MSU0325MMT919G1
2	MMT-102	Principles of Climatology	4	MSU0325MMT919G2
3	MMT-103	Geodesy and Cartography	4	MSU0325MMT919G3
4	MMPR-104	Statistical and Computational Analysis in Geography	2	MSU0325MMP919G1
5	MET-105	Agricultural Geography	4	MSU0325MET919G1
	MET-106	Political Geography	4	MSU0325MET919G2
	MET-107	Economic Geography	4	MSU0325MET919G3
6	RM-108	Research Methodology	4	MSU0325RMP919G
		Semester - II		
1	MMT-201	Climate Change and Disaster Management	4	MSU0325MMT919H1
2	MMT-202	Regional Planning and Development	4	MSU0325MMT919H2
3	MMPR-203	Climatic Data Analysis and Visualization	2	MSU0325MMP919H1
4	MET-204	Fundamentals of GIS	4	MSU0325MET919H1
	MET-205	Introduction to Tourism	4	MSU0325MET919H2
5	MEPR-206	Introduction to GIS Software	4	MSU0325MEP919H1
	MEPR-207	Tour Agency Management	4	MSU0325MEP919H2
6	OJT-208	On Job Training	4	MSU0325OJP919H
	FP-209	Field Project	4	MSU0325FPP919H
		Semester - III		
1	MMT-301	Geohydrology and Oceanography	4	MSU0325MMT919I1
2	MMT-302	Fundamentals of Remote Sensing	4	MSU0325MMT919I2
3	MMPR-303	Photogrammetry and Remote Sensing	4	MSU0325MMP919I1
4	MMPR-304	Hydrological Data Analysis	2	MSU0325MMP919I2
5	MET-305	Population Geography	4	MSU0325MET919I1
	MET-306	Biogeography	4	MSU0325MET919I2

	MET-307	Urban Geography	4	MSU0325MET919I3
6	RP-308	Research Project – I	4	MSU0325RPP919I1
		Semester - IV		
1	MMT-401	Development of Geographical Thought	4	MSU0325MMT919J1
2	MMT-402	Environment Geography	4	MSU0325MMT919J2
3	MET-403	Advance GIS and Python	4	MSU0325MET919J1
	MET-404	Tour and Travel Agency Management	4	MSU0325MET919J2
	MET-405	Surveying	4	MSU0325MET919J3
4	MEPR-406	Advance GIS and Python	4	MSU0325MEP919J1
	MEPR-407	Travel Agency Management	4	MSU0325MEP919J2
	MEPR-408	Advanced Surveying	4	MSU0325MEP919J3
5	RP-409	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 (MSU0325MMT919G1)
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 tectonism and geomorphology with knowledge of the interior of the Earth.*
2. *Look into the evolution of continents and ocean basins with the 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. Holm's Convectional Current theory, Geosynclinal theory of Kobber etc.

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 and Walther Penck.

Unit - 4: Applied Geomorphology **10 Lectures**
Geomorphology and hazard management, Anthropogenic Geomorphology, Environmental Geomorphology, and recent trends in Geomorphology.

Reference:

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2. Bloom, A. L. (1991). *Geomorphology* (2nd ed.). Prentice Hall.
3. Brierley, G. J., & Fryirs, K. A. (2005). *Geomorphology and river management*. Blackwell Publishing.
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17. Singh, S. (1998). *Geomorphology*. Prayag Pustak Bhavan.
18. Sparks, B. W. (1986). *Geomorphology*. Longman.
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20. Thomas, M. F. (1974). *Tropical geomorphology*. Macmillan.
21. Thornbury, W. D. (1969). *Principles of geomorphology*. Wiley Eastern Ltd.
22. Wadia, D. N. (1993). *Geology of India*. Tata McGraw-Hill.
23. Worcester, P. G. (1948). *Textbook of geomorphology*. D. Van Nostrand.

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.nature.com/subjects/geomorphology

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 the structure and composition of the Atmosphere.*
2. *Understand the variations of weather systems in terms of Stability and Instability of the 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 anticyclones.*
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: Introduction to Climatology **15 Lectures**

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

Unit - 2: Moisture in the Atmosphere **15 Lectures**

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: Atmospheric Motion **15 Lectures**

Air Pressure, Pressure measurement and distribution, Factors affecting wind, Pressure belts, Classification of Wind, Planetary winds, Monsoon and Local winds, Air Masses, Classification of Air Masses.

Unit - 4: Atmospheric Disturbances **15 Lectures**

Fronts, Characteristics and types, Tropical Cyclones, Anticyclones, Thunderstorms, Monitoring and Modeling Atmospheric Disturbances, Weather forecasting and meteorological satellites, Application of Synoptic Climatology.

References:

1. Aguado, E., and Burt, J.E. (2013): *Understanding Weather and Climate*, Pearson, New York, 552pp.
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1. *Bulletin of the American Meteorological Society (https://journals.ametsoc.org/toc/bams/current)*
2. *Climate Dynamics (https://link.springer.com/journal/volumesAndIssues/382)*
3. *International Journal of Climatology (https://rmets.onlinelibrary.wiley.com/journal/10970088)*
4. *Journal of Climate (https://journals.ametsoc.org/toc/clim/current)*
5. *Nature Climate Change (https://www.nature.com/nclimate/)*
6. *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: Geodesy and Digital Cartography

Course Code: MMT-103 (MSU0325MMT919G3)

Total Credits: 04

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

1. *Understand the basic concepts of geodesy, Earth's shape, datums, coordinate systems, and map projections.*
2. *Apply cartographic principles in map design, including data types, scales, symbols, and colour systems.*
3. *Differentiate between manual and digital cartography, and use tools for spatial data representation.*
4. *Use advanced digital tools like web, mobile, and 3D mapping platforms.*
5. *Evaluate emerging technologies such as automation, AR, VR, and AI in cartography.*

Unit - 1: Concept of Geodesy and Map Projection **15 Lectures**

Definition and fundamentals of geodesy, shape and size of the Earth – geoid, spheroid, ellipsoid, concept of datum – vertical and horizontal, coordinate systems – geographic and projected, principles and classification of map projections, choice of projections, WGS 84 and UTM projection system.

Unit - 2: Fundamentals of Cartography **15 Lectures**

Cartographic data – nature, classification, and sources, scale, types and importance, definition and classification of maps, map elements, design principles and process, symbolization and generalization, cartographic errors and accuracy, basics of colour systems in cartography.

Unit - 3: Digital Cartography **15 Lectures**

Introduction to digital cartography, manual vs. digital cartography, components – hardware and software, cartographic databases and data formats, methods of spatial and non-spatial data representation, visualization techniques, applications of digital cartography.

Unit - 4: Advanced Methods and Technologies in Digital Cartography **15 Lectures**

Web-based and interactive mapping, real-time, dynamic and mobile cartography, location-based services (LBS), 3D cartography and virtual globes (e.g., Google Earth, Cesium), Automation and scripting in cartography, Emerging trends: AR, VR, and AI in cartographic visualization.

References:

1. Field, Kenneth (2018). *Cartography.* Esri Press.
2. Fu, P., & Sun, J. (2020). *Web GIS: Principles and Applications.* Esri Press.
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1. *Bhuvan (Indian Geo-Platform of ISRO): https://bhuvan.nrsc.gov.in*
2. *Survey of India (Department of Science & Technology): https://www.surveyofindia.gov.in*
3. *USGS (Map Projections Resource): https://pubs.usgs.gov/pp/1395/*
4. *CesiumJS (3D virtual globe): https://cesium.com*
5. *EPSG Geodetic Parameter Dataset: https://epsg.io*
6. *Esri Training and GIS Education: https://www.esri.com/training/*
7. *Google Earth Engine: https://earthengine.google.com*
8. *Indian Institute of Surveying & Mapping (IISM): http://www.iism.nic.in*
9. *Indian National Cartographic Association (INCA): https://incaindia.org*
10. *National Atlas & Thematic Mapping Organisation (NATMO): https://www.natmo.gov.in*
11. *GIS (Open-source GIS software): https://www.qgis.org*

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

Title of Course: Statistical and Computational Analysis 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. *Identify and classify various types of geographical data for statistical analysis.*
2. *Perform descriptive statistical calculations using computer-based tools and represent results through appropriate graphs and charts.*
3. *Analyse spatial relationships using correlation, regression, and hypothesis testing techniques.*
4. *Demonstrate the use of statistical software for data processing and visualization in geography.*
5. *Evaluate and interpret geographic patterns through quantitative techniques and reporting.*

Unit - 1: Descriptive Statistics and Data Handling in Geography 35 Hrs.

(using MS Excel/statistical software)

Exercise 1: Types and classification of geographic data - attribute vs spatial; primary vs secondary.
Exercise 2: Preparation and tabulation of geographic data
Exercise 3: Graphical representation of data- bar chart, line graph, pie chart, histogram, cumulative frequency curves.
Exercise 4: Calculation of measures of central tendency of grouped and ungrouped data- mean, median, mode.
Exercise 5: Calculation of measures of dispersion of grouped and ungrouped data - range, standard deviation, variance, coefficient of variation.
Exercise 6: Calculation of measures of position- Decile and percentile
Exercise 7: Computation and interpretation of skewness and kurtosis in a geographic dataset.

Unit - 2: Inferential Statistics and Computational Applications in Geography 25 Hrs.

(using MS Excel/statistical software)

Exercise 8: Introduction to correlation - calculation of Karl Pearson's correlation coefficient.
Exercise 9: Simple linear regression - computation, plotting, and interpretation with geographic examples.
Exercise 10: Hypothesis testing - application of t-test and chi-square test in geographical data.
Exercise 11: Applying statistical techniques to real datasets using climate, population, or land use datasets for practical statistical analysis.
Exercise 12: Interpretation of results and preparation of statistical reports from exercises.

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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: Agricultural Geography
Course Code: MET-105 (MSU0325MET919G1)
Total Credits: 04
Course Outcomes (COs): *Upon successful completion of this course, students will be able to:*

1. *Critically evaluate the theories, scope, and evolution of agricultural geography.*
2. *Analyze the physical, economic, and technological determinants shaping agricultural patterns.*
3. *Apply quantitative techniques to delineate agricultural regions*
4. *Assess the impacts of agricultural revolutions, policies, and globalization on food security and sustainability.*
5. *Design field-based surveys.*

Unit - 1: Foundations and Emerging Paradigms **15 lectures**
Definition, nature, and scope of agricultural geography, Origin and dispersion of Agriculture; Approaches to the study of Agricultural Geography.

Unit - 2: Determinants and Global Systems **15 lectures**
Physical determinants: soil, climate, topography, water resources, Economic and market factors: land tenure, infrastructure, input-output linkages, Technological drivers: mechanization, precision agriculture, biotechnology, Global agricultural systems: shifting cultivation, plantation, mixed farming, pastoralism, intensive commercial agriculture.

Unit - 3: Regionalization and Productivity Analysis **15 lectures**
Delimitation of agricultural regions: crop combination, diversification indices, Land-use theories: Von Thunen model, Productivity measurement: yield indices, statistical and remote-sensing derived estimates.

Unit - 4: Field Applications **15 lectures**
Understanding Land-use Survey, Food Security, Organic Farming best-practice guidelines. Climate change and agriculture, AI in agriculture.

References:

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3. *European Space Agency. (n.d.). Copernicus Open Access Hub. Retrieved June 25, 2025, from https://scihub.copernicus.eu/*
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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: Political Geography
Course Code: MET-106 (MSU0325MET919G2)
Total Credits: 04
Course Outcomes (COs): *Upon successful completion of this course, students will be able to:*

1. *Define and explain the fundamentals and approaches of Political Geography.*
2. *Describe the spatial, economic, and human elements influencing political structures.*
3. *Analyse classical geopolitical theories and assess their contemporary relevance.*
4. *Apply geographic tools and techniques to study electoral systems and behaviour.*
5. *Evaluate political conflicts, state reorganization, and internal security issues in India.*

Unit - 1: Fundamentals of Political Geography **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: Geopolitics and State Dynamics **15 Lectures**

Concepts of state, nation, and nation-state, Governance structures: Federalism, unitary systems, Frontiers and boundaries: classification, disputes, Geopolitics: theories (Mahan, Mackinder's Heartland, Spykman's Rimland), India's role in contemporary geopolitics

Unit - 3: Electoral Geography **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: Political Geography of India **15 Lectures**

Geopolitical conflicts in 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.
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Research Journals:

1. *Political Geography* (*https://www.journals.elsevier.com/political-geography*)
2. *Journal of Geography, Politics and Society:* 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. *Legislative Department, Govt. of India (http://legislative.gov.in/)*

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: MET-107 (MSU0325MET919G3)
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. *Theorize and critique core and emerging concepts in economic geography.*
3. *Analyze resource distribution and energy systems using geospatial techniques.*
4. *Evaluate industrial and service sector dynamics within global and regional contexts.*
5. *Get detailed knowledge of the economic power determinants of a country and be able to analyze the economic development of a country.*

Unit – 1: Theoretical Foundations & Emerging Concepts **15 lectures**
Nature, scope, and key approaches in economic geography, Economic processes: production, exchange, consumption, and spatial interaction, Classification of economic activities: primary, secondary, tertiary, quaternary, Emerging paradigms: digital economy, circular economy, spatial econometrics, sustainable development.

Unit – 2: Resource Geography & Energy Systems **10 lectures**
Conceptualization and classification of resources, Global distribution of energy resources: fossil fuels and renewables, OPEC energy crises.

Unit - 3: Industrial & Service Sector Geography **15 lectures**
Classical and contemporary location theories: Weber, Losch approaches, Global value chains, industrial clusters, and innovation ecosystems, Service sector geography: spatial patterns of urban, financial, and digital services, Policy frameworks: SEZs, industrial corridors, Make in India.

Unit - 4: Applied Economic Geography **20 lectures**
Resource Distribution Mapping, Industrial Location Modelling: Conduct cost-distance and least-cost path analysis for a proposed facility, Global Value Chain Visualization: trade flow of a selected commodity, Digital Economy (e.g., internet penetration, e-commerce hubs), Regional Trade blocks EEC, EFTA, & WTO.

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

1. *Formulate clear geographic research problems and hypotheses.*
2. *Design sampling schemes and instruments for primary data collection.*
3. *Process and analyse quantitative and spatial datasets.*
4. *Write and present research reports, abstracts, proposals, and journal-style papers using proper citation and ethical best practices.*

Unit - 1: Concepts & Design **30 Hrs.**
Exercise 1: Defining a Research Problem: write aim/objectives, delimit the study area, methodology, and Charts.
Exercise 2: Hypothesis Formulation & Conceptual Framework: Draft two testable hypotheses and sketch a simple causal diagram.
Exercise 3: Research Designs: experimental (formal/informal), non-experimental; case-study, survey, action research

Unit - 2: Data Collection & Preparation **30 Hrs.**
Exercise 4: Data Types & Sources: primary (observation, interviews, and questionnaires), secondary (census, maps, and archives)
Exercise 5: Sampling Design: probability (simple random, systematic, stratified, cluster) and non-probability (purposive, quota, convenience), Sampling Design Simulation.
Exercise 6: Questionnaire & Schedule Construction
Exercise 7: Data Processing: editing, coding, tabulation.

Unit - 3: Literature Review & Citation **30 Hrs.**
Exercise 8: Loc. cit.., Op. cit. & Ibid.
Exercise 9**:** Footnotes vs. Endnotes
Exercise 10**:** In-Text Citations & Quotation Integration
Exercise 11**:** Reference List & Bibliography Compilation.

Unit - 4: Research Writing & Ethics **30 Hrs.**
Exercise 12: Plagiarism Awareness & Ethical Use of Sources: Identify plagiarism in three passages, rewrite with attribution, and list mitigation strategies.
Publication Process: choosing journals; understanding h-index, i10-index, altmetrics
Exercise 13: Abstract & Summary Writing: Draft a 250-word abstract and a 500-word executive summary.
Exercise 14: Project Proposal Drafting: Prepare a 2-page mini-proposal: background, rationale, methodology, timeline, expected outcomes.

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Websites:

1. *Elsevier Journals:* https://www.elsevier.com
2. *Google Scholar:* https://scholar.google.co.in/
3. *Web of Science:* https://clarivate.com/products/web-of-science/
4. *Scopus:* https://www.scopus.com/home.uri
5. *JSTOR:* https://www.jstor.org/
6. *Directory of Open Access Journals (DOAJ):* https://doaj.org/
7. *Science Open:* https://www.scienceopen.com/
8. *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: Climate Change and Disaster Management
Course Code: MMT-201 (MSU0325MMT919H1)
Total Credits: 04
Course Outcomes (COs): *Upon successful completion of this course, students will be able to:*

1. *Understand climate and climate change-related issues and impacts on society and the environment.*
2. *Get comprehensive knowledge about the history, recent trends, impacts, and dynamics of climate change on Earth.*
3. *Assess future risks of climate change and the adaptation and mitigation options.*
4. *Recognize causes, consequences, and vulnerabilities of various natural and man-made disasters.*
5. *Plan for prevention, preparation, and mitigation of disasters.*

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

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 **14 Lectures**

Paleoclimatology regarding the evolution of the Earth's systems, General overview of climate change, Recent trends of climate change and extreme weather events, and its impact on natural and human subsystems, Future climate changes – risks and impacts, Adaptation and mitigation options of climate change.

Unit - 3: Hazards and Disasters **14 Lectures**

Meaning and types of hazards and disasters; Causes and impacts of hazards and disasters (with special reference to earthquake, volcanic eruption, tsunami, landslide, cyclone, flood, and drought); Disaster exposure and vulnerabilities in Maharashtra, India, and the world.

Unit - 4: Disaster Management **08 Lectures**

Prevention and mitigation of disasters; Disaster preparedness and response plan; Disaster management cycle; 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.
6. Christopherson, R.W. (2012): *Geosystems – An Introduction to Physical Geography*, Prentice Hall, Boston, 623pp.
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.
8. IPCC 5th Assessment report on Climate Change*:* *http://www.ipcc.ch/report/ar5/*
9. IPCC 6th Assessment report on Climate Change: *https://www.ipcc.ch/assessment-report/ar6/*
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12. Khan, M.Z.A., and Gangawala, S. (2011): *Global Climate Change – Causes and Consequences*, Rawat Publications, Jaipur, 298pp.

13. Lal, D.S. (2011): *Climatology*. Sharda pustak Bhavan, Allahabad, 448pp.
14. Levin, H.L., and King, D.T. (2017): *The Earth Through Time*. John Wiley & Sons, USA, 590pp.
15. Lutgens, F.K., and Tarbuck, E.J. (2013): *The Atmosphere – An Introduction to Meteorology*. Prentice Hall, Boston, 506pp.
16. Martin, R.E., (2018): *Earth's Evolving Systems – The History of Planet Earth*. Jones & Bartlett Learning, Burlington, USA, 615pp.
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18. Philander, S.G. (2008): *Encyclopedia of Global Warming and Climate Change*, Sage, London, 1283pp.
19. Rohli, RV., and Anthony, J.V. (2018): *Climatology*. Jones & Bartlett Learning, Burlington, USA, 418pp.
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21. Singh, S. (2009): *Climatology*, Prayag Pustak Bhawan, Allahabad, 504pp.
22. Stanley, S.M. (2009): *Earth System History*, W.H. Freeman, New York, 551pp.
23. *World Development Report 2010: Development and Climate Change*, World Bank, Washington D.C., 417pp.

Research Journals:

1. *Atmospheric Environment (https://www.sciencedirect.com/journal/atmospheric-environment)*
2. *Bulletin of the American Meteorological Society (https://journals.ametsoc.org/toc/bams/current)*
3. *Climate Change (https://link.springer.com/journal/volumesAndIssues/10584)*
4. *Climate Dynamics (https://link.springer.com/journal/volumesAndIssues/382)*
5. *Global Environmental Change (https://www.sciencedirect.com/journal/global-environmental-change)*
6. *International Journal of Climatology (https://rmets.onlinelibrary.wiley.com/journal/10970088)*
7. *International Journal of Disaster Risk Reduction (https://www.sciencedirect.com/journal/international-journal-of-disaster-risk-reduction)*
8. *Journal of Climate (https://journals.ametsoc.org/toc/clim/current)*
9. *Mausam (http://metnet.imd.gov.in/imdmausam/)*
10. *Natural Hazards (https://link.springer.com/journal/11069)*
11. *Nature Climate Change (https://www.nature.com/nclimate/)*
12. *Nature Geoscience (https://www.nature.com/ngeo/)*
13. *Weather and Climate Extremes (https://www.sciencedirect.com/journal/weather-and-climate-extremes)*
14. *WIREs Climate Change (https://onlinelibrary.wiley.com/journal/17577799)*

Websites:

1. *India Meteorological Department: http://www.imd.gov.in*
2. *Intergovernmental Panel on Climate Change: https://www.ipcc.ch/*
3. *NASA-Climate Change and Global Warming: https://climate.nasa.gov/*
4. *NCEI-NOAA: https://www.ncei.noaa.gov/*
5. *NCEI-NOAA Natural Hazards Data: https://www.ngdc.noaa.gov/hazel/view/about*
6. *National Disaster Management Authority: https://ndma.gov.in/*
7. *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: Regional Planning and Development
Course Code: MMT-202 (MSU0325MMP919H2)
Total Credits: 04
Course Outcomes (COs): *Upon successful completion of this course, students will be able to:*

1. *Explain the key concepts, typologies and indicators used in regional planning.*
2. *Critically evaluate classical and contemporary theories and models of regional development.*
3. *Assess national- and state-level policy frameworks and institutional mechanisms through comparative case studies.*
4. *Get a specialized knowledge of policies and experiences of regional planning in India.*
5. *Design and implement a practical model for regional planning, integrating field data and spatial analysis tools.*

Unit - 1: Foundations of Regional Planning **15 lectures**

Concepts & Definitions: Region, typologies (formal, functional, planning), hierarchy and scales, planning: concept, objectives, levels (national - regional - local), Delineation & Measurement: Criteria and methods for delimiting planning regions, Indicators: demographic, economic, social, environmental, Quantitative measures of growth vs. development.

Unit - 2: Theoretical Frameworks in Regional Development **15 lectures**

Classical Models: Spread–backwash (Myrdal), Core–periphery (Friedmann), Central Place Theory (Christaller), Growth Poles (Perroux) & Growth Foci (Mishra), Planning Concepts: Ebenezer Howard's Garden City & Green Belt, Polycentric and networked regional development, Contemporary Approaches: Sustainable regional development models, Smart specialization and innovation ecosystems.

Unit - 3: Policy Frameworks & Case Studies **15 lectures**

Institutional Architecture: National (NITI Aayog, Ministry of Housing & Urban Affairs), State planning commissions, regional planning boards, Policy Instruments: Five-Year Plans- policies and experiences of regional planning in India, Comparative Case Studies: Damodar Valley Corporation (India), Tennessee Valley Authority (USA)

Unit - 4: Practical Model Development **15 lectures**

Selection and delimitation of a planning region (rural/urban/tribal/hilly), Formulation of objectives and development indicators, Primary data collection (household surveys, transects) or Secondary data sources (Census, town-planning maps, remote sensing), Building a decision-support model, and policy recommendations.

References:

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2. Alden, J., & Morgan, J. (1974). *Regional planning: A comprehensive view*. Leonard Hill Books.
3. Berry, B. J. L., & Horton, F. F. (1970). *Geographic perspectives on urban systems*. Prentice Hall.
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5. Blij, H. J. de (1971). *Geography: Regions and concepts*. John Wiley & Sons.
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Websites:

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5. *Kolkata Metropolitan Development Authority. (n.d.). Retrieved from http://www.kmdaonline.org/*
6. *Mumbai Metropolitan Region Development Authority. (n.d.). Retrieved from https://mmrda.maharashtra.gov.in/home/*
7. *National Capital Region Planning Board. (n.d.). Retrieved from http://ncrpb.nic.in/*
8. *Planning authorities and vision documents*
9. *Planning Commission of India (archive). (n.d.). Retrieved from http://planningcommission.nic.in/*
10. *Planning Commission of India. (n.d.). Retrieved from http://planningcommission.gov.in/*
11. *Town and Country Planning, Maharashtra. (n.d.). Retrieved from https://dtp.maharashtra.gov.in/en*

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

Title of Course: Climate Data Analysis and Visualization
Course Code: MMPR-203 (MSU0325MMP919H1)
Total Credits: 02
Course Outcomes (COs): *Upon successful completion of this course, students will be able to:*

1. *Browse and perform basic statistical analysis of weather and climate data.*
2. *Integrate climatic data with geospatial tools for visualization and interpretation.*
3. *Analyze and interpret climate data for projection, and vulnerability assessment.*

Practical Exercise(s):

Unit-I Climate Data- Browsing and Basic Statistical Analysis **30 Hours**

Exercise 1: Browsing of climate data - stationary data
Exercise 2: Browsing of climate data - gridded data
Exercise 3: Calculation of climate averages and anomalies
Exercise 4: Co-relation analysis between climate variables
Exercise 5: Rainfall and temperature trend analysis and projection

Unit-II: Climate Data- Visualization and Interpretation **30 Hours**

Exercise 6: Climograph preparation and interpretation
Exercise 7: Integration of climate data with geospatial tools
Exercise 8: Visualization and interpretation of spatiotemporal temperature characteristics
Exercise 9: Visualization and interpretation of spatiotemporal rainfall characteristics
Exercise 10: Depiction of anomalies and changes in temperature and rainfall

References:

Books & Reports:

1. **Aguado, E.,** and Burt, J.E. **(2013)**: *Understanding Weather and Climate*, Pearson, New York, 552pp.
2. **Ahrens, C.D. (2008)**: *Essentials of Meteorology – An Invitation to the Atmosphere*, Thomson Learning, Belmont, 485pp.
3. **Barry, R.G.,** and Chorley, R.J. **(2010)**: *Atmosphere, Weather and Climate*, Routledge, London, 516pp.
4. **IPCC 6th Assessment report on Climate Change**: https://www.ipcc.ch/assessment-report/ar6/
5. **Lutgens, F.K.,** and Tarbuck, E.J. **(2013)**: *The Atmosphere – An Introduction to Meteorology*. Prentice Hall, Boston, 506pp.
6. **Sarkar A. (2015)**: Practical geography: A systematic approach. Orient Blackswan, New Delhi.
7. **Singh, L.R. (2022):** Fundamentals of Practical Geography, Sharda Pustak Bhawan.
8. **Wilks, D.S. (2011):** Statistical Methods in the Atmospheric Sciences, Academic Press, New Delhi. 676pp.

Research Journals:

Bulletin of the American Meteorological Society: https://journals.ametsoc.org/toc/bams/current
Current Science: https://www.currentscience.ac.in/
Hydrology and Earth System Sciences: https://www.hydrol-earth-syst-sci.net/
International Journal of Climatology: https://rmets.onlinelibrary.wiley.com/journal/10970088
Journal of Climate: https://journals.ametsoc.org/toc/clim/current
Journal of Water Resource Planning and Management: https://ascelibrary.org/journal/jwrmd5

Mausam: http://metnet.imd.gov.in/imdmausam/
Nature Geoscience: https://www.nature.com/ngeo/
Physics and Chemistry of the Earth: https://www.sciencedirect.com/journal/physics-and-chemistry-of-the-earth-parts-a-b-c
Water Research: https://www.sciencedirect.com/journal/water-research
Water Resources Research: https://agupubs.onlinelibrary.wiley.com/journal/19447973

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/
NCEI-NOAA: https://www.ncei.noaa.gov/
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: Fundamentals of Geographical Information System
Course Code: MET-204 (MSU0325MET919H1)
Total Credits: 04
Course Outcomes (COs): *Upon successful completion of this course, students will be able to:*

1. *Understand the core principles and foundational concepts of Geographic Information Systems (GIS).*
2. *Gain proficiency in using various GIS analysis tools and techniques.*
3. *Develop awareness of current trends and advancements in the field of Geoinformatics.*
4. *Acquire practical skills to effectively apply GIS knowledge in professional and real-world scenarios*

Unit - 1: Basics of GIS **15 Lectures**

Definition of GIS, History and development of GIS, Components, Types of Geographic data; Raster and Vector data model; Spatial data input: Digitization and Conversion, Digitization errors, Topology and topological relationship.

Unit - 2: Introduction to DBMS **15 Lectures**

Attribute Data in GIS, Types of attribute data, Database Management System (DBMS); Relational Model, Normalization, Types of relationship, and SQL.

Unit - 3: GIS Analysis **20 Lectures**

Spatial analysis: Overlay and Buffer Analysis; Spatial Queries; Interpolation techniques in GIS, Network analysis, Terrain analysis: DEM, DTM, and TIN; Data quality Issues.

Unit - 4: Recent Trends **10 Lectures**

Recent trends in GIS with its applications – Web GIS, Virtual 3D GIS, Role of AI/ML, Mobile GIS

References:

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
4. Bracken, Ian and Webster, Christopher. 1990. Information Technology in Geography and Planning (Including Principles of GIS). London & New York: Routledge.
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13. DeMers, Michael N. 2000. Fundamentals of Geographic Information Systems (2n d Ed.) (Wiley Student Edit ion). New York: John Wiley & Sons, Inc.
14. Foresman, T. (Ed.) 1998. The History of Geographic Information Systems – Perspectives from the Pioneers. Upper Saddle River, NJ: Prentice Hall.
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23. Progress in Human Geography, vol. 24, no. 4, pp.569-590.
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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:

1. *GeoInformatica*
2. *Journal of Geographic Information Systems*
3. *Journal of Geographical Sciences.*
4. *Geo-environmental Disasters*
5. *Geospatial Information Science*
6. *Agricultural Water Management*
7. *Land Use Policy*

Websites:

1. *https://www.esri.com/en-us/what-is-gis/overview*
2. *https://gisgeography.com/what-gis-geographic-information-systems/*
3. *http://webhelp.esri.com/arcgisdesktop/9.3/index.cfm?TopicName=Topology%20basics*
4. *https://www.esri.com/news/arcuser/0401/topo.html*
5. *https://gisgeography.com/100-earth-remote-sensing-applications-uses/*
6. *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: Introduction to Tourism
Course Code: MET-205 (MSU0325MET919H2)
Total Credits: 04
Course Outcomes (COs): *Upon successful completion of this course, students will be able to:*

1. *Understand basic concepts in tourism.*
2. *Learn about different tourism systems for the development of tourism.*
3. *Work efficiently, learn the concept of travel behaviour and motivations.*
4. *Understand the different linkages of the tourism industry.*
5. *Gain knowledge of the tourism field.*

Unit - 1: Introduction **15 Lectures**

Tourism: Meaning and definition, characteristics of tourism, significance of tourism. History of tourism development. Components of Tourism and Its Theories: Need for Measurement of Tourism, Interdisciplinary Approaches, Types & Forms of Tourism.

Unit - 2: Different Tourism Systems **15 Lectures**

Different Tourism Systems- Leiper's Geospatial Model, Mill-Morrison, Mathieson & Wall, Butler's Tourism Area Life Cycle (TALC) - Doxey's Irritation Index – Demonstration Effect–Crompton's Push and Pull Theory, Allo-centric and Psycho-centric Model of Destination Preferences.

Unit – 3: Travel Behaviour & Motivations **15 Lectures**

Travel Behaviour& Motivations: Origin of Travel Motivation, Meaning of Motivation &Behaviour, Theory of Travel Motivations, Typology of Tourists, Different Travel Motives, Tourist Centric Approach, Leisure Travel Motivations, Tourist Decision making Process, Lifestyle Pattern, Tourism Mindedness of People, Tourism & Cultural Relationships, Cultural Exchanges, GIT, FIT & Affinity Group Travel, Bilateral & Multilateral Tourism, Relationship between Human Life and Travel, Growth of Social Tourism.

Unit – 4: Tourism Industry & Its Linkages **15 Lectures**

Tourism Industry & Its Linkages: Meaning and Nature of Tourism Industry, Input and Output of Tourism Industry, Tourism Industry Network- Direct, Indirect and Support Services, Basic Components of Tourism - Transport- Accommodation- Facilities & Amenities, Horizontal and Vertical Integration in Tourism Business, Tourism Business during Liberalisation &Globalisation, Positive & Negative Impacts of Tourism.

References:

1. Swain, S.K. & Mishra, J.M.(2012). Tourism Principles & Practices, Oxford University Press, New Delhi.
2. Bhatia A.K. (2002), International Tourism Management, Sterling Publishers, New Delhi.
3. Robert W. McIntosh, Charles R. Goeldner, J. R. Brent Ritchie (1995) Tourism: Principles, Practices, Philosophies, John Wiley & Sons; 7th Edition
4. Goeldner, C.R. & Brent Ritchie, J.R. (2006). Tourism, Principles, Practices, Philosophies. John Wiley and Sons, New Jersey.
5. Michael M. Coltman. (1989). Introduction to Travel and Tourism- An International Approach. Van Nostrand Reinhold, New York.
6. Roday. S, Biwal. A & Joshi. V. (2009). Tourism Operations and Management, Oxford University Press, New Delhi. 9
7. Jitendra Mohan Mishra & Sampad Kumar Swain (2011) Tourism: Principles and Practices.

Websites:

1. Indian Tourism Development Corporation : https://itdc.co.in/
2. World Tourism organisation: https://www.unwto.org/

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
Course Code: MEPR-206 (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 a decision support system and to develop various models for GIS spatial analysis.*
4. *To develop practical skills in spatial data acquisition, exploration, management, and analysis using DBMS techniques.*
5. *To analyze and apply recent advancements in geospatial technologies, including 3D visualization, Web GIS, and Mobile GIS for real-world applications.*

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: DBMS- Design a Database and Create Tables
Exercise 10: DBMS- Defining Relationships and Creating Queries and Reports
Exercise 11: Data query: Spatial and Attribute
Exercise 12: Interpolating Point Data
Exercise 13: Overlay and Buffer Analysis
Exercise 14: Network and Terrain Analysis

Unit-4 Unit-4: Recent Trends in GIS **30 Hrs.**

Exercise 15: 3D Visualization
Exercise 16: Web GIS
Exercise 17: Mobile GIS

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5. Obe, R. O., & Hsu, L. S. (2015). PostGIS in Action (2nd ed.). Manning Publications.
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Websites:

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2. https://www.qgistutorials.com/en/
3. https://spatialthoughts.com/learning-paths/
4. https://earthdata.nasa.gov
5. https://www.tutorialspoint.com/postgresql/index.htm
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7. https://extract.bbbike.org
8. https://www.sqltutorial.org
9. https://openlayers.org/doc/tutorials/concepts.html
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M.A./M.Sc. Geography (Part I) (Level - 6.0) (Semester II)
(NEP – 2020)
(Introduced from Academic 2023-24)

Title of Course: Tour Agency Management
Course Code: MEPR-207 (MSU0325MEP919H2)
Total Credits: 04
Course Outcomes (COs): *Upon successful completion of this course, students will be able to:*

1. *Understand the work procedure of a tour agency.*
2. *Learn how to prepare packages.*
3. *Develop communication skills for communication with service providers.*
4. *Develop the skill of itinerary preparation.*
5. *Learn how to calculate cost.*
6. *Become familiar with marketing skills for the tourism industry.*

Unit – 1: Preparation of packages
Exercise 1 Development of package: collection of information of region, selection of destination, facilities available at destination, selection of sightseeing, arrangement of services, negotiation for services, communication with service providers. Preparation and days, and schedule.
Exercise 2. Packages for a school trip.
Exercise 3. Packages for college trips.
Exercise 4. Packages for senior citizens.
Exercise 5. Packages for mass packages.
Exercise 6. Packages for customised packages.

Unit - 2: Itinerary preparation
Exercise 7: Itinerary preparation rules and regulations, dos and don'ts.
Exercise 8: Itinerary preparation for mass package.
Exercise 9: Itinerary preparation for a customised package.
Exercise 10: Itinerary preparation for special groups for Indian states and
Exercise 11: Itinerary preparation for international tours.

Unit – 3: Costing of package
Exercise 12: Write Fixed cost.
Exercise 13: Write variable cost.
Exercise 14: Cost preparation for mass package.
Exercise 15: Cost preparation for customised package.
Exercise 16: Cost preparation for special groups for Indian states and
Exercise 17: Cost preparation for international tours.

Unit – 4: Marketing and selling of tour packages
Exercise 18 Promotions of packages.
Exercise 19 advertisement.
Exercise 20 brochures.
Exercise 21 website design.
Exercise 22 pamphlets and leaflets.
Exercise 23 SWOT analysis.

References:
1. Swain, S.K. & Mishra, J.M.(2012). Tourism Principles & Practices, Oxford University Press, New Delhi.
2. Chand, M. (2002), Travel Agency Management: An Introductory Text, Anmol Publications Pvt. Ltd., New Delhi.
3. Negi. J (2005), Travel Agency Operations: Concepts and Principles, Kanishka, New Delhi.
4. Holloway, J.C. (2002), The Business of Tourism, Prentice Hall, London, pp.220-279.
5. Roday S., Biwal A.& Joshi. V. (2009), Tourism Operations and Management, Oxford University Press, New Delhi, pp-164-296.

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

Title of Course: On-the-Job Training
Course Code: OJT-208 (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 the given task;*
3. *Learn new concepts and improve their knowledge base;*
4. *Do teamwork and manage job practical difficulties.*

Duration: One month during summer vacation

Joining Report of On-Job Training: Students are expected to join for their on-the-job training with prior intimation to the department. They are expected to carry out work under the guidance of a 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 a report of their work in the prescribed format.*
2. *Internal assessment while on job training will be done by the job supervisor and needs 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-208 (MSU0325FPP919H)
Total Credits: 04
Course Outcomes (COs): *Upon successful completion of this course, students will be able to:*

1. *Carry out a field project on their own;*
2. *Formulate project design and methodologies;*
3. *Organize and carry out field visits, collect field data, and/or conduct a 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. *The field project applies only to those students who are unable to find placement for on-the-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.*

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

1. 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

2. 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.

3. 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**
MMT-101	Geomorphology	4	MMT-101	Geomorphology	4
MMT-102	Principles of Climatology	4	MMT-102	Principles of Climatology	4
MMT-201	Advanced Cartography and Surveying	4	MMT-103	Geodesy and Cartography	4
MMPR-304	Statistical Techniques in Geography	2	MMPR-104	Statistical and Computational Analysis in Geography	2
MET-403	Agricultural Geography	4	MET-105	Agricultural Geography	4
MET-307	Political Geography	4	MET-106	Political Geography	4
MMT-103	Economic Geography	4	MET-107	Economic Geography	4
RM-108	Research Methodology in Geography	4	RM-108	Research Methodology	4
MMT-202	Climate Change and Disaster Management	4	MMT-201	Climate Change and Disaster Management	4
MMT-401	Regional Planning and Development	4	MMT-202	Regional Planning and Development	4
MEPR-406	Data Representation Methods – Physical Geography	4			
MET-204	Fundamentals and Applications of GIS and GPS	4	MET-204	Fundamentals of GIS	4
MET-206	Tourism Geography	4	MET-205	Introduction to Tourism	4
MEPR-207	Introduction to GIS Software and GPS	4	MEPR-206	Introduction to GIS Software	4
MEPR-209	Practical in Tourism Geography	4	MEPR-207	Tour Agency Management	4
OJT-210	On Job Training	4	OJT-208	On Job Training	4
FP-210	Field Project	4	FP-208	Field Project	4