SAVITRIBAI PHULE PUNE UNIVERSITY, PUNE

(Formerly University of Pune)

Two Year Post Graduate Programme in Geography

(Faculty of Science & Technology)

Choice Based Credit System (CBCS)

Syllabi for

M. A. / M. Sc. Geography (First Year)

(For Affiliated Colleges to Savitribai Phule Pune University)

Syllabus as per the guidelines of National Education Policy 2020

To be implemented from Academic Year 2023-2024

SAVITRIBAI PHULE PUNE UNIVERSITY, PUNE

SyllabiasperNEP2020 for

M.A./M.Sc.(Geography)Part–I

(For Affiliated Colleges to Savitribai Phule Pune University)

Two Year - IV Semester award PG Degree on completion of 88 credits

or

One Year - PG Degree (44 credits) after Four Year UG Degree (UG Honors)

Choice Based Credit System (CBCS)

Title of the Programme: M.A. / M.Sc. Geography

Preamble:

Introduction:

National Education Policy 2020 lays particular emphasis on the development of creative potential of each individual. It is based on the principle that education must develop not only cognitive capacities - both the 'foundational capacities' of literacy and numeracy and 'higher-order' cognitive capacities, such as critical thinking and problem solving – but also social, ethical, and emotional capacities and dispositions. On behalf of new education policy Savitribai Phule Pune University has decided to change the syllabi of various faculties from June 2023. Taking into consideration the rapid changes in science and technology and new approaches in different areas of Geography and related subjects, Board of Studies in Geography after a thorough discussion with the teachers of Geography from different colleges affiliated to the Savitribai Phule Pune University and all stakeholders has prepared the syllabus of M. A. / M. Sc. Semester - I and Semester- II (w.e.f. 2023-2024) Geography programme under the Choice Based Credit System (CBCS). The model curriculum as developed by NEP 2020 is used as a guideline for the present syllabi. The syllabi focus on credits related to major core, major elective, research methodology, internship/On job training and research projects.

Aims and Objectives of the new curriculum:

i. To update the curriculum as per the NEP 2020.
ii. To incorporate recent development in the field of Geography.
iii. To enhance the quality and standards of knowledge of Geography.
iv. To create an aptitude for Geography in those students who show a promise for higher studies and creative work in Geography.

v. Even if a student takes exit after 1st year, he will be provided with job opportunities with required skill set.

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

vii. Provide job oriented skills to the students with multiple entry and exit option.

viii. To create research culture and on job training for made a competent students for Indian future.

ix. To inculcate the interdisciplinary and multidisciplinary approach in the curriculum.

x. To enhance employability and entrepreneurship skill among the students.

xi. To develop research and innovative skill among the students.

Programme Specific Outcome (PSO):

On completion of the Two-year Post Graduation in Geography, students will:

1. Possess an enriched and comprehensive knowledge of Geography and its practical applications across various disciplines.
2. Develop a strong sense of environmental values, being well-informed about sustainable development goals, as well as various cross-cutting issues affecting our planet.
3. Augment their skills in spatial analysis through the application of statistical techniques, geospatial tools, and by keeping abreast of emerging trends, theories, and models in the field.
4. Be able to analyze, compare, and critically evaluate concepts and content relevant to competitive examinations and global contexts, nurturing a deeper understanding of global issues.
5. Demonstrate knowledge and expertise in field excursions, advanced surveying techniques and digital map-making, aiding them to interpret and represent geographical data effectively.
6. Be proficient in research writing, preparing manuscripts, and designing research projects.
7. Develop essential employability and entrepreneurship skills, making them well-prepared for market jobs or for establishing their own endeavors in relevant fields.
8. Apply geographical knowledge, tools, and techniques to address various geo-environmental and human challenges, contributing to effective problem-solving.
9. Recognize the significance of resource management, regional planning, and sustainable development, ensuring responsible and informed decision-making.
10. Prioritize diverse emerging issues, trends and techniques effectively in real-time geographical problems, leading to positive contributions to both society and the environment.

SAVITRIBAI PHULE PUNE UNIVERSITY, PUNE

Syllabi as per NEP 2020 for

M.A. / M.Sc. (Geography) Part–I (CBCS)

(For Affiliated Colleges to Savitribai Phule Pune University)

Two Year - IV Semester award PG Degree on completion of 88 credits

or

One Year - PG Degree (44 credits) after Four Year UG Degree (UG Honors)

M. A./ M. Sc. Geography Semester I

Level	Semester	Group	Course Code	Course Name	Credits		Total Credits
					T	P	
6.0	First Semester	**Major Core**	GEO 501 MJ	Principles of Geomorphology	02	--	02
			GEO 502 MJ	Principles of Climatology	02	--	02
			GEO 503 MJ	Principles of Economic Geography	02	--	02
			GEO 504 MJ	Principles of Population and Settlement Geography	02	--	02
			GEO 505 MJ	Introduction to Statistical Methods in Geography	02	--	02
			GEO 506 MJP	Practicals in Physical Geography	--	02	02
			GEO 507 MJP	Practicals in Human Geography	--	02	02
				Total credits related to Major Core	**10**	**04**	**14**
		Major Elective (Select any one group)		**Group A**			
			GEO 510 MJ	Introduction to Geographic Information System	02	--	02
			GEO 511 MJP	Practicals in Geographic Information System	--	02	02
				Group B			
			GEO 512 MJ	Tourism Management	02	--	02
			GEO 513 MJP	Practicals in Tourism Management	--	02	02
				Group C			
			GEO 514 MJ	Geography of Soil	02	--	02
			GEO 515 MJP	Practicals in Soil Analysis	--	02	02
				Total Credits related to Major Electives	**02**	**02**	**04**
		Research Methodology	GEO 531 RM	Research Methodology	**04**	--	**04**
				Semester I- Total Credits	**16**	**06**	**22**

Vertical Group (Semester - I)	Credit for Theory	Credit for Practical	Total Credit
Total Credits related to Major Core	10	04	**14**
Total Credits related to Major Electives	02	02	**04**
Research Methodology	04	--	**04**
Total Credits	**16**	**06**	**22**

Savitribai Phule Pune University, Pune
M.A. / M. Sc. Syllabus in Geography (as per NEP 2020)
Syllabus (from June, 2023)
M. A./M. Sc. Geography Semester II

Level	Semester	Group	Course Code	Course Name	Credits		Total Credits
					T	P	
6.0	Second Semester	**Major Core**	GEO 551 MJ	**Core Special–1 (Theory)** **(Select any one as per specialization from following)** A. Fluvial Geomorphology B. Synoptic Climatology C. Agricultural Geography D. Population Geography	04	--	04
			GEO 552 MJP	**Core Special– 1 (Practical)** **(Select any one as per specialization from following)** A. Practicals in Fluvial Geomorphology B. Practicals in Synoptic Climatology C. Practicals in Agricultural Geography D. Practicals in Population Geography	--	02	02
			GEO 553 MJ	Geographical Thought	02	--	02
			GEO 554 MJ	**Core Special – 2 (Theory)** **(Select any one as per specialization from following)** A. Coastal Geomorphology B. Agro-Meteorology C. Geography of Development D. Geography of Rural Settlement	04	--	04
			GEO 555 MJP	**Core Special - 2 (Practical)** **(Select any one as per specialization from following)** A. Practicals in Coastal Geomorphology B. Practicals in Agro-Meteorology C. Practicals in Geography of Development D. Practicals in Geography of Rural Settlement	---	02	02
				Total credits related to Major Core	**10**	**04**	**14**

		Major Elective (Select any one group)	**Group A**				
			GEO 560 MJ	Introduction to Remote Sensing	02	--	02
			GEO 561 MJP	Practicals in Remote Sensing	--	02	02
			Group B				
			GEO 562 MJ	Geography of India	02	--	02
			GEO 563 MJP	Practicals in Surveying	--	02	02
			Group C				
			GEO 564 MJ	Political Geography	02	--	02
			GEO 565 MJP	Practicals in Digital Cartography	--	02	02
			Total Credits related to Major Electives		**02**	**02**	**04**
		On Job Training	GEO 581 OJT	**On Job Training** (Student should complete on job training not less than 60 clock hours)			**04**
			Sem. II Total Credits=Major Core + Major Elective + OJT		**12**	**06**	**22**

Vertical Group (Semester - II)	**Credit for Theory**	**Credit for Practical**	**Total Credit**
Total Credits related to Major Core	10	04	**14**
Total Credits related to Major Electives	02	02	**04**
On Job Training	--	--	**04**
Total Credits	**12**	**06+ 04**	**22**

Note:- Students will be awarded PG Degree on completion of two year- IV semester. (88 Credits)

SAVITRIBAI PHULE PUNE UNIVERSITY, PUNE

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Two Year Post Graduate Programme in Geography

(Faculty of Science and Technology)

Choice Based Credit System (CBCS)

Syllabi for

M. A. / M. Sc. Geography (Second Year)

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Syllabus as per the guidelines of National Education Policy 2020

To be implemented from Academic Year 2023-2024

SAVITRIBAI PHULE PUNE UNIVERSITY, PUNE

Syllabi as per NEP 2020 for

M.A. / M.Sc. (Geography) Part – II

Choice Based Credit System (CBCS)

(For Affiliated Colleges to Savitribai Phule Pune University)

Two Year, IV Semester award PG Degree on completion of 88 credits

or

One Year -PG Degree (44 credits) after Four Year UG Degree (UG Honors)

M. A./ M. Sc. Geography Semester III

Level	Semester	Group	Course Code	Course Name	Credits		Total Credits
					T	P	
6.5	Third Semester	Major Core	GEO 601 MJ	**Core Special–3 (Theory)** **(Select any one as per specialization from following)** 1. Tropical Geomorphology 2. Monsoon Climatology 3. Geography of Development II 4. Urban Geography	04	--	04
			GEO 602 MJP	**Core Special– 3 (Practical)** **(Select any one as per specialization from following)** 1. Practicals in Tropical Geomorphology 2. Practicals in Monsoon Climatology 3. Practicals in Geography of Development- II 4. Practicals in Urban Geography	--	02	02
			GEO 603 MJ	Watershed Management	02	--	02
			GEO 604 MJ	**Core Special – 4 (Theory)** **(Select any one as per specialization from following)** 1. Applied Geomorphology 2. Applied Climatology 3. Advances in Economic Geography 4. Geography of Migration	04	--	04
			GEO 605 MJP	**Special Paper - 4 (Practical)** **(Select any one as per specialization from following)** 1. Practicals in Applied Geomorphology 2. Practicals in Applied Climatology 3. Practicals in Advances in Economic Geography 4. Practicals in Geography of Migration	--	02	02
				Total Credits related to Major Core	**10**	**04**	**14**

		Major Elective (Select any one group)	**Group A**				
			GEO 610 MJ	Advances in Geoinformatics	02	--	02
			GEO 611 MJP	Practicals in Geoinformatics	--	02	02
			Group B				
			GEO 612 MJ	Geography of Resource Management	02	--	02
			GEO 613 MJP	Practicals in Resource Management	--	02	02
			Group C				
			GEO 614 MJ	Regional Planning and Development	02	--	02
			GEO 615 MJP	Practicals in Applied Statistics	--	02	02
			Total Credits related to Major Electives		**02**	**02**	**04**
		Research Project	GEO 631 RP	Research Project (RP)			**04**
			Sem. III- Total Credits=Major Core+ Major Elective + RP		**12**	**06**	**22**

Vertical Group (Semester - III)	**Credit for Theory**	**Credit for Practical**	**Total Credit**
Total Credits related to Major Core	10	04	**14**
Total Credits related to Major Electives	02	02	**04**
Research Project			**04**
Total Credits	**12**	**06 +04**	**22**

SAVITRIBAI PHULE PUNE UNIVERSITY, PUNE

Syllabi as per NEP 2020 for

M.A. / M.Sc. (Geography) Part–II (from June, 2024)

M. A. /M. Sc. Geography Semester IV

Level	Semester	Group	Course Code	Course Name	Credits		Total Credits
					T	P	
6.5	Fourth Semester	**Major Core**	GEO 651 MJ	Social and Cultural Geography	04	--	04
			GEO 652 MJ	Geography of Disaster Management	04	--	04
			GEO 653 MJP	Practical in Watershed Management	--	02	02
			GEO 654 MJP	Interpretation of Topographical Maps	--	02	02
			Total credit related to Major Core		**08**	**04**	**12**
		Major Elective (Select any one group)	**Group A**				
			GEO 660 MJ	Advance Surveying	02	--	02
			GEO 661 MJP	Practicals in Advance Surveying	--	02	02
			Group B				
			GEO 662 MJ	Geography of Maharashtra	02	--	02
			GEO 663 MJP	Practicals in Energy Audit	--	02	02
			Group C				
			GEO 664 MJ	Environmental Laws	02	--	02
			GEO 665 MJP	Practicals in Green Audit	--	02	02
			Total Credits related to Major Electives		**02**	**02**	**04**
		Research Project	GEO 681 RP	Research Project			**06**
			Sem. IV Total Credits =Major Core + Major Elective + RP		**10**	**06**	**22**

Vertical Group (Semester - IV)	Credit for Theory	Credit for Practical	Total Credit
Total Credits related to Major Core	08	04	**12**
Total Credits related to Major Electives	02	02	**04**
Research Project			**06**
Total Credits	**10**	**06+06**	**22**

M. A. / M. Sc. Geography – I (Semester - I)

GEO 501 MJ: Principles of Geomorphology

Year	Semester	Group vertical (V)	Course type	Course and Course code	Course title	Total credit	No of periods	Total lectures per week
I	**I**	**Major Core**	**Theory**	**GEO 501 MJ**	**Principles of Geomorphology**	**02**	**30**	**02**

Objectives of the course:

1. To develop interest amongst the students to capture the richness of landform types and the pleasure to understand how they form.
2. To discuss the interactions between landforms, geomorphic processes, and humans.
3. To acquaint students to applications of geomorphology to the solution of miscellaneous problems, especially to the development of resources and the diminution of hazards to planning, conservation and specific engineering or environmental issues.

Topic No.	Topic Name	Sub Topic	Number of Periods
1	**Introduction to Geomorphology**	i. Definitions, Nature and Scope of Geomorphology ii. Branches of Geomorphology iii. Geological Time Scale iv. Distribution of Continents and Oceans	04
2	**Geomorphology and Tectonics**	i. Earth's Interior: Layers Based on Physical and Chemical Properties ii. Continental Drift Theory iii. Plate Tectonics: Plate Boundaries and Subduction Zone	10
3	**The Dynamic Earth**	i. Earth's Movement: Endogenic and Exogenic Forces : Meaning, Types and Examples ii. Weathering: Types and Related Landforms iii. Mass Movement: Types:- Landslide, Rock fall iv. Rocks: Types and Characteristics	10
4	**Applied Geomorphology**	i. Introduction of Applied Geomorphology ii. Slopes and landslides iii. Concept of Hazard and Risk iv. Geotourism	06

Course Outcome:

By the completion of the course, students will be able to;

COs 1: Define the field of Geomorphology and explain the essential principles of it.

COs 2: Illustrate and explain the forces affecting the crust of the Earth and gain knowledge about Earth's interior.

COs 3: Develop an idea about systems and cycles of the solid Earth

COs 4: Explain the evolution of continents and ocean basin

COs 5: Co-relate the Endogenic and Exogenic forces controlling landform development.

COs 6: Compare the mountain building activities processes of weathering and mass movement

COs 7: Develop research interest to solve critical and emerging issues of Geomorphology

Reference Books:

1. Allison, R.J. (2005): Applied Geomorphology: Theory and Practice, Wiley, New York.
2. Bloom, A.L. (2012): Geomorphology- A Systematic Analysis of Late Cenozoic Landforms, Prentice-Hall of India, New Delhi
3. Chorley, R.J., Schumm, S. A. and Sugden, D. E. (1984): Geomorphology, Methuen, London.
4. Christiansen E.H. and Hamblin, W.K. (2008): The Earths dynamic systems Macmillan, New York and Collier Macmillan London.
5. Gregory, K.J. and Goudie, A.S. (2014): The SAGE Handbook of Geomorphology, SAGE, London.
6. Holmes, (1944): Principles of Physical Geology, Thomas Nelson and Sons Ltd, London.
7. Huggett, R.J. (2008): Fundamentals of Geomorphology, Routledge, London and New York.
8. Kale, V.S. (2014): Landscapes and Landforms of India, Springer, London/New York.
9. Kale, V. S. and Gupta, A. (2010): Introduction to Geomorphology, Universities Press, Hyderabad

M. A. / M. Sc. Geography – I (Semester - I)

GEO 502 MJ: Principles of Climatology

Year	Semester	Group Vertical (V)	Course Type	Course & Course Code	Course Title	Total Credits	No. of Periods (01 Hrs. lecture)	Total lectures per week
I	I	Major Core	Theory	GEO 502 MJ	Principles of Climatology	02	30	02

Objectives of the Course:

1. To promote understanding of basic principles of atmosphere and climate.
2. To motivate to pursue the comprehensive study of climatology and meteorology.
3. To develop scientific insight into role of climate in natural and human resources.
4. To asses and understand the influences of various factors on the weather in the short and long term period.

Topic No.	Topic Name	Sub Topic	No. of periods
1	**Introduction to Climatology**	i. Meteorology and Climatology ii. Nature and Scope of Climatology iii. Development of Climatology	5
2	**Earth's Atmosphere**	i. Composition of atmosphere ii. Structure of atmosphere iii. Ozone layer depletion	5
3	**Insolation and Temperature**	i. Solar and terrestrial radiation ii. Electromagnetic spectrum iii. Factors affecting insolation iv. Greenhouse effect v. Heat budget vi. Temperature measurements and controls vii. Lapse rate viii. Temperature inversion: Concept and Types	10
4	**Atmospheric Pressure and Atmospheric Moisture**	i. Pressure measurement and distribution ii. Factors affecting horizontal distribution of pressure iii. General circulation of the atmosphere iv. Geostropic wind and Gradient wind v. Cyclones and Anticyclone vi. Atmospheric moisture vii. Hydrologic cycle viii. Forms of condensation ix. Measurement of humidity	10

Course Outcome:

By the completion of the course, student will be able to:

COs 1: Acquainted with the role of climate in the formation of complex interactive earth systems.

COs 2: Understand various contemporary climatic issues particularly climate change, flood, drought, cyclones etc.

COs 3: Demonstrate scientific explanation of weather and climate patterns in different parts of the world.

COs 4: Examine causes and processes influencing the climatic variations and the impact of climate on humans or vice-versa.

Reference Books:

1. Ahrens, C. D., & Henson, R. (2016): Essentials of Meteorology: An invitation to the atmosphere, Cengage Learning.
2. Critchfield, H. J.(2010): General Climatology, Prentice Hall, New Delhi.
3. Lal, D. S. (2014): Climatology, Chaitanya Publishing House, Allahabad.
4. Lutgens, F. K., Tarbuck, E. J., Herman, R., &Tasa, D. G. (2018): The Atmosphere: An introduction to Meteorology. Pearson Prentice Hall, New Jersey.
5. Oliver, J. E. &Hidore, J. J. (2003): Climatology: An Atmospheric Science, Pearson Education, Delhi.
6. Rohli, R. V., & Vega, A. J. (2018): Climatology, Jones & Bartlett Publishers.
7. Savindra Singh (2005): Climatology, Prayag Pustak Bhawan, Allahabad.
8. Singh, S. (2005): Climatology, Prayag Pustak Bhawan, Allahabad.
9. Trewartha, G. T.: Introduction to Weather and Climate.

M. A. / M. Sc. Geography – I (Semester - I)

GEO 503 MJ: Principles of Economic Geography

Year	Semester	Group Vertical (V)	Course Type	Course & Course Code	Course Title	Total Credits	No. of Periods (01 Hrs. lecture)	Total lectures per week
I	I	Major Core	Theory	GEO 503 MJ	Principles of Economic Geography	02	30	02

Objectives of the Course:

1. To simplify fundamental concepts to Economics
2. To realize theories and models of Economic Geography
3. To aware about the basic economical concepts.
4. To understand emerging concepts in the field of Economic Geography.

Topic No.	Topic Name	Sub Topic	No. of periods
01	**Introduction**	i. Definition, Nature and Scope of Economic Geography ii. Types of Economic Activities iii. Recent Trends and Issues of Economic Geography	05
02	**Model and Theories**	i. Rostow's Model of Economic Growth ii. Von Thunens Model of Agricultural Land Use iii. Weber's Theory of Industrial Location	10
03	**Concepts in Economic Geography**	i. Economic Landscape ii. Economic System iii. New Economic Geography iv. New liberalism	07
04	**Emerging Concepts**	i. Concept of Trading bloc ii. Concept of Region iii. Concept of Consumption function iv. Geography of Cyber Space	08
		Total Periods	**30**

Course Outcome:

By the completion of the course, students will be able to:

COs 1: Understand with the fundamental ideas of economic geography.

COs 2: Explain the theories and models in Economic Geography.

COs 3: Illustrate concepts of Economic Geography.

COs 4: Explain the emerging concepts of Economic Geography.

References:

1. Chatterjee K., (2015): Basics of Economic Geography, Concept Publishing Company, Pvt. Ltd. New Delhi, India.
2. K. Siddhartha., (2018): Economic Geography, Kitab Mahal, India.
3. Majid Husain., (2016): Models in Geography, Rawat Publications, India.
4. S. K. Shelar., (2013): Principles of Economic Geography, Kanpur ChandralokPrakashan, India.
5. Uma Kapila.,(2022):Indian Economy Performance and Policies Academic Foundation, India.
6. Y. S. Chander., (2010): Developmental Geography and Economic Theory, Swastik Publications, India.

M. A. / M. Sc. Geography – I (Semester - I)

GEO 504 MJ: Principles of Population and Settlement Geography

Year	Semester	Group Vertical (V)	Course Type	Course & Course Code	Course Title	Total Credits	No. of Periods	Total lectures per week
I	I	Major Core	Theory	GEO 504 MJ	Principles of Population and Settlement Geography	02	30	02

Objectives of the Course:

1. To acquire knowledge about Population and Settlement Geography.
2. To acquaint the students with distribution of population and influencing factors on it.
3. To make the students aware about site, situation, classification, types and patterns of settlements.
4. To give information about growth of population and settlement.

Topic No.	Topic Name	Sub Topic	No. of periods
1	**Introduction to Population and Settlement Geography**	i. Definition, Nature and Scope of Population Geography ii. Approaches to the study of Population Geography iii. Definition, Nature and Scope of Settlement Geography iv. Approaches to the study of Settlement Geography	08
2	**Population and Settlement growth**	i. Concept of population growth ii. Components of Population Change - Fertility, Mortality and Migration iii. Concept of settlement growth iv. Factors influencing growth and distribution of settlement	06
3	**Population Distribution and Density**	i. Population distribution - India and World ii. Factors influencing distribution of population iii. Population density: meaning, definition and its types iv. Factors influencing density of population	08

4	**Human Settlement**	i. Concept of site and situation aspect in settlement ii. Classification of settlement - Rural and Urban iii. Rural Urban Fringe and dichotomy iv. Types and Patterns of settlement	08
		Total	**30**

Course Outcome:

By the completion of the course, students will be able to;

COs 1: Understand the basic concepts in population and settlement Geography

COs 2: Acquire knowledge about the population distribution in the world, factors affecting population distribution.

COs 3: Identify patterns and processes of population and settlement growth

COs 4: Evaluate the factors influencing the growth of population and settlement

References:

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

M. A. / M. Sc. Geography – I (Semester - I)

GEO 505 MJ: Introduction to Statistical Methods in Geography

Year	Semester	Group Vertical (V)	Course Type	Course & Course Code	Course Title	Total Credits	No. of Periods	Total lectures per week
I	I	Major Core	Theory	GEO 505 MJ	Introduction to Statistical Methods in Geography	02	30	02

Objectives of the Course:

1. To familiarize students with basic concepts of statistical methods
2. To acquaint the students with techniques of data analysis
3. To develop a strong foundation in statistical methods and their application to geographical research.
4. To develop capacity to analyze and interpret statistical data.

Topic No.	Topic Name	Sub Topic	No. of periods
1	**Introduction**	i. Nature of Geographical Data ii. Scales of Measurement iii. Types of Data: Primary and Secondary, Discrete and Continuous Scales iv. Frequency distribution and Graphical Representation	06
2	**Central Tendency**	i. Concept ii. Measures of Central Tendency (arithmetic mean, median and mode) iii. Selection of correct average for representing data (with suitable examples)	08
3	**Dispersion, Skewness and Kurtosis**	i. Concept of measures ii. Absolute-Range, standard deviation and relative measures of Dispersion , coefficient variation iii. Definition and Types of Skewness iv. Definition and Types of Kurtosis	10
4	**Association of Variables**	i. Concept and types of correlation ii. Concept of regression iii. Simple and multiple regression iv. Use of correlation and regression in context of geographical research	06
		Total	**30**

Course Outcome:

By the completion of the course, students will be able to:

COs 1: Understand the basic principles of statistics in the context of geography

COs 2: Apply appropriate descriptive statistical technique to analyze geographical data

COs 3: Interpret statistical results effectively

COs 4: Evaluate the use of descriptive statistics in geographical research

References:

1. Croxton, C., Cowden, D. J., & Klein, S. (1967). Applied general statistics. Prentice Hall, New Jersey.
2. Frank, H., &Althoen, S. C. (1994). Statistics: Concepts and applications. Cambridge University Press.
3. Hammond, R., &McCullagh, P. S. (1985). Quantitative techniques in geography: an introduction. Clarendon Press, Oxford University Press.
4. Mann, P. S. (2020). Introductory statistics. John Wiley & Sons.
5. O'Brien, L. (2005). Introducing quantitative geography: measurement, methods, and generalized linear models. Taylor & Francis.
6. Rogerson, P. A. (2019). Statistical methods for geography: a student's guide. Sage Publications, London.

M. A. / M. Sc. Geography – I (Semester - I)

GEO 506 MJP: Practicals in Physical Geography

Year	Semester	Group Vertical (V)	Course Type	Course & Course Code	Course Title	Total Credits	No. of Periods	Total lectures per week
I	I	Major Core	Practical	GEO 506 MJP	Practicals in Physical Geography	02	30	02

Objectives of the Course:

1. To acquaint the students with the role of geomorphic techniques in geography as the scientific method for understanding landforms.
2. To study the various aspects of drainage morphometry
3. To examine the drainage basin for understanding the topographical variations.
4. To focus on relevant aspects of climatology, with particular emphasis on the climatic elements diagrams and climatic classification.

Topic No.	Topic Name	Sub Topic	No. of periods
1	**Drainage Network**	Drainage Network (up to 5th order drainage basin from SOI Toposheet) i. Stream ordering by Strahler's method ii. Bifurcation ratio	08
2	**Drainage Basin Relief Analysis**	Relief analysis (up to 5thorder drainage basin- based on grid method) i. Absolute relief map ii. Relative relief map iii. Hypsometric analysis iv. Basin profiles	07
3	**Climatic Element Diagrams**	i. Climatograph ii. Climograph iii. Simple wind rose iv. Hythergraph	07
4	**Climatic Classification**	i. Water Budget ii. Koppen's Climatic classification	08
		Total	**30**

Course Outcome:

By the completion of the course, students will be able to:

COs 1: Understand the drainage network in terms of stream orders, numbers etc.

COs 2: Examine the drainage basin for understanding the topographical variations.

COs 3: Acquainted with the role of geomorphic techniques in geography as a scientific method for understanding the landforms.

COs 4: Helpful to learn important applied aspects of climatology, elements diagrams and climatic classification.

COs 5: Construct climatic elements diagrams and inspect climatic classification

Reference Books:

1. Aackombe, R. V. and Gardiner, V. (1983): Geomorphological Field Manual.
2. Chorley, R. J., Schumm, S. A. and Sugden, D. E. (1984): Geomorphology, Methuen, London.
3. Goudie, A. (1990): Geomorphological Techniques, Un win Hyman, London.
4. Kale, V. S. and Gupta, A. (2001): Introduction to Geomorphology, Orient Longman, Culcutta.
5. King, C. A. M. (1966): Techniques in Geomorphology, Edward Arnold, London.
6. Lutgens, F. K., Tarbuck, E. J., Herman, R., &Tasa, D. G. (2018): The Atmosphere: An introduction to Meteorology. Pearson Prentice Hall, New Jersey.
7. Monkhouse, F. J., & Wilkinson, H. R. (1964): Maps and Diagrams: Their Compilation and Construction. London: Metheun and Co. Ltd.

M. A. / M. Sc. Geography – I (Semester - I)

GEO 507 MJP: Practicals in Human Geography

Year	Semester	Group Vertical (V)	Course Type	Course & Course Code	Course Title	Total Credits	No. of Periods	Total lectures per week
I	I	Major Core	Practical	GEO 507 MJP	Practicals in Human Geography	02	30	02

Objectives of the Course:

1. To understand the spatial distribution of human activities and phenomena.
2. To develop skills in conducting field research, observing social and cultural practices, and understanding local contexts.
3. To analyze and interpret data using appropriate statistical or qualitative methods
4. To develop problem-solving skills and promote a deeper understanding of the complexities of human geography.

Topic No.	Topic Name	Sub Topic	No. of Periods
1.	**Economic Indices**	i. Indicators of Economic Development ii. Gravity Model iii. Cost benefit Analysis	07
2.	**Population and Development Indices**	i. Population Projection methods a. Arithmetic Increase Method, b. Geometric Increase Method ii. Calculation of Arithmetic Density, Physiological Density and Agricultural Density.	08
3.	**Measures of Settlement**	i. Rank Size Rule – (Special reference to Maharashtra and India) ii. Nearest neighbor analysis	08
4.	**Application of Human Geography**	i. Introduction ii. Field visit for data collection	07
		Total	**30**

Course Outcome:

By the completion of the course, students will be able to:

COs 1: Acquire the advance knowledge about the human phenomena

COs 2: Understand the various concepts and methods of the human geography

COs 3: Calculate the geographical problems as well as research problems

COs 4: Apply practical knowledge for the analysis of the project work as well as research.

References:

1. Majid, Hussain, M (2008): Systematic Agricultural Geography, Rawat Publications, Jaipur (India).
2. Singh, J. and Dhillon, S.S. (2006): Agricultural Geography, Tata McGraw-Hill Publishing Company Limited, New Delhi.
3. Shafi, M. (1984): Agricultural Productivity and Regional Imbalances: A Study of Uttar Pradesh, Concept Publishing Company, New Delhi.
4. Chandna, R.C. (2010) Population Geography, Kalyani Publisher.
5. Hassan, M.I. (2005) Population Geography, Rawat Publications, Jaipur
6. Daniel, P.A. and Hopkinson, M.F. (1989) The Geography of Settlement, Oliver & Boyd London.
7. Johnston R; Gregory D, Pratt G. et al. (2008) The Dictionary of Human Geography, Blackwell Publication.
8. Jordan-Bychkov et al. (2006) The Human Mosaic: A Thematic Introduction to Cultural Geography. W. H. Freeman and Company, New York.

M. A. / M. Sc. Geography – I (Semester - I)

GEO 510 MJ: Introduction to Geographic Information System

(Major Elective Group A- Theory)

Year	Semester	Group Vertical (V)	Course Type	Course & Course Code	Course Title	Total Credits	No. of Periods	Total lectures per week
I	I	Major Elective	Theory	GEO 510 MJ	Introduction to Geographic Information System	02	30	02

Objectives of the Course:

1. To introduced fundamental concepts of Geographic Information System (GIS)
2. To familiarize the students with the GIS data types and models
3. To acquaint the students with spatial analysis skills

Topic No.	Topic Name	Sub Topic	No. of periods
1.	**Introduction to GIS**	i. Historical Development of GIS ii. Objectives of GIS iii. Components of GIS -Hardware, Software, Data, Methods and People iv. Applications of GIS	05
2.	**GIS Data Types**	i. Concept of Space and Time ii. Spatial Data -Concepts and Sources iii. Non Spatial Data- Concepts and Sources	05
3.	**GIS Data Models**	**a. Spatial Data Models:** i. Vector Data - Concept of Arc, Node, Vertices and Topology, Computer file structure of geographical features in Vector-Point, Line, Polygon ii. Raster Data–Raster data types, Computer file structure of geographical features in Raster **b. Non Spatial Data Models:** Concept and Types of Database Management System (DBMS)	14
4.	**Structuring and Operations of spatial data**	i. Digitization, Editing and topology building ii. DEM and DTM iii. Overlay analysis iv. Map algebra	06
		Total	**30**

Course Outcome:

By the completion of the course, students will be able to:

COs 1: Describe objectives and components of GIS

COs 2: Understand the concept of spatial database and analysis

COs 3: Explain the nature and structure of spatial data models

COs 4: Compare the raster and vector GIS spatial data

COs 5: Assess the topology building and overlay analysis

COs 6: Generate the spatial overlay analysis and grid operations

References:

1. Burroughs, P. A. and McDonnell, R. A. (2002): Principles of Geographical Information System, Oxford University Press.
2. Clarke, Keith C.(1999) Getting Started with Geographic Information Systems, Prentice Hall, New Jersey
3. DeMers Michel N.(2000): Geographic Information Systems, John Wiley and Sons.
4. George J. (2004): Fundamentals of Remote Sensing, Universities Press Pvt. Ltd., Hyderabad.
5. Jensen, J. R. (2003): Remote Sensing of Environment, An Earth Resource Perspective, Pearson Education Pvt. Ltd., New Delhi.
6. Kang-tsung Chang (2003): Geographic Information Systems, Tata McGraw Hill, New Delhi
7. Lillesand, T. M. and Kiefer R. W. (2002): Remote Sensing and Image Interpretation, John Wiley and Sons, New Delhi.
8. LoAlbert, C. P., and Young, K. W (2003): Concepts and Techniques of Geographical Information Systems, Prentice Hall of India Pvt. Ltd., New Delhi.
9. Michael F. Goodchild and Karen K. Kemp (1990): Introduction to GIS, National Center for Geographic Information and Analysis, University of California, Santa Barbara.
10. Paul A. Lonfley, Michel F. Goodchild, D J. Maguire and D W. Rhind, (2002): Introduction to Geographic Information Systems and Science, John Wiley and Sons Ltd.
11. Shrikat Karlekar (2014): Geographic Information Systems, dimand publication, Pune
12. StarJ, and J.Estes, (1994): Geographic Information Systems: An Introduction, Prentice Hall, New Jersey.

M. A. / M. Sc. Geography – I (Semester - I)

GEO 511 MJP: Practicals in Geographic Information System

(Major Elective Group A - Practical)

Year	Semester	Group Vertical (V)	Course Type	Course & Course Code	Course Title	Total Credits	No. of periods	Total lectures per week
I	I	Major Elective	Practical	GEO 511 MJP	Practicals in Geographic Information System	02	30	02

Objectives of the Course:

1. To introduce major components of Geospatial technologies
2. To provide exposure to students with spatial analysis, GIS operations and mapping
3. To acquaint students with the use and applications of GIS software's and techniques

Instructions:

1. Use of any open source or license copy GIS software is mandatory
2. Hand-on exercise of GIS software should be conduct batch wise
3. Students should maintain a journal of all the exercise conducted

Topic No.	Topic Name	Sub Topic	No. of Periods
1.	**GIS Input**	i. Introduction of basic computer hardware and any one GIS software ii. Scanning of SOI Toposheet / quadrant into various formats e.g. .JPEG, .BMP, .PDF, .TIFF, etc. iii. Coordinate systems -Degree Minutes Second (DMS), Degree Decimal (DD),Conversion of DMS to DD and DD to DMS iv. Geo-referencing and mosaicking of toposheets / maps using GIS software	08

2.	**Spatial Database Analysis**	**a. Software based exercise** i. Digitization of layers (point, line and polygon features) from geo-referenced SOI toposheet /quadrant ii. Creation and export of .shp files , Editing and topology of vector layers iii. Attribute data attachment b. **Manual exercise** raster layer file structure: Run-Length Encoding, Block Code, Chain Coding, Quadtree	14
3.	**GIS Output**	**GIS software based** i. Map layout -Title, Grid, Scale, Direction, Index, sign and symbols ii. Design of maps (Point, Line and Polygon features maps) using shape files of digitized toposheet/ quadrant iii. Design of elevation map, contours map, 3D View based on ASTER/ SRTM DEM	06
		Total	**30**

Course Outcome:

By the completion of the course, students will be able to:

COs 1: Understand the components of GIS

COs 2: Examine the raster and vector layer file structure

COs 3: Classify geographical features with point, line, polygon

COs 4: Prioritize GIS input, storage, manipulation, retrieval, analysis and maps geographical data

COs 5: Design map layout and prepare GIS based various spatial and thematic maps

References:

1. Burroughs, P. A. and McDonnell, R.A. (2002): Principles of Geographical Information System, Oxford University Press.
2. Clarke, Keith C.(1999) Getting Started with Geographic Information Systems, Prentice Hall, New Jersey
3. DeMers Michel N.(2000): Geographic Information Systems, John Wiley and Sons.
4. George J. (2004): Fundamentals of Remote Sensing, Universities Press Pvt. Ltd., Hyderabad.
5. Kang-tsung Chang (2003): Geographic Information Systems, Tata McGraw Hill, New Delhi
6. Shrikat Karlekar (2014): Geographic Information Systems, dimand publication, Pune

M. A. / M. Sc. Geography – I (Semester - I)

GEO 512 MJ: Tourism Management

(Major Elective Group B - Theory)

Year	Semester	Group Vertical (V)	Course Type	Course & Course Code	Course Title	Total Credits	No. of Periods (01 Hrs. lecture)	Total lectures per week
I	I	Major Elective	Theory	GEO 512 MJ	Tourism Management	02	30	02

Objectives of the Course:

1. Explore the concept and evolution of tourist destinations, including the factors that contribute to their development and evolution over time.
2. Understand the principles and applications of market research in the tourism industry, including consumer behavior analysis and segmentation.
3. Develop an understanding of digital marketing strategies and their application in the tourism industry, including website development, social media marketing, and online advertising.
4. Familiarize students with tourist agencies, roles, and responsibilities

Topic No.	Topic Name	Sub Topic	No. of lectures
1.	**Tourism Management and Planning**	i. Concept of Tourism Management and Planning ii. Tourist Destination – Concept and Evolution iii. Destination Life Cycle (Tourist Area Life Cycle) iv. Data Collection and analysis in tourism research	06
2.	**Tourism Marketing and Promotion**	i. Principles of tourism marketing ii. Branding of tourist destinations iii. Strategies for effective promotion techniques and campaigns iv. Digital marketing strategies for the tourism industry	09
4.	**Tour Management**	i. Tour planning and coordination in tourism ii. Tour packages in the tourism industry iii. Principles of tour marketing and Budget. iv. Types of Tourist agencies	09
5.	**Tourism Planning**	i. Review and feedback in tour management ii. Different types of feedback forms iii. Online guest reviews and feedback form iv. Tourist review analysis	06
		Total	**30**

Course Outcome:

By the completion of the course, students will be able to:

COs 1: Understand the concept of tourism management and planning and its application in the tourism industry.

COs 2: Explain the concept and evolution of tourist destinations, and identify factors contributing to their development and evolution over time.

COs 3: Assess the implications of the destination life cycle stages on destination management strategies and decision-making processes.

COs 4: Utilize digital marketing strategies in the tourism industry, including website development, social media marketing, and online advertising.

COs 5: Design and implement effective promotion techniques and campaigns for tourism products, services, or destinations.

COs 6: Identify and analyze technology trends and innovations influencing the tourism industry.

COs 7: Recognize the potential of virtual reality in enhancing tourism experiences and identify its practical applications in the industry.

COs 8: Develop tour packaging strategies based on target markets, themes, and pricing considerations.

References:

1. "Virtual Reality in Tourism and Hospitality" by (Vikas Publishing House)
2. Anil G. Jadhav "Promotion Techniques and Campaigns in Tourism" by (Excel Books)
3. Charles R. Goeldner and J.R. Brent Ritchie "Tourism: Principles, Practices, Philosophies" by Wiley Publication.
4. Claire Boobbyer "Tourism Planning: Basics, Concepts, Cases" by CABI publication.
5. Clare Inkson and Medlik S. "Tourism Planning: Policies, Processes, and Relationships" by (Cengage Learning EMEA)
6. ErcanSirakaya-Turk, MuzafferUysal, and William E. Hammitt "Research Methods for Leisure, Recreation, and Tourism" by (CABI)
7. Guido Candela and Paolo Figini "Tourist Destination Management: Issues, Analysis, and Policies" by Routledge publication.
8. Gurdeep Singh and S. P. Gupta "Tourism Management and Planning" by (Ane Books Pvt. Ltd.)
9. Hannes Werthner and Noelle O'Connor "Virtual Reality in Tourism" by (Springer)
10. S. Gokulakrishnan (2013) "Tour Marketing and Budgeting" (PHI Learning Pvt. Ltd.)

M. A. / M. Sc. Geography – I (Semester - I)

GEO 513 MJP: Practicals in Tourism Management

(Major Elective Group B - Practical)

Year	Semester	Group Vertical (V)	Course Type	Course & Course Code	Course Title	Total Credits	No. of Periods	Total lectures per week
I	I	Major Elective	Practicals	GEO 513 MJP	Practicals in Tourism Management	02	30	02

Objectives of the Course:

1. To understand the process of assessing a potential tourism site.
2. To develop skills in interpreting data and generating reports of tourism.
3. To gain practical experience of promotional materials, online reservation management and cancellation processes in tourism.
4. To develop the ability to design Budget and plan tour packages.

Topic No.	Topic Name	Sub Topic	No. of Period
1	**Tourism Site Assessment**	i. Assess a potential tourism site ii. Destination analysis iii. Research the destination case Study - attractions, accommodations, transportation, and other tourism-related aspects.	04
2	**Data Analysis and Reporting**	i. Data analysis of Tourist arrivals, hotel occupancy rates, or tourism expenditure. ii. Analyze the data using tools like Microsoft Excel or statistical software. iii. Generate reports, create visualizations, and draw conclusions based on their data analysis.	06
3	**Tourism Promotions and Marketing Campaign**	i. Develop promotional materials such as brochures, posters, and social media content. ii. Develop a marketing campaign for their assigned product. iii. Tourism marketing through online platform	04
4	**Tour Planning**	i. Online Booking and Cancellation – Bus, Rail, flights, accommodations. ii. Design a tour package domestic and international for market. iii. Prepare Budget for package domestic and international Tour	06
5	**Field Trip**	Organize a field trip to a tourism-related business such as a hotel, travel agency, or tourist attraction. Prepare a report summarizing their observations.	10
		Total	**30**

Course Outcome:

By the completion of the course, student will be able to:

COs 1: Evaluate and assess the suitability of potential tourism sites based on their natural, cultural, and infrastructure attributes.

COs 2: Demonstrate proficiency in data analysis techniques and tools, allowing them to interpret and present tourism-related data effectively for decision-making purposes.

COs 3: Develop the ability to design and implement comprehensive marketing campaigns

COs 4: Utilizing online travel booking systems, including making reservations, managing itineraries, and understanding the ticket booking and cancellation processes.

COs 5: They should organize well planned filed visit or tour.

References:

1. Anil Kumar (2012) "Hospitality and Tourism Management" (Excel Books)
2. Arch G. Woodside (2008) "Tourism Management: Analysis, Behaviour and Strategy" (Publisher: CABI)
3. C. R. Goeldner (2007) "Tourism: Principles, Practices, Philosophies" (Wiley)
4. Chris Cooper (2017) "Tourism Principles and Practice" (Pearson Education)
5. David Airey and John Tribe (2006) "Tourism and Destination Management" (Sage)
6. Devesh Nigam (2008) "Tourism Planning and Tour Operation" (Shree Publishers)
7. Dimitrios Buhalis (2022) 'Encyclopedia of Tourism Management and Marketing" (Edward Elgar Publishing)
8. Jennifer Raga (2017) "Hospitality and Tourism Management Trends, Challenges and Innovations" (Society Publishing)
9. John Beech and Simon Chadwick (2006) "The Business of Tourism Management" (Pearson Education)
10. K.V. Rao (2014) "Tourism Planning and Development" (Sterling Publishers Pvt. Ltd.)
11. Manoj Dixit (2020) "Tourism Management" (Oxford University Press India)
12. Meenakshi Gupta (2019) "Tourism: Principles and Practices" (VK Global Publications Pvt. Ltd.)

M. A. / M. Sc. Geography – I (Semester - I)

GEO 514 MJ: Geography of Soil

(Major Elective Group C - Theory)

Year	Semester	Group Vertical (V)	Course Type	Course & Course Code	Course Title	Total Credits	No. of Periods	Total lectures per week
I	I	Major Elective	Theory	GEO 514 MJ	Geography of Soil	02	30	02

Objectives of the Course:

1. To understand the significance of soil geography in environmental studies and land management.
2. To identify the relationships between soil and various natural systems, including ecosystems and climate.
3. To recognize the role of soil in supporting human activities, agriculture, and ecosystem services.
4. To familiarize with major soil classification systems
5. To assess the importance of soil conservation and sustainable land management practices.

Topic No.	Topic Name	Sub Topic	No. of Period
1	**Introduction to Soil Geography**	i. Definition, Nature and Scope of Soil Geography ii. Soil as a Natural Resource iii. Factor of Soil Formation- climate, biotic, topography, parent material and time	06
2	**Soil Profile**	i. Soil Profile- Development of soil profile and horizon ii. Physical Properties-Texture, Structure, Colour, Density (Particle and Bulk Density), Porosity, Pore Space, Temperature, Permeability, Moisture iii. Chemical Properties- Acidity and Alkalinity, Soil pH and NPK, Redox Potential, Cation, Anion exchange	10
3	**Classification System and types of Soil**	i. Soil Classification System ii. Land Capability Classification iii. Land Suitability Classification iv. Soil types of India.	08
4	**Soil Degradation and Conservation**	i. Soil Degradation : Soil Pollution, Acidification and Salinization ii. Soil Conservation: Definition and various methods iii. Soil Conservation in India iv. Role of RS and GIS in Soil Conservation.	06
		Total	**30**

Course Outcome:

By the completion of the course, student will be able to:

COs 1: Demonstrate a comprehensive understanding of soil geography as a discipline.

COs 2: Apply theoretical knowledge and practical skills to analyze soil properties and classifications.

COs 3: Identify and address soil-related problems and propose conservation strategies.

COs 4: Understand the role of soil in supporting ecosystems, human activities, and global sustainability.

COs 5: Analyze soil properties, profiles, and classifications using appropriate methods and tools.

COs 6: Evaluate the environmental impact of soil-related issues and propose conservation measures.

References:

1. A text book of Soil Science: Biswas T. D. & Mukharji ; Tata Mc Grow Hill Mumbai
2. A.S. Gustafson, (2007): "Soils and Management" Published by Agrobios (India).
3. Backman, H.O and Brady, N.C. (1960.)The Nature and Properties of Soils, Mc Millan NewYork.
4. Bennet, Hugh H.: Soil Conservation, McGraw Hill, New York.
5. Birkeland, P. W (1999): Soils and Geomorphology, Oxford University Press, New York.
6. Brady Nyle C., Weil Raymond C. (2012): The Nature And Properties of Soils. Pearson Publishing, 14th Edition.
7. Bridges, E. M. and Davidson, D. A. (1982): Principles and Applications of Soil Geography, Longman Group, London.
8. Bunting, B.T. (1973) The Geography of Soils, Hutchinson, London.
9. C. E. Miller, L.M. Turk, (2001): "Fundamental of soil Science" Biotech Books Delhi.
7. Charman P.E.V and Murphy B.W. (2000): Soils : Their Properties and Management, Oxford University Press, Melbourne, Australia

M. A. / M. Sc. Geography – I (Semester - I)

GEO 515 MJP: Practicals in Soil Analysis

(Major Elective Group C - Practical)

Year	Semester	Group Vertical (V)	Course Type	Course & Course Code	Course Title	Total Credits	No. of Practicals	Total lectures per week
I	I	Major Elective	Practical	GEO 515 MJP	Practicals in Soil Analysis	02	30	02

Objectives of the Course:

1. To collect soil samples effectively and label them for proper identification and analysis.
2. To perform laboratory analysis to determine soil texture, structure, and porosity.
3. To analyze soil properties
4. To interpret soil data obtained from practical experiments.
5. To apply the knowledge gained to propose appropriate soil management practices.

Topic No.	Topic Name	Sub Topic	No. of Practicals
1	**Introduction**	i. Methods of Soil Sample collection ii. Instruments required for sampling iii. Safety guidelines in the laboratory	8
2	**Analysis of Physical Properties**	i. Soil Structure and Porosity Analysis ii. Water Holding capacity iii. Particle size distribution using sieve analysis iv. Determination of soil texture –Sand, silt, clay etc.	6
3	**Analysis of Chemical Properties**	i. Soil pH Measurement ii. Soil Nutrient Analysis (N, P, K) iii. Organic Matter and Soil Carbon Analysis	8
4	**Soil Data Interpretation and applications**	i. Interpretation of Soil Analysis Results ii. Measuring soil respiration and microbial biomass iii. Understanding soil fertility and health indicators iv. Soil Management Strategies	8
		Total	**30**

Course Outcome:

By the completion of the course, student will be able to:

COs 1: Demonstrate proficiency in collecting, preparing, and analyzing soil samples.

COs 2: Apply appropriate methods to assess soil physical, chemical, and biological properties.

COs 3: Interpret and evaluate soil analysis data to make informed land management decisions.

COs 4: Utilize soil analysis knowledge to recommend sustainable soil management practices.

COs 5: Recognize the significance of soil analysis in real-life applications for agriculture, environmental conservation, and land development.

References:

1. Helmut Kohnke and P. J. Niederholzer, "Soil Science Simplified", Wiley-Blackwell
2. J. R. Schaetzl and Robert O. Siltanen, "Soil Geography and Land Use Planning", CRC Press
3. Michael E. Essington, "Soil and Water Chemistry: An Integrative Approach", CRC Press
4. J. Russell Boulding and G. Fred Lee, "Practical Handbook of Soil, Vadose Zone, and Ground-Water Contamination: Assessment, Prevention, and Remediation", CRC Press
5. M.R. Carter and E.G. Gregorich (Editors), "Soil Sampling and Methods of Analysis", CRC Press
6. Eldor A. Paul, "Soil Microbiology, Ecology, and Biochemistry", Academic Press
7. Kim H. Tan, "Environmental Soil Science", CRC Press
8. Daniel Hillel, "Introduction to Environmental Soil Physics", Academic Press.

M. A. / M. Sc. Geography – I (Semester - I)

GEO 531 RM: Research Methodology

Year	Semester	Group Vertical (V)	Course Type	Course & Course Code	Course Title	Total Credits	No. of Periods	Total lectures per week
I	I	Research Methodology	Theory	GEO 531 RM	Research Methodology	04	60	04

Objectives of the Course:

1. To develop research aptitude among the students.
2. To provide comprehensive understanding of the technique involved in conducting research.
3. To develop creative and critical thinking skills among the students.
4. To enhance the ability of students to conduct research ethically and meticulously.
5. To prepare the students for future research endeavors.

Topic No.	Topic Name	Sub Topic	No. of periods
1.	**Introduction to Research**	i. Concept of Discovery, Innovation and Research ii. Types of research iii. Research Approaches: 1. Inductive reasoning 2. Deductive reasoning 3. Logical and Scientific Thinking approach	08
2.	**Review of literature**	i. Definition of literature review, ii. Purpose of literature review iii. Components of literature review iv. Literature matrix/log book	06
3.	**Hypothesis and theory**	i. Hypothesis: Meaning and types ii. Theories – 1) Empirically inductive 2) Deductively Complete iii. Models – 1) Natural analogue system 2) Physical system 3) General system	08
4.	**Framing of research problem**	i. Research Questions ii. Identifying Research Gap iii. Statement of Problem iv. Framing of research aims, goals and objectives	04
5.	**Research design**	i. Methods and Methodology ii. Research techniques iii. Data types and sources	08

		iv. Data acquisition method v. Sampling (Probability & Non-Probability) vi. Questionnaire and check list	
6.	**Data Processing and analysis**	i. Qualitative and Quantitative ii. Geospatial analysis iii. Mapping	08
7.	**Research Paper Writing**	**i. Manuscript preparation and formatting:** a. Title, Abstract and Keywords b. IMRaD format c. Findings and conclusion d. Tables, figures and equations e. Citations and References f. Synonyms and abbreviations g. Preparation of research paper	08
8.	**Research Proposal**	i. Sections: Summary, Introduction, Review of literature, Research gap, Framework and Methods, Innovativeness, Expected Outputs, Relevance of the proposed study for policy-making and society, Importance for society ii. Funds and time scale iii. Presentation iv. Preparation of research proposal	06
9.	**Research Publication in reputed journal**	i. Reputed Journals ii. Research indexing Systems and data base iii. Citation, h-index, i10-index and Impact factor iv. Publication Ethics	04
		Total	**60**

Course Outcome:

By the completion of the course, student will be able to:

COs 1: Develop research aptitude among the students through comprehensive understanding of core concepts in research, review of research

COs 2: Find the research questions, statement of research problem and frame the aims and objectives of the research.

COs 3: Frame research methodology and select appropriate methods.

COs 4: Prepare research reports and presentation for publication ethically.

COs 5: Able to creative and critical thinking abilities essential for research among the students.

References:

1. Gomez, B., & Jones III, J. P. (Eds.). (2010). *Research methods in geography: A critical introduction* (Vol. 6). John Wiley & Sons.
2. Gomez, B., & Jones, J. P. III (2010). Research Methods in Geography: A Critical Introduction. John Wiley and Sons.
3. Goudie, A. (Ed) (2004): Encyclopedia of Geomorphology, Routledge, London.
4. Gregory, D., Johnston, R., Pratt, G., Watts, M. &Whatmore, S. (2009). The Dictionary of Human Geography. Singapore: Wiley-Blackwell.
5. Hay, I. (2000). Qualitative research methods in Human Geography.
6. Montello, D. and Sutton, P. (2013). An Introduction to Scientific Research Methods in Geography and Environmental Studies. SAGE Publications.
7. Warf, B. (Ed)(2006). Encyclopedia of Human Geography. London: SAGE Publications.

M. A. / M. Sc. Geography – I (Semester -II)

GEO 551 MJ (A): Fluvial Geomorphology

Core Special – 1 (Theory)

Year	Semester	Group Vertical (V)	Course Type	Course and Course Code	Course Title	Total Credits	No. of Periods (01 Hrs. lecture)	Total lectures per week
I	II	Major Core	Theory	GEO 551 MJ (A)	Fluvial Geomorphology	04	60	04

Objectives of the Course:

1. To provide an accessible introduction to the subject of fluvial Geomorphology.
2. To offer supporting material for students who are looking for basic explanations to aid in the understanding of advanced texts and journal articles.
3. To introduce fluvial geomorphology as a rapidly expanding, multi-disciplinary area.
4. To create interest amongst the students those who require a broad overview of the subject.

Topic No.	Topic Name	Sub Topic	No. of periods
1.	**Introduction to Fluvial Geomorphology**	i. Definition and scope ii. Drainage basin and stream network iii. The drainage basin as a geomorphic unit iv. Horton's laws of drainage composition v. Phases of drainage network development- Glock's model	6
2.	**Drainage Basin Hydrology**	i. Runoff generation and types (infiltration-excess overland flow, saturation-excess overland flow. ii. Channel initiation iii. Gully and channel formation iv. Discharge and magnitude / frequency of flows in river system (flood stages and hydrographs, discharge measurement methods)	6
3.	**Open Channel Hydraulics**	i. Types of flows- steady and unsteady flow, uniform and non-uniform flow, laminar and turbulent flow ii. Flow behaviour- sub-critical, critical and supercritical flow iii. Flow velocity variations and measurement methods iv. Shear stress and stream power	8
4.	**Channel Morphology**	i. River categories- alluvial, bedrock and mix alluvial-bedrock ii. Cross-section morphology and reach morphology- width-depth ratio, channel capacity, wetted perimeter, hydraulic radius and gradient	

		iii. Controls on channel morphology- morphologic and hydrologic controls iv. Channel bed configuration- ripples, dunes, anti-dunes, riffle-pool sequence, steps and pools v. Channel patterns or planforms - straight, meandering, braided, anabranching and anastomosing vi. Concept of grade- long profile: below, near and above grade conditions	10
5.	**Hydraulic Geometry**	i. At-a-station hydraulic geometry ii. Downstream hydraulic geometry (Relation of discharge with width, depth, velocity and gradient)	6
6.	**Fluvial Erosion**	i. Types of erosion- vertical, lateral and headward erosion ii. Erosional processes- solution, abrasion, cavitations, attrition, impaction, hydraulic action iii. Erosion all and forms of bedrock channels- gorge, canyon, incised meanders, rapids, waterfalls, potholes, inner channels, grooves.	8
7.	**Sediment Transport**	i. Types of river load- solution and particulate load ii. Capacity and competence iii. Entrainment of sediment- forces acting on a submerged particle, critical shear stress and critical velocity iv. Modes of sediment transport in rivers – dissolved load, wash load, bed load and suspended load v. Measurement of sediment load vi. Sediment yield	8
8.	**Fluvial Deposition**	i. Flood plains and associated features- meanders, point bars, ox-bow lakes, natural levees, back swamp, Yazoo streams. ii. River terraces – formation and classification iii. Alluvial fans and bajadas iv. Delta- formation and types v. Mid-channel and bank attached channel forms	8
		Total	**60**

Course Outcomes:

By the end of the course, student will be able to -

COs 1: Straightforward explanations of concepts and formulate even if students have little previous knowledge of mathematics and science.

Cos 2: Illustrations with case studies and examples will develop the student's interest in fluvial geomorphology.

COs 3: Holistic, catchment-wide approach will be widely advocated for successful river channel management.

COs 4: Recently developed environmental engineering techniques will be examined.

COs 5: Restoration by providing an overview of the main techniques used and the considerations that need to be taken into account if these are to be successful.

Reference:

1. Charlton, R. (2008): Fundamentals of fluvial Geomorphology, Routledge, New York.
2. Fryirs, K.A. and Brierley, G.J. (2013): Geomorphic Analysis of River Systems: An approach to reading the landscape, Wiley Blackwell.
3. Garde, R.J. (2006): River Morphology, New age international limited publishers, New Delhi.
4. Kale, V.S. and Gupta, A. (2001): Introduction to Geomorphology, Orient Longman, Kolkata.
5. Knighton, D. (1998): Fluvial forms and processes, Arnold, an imprint of Hodder Education, Hachette UK Company, London.
6. Kondolf, M.G. and Piegay, H. (2016): Tools in Fluvial Geomorphology, Wiley-Blackwell.
7. Leopold, L.B., Wolman, M.G. and Miller, P. (1954): Fluvial processes in Geomorphology, Freeman and Co. San Francisco.
8. Maithi, R. (2016): Modern approaches to Fluvial Geomorphology, Primus Books.
9. Mangelsdorf, J., Scheurmann, K. and Weib, F.H. (1989): River Morphology, Springer-Verlag.

M. A. / M. Sc. Geography – I (Semester -II)

GEO 551 MJ (B): Synoptic Climatology

Core Special – 1 (Theory)

Year	Semester	Group Vertical (V)	Course Type	Course and Course Code	Course Title	Total Credits	No. of Periods (01 Hrs. lecture)	Total lectures per week
I	II	Major Core	Theory	GEO 551 MJ (B)	Synoptic Climatology	04	60	04

Objectives of the Course:

1. To train students in various key concepts of synoptic climatology
2. To acquaint students with different scales of Atmospheric motion, Atmospheric stability and synoptic-scale processes
3. To help students acquire knowledge of air masses and fronts, their classification associated weather.
4. To provide an in-depth understanding of large-scale weather systems and their influence on regional and global climate patterns

Topic No.	Topic Name	Sub Topic	No. of periods
1	**Introduction**	i. Nature and scope of Synoptic Climatology ii. Scales of atmospheric motion iii. Laws of motion iv. Synoptic charts and maps	12
2	**Atmospheric Stability**	i. Dry adiabatic lapse rate ii. Wet adiabatic lapse rate iii. Types of atmospheric stability iv. Changes in atmospheric stability	12
3	**Air masses**	i. Introduction ii. Source regions iii. Classification and modification	08
4	**Fronts**	i. Frontal Weather ii. Types of Fronts	08
5	**Cyclones and Anticyclones**	i. Tropical and mid-latitude cyclones ii. Cold and warm-core anticyclones iii. Rossby waves and western disturbances	08
6	**Weather Forecasting**	i. Weather observation and analysis ii. Synoptic and Dynamic Conditions during summer and winter iii. Types and methods of forecasting	12
		Total	**60**

Course Outcome:

By the end of the course, students will be able to:-

COs 1: Understand the concepts and fundamental principles of Synoptic Climatology

COs 2: Analyze synoptic weather maps and atmospheric circulation patterns

COs 3: Evaluate the implications of synoptic systems on various weather phenomena

COs 4: Gain in-depth knowledge about air masses, fronts, cyclones and anticyclones

COs 5: Explain the linkages between synoptic-scale processes and climate variability

References:

1. Barry, R. G., and Perry, A. H. (1973). Synoptic climatology: methods and applications. Metheun and Co. Limited, London.
2. Lutgens, F. K., Tarbuck, E. J., Herman, R., and Tasa, D. G. (2018). The atmosphere: An introduction to Meteorology. Pearson Prentice Hall.
3. Navarra, J. G. (1979): Atmosphere, Weather and Climate, W. B. Saunders Company, Philadelphia.
4. Ackerman, S., and Knox, J. (2011). Meteorology. Jones and Bartlett Publishers.
5. Ahrens, C. D., and Henson, R. (2016). Essentials of meteorology: An invitation to the atmosphere. Cengage Learning.
6. Stringer, E. T. (1972). Foundations of climatology: an introduction to physical, dynamic, synoptic, and geographical climatology. W. H. Freeman and Company, New York.

M. A. / M. Sc. Geography – I (Semester -II)

GEO 551 MJ (C): Agriculture Geography

Core Special – 1 (Theory)

Year	Semester	Group Vertical (V)	Course Type	Course and Course Code	Course Title	Total Credits	No. of Periods	Total lectures per week
I	II	Major Core	Theory	GEO 551 MJ (C)	Agriculture Geography	04	60	04

Objectives of the Course:

1. To ascertain the definition, concepts and recent trends in Agriculture Geography innovative technologies on agricultural practices and productivity.
2. To explore and assess different agricultural models and techniques in agricultural practices.
3. To understand the characteristics, practices, and challenges associated with each agricultural type, including their suitability to specific geographic regions, environmental impacts, and socio-economic implications.
4. To analyze the factors influencing the choice and adoption of different agricultural types, in order to develop strategies for optimizing agricultural productivity, sustainability, and rural livelihoods.

Topic No.	Topic Name	Sub Topic	No. of periods
1.	**Introduction to Agriculture Geography**	i. Definition, Nature and Scope ii. Approaches to study of Agriculture Geography iii. Recent trends in Agriculture Geography	06
2.	**Determinants of Agriculture**	i. Physical Determinants ii. Economic Determinants iii. Social Determinants iv. Technological Determinants	12
3.	**Agricultural Regionalization**	i. Definition and Concept of Region ii. Crop Combination Techniques: Weaver and Thomas method iii. Crop Diversification: Bhatia's method and Doi's method iv. Agricultural efficiency: Kendall's ranking coefficient v. Agricultural Regions in India	12

4.	**Agricultural Types**	i. Shifting cultivation ii. Subsistent Farming iii. Commercial Grain Farming iv. Mixed Farming v. Horticulture vi. Plantation Agriculture	10
5.	**Significance , Problem and Prospects of Agriculture**	i. Significance of agriculture in world region. ii. Importance of agriculture in Indian Economy iii. Problems faced by Indian agriculture iv. Prospects for development of agricultural economy in India.	10
6.	**Recent Concepts in Agriculture**	i. Recent Concepts: Organic farming, Agro-tourism, Biotechnology in agriculture, Community farming, ii. National agricultural policy of India iii. Geographical indication of crops in India	10
		Total	**60**

Course Outcome:

By the end of the course, student will be able to -

COs 1: Explain definitions, concepts, nature and scope of Agricultural Geography

COs 2: Examine the determinants of agriculture

COs 3: Critically analyze the agricultural regionalization and related concepts

COs 4: Classify the agricultural types

COs 5: Illustrate the problems and prospects of agriculture

COs 6: Distinguish between different concepts of agriculture

COs 7: Apply the knowledge in actual practice

References:

1. Aiyer, A.K.Y.N. (1949): Agricultural and Allied Arts in Vedic India.
2. Bayliss Smith, T.P. (1987): The Ecology of Agricultural Systems. Cambridge University Press, London.
3. Berry, B.J.L. et. al. (1976): The Geography of Economic Systems. Prentice Hall, New York.
4. Brown, L.R. (1990): The Changing World Food Prospects - The Nineties and Beyond.
5. Dyson, T. (1996): Population and Food, Global Trends and Future Prospects. Routledge, London.
6. Gregor, H.P. (1970): Geography of Agriculture. Prentice Hall, New York.

M. A. / M. Sc. Geography – I (Semester -II)

GEO 551 MJ (D): Population Geography

Core Special – 1 (Theory)

Year	Semester	Group Vertical (V)	Course Type	Course and Course Code	Course Title	Total Credits	No. of Periods (01 Hrs. lecture)	Total lectures per week
I	II	Major Core	Theory	GEO 551 MJ (D)	Population Geography	04	60	04

Objectives of the Course:

1. To acquire knowledge about concepts in Population Geography.
2. To acquaint the students with sources of population data and demographic attributes.
3. To make the students aware aboutpopulation dynamics, composition and policies.
4. To give information of population growth theories and various indices.

Topic No.	Topic Name	Sub Topic	No. of periods
1	**Introduction**	i. Development of Population Geography as a discipline ii. Population as a social capital iii. Concepts of Over, Under and Optimum population iv. Significance of Population Geography	06
2	**Sources of population data**	i. Census of India ii. Vital Registration System iii. National Sample Survey iv. Sample Registration Survey v. National Family Health Survey vi. District Level Household Survey	08
3	**Demographic attributes**	Concepts and its regional variations in India i. Sex-ratio ii. Age structure iii. Literacy rate iv. Work-force v. Dependency ratio vi. Longevity	08
4	**Population Dynamics**	i. Concept of fertility and mortality ii. Factors affecting fertility and mortality iii. Spatio-temporal variation in fertility and mortality in India iv. Theories of Fertility and Mortality (one theory of each)	08
5	**Population Theories**	i. Malthusian theory of Population growth ii. Optimum theory of Population	08

		iii.Marxian theory of Population iv. Theory of Demographic Transition	
6	**Population Composition**	i. Demographic ii. Social iii. Economic iv. Cultural	06
7	**Population Policies**	i. Definition and features of Population Policy ii. Population policies in the context of population growth, structure and distribution.(with reference to India) iii. Socio-cultural, political and ethical issues related to population policy .(with reference to India) iv. Health policies in India	08
8	**Research Areas in Population Geography**	i. Human Development Index ii. Gender Development Index iii. Health indicators in India iv. Demographic Dividend-Causes,Opportunities and challenges facing in India	08
		Total	**60**

Course Outcome:

By the end of the course, student will be able to -

COs 1: To learn the various concepts of Population Geography and sources of Population data.

COs 2: To understand demographic attributes and examine regional variation in India

COs 3: To understand the population theories as well as demographic, social, economic and cultural composition of population.

COs 4: To understand and analyze the population policy in the context of population growth, structure and distribution.

COs 51: To able to know the concept of HDI and GDI and relation between population and development.

References:

1. Agarwala, S.N. (1977): India's population Problems, Tata McGraw Hill publishing Co. Ltd. , New Delhi.
2. Birdsell N., Kelley A.C., Sinding S. (2003): Population Matters: Demographic Change, Economic Growth and Poverty in Developing Countries. Oxford University Press.
3. Bose Ashis et.al. (1974): Population in India's Development Vikas Publishing House, New Delhi, 1974.
4. ChandnaR.C. (1986) :Geography of Population concepts, Determinants and Patterns, Kalyani Publishers, New Delhi.

M. A. / M. Sc. Geography – I (Semester -II)

GEO 552 MJP (A): Practicals in Fluvial Geomorphology

Core Special – 1 (Practical)

Year	Semester	Group Vertical (V)	Course Type	Course & Course Code	Course Title	Total Credits	No. of Periods	Total lectures per week
I	II	Major Core	Practical	GEO 552 MJP (A)	Practicals in Fluvial Geomorpholog	02	30	02

Objectives of the Course:

1. To focus on relevant aspects of hydrology, with particular emphasis on the characteristics of different flow regimes and flood frequency–magnitude relationships.
2. To explain how sediment is transferred through the fluvial system.
3. To provide a basic overview of the properties of fluid flow.
4. To study processes of erosion, sediment transport and deposition.
5. To examine channel form which starts by considering the various controls on morphology, the nature of morphological adjustments and the space and time scales over which they take place.

Topic No.	Topic Name	Sub Topic	No. of periods
1	**The flow regime**	i. The measurement of stream flow a) The velocity–area method b) Continuous stream flow measurement c) Construction of rating curve ii. Construction of typical annual hydrograph iii. Construction of a storm hydrograph	8
2	**Large-scale sediment transfer and Flow in channels**	i. Estimating the suspended sediment load of a river ii. Computation of channel parameters (Bank full discharge, Bank full width, depth, hydraulic radius, wetted perimeter, channel slope) iii. Flow velocity measurement by Manning's equation iv. Flow behavior (Calculation of Froude number-Subcritical, critical and supercritical flow	7
3	**Erosion, Transport and Deposition**	i. Calculating bed shear stress and unit stream power ii. Application of William equations for sediment entrainment and transport (By using bed shear stress, unit stream power and mean velocity) ii. Calculation of sediment yield index	7

4	**Channel form and Behavior**	i. Computation of sinuosity ratio (Strait, sinuous, meandering) ii. Establishing Hydraulic geometry relationships a) At-a-station b) Downstream	8
		Total	**30**

(Important Note: Conduct a cross-sectional survey of a river or a stream in nearby area and use the parameters for the practical wherever applicable.)

Course Outcome:

By the end of the course, student will be able to -

COs 1: Relevant aspects of hydrology, with particular emphasis on the characteristics of different flow regimes and flood frequency–magnitude relationships.

COs 2: Acquainted with the process of sediment transport through the fluvial system.

COs 3: Explain the basic overview of the properties of fluid flow.

COs 4: Introduced with the processes of erosion, sediment transport and deposition.

COs 5: Examine channel form which starts by considering the various controls on morphology, the nature of morphological adjustments and the space and time scales over which they take place.

Reference:

1. Charlton, R. (2008): Fundamentals of fluvial Geomorphology, Routledge, New York.
2. Fryirs, K.A. andBrierley, G.J. (2013): Geomorphic Analysis of River Systems: An approachto reading the landscape, WileyBlackwell.
3. Garde, R.J. (2006): River Morphology, New age international limited publishers, New Delhi.
4. Kale, V.S. and Gupta, A. (2001): Introduction to Geomorphology, Orient Longman, Kolkata.
5. Knighton, D. (1998): Fluvial forms and processes, Arnold, an imprint of Hodder Education, Hachette UK Company, London.
6. Kondolf, M.G. and Piegay, H. (2016): Tools in Fluvial Geomorphology, Wiley-Blackwell.
7. Leopold, L.B., Wolman, M.G. and Miller, P. (1954): Fluvial processes in Geomorphology, Freeman and Co.San Francisco.
8. Maithi, R. (2016): Modern approaches to Fluvial Geomorphology, Primus Books.

M. A. / M. Sc. Geography – I (Semester -II)

GEO 552 MJP (B): Practicals in Synoptic Climatology

Core Special – 1 (Practical)

Year	Semester	Group Vertical (V)	Course Type	Course & Course Code	Course Title	Total Credits	No. of Periods (01 Hrs. lecture)	Total lectures per week
I	II	Major Core	Practical	GEO 552 MJP (B)	Practicals in Synoptic Climatology	02	30	02

Objectives of the Course:

1. To familiarize students with different meteorological instruments for acquisition of data related to various climatic variables.
2. To acquaint students with synoptic climatic datasets and their analysis
3. To train students in coding and decoding surface weather maps
4. To impart knowledge on lapse rate and atmospheric stability

Topic No.	Topic Name	Sub Topic	No. of Periods
1	**Weather Data**	i. Instrumentation and measurement techniques of different weather elements: a. Temperature: Working of maximum and minimum thermometer, Thermographs, Basic Calculations of air-temperature data b. Pressure: Mercurial barometer, correction of instrumental error c. Wind: Construction and working of wind vanes and cup anemometer d. Precipitation: Types of rain gauges e. Humidity: Types, Calculation of Relative Humidity, Principle of working of Hygrometer	15
2	**Station Model**	i. Introduction to surface weather maps ii. Coding and decoding of synoptic data iii. Analysis of isobars, frontal systems and other synoptic systems	07
3	**Atmospheric Stability**	i. Temperature Profile and Environmental lapse rate ii. Adiabatic lapse rates iii. Determining Atmospheric Stability	08
		Total	**30**

Course Outcome:

By the end of the course, students will be able to:-

COs 1: Understand the process of instrumentation and collection of weather data

COs 2: Analyze and interpret synoptic weather maps

COs 3: Perform statistical analysis of different weather variables

COs 4: Describe the mechanism of adiabatic changes and its relation with atmospheric stability

References:

1. Fitzroy, R. (1863). The weather book: a manual of practical meteorology (Vol. 2). Longman, Green, Longman, Roberts, & Green.
2. Lutgens, F. K., Tarbuck, E. J., Herman, R., &Tasa, D. G. (2018). The atmosphere: An introduction to Meteorology. Pearson Prentice Hall.
3. Navarra, J. G. (1979): Atmosphere, Weather and Climate, W. B. Saunders Company, Philadelphia.
4. World Meteorological Organization. (1983). Guide to meteorological instruments and methods of observation. Secretariat of the World Meteorological Organization.

M. A. / M. Sc. Geography – I (Semester -II)

GEO 552 MJP (C): Practical in Agriculture Geography

Core Special– 1 (Practical)

Year	Semester	Group Vertical (V)	Course Type	Course and Course Code	Course Title	Total Credits	No. of Practicals	Total lectures per week
I	II	Major Core	Practical	GEO 552 MJP (C)	Practicals in Agriculture Geography	02	30	02

Objectives of the Course:

1. To introduce students about the basic methods, techniques and application.
2. To acquaint the students in applied agricultural Geography.
3. To train students for data collection, and analysis in the field of Agricultural Geography.

Topic No.	Topic Name	Sub Topic	No. of Practicals
1	**Crop Combination : Methods and Applications**	i. Weavers, method and its application. ii. Thomas method and its application. iii. Doi's methods and their applications.	**08**
2	**Agricultural Efficiency**	i. Kendall's ranking coefficient method ii. Bhatia's method and its applications	**04**
3	**Crop Concentration and Diversification**	i. Jasbir Singh's method and their applications	**04**
4	**Productivity Index**	i. Enyedi Method and their applications	**04**
5	**Field Visit and Analysis of Agricultural Data**	i. Collection of agricultural data through questionnaires ii. Preparation and analysis of agricultural data with the help of any two above said methods. iii. Prepare short report on the basis of field visit and agricultural data analysis.	**10**
		Total Practicals	**30**

Course Outcome:

By the end of the course, student will be able to -

COs 1 : To compare crop combination and diversification indices.

COs 2 : To calculate agricultural efficiency.

COs 3 : To interpret level and index of agricultural productivity.

COs 4 : To synthesize agricultural field data.

References:

1. Asis Sarkar (2015): Practical Geography, A Systemic Approach ,Orient Block Swan
2. Carter ,H (1977):The study of Urban Geography, Edward Arnold .London
3. Grigg, D.(1955) An Introduction to Agricultural Geography, London, Routledge
4. Hans, R. (1978): Fundamentals of Demography, Surjeet, Delhi
5. Hudson F.S. (1976): Geography of Settlements, Eastover, Macdonald and amp; Evans, England
6. Hussain, M (1978): Agricultural Geography, Rawat Publication, Jaipur

M. A. / M. Sc. Geography – I (Semester -II)

GEO 552 MJP (D): Practicals in Population Geography

Core Special – 1 (Practical)

Year	Semester	Group Vertical (V)	Course Type	Course and Course Code	Course Title	Total Credits	No. of Periods (01 Hrs. lecture)	Total lectures per week
I	II	Major Core	Practical	GEO 552 MJP (D)	Practicals in Population Geography	02	30	02

Objectives of the Course:

1. To provide students with basic knowledge of measures of Fertilityand Mortality.
2. To analyze and interpret Human Development Index and Gender Development Index.
3. To develop skills in construction of life table in Population Geography.
4. To develop knowledge of computer applications in Population data representation.

Topic No.	Topic Name	Sub Topic	No. of periods
1	**Measures of Fertility**	i. Crude Birth Rate ii. General Fertility Rate iii. Age-Specific Fertility Rates iv. Total Fertility Rate v. Gross Reproduction Rate vi. Net Reproduction Rate	06
2	**Measures of Mortality**	i. Crude Death Rate ii. Age-Specific Death Rate iii. Maternal Mortality Rate iv. Infant Mortality Rate v. Cause-Specific Death Rate vi. Standard Mortality Ratio	08
3	**Measures of Human Resource**	v. Human Development Index vi. Gender Development Index vii. Construction of Life Table	08
4	**Computer Applications in Population data Representation**	i. Collection of data ii. Data analysis using Microsoft excel/ SPSS iii. Graphical representation of population data	08
		Total	**30**

Course Outcome:

By the end of the course, student will be able to -

COs 1: Acquire the knowledge about the measures of Fertility and Mortality.

COs 2: They calculate and compare various measures of Human Resource.

COs 3: Apply computer applications for the analysis and representation of population data.

COs 4: Design graphical representation of population data.

References:

1. Agarwala, S. N. (1962). Age at Marriage in India, Allahabad: Kitab Mahal Pvt. Ltd.
2. Barclay, G. W. (1958). Techniques of Population Analysis, New York: John Wiley and Sons.
3. Mandal, R. B., Uyanga, J., and Prasad, H. (2007), Introductory Methods in Population Analysis, New Delhi: Concept Publishing Company.
4. Pathak, K. B., and Ram, F. (2013). Techniques of Demographic Analysis, Mumbai: Himalaya Publishing House.
5. Shryock, H. S. (1970). The Methods and Materials of Demography, New York: Academic Press.
6. Siegel, J. S., and Swanson, D. A. (2004). The Methods and Materials of Demography. Boston: Academic Press.
7. Taylor, P. J. (1977). Quantitative Methods in Geography. Boston: Hughton Miffin Co.
8. Wilkinson, F. J., and Monkhouse, H. R. (1966). Maps and Diagrams: Their Compilation and Construction. London: Metheun and Co.

M. A. / M. Sc. Geography – I (Semester -II)

GEO 553 MJ: Geographical Thought

Major Core Theory

Year	Semester	Group Vertical (V)	Course Type	Course and Course Code	Course Title	Total Credits	No. of Periods (01 Hrs. lecture)	Total lectures per week
I	II	Major Core	Theory	GEO 553 MJ	Geographical Thought	02	30	02

Objectives of the Course:

1. To understand development in the Geography during ancient and modern period.
2. To assess the true nature of geography while studying the course of its evolution through debates and discussions.
3. To understand the diverse views expressed by geographers in different parts of the world.
4. To know about the enormous contribution made by the Indian Geographers.

Topic No.	Topic Name	Sub Topic	No. of periods
1.	**History of Geographical Thought in Ancient Period**	i. Geographical Thought of Greek and Roman ii. Dark Age iii. Arab Geographical Thought	08
2.	**History of Geographical Thought in Modern Period**	i. French and German Geographical Thought ii. American and British Geographical Thought iii. Russian Geographical Thought	08
3.	**Dualism in Geography**	i. Determinism and Possibilism ii. Systematic versus Regional Geography iii. Physical versus Human Geography	07
4.	**Indian Geographical Thought**	i. Ancient Indian Geography and Scientific Outlook ii. Modern Indian Geographers iii. Indian Geography: Problems and Perspectives	07
		Total	**30**

Course Outcome:

By the end of the course, student will be able to -

COs 1: Understand the Historical development of Geography.

COs 2: Establishing relationship of Geography with other disciplines.

COs 3: Analyzing modern and contemporary principles of Systematic, Regional, Physical and Human approaches in Geography.

COs 4: Elaborate philosophy and Contribution of Indian Geographers.

References:

1. Adhikari, S. (2006), Fundamentals of geographical thought, Allahabad, India.
2. Adhikari, Sudeepta (2010) Fundamentals of Geographical Thought, Chaitanya PublishingHouse, Allahabad, India.
3. Ahmad, N., (1947), Muslim contributions to geography, Lahore.
4. Ahmad, S.M. (953), Al-Masudi's contribution to medieval geography Islamic culture, Vol. XXVII, No.2
5. Ali , S.M, (1976), Arab geographical thought, Aligarh, India.
6. Arild Halt (1980), Geography: Its history and concepts, London.
7. Dikshit, R. D. (2006), *Geographical Thought: A Contextual History of Ideas*, Prentice Hall ofIndia, New Delhi, India.
8. Dikshit, R.D. (2001), *"Indian geography: An encounter with reality",* Transactions, Institute of Indian Geographers, 23 (1 and 2), pp: 1-18, India.
9. Hartshorne, R. (1959), Perspective on Nature of Geography, Chicago.
10. Husain, Majid (2004), *Evolution of Geographical Thought*, Rawat Publications, Jaipur, India.
11. James and Martin (2005), "All Possible World: A History of Geographical Ideas", 2nd edition, John Wiley and Sons: New York.

M. A. / M. Sc. Geography – I (Semester -II)

GEO 554 MJ (A): Coastal Geomorphology

Special Paper – 2 (Theory)

Year	Semester	Group Vertical (V)	Course Type	Course and Course Code	Course Title	Total Credits	No. of Periods (01 Hrs. lecture)	Total lectures per week
I	II	Major Core	Theory	GEO 554 MJ (A)	Coastal Geomorphology	04	60	04

Objectives of the Course:

1. To introduce coastal system and shore zone.
2. To know the coastal processes like wave, tide and current.
3. To know the causes and consequences of sea level change.
4. To analyze Coastal environments; Fluvial and Coastal dominated.
5. To Know the Coastal Hazards and Conservation of coastal area,

Topic No.	Topic Name	Sub Topic	No. of periods
1	**Introduction**	i. Introduction to coastal geomorphology ii. The coastal environment: littoral, shore, coastal zones iii. Components of coastal systems processes, sediment transport, morphology. iv. Spatial and temporal variation in Coastal Geomorphology v. Coastal classification: genetic and morphological	08
2	**Coastal Processes: Waves and Tides**	**Waves:** i. Definition wave length, amplitude, depth, period, fetch, frequency ii. Types of waves: sea waves, swell waves, capillary waves, gravity waves, long period tidal waves, storm waves, standing waves iii. Process of shoaling: wave breakers- spilling, plunging and surging, reflection, diffraction and refraction of waves **Tides:** i. Equilibrium Theory of Tides ii. Dynamical Theory of Tides iii. Semidiurnal, diurnal, spring, and neap tides iv. Tides in bays and estuaries v. Tides and coastal landforms	10

3	**Sea level Changes**	i. Transgression, regression, relative and eustatic sea level change ii. Causes and consequences of sea level change iii. Indicators of former sea levels: Fossil beach ridges, beach rocks, abandoned cliffs, caves , raised features , marine terraces	09
4	**Coastal Sediments**	i. Properties of coastal sediments ii. Types: clastic and biogenic sediments iii. Grain size characteristics iv. Sources of sediments: coastline erosion and sea floor	09
5	**Coastal environments: Fluvial and Wave dominated**	**Fluvial-dominated:** i. Coastal deltas: classification, formation, morphology of delta plain, delta front and pro-delta, Fan delta, braided delta, morphodynamics of deltas **Wave-dominated:** i. Process of deposition, Beaches and spits: profiles, types and sediments, barrier islands, coastal sand dunes, dune systems, sea cliffs and caves: formation and morphology, shore platforms: formation types and morphology, sea arches, stack, stumps, geos and blow holes	09
6	**Coastal Hazards and Coastal Conservation**	**Coastal hazard:** i. Impact, vulnerability and risk ii. Shoreline erosion iii. Coastal adaptation and resilience iv. Coastal conservation v. Coastal Regulation Zone (CRZ Notification 2018)	08
7	**Applied coastal Geomorphology**	**Current coastal issues:** i. Sea level rise ii. Storm hazard management iii. Tsunami iv. Coastal erosion and progradation v. Wetlands, kharlands, estuarine reclamation vi. Salt water intrusion	07
		Total	**60**

Course Outcome:

By the end of the course, student will be able to - -

COs 1 : Actual knowing the coastal system and shore zone.

COs 2 : It actually helps students to knowing the coastal processes like wave, tide and ocean current and they aware about it.

COs 3 : Students knowing the causes and consequences of sea level change and they aware about the future Hazards.

COs 4 : Students knowing the Coastal Hazards and is apply this knowledge to Conservation of coastal area,

References:

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

M. A. / M. Sc. Geography – I (Semester -II)

GEO 554 MJ (B): Agro- Meteorology

Core Special– 2 (Theory)

Year	Semester	Group Vertical (V)	Course Type	Course and Course Code	Course Title	Total Credits	No. of Periods (01 Hrs. lecture)	Total lectures per week
I	II	Major Core	Theory	GEO 554 MJ (B)	Agro-Meteorology	04	60	04

Objectives of the Course:

5. To comprehend the role of meteorological factors in agricultural production.
6. To acquaint the students with the application of geospatial technologies in Agro-Meteorology.
7. To make students aware of the applications of crop models for agricultural decision-making.
8. To understand the implications of climate change in the field of agriculture and allied activities.

Topic No.	Topic Name	Sub Topic	No. of periods
1	**Introduction**	Nature and Scope of Agro-Meteorology, Perspectives and Applications of Agro-Meteorology	5
2	**Plants and Energy**	Solar Radiation and its role in plant growth, Solar Radiation Interception by Plants, Concepts of Soil and Air Temperature, Thermoperiodism, Plant injury due to sudden changes in temperature	8
3	**Plants and Moisture**	Concepts of Evaporation and Evapotranspiration, Water Use and Loss in irrigation, Water loss and its measurements	8
4	**Droughts**	Definition, Meteorological Indicators, Drought Assessment Methods, Desertification	6
5	**Crops and Biological Hazards**	Role of Weather and Climate, Pests and Insects affecting crop plants, climate and parasites of animals	6
6	**Applications of RS and GIS**	Remote Sensing Applications in Agro-Meteorology, GIS applications in the field of Agro-Meteorology	7

7	**Computer Models in Agricultural Systems**	Modeling Biological Response to weather conditions, applications of crop models, Decision Support System (DSS)	7
8	**Agro-climatological Services**	Weather and Climate Forecasting, Use and Benefits of Climate Forecast system	6
9	**Climate change and Agriculture**	Climate variability and Climate change, observed impacts of climate change on agriculture, hydrology and livestock; Future scenarios of climate change	7
		Total	**60**

Course Outcome:

By the end of the course, student will be able to - -

COs 1 : Understand the relationship between meteorological factors and agricultural activities.

COs 2 : Utilize drought assessment method in different climatic regions.

COs 3 : Learn applications of remote sensing and Geographical Information System for decision-making in agricultural activities.

COs 4 : Synthesize the impacts of observed climate change on agricultural systems and predict future scenarios.

References:

1. Doorenbos, J. (1977). Crop water requirements. FAO irrigation and drainage paper, 24, 1-144.
2. Kakade, J. R. (1985). Agricultural climatology. Metropolitan Book Co. New Delhi.
3. Mavi, H. S. (1986). Introduction to agrometeorology. Oxford & IBH Publishing.
4. Mavi, H. S., & Tupper, G. J. (2004). Agrometeorology: principles and applications of climate studies in agriculture. CRC Press.
5. Sharma, B.T. (2015). Agricultural and hydrological applications of remote sensing. Koros Publishing.

M. A. / M. Sc. Geography – I (Semester -II)

GEO 554 MJ (C): Geography of Development

Core Special – 2 (Theory)

Year	Semester	Group Vertical (V)	Course Type	Course and Course Code	Course Title	Total Credits	No. of Periods (01 Hrs. lecture)	Total lectures per week
I	II	Major Core	Theory	GEO 554 MJ (C)	Geography of Development	04	60	04

Objectives of the Course:

1. To understand the concept of growth and development with geographical perspectives.
2. To develop an understanding of agricultural economics in the theoretical as well as practical context.
3. To discuss and debate the various issues and challenges faced by agrarian economies.
4. To understand international trade and its relation with regional economic development.
5. To understand the theories of economic growth and concepts in development.

Topic No.	Topic Name	Sub Topic	No. of periods
1.	**Introduction**	i. Concept of Economic Growth and Development ii. Per capita income as an index of development. iii. Economic development in geographical perspective.	06
2.	**Theories of Economic Growth and Development**	i. The Harrod Domar growth model and its application to LDC's ii. Solow model of economic growth iii. The Big Push Model (Rosenstein-Rodan) iv. Growth pole theories – regional development	10
3.	**Role of Agriculture and Industry**	i. Role of Agriculture in economic development ii. Role of industries major reasons for industrialization in LDCs (Least Developed Countries)	06
4.	**Trade , Development and Globalization**	i. Concept and impact of globalization. ii. Trade as an engine of economic growth iii. Types and measurement of international capital flows iv. Role of World Bank , FDI.	10
5.	**Sustainable Development**	i. Social Development ii. Industrial Development iii. Economic Development iv. Environmental Development	10
6.	**Application of Economic Development**	i. Case study – success stories of economic developed village / town.	18
		Total	**60**

Course Outcome:

By the end of the course, student will be able to - -

COs 1 : Students develop conceptual knowledge of growth and development.

COs 2 : Analyze and evaluate the subject with reference to various aspects of economic.

COs 3 : Students are able to interpret the data with analysis of development theories

COs 4 : Develop an understanding of various concepts of sustainable development.

COs 5 : Interpret the characteristics of developed village or towns.

References:

1. Ajit Singh and Hamid Tabatabai (1993) 'Economic Crisis and Third World Agriculture', Cambridge University Press
2. B.N.P Singh (2004) 'Indian Economy Today Changing Contours' .Deep and Deep Publications
3. Behrman, S. and T.N. Srinivasan (1995), Handbook of Development Economics, Vol. 3, Elsevier, Amsterdam.
4. Brown, M. (1966), On the Theory and Measurement of Technical Change, Cambridge University Press, Cambridge, Mass.
5. C.S.Prasad (2006) 'Sixty years of Indian Agriculture'–New Delhi
6. Chenery, H. and T.N. Srinivasan (Eds.) (1989), Handbook of Development Economics, Vols.1 and 2, Elsevier, Amsterdam.
7. DewettKewal (2005) Indian Economy C. Chand andCo. Ltd, New Delhi
8. Gillis, M., D.H. Perkins, M. Romer and D.R. Snodgrass (1992), Economics of Development,(3rd Edition), W.W. Norton, New York.
9. GopalJiand Suman Bhakari (2012) 'Indian Economy Performance and Policies, Pearson Publication Delhi
10. Gulati andKelley(1999),'Trade Liberalization of Indian Agriculture' OUP
11. Hansra Parumal and Chandrakarn– 'Modernization of Indian Agriculture in the 21st Century- Challenges, Opportunity and Strategies' Concept Publication Co. New Delhi.

M. A. / M. Sc. Geography – I (Semester -II)

GEO 554 MJ (D): Geography of Rural Settlement

Core Special – 2 (Theory)

Year	Semester	Group Vertical (V)	Course Type	Course and Course Code	Course Title	Total Credits	No. of Periods	Total lectures per week
I	II	Major Core	Theory	GEO 554 MJ (D)	Geography of Rural Settlement	04	60	04

Objectives of the Course:

1. To understand rural settlements, its growth and distribution
2. To study the theories of settlement and morphogenesis of rural settlement
3. To intends to acquaint the students with rural house types and rural settlement in Maharashtra
4. To make students aware about demographic characteristics of rural settlement
5. To aware about Schemes for rural development

Topic No.	Topic Name	Sub Topic	No. of periods
1	**Introduction to Geography of Rural Settlements**	1. Definition, nature and scope 2. Evolution of Settlements 3. Historical, cultural and geographical aspects of rural settlement related in place names 4. Approaches to study of rural settlement	06
2	**Growth and Distribution of Settlement**	1. Site, situation and location 2. Factors influencing on settlement site and situations 3. Factors influencing on growth of settlements 4. Dispersion and nucleation 5. Factors influencing on dispersion and nucleation	10
3	**Theories of Settlement**	1. Central place theory 2. Centrality and hierarchy of rural service centre 3. Rank size rule	06
4	**Morphology of Rural Settlement and Transformation**	1. Social and Cultural 2. Economic organization within villages 3. Functional growth 4. Socio-economic transformation in rural areas	08
5	**Rural House Types**	1. Primitive, vernacular and modern high rise 2. Factors affecting on rural house types- Physical, social, cultural and economic	08

		3. Size, functional use and architectural style 4. Building material	
6	**Demographic Characteristics of Rural Settlement**	1. Age, Sex, Education and Occupation 2. Migration: Causes and consequence of migration in rural areas 3. Seasonal migration 4. Commuting patterns	08
7	**Rural Settlement in Maharashtra**	1. Characteristics of rural settlement in Maharashtra 2. Rural settlement patterns in Maharashtra 3. Modern forms of rural settlements 4. Problems and Prospects of Settlements	06
8	**Schemes for rural development**	1. Pradhan Mantri Awaas Yojana (Gramin) 2. Pradhan Mantri Gram Sadak Yojana 3. Sansad Adarsh Gram Yojana 4. Pradhan Mantri Gram Samridhi Yojana	08
		Total	**60**

Course Outcome:

By the end of the course, student will be able to -

COs 1 : Understand rural settlements, its growth and distribution.

COs 2 : Explain the theories of settlement and morphogenesis of rural settlement.

COs 3 : Acquaint rural house types and rural settlement in Maharashtra.

COs 4 : Analyze the demographic characteristics of rural settlement.

COs 5 : Understand the Schemes for rural development.

References:

1. Alam, S.M. et.al. (1982): Settlement System of India Oxford and IBH Publication Co., New Delhi
2. Chisholm M. (1967): Rural Settlement and Land use. John Wiley, New York
3. Chisholm, M., Rural Settlement and Land Use, Hutchinson, London,1970
4. Clout, H.D. (1977): Rural Geography, Pergamon, Oxford
5. Ghosh, Sumita, Introduction to Settlement Geography, Orient Longman, Calcutta, 1998
6. Ghosh. S. (2015): "Introduction to Settlement Geography", Orient Blackswan Private Limited, Hyderabad
7. Hudson, F.S. (1976):A Geography of Settlements, Macdonald and Evans, New York
8. Mandal, R.B. 2001. Introduction to Rural Settlement, 2nd ed, Concept Publishing Company
9. Musmade A H, Sonawane AE, More JC, (2015): Population and Settlement Geography, (Marathi), Diamond Publication, Pune

M. A. / M. Sc. Geography – I (Semester -II)

GEO 555 MJP (A): Practicals in Coastal Geomorphology

Core Special - 2 (Practical)

Year	Semester	Group Vertical (V)	Course Type	Course and Course Code	Course Title	Total Credits	No. of Periods	Total lectures per week
I	II	Major Core	Practical	GEO 555 MJP (A)	Practicals in Coastal Geomorphology	02	30	02

Objectives of the Course:

1. To Understand the Geomorphic Landforms using topographical maps and satellite images.
2. To analyze the wave processes and recording data.
3. To analyze the spatio-temporal variation of tides in coastal area.
4. Creation of coastal profiles in selected coastal study area.
5. To collect and to analyze coastal sediment.
6. Organize a field visit to coastal area.

Topic No.	Topic Name	Sub Topic	No. of periods
1	**Geomorphic Landforms**	i. Study of Coastal Landforms using Topographic Maps and Satellite Images	4
2	**Wave Analysis**	i. Wave Analysis, Recording of Waves in the Surf Zone	6
3	**Tide Analysis**	i. Tide Data Analysis and Classification	6
4	**Coastal Profile**	i. Beach/ Dune/ Sand Bar Profiles	6
5	**Coastal Sediments**	i. Sample Collection and Analysis	4
6	**Field Work/ Study tour**	i. Study/measurement of beach/cliff/shore platform morphology in the field ii. Observations and recording of human activities in selected coastal areas	4
		Total	**30**

Course Outcome:

By the end of the course, student will be able to -

COs 1 : Develop geomorphic mapping.

COs 2 : Understand coastal wave processes and recording data.

COs 3 : Explain the various processes of spatio-temporal variation of tide in coastal area.

COs 4 : Synthesize data and creation of coastal profiles in selected coastal area.

References:

1. Bloom, A. L. (2002). Geomorphology: A Systematic Analysis of Late Cenozoic, Landforms, New Delhi: Prentice Hall of India.
2. Carter, R. W. G. (1988). Coastal Environments, London: Academic press ltd.
3. Dackombe, R. V. and Gardiner, V. (1983): Geomorphological Field Manual. George Allen and Unwin, London.
4. Goudie, A. (1990): Geomorphological Techniques. Unwin Hyman, London.
5. King, C. A. M. (1972). Beaches and Coasts, London: Edward Arnold.
6. Pethick, J. (1984). An Introduction to Coastal Geomorphology. London: Arnold-Heinemann.
7. Smith, M. J., Paron, P., and Griffiths, J. (2011). Geomorphological Mapping. Amsterdam: Elsevier.

M. A. / M. Sc. Geography – I (Semester -II)

GEO 555 MJP (B): Pracitcals in Agro-Meteorology

Core Special - 2 (Practical)

Year	Semester	Group Vertical (V)	Course Type	Course & Course Code	Course Title	Total Credits	No. of Periods	Total lectures per week
I	II	Major Core	Practical	GEO 555 MJP (B)	Pracitcals in Agro-Meteorology	02	30	02

Objectives of the Course:

1. Understand the use of meteorological data for measuring water loss from crop plants.
2. Acquaint themselves with the four crop phenological stages and prepare crop calendar according to the phenological stage.
3. Understand the components of water balance that are critical in agricultural systems.
4. Assess the importance of irrigation scheduling in optimizing water management.

Topic No.	Topic Name	Sub Topic	No. of periods
1	**Water loss and its measurement**	Concept of Evapotranspiration, Estimation of Potential Evapotranspiration, Crop Evapotranspiration, Crop coefficient Curve	7
2	**Crop Phenology**	Crop Phenological Stages, Preparation of Crop Weather Calendar	7
3	**Water Balance**	Components of Water Balance, Computation of Weekly Water Balance	8
4	**Irrigation Scheduling**	Concepts of Available Water and Management Allowable Deficit (MAD), Computation of Irrigation Scheduling	8
		Total	**30**

Course Outcome:

By the end of the course, student will be able to -

COs 1: Utilize different meteorological methods for estimation of crop evapotranspiration.

COs 2: Prepare crop weather calendar on the basis of crop phenological stages and variability of climatic conditions.

COs 3: Design and implement water balance methods for sustainable agriculture.

COs 4: Acquire skills to effectively schedule irrigation activities for optimal crop production and water use efficiency.

References:

9. Doorenbos, J. (1977). Crop water requirements. FAO irrigation and drainage paper, 24, 1-144.
10. Mavi, H. S., & Tupper, G. J. (2004). Agrometeorology: principles and applications of climate studies in agriculture. CRC Press.
11. Thornthwaite, C. W. and Mather, J. R. (1957): Instructions and Tables for Computing Potential Evapotranspiration and Water Balance, Drexel Institute of Technology, Laboratory of Climatology
5. Broner, I. (1989). Irrigation scheduling. Service in action; no. 4.708.

M. A. / M. Sc. Geography – I (Semester -II)

GEO 555 MJP (C): Practicals in Geography of Development

Special Paper- 2 (Practical)

Year	Semester	Group Vertical (V)	Course Type	Course and Course Code	Course Title	Total Credits	No. of Periods	Total lectures per week
I	II	Major Core	Practicals	GEO 555 MJP (C)	Practicals in Geography of Development	02	30	02

Objectives of the Course:

1. To understand the application of economic theories in economic data calculation.
2. To acquaint the students with application of techniques in Industrial Geography, Trade and Transport Geography.
3. To familiarize the students with the cartographic techniques in the presentation of economical data.

Topic No.	Topic Name	Sub Topic	No. of periods
1.	**Application of Theories in Economic Growth and Development**	Application of following theories with statistical data : v. Solow model analysis of economic growth vi. The Big Push Model (Rosenstein-Rodan) (each theory explain with one suitable examples)	08
2.	**Techniques in Industrial Geography**	i. Lorenz Curve : Calculation and Plotting ii. Location Quotient: Calculation and Plotting iii. Gini's Co-efficient	07
3.	**Techniques in Trade and Transportation Geography**	iii. Measure in Network structure: Ratio measure, Alpha, Beta, Gamma, Associate Number and Cyclomatric number iv. Gravity Potential Population Surface techniques v. Break Point Theory vi. Law of Retail Trade Gravitation	08
4.	**Cartographic Techniques in Economic Geography**	v. Use of Thematic Maps in Economic Geography vi. Use of Choropleth Maps in Economic Geography vii. Use of GIS for presenting economical development level	07
		Total	**30**

Course Outcome:

By the end of the course, student will be able to -

COs 1: Understand the economic theories with statistical data.

COs 2: The illustration of techniques in the field of industrial and transport geography.

COs 3: Analyze and explain the cartographic techniques in economical data analysis.

COs 4: Inculcate the knowledge of changing dynamics in the industrial and transport sector that will help them in their research studies

References:

1. Ajit Singh and Hamid Tabatabai (1993) 'Economic Crisis and Third World Agriculture', Cambridge University Press
2. B.N.P Singh (2004) 'Indian Economy Today Changing Contours' .Deep and Deep Publications
3. Behrman, S. and T.N. Srinivasan (1995), Handbook of Development Economics, Vol. 3, Elsevier, Amsterdam.
4. Brown, M. (1966), On the Theory and Measurement of Technical Change, Cambridge University Press, Cambridge, Mass.
5. C. S. Prasad (2006) 'Sixty years of Indian Agriculture'–New Delhi
6. Development,(3rd Edition), W.W. Norton, New York.
7. Gopal Jiand Suman Bhakari (2012) 'Indian Economy Performance and Policies, Pearson Publication Delhi
8. Hansra Parumal and Chandrakarn–'Modernization of Indian Agriculture in the 21st Century- Challenges, Opportunity and Strategies' Concept Publication Co. New Delhi.
9. Kindleberger, C.P. (1977), Economic Development, (3rd Edition), McGraw Hill, New York. Economics
10. M.P.Singh (2004) 'Indian Economy Today-Problems Planning and Development' Deep and Deep Publication.
11. Norton George W. And Jeffery Alwang (1993) 'The Introduction to Economic and Agricultural Development' McGraw Hill Co. Publication
12. Singh Acharya, Sagar (2002) 'Sustainable Agricultural Poverty and Food Securities' Rawat Publications Jaipur Vol.- I and II

M. A. / M. Sc. Geography – I (Semester -II)

GEO 555 MJP (D): Practicals in Geography of Rural Settlement

Special Paper -2 (Practical)

Year	Semester	Group Vertical (V)	Course Type	Course and Course Code	Course Title	Total Credits	No. of Pracitcals	Total lectures per week
I	II	Major Core	Practical	GEO 555 MJP (D)	Practicals in Geography of Rural Settlement	02	30	02

Objectives of the Course:

1. To develop interest and practical skills in Rural Settlement Geography.
2. To understand the different practical concepts in Settlement Geography.
3. To study the differences between rural and urban settlements.
4. To analyze the collected primary data from village survey.
5. To encourage the students for statistical analysis in Settlement Geography.

Topic No.	Topic Name	Sub Topic	No. of Practicals
1	**Measurement of Methods in Rural Settlements**	i. Methods of Concentration and Dispersion of rural settlement (Dispersion of rural settlements- Nearest Neighbor Scale - Clark and Evans Method (1954)) ii. Measurement of Shape (Pattern) of rural settlement (Determinants of Spacing and Methods of Size and Spacing) (analyze any one example for each sub points)	07
2	**Rural Service Centres and Hierarchy of Settlements**	i. Identification of Rural Service Centres-On the Basis of Score of Functions ii. Identification of Hierarchy- b) Rank- Size Rule	06

3	**Village Survey & GPS Mapping**	i. Prepare questionnaire for social / economical/ cultural data collection through village survey ii. Village Information Map Using GPS iii. Prepare Village survey report with help of above collected data. (select any village for above survey in the vicinity of the college)	11
4	**Application of GIS in Rural Settlement Geography**	i. Basic Spatial Elements – a. Points b. Lines and c. Polygons ii. Overlay Methods iii. Buffer Analysis	06
		Total	**30**

Course Outcome:

By the end of the course, student will be able to -

COs 1 : Familiarize with fundamental concepts and methods of Settlement Geography

COs 2 : Understand the similarities and differences between rural and urban settlements.

COs 3 : Compare conditions and connections in one place to another

COs 4 : Give reasons for the hierarchy of settlements and services in rural area.

COs 5: Analyze the inter-relationship between physical and cultural environments and utilize such knowledge in reflecting on issues related to rural settlement.

References:

1. Haggett, P. (1965). *Locational Analysis in Human Geography*. London: Edward Arnold.
2. Hall, T. (2006). *Urban Geography*. London: Routledge.
3. Mandal, R. B. (2001). *Introduction to Rural Settlement*. New Delhi: Concept Publishing
4. Pacione, M. (2009). *Urban Geography- A Global Perspective*. London: Routledge.
5. Pathak, K. B., & Ram, F. (2013). *Techniques of Demographic Analysis*. Mumbai: Himalaya
6. Berry, B. J. L. (1965): *Geography of Market Centers and Retail Distribution*, Prentice Hall.
7. Carter (1972): *The Study of Urban Geography*, Edward Arnold, London.
8. Christaller, Walter (1933): *Central Places in Southern Germany* (Translated by C. W. Baskinin 1966), Prentice Hall, New Jersey.

Company.

9. Ghosh, Sumita (1999) : *Introduction to Settlement Geography*, Orient Longman, Kolkata.
10. Gosal, G. S. (1972) : *Geography of Rural Settlement* : A Survey of Research in Geography, Indian Council of Social Science Research (New Delhi).

11. Hudson, F. S. (1976) : *A Geography of Settlements* , Mac Donald and Evans, New York.

M. A. / M. Sc. Geography – I (Semester -II)

GEO 560 MJ: Introduction to Remote Sensing

(Major Elective Group A- Theory)

Year	Semester	Group Vertical (V)	Course Type	Course and Course Code	Course Title	Total Credits	No. of Periods	Total lectures per week
I	II	Major Elective	Theory	GEO 560 MJ	Introduction to Remote Sensing	02	30	02

Objectives of the Course:

1. To introduce the students with basic remote sensing techniques and its wide application fields
2. To acquaint the students with remotes sensing principles, EMR, types and platforms, satellites images
3. To familiarize the students with the aerial photography and its interpretation techniques

Topic No.	Topic Name	Sub Topic	No. of lectures
1.	**Introduction to Remote Sensing**	i. Introduction and Definition ii. Types of remote sensing - Active and Passive iii. History and development of Remote Sensing in India iv. Applications of Remote Sensing data	04
2.	**Electromagnetic Energy**	i. Stages in Remote sensing ii. Electromagnetic Radiation and Electromagnetic Spectrum iii. Interaction of EMR with atmosphere - scattering, Absorption and Atmospheric Windows iv. Interaction of EMR with Earth's surface features- reflection, absorption, emission and transmission	08
3.	**Remote Sensing Platforms and Sensors**	i. Types of platforms- Ground based, Air based, Space based ii. Orbit- Geo-stationary and sun-synchronous iii. Sensors-Types and characteristics iv. Concept of Resolution - Spatial, Spectral, Temporal, Radiometric v. Earth Resources and meteorological Satellites	12
4.	**Aerial Photography**	i. Definition and Geometric Characteristics ii. Elements of aerial photography interpretation	06
		Total	**30**

Course Outcome:

By the end of the course, student will be able to -

COs 1 : Write history of Indian remote sensing and application areas of RS

COs 2 : Discuss the EMR, EMS and types of RS

COs 3 : Illustrate RS platforms and sensors

COs 4 : Classify the satellite images based on sensor and resolution

COs 5 : Interpret the satellites data/images visually

COs 6 : Compare the satellite images and aerial photographs

COs 7 : Interpretation of aerial photographs

References:

1. American society for Photogrammetry and Remote Sensing, (1999), Remote Sensing for the Earth Sciences, Manual of Remote Sensing,3rd ,vol. 3, Wiley, New York
2. Bethesda (2005) Photogrammetry and Remote Sensing, Mary Land, USA. 2005.
3. Campbell, J. B. (2002), Introduction to Remote Sensing. London: Taylor and Francis.
4. Jensen, J.R. (2000), Remote Sensing of the Environment: An Earth resource Perspective. Prentice Hall.
5. Joseph, G. (2003). Fundamentals of Remote Sensing, Hyderabad: University Press.
6. Lueder, D.R., (1959) Aerial photographic interpretation, McGraw Hill Book Co.,
7. Mather, P.M. (1999). Computer processing of remotely sensed images: an introduction, Wiley, Chichester.
8. OllierLillesand, T. M., and Ralph, K. W. (2008). Remote Sensing and Image Interpretation. Singapore: John Wiley and Sons.
9. Paul R.Wolf, (2001) Elements of Photogrammetry, McGraw-Hill Science, 2001.
10. Sabins, F. F. (1996). Remote Sensing: Principles and Interpretation, San Francisco: W. H. Freemanand Company.
11. Shrikant Karlekar (2014) Remote Sensing, Diamond Publication, Pune
12. Tempfi, K., Kerle, N., Huurneman, G., and Janssen, L. F. (Eds) (2009). Principles of Remote Sensing - An Introductory Text Book. Netherlands: The International Institute for Geoinformation Science

M. A. / M. Sc. Geography – I (Semester -II)

GEO 561 MJP: Practicals in Remote Sensing

(Major Elective Group A – Practical)

Year	Semester	Group Vertical (V)	Course Type	Course & Course Code	Course Title	Total Credits	No. of Practicals	Total lectures per week
I	II	Major Elective	Practical	GEO 561 MJP	Practicals in Remote Sensing	02	30	02

Objectives of the Course:

1. To familiarize students with the tools and techniques of interpretation ofArial photographs, satellite image
2. To introduced students with Digital Image Processing methods applying satellite data
3. To create skill amongst students about the mapping and accuracy assessment of satellite data

Topic No.	Topic Name	Sub Topic	No. of Practicals
1.	**Aerial Photography**	i. Measurements and Interpretation Scale and height (using parallax bar) ii. Visual Interpretation of single aerial photograph iii. Interpretation of stereo pair using Stereoscope	08
2.	**Satellite Images**	i. Visual interpretation of Landsat, LISS, PAN, Sentinel-2	08
3.	**Digital Image Processing**	Use of open source GIS software and classify any satellite image applying the methods of i. Supervised Classification ii. Unsupervised Classification	08
4.	**Mapping and accuracy assessment**	i. Land use/land cover map using GIS software (upto secondary level classification) ii. Ground Truth- Land use / land cover layer ground verification iii. Accuracy assessment of Land use/land cover map	06
		Total	**30**

Course Outcome:

By the end of the course, student will be able to -

COs 1 : List the elements of visual interpretation key of aerial photos and satellite images.

COs 2 : Identify geographical features from aerial photos and satellite images

COs 3 : Use of stereoscope and open source GIS software

COs 4 : Classify the land use/land cover layers using DIP

COs 5 : Compose land use/land cover maps using software's

COs 6 : Examine accuracy assessment of Land use/land cover map

COs 7 : Invent object height using aerial photographs with stereoscope

References:

6. American society for Photogrammetry and Remote Sensing, (1999), Remote Sensing for the Earth Sciences, Manual of Remote Sensing,3rd,vol. 3, Wiley, New York
7. Bethesda (2005) Photogrammetry and Remote Sensing, Mary Land, USA. 2005.
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9. Jensen, J.R. (2000), Remote Sensing of the Environment: An Earth resource Perspective. Prentice Hall.
10. Joseph, G. (2003). Fundamentals of Remote Sensing, Hyderabad: University Press.
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12. Mather, P.M. (1999). Computer processing of remotely sensed images: an introduction, Wiley, Chichester.
13. Ollier Lillesand, T. M., & Ralph, K. W. (2008). Remote Sensing and Image Interpretation. Singapore: John Wiley and Sons.
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15. Sabins, F. F. (1996). Remote Sensing: Principles and Interpretation, San Francisco: W. H. Freeman and Company.
16. Shrikant Karlekar (2014) Remote Sensing, Diamond Publication, Pune

M. A. / M. Sc. Geography – I (Semester -II)

GEO 562 MJ: Geography of India

(Major Elective Group B – Theory)

Year	Semester	Group Vertical (B)	Course Type	Course and Course Code	Course Title	Total Credits	No. of Periods (01 Hrs. lecture)	Total lectures per week
I	II	Major Elective	Theory	GEO 562 MJ	Geography of India	02	30	02

Objectives of the Course:

1. To understand Physiography and Drainage system with their importance in human development.
2. To explain the various types of climate and soils with their importance in human development.
3. To applying geographical knowledge to everyday living and development of agriculture and industries.
4. To create awareness among students about importance of major resources and their conservation.

Topic No.	Topic Name	Sub Topic	No. of periods
1.	**Physiography and Drainage**	i. Location and Extension a) Physiographic division of India. b) Drainage systems:- Ganga River System. Godavari River System	15
2.	**Climate and Soil**	i. Climate : (i) Main Seasons and Associated weather conditions: (ii) Origin and mechanism of monsoon: ii. Traditional concept: Halley's view iii. Recent Concept: (i) Role of Tibet plateau (a)ITCZ (b) Jet Stream (c) El-Nino and La Nina iv. Soils : Major soil types and their distribution in India.	07

3.	**Agriculture**	i. Agriculture: (a)Factors affecting on Indian Agriculture: Environmental, Technological Factors, Institutional Factors. ii. Distribution and Production of Major Crops: a. Rice, b. Wheat, c. Cotton and d. Sugarcane. iii. Green revolution in India. iv. Problems and Prospects of Agriculture Development in India.	04
4.	**Industries**	i. Industries : (a) Major Industries in India: a. Cotton Textile, c. Sugar b. Iron and Steel, d. I T Industries. ii. Major Industrial Regions in India. iii. Problems and Prospects of Industrial development in India.	04
		Total	**30**

N.B.: According need of topics, maps are expected.

Course Outcome:

By the end of the course, student will be able to -

COs 1 : Understand Physiography and Drainage system with their importance.

COs 2 : Explain the various types of climate and soils with their importance in human development.

COs 3 : Applying knowledge of geography to solve a problems related to agricultural and industrial development in India.

Reference Books:

1. Agrawal A. N. (2019): "Indian economy, Developmental Problems and policies" New Age International Pvt. Ltd.
2. Bindra, S.S. (1989): India and Her Neighbours, Deep and Deep Publications, New Delhi.
3. Chatterjee, Rupali. (2015): "Geography of India", Global Academic Publishers, New Delhi.
4. Deshpande, C.D (1992): India- A Regional Interpretation, Northern Book Centre, New Delhi.
5. Dubey and Negi - Economic Geography of India.
6. Gautam, Alka. (2006): "Advanced Geography of India", Sharda Pustak Bhawan, Allahabad, India.
7. Geography of India (2022) (The Gist of NCERT 6-12 Class) Books.

M. A. / M. Sc. Geography – I (Semester -II)

GEO 563 MJP: Practicals in Surveying

(Major Elective Group B – Practical)

Year	Semester	Group Vertical (V)	Course Type	Course & Course Code	Course Title	Total Credits	No. of practical	Total lectures per week
I	II	Major Elective	Practical	GEO 563 MJP	Practicals in Surveying	02	30	02

Objectives of the Course:

1. To introduce students to the fundamental principles and techniques used in surveying.
2. To provide hands-on experience in conducting field surveys.
3. To emphasize the importance of accuracy, precision, and ethical considerations in surveying.
4. To encourage critical thinking and problem-solving skills in the context of surveying.

Topic No.	Topic Name	Sub Topic	No. of periods
1	**Introduction to Surveying and Mapping**	i. Surveying: Definitions and Overview ii. Role and importance of surveying iii. Types of survey; a. According to area covered b. According to instruments c. According to nature of field d. According to purpose	05
2	**Angular Measurement and Leveling**	**A- Dumpy level :** i. Components and common terms used in dumpy level survey ii. Leveling , Types of leveling iii. Types and Methods of leveling iv. Profile drawing and block contouring **B.- Theodolite :** i. Components and common terms ii. Temporary and permanent adjustment iii. Measurement of Horizontal Angle – Direct, Repetition, Reiteration iv. Measurement of vertical angle and deflection angle	15
3	**Application of Survey Methods**	i. Field visit for data collection using dumpy level survey and Theodolite.	10
		Total	**30**

Course Outcome:

By the end of the course, student will be able to -

COs 1 : Demonstrate a basic concept of surveying.

COs 2 : Aware about various surveying instruments.

COs 3 : Acquire the skill to conduct field survey, including data collection, measurement, and observation.

COs 4 : Effectively in terms to plan and execute surveying.

References:

1. Asis Sarkar (2015): Practical Geography, A Systematic Approach, Orient Black Swan
2. Duggal, S.K. (2013): Surveying Vol. 2, McGraw Hill Publication, New York.
3. Kanetkar, T.P. and Kulkarni, S.V. (2010): Surveying and Leveling Vol. II, Pune Vidyarthi Publication, Pune.
4. Maslov, AV., Gordeev, A.V. and Batrakov, Yu.G. (1984): Geodetic surveying, Mir Publishers, Moscow.
5. Rangwala, S.C. (2011): Surveying and Leveling, Charotar Publishing House Pvt. Ltd. Anand,(Gujarat), India.
6. Punmia B.C., Jain A. and Jain A. (2011): Surveying, Vol. II. and III, Laxmi Publication -New Delhi.
7. R. Subramanian :Surveying and Levelling, Oxford University Press
8. S.K. Roy: Fundamental of surveying, PHI

M. A. / M. Sc. Geography – I (Semester -II)

GEO 564 MJ: Political Geography

(Major Elective Group C – Theory)

Year	Semester	Group Vertical (V)	Course Type	Course and Course Code	Course Title	Total Credits	No. of Periods	Total lectures per week
I	II	Major Elective	Theory	GEO 564 MJ	Political Geography	02	30	02

Objectives of the Course:

1. To explain the historical evolution of the discipline of Political Geography.
2. To provide knowledge about key concepts, including the state, the nation, frontiers, boundaries, Buffer zones, Core area, etc.
3. To help to understand the theoretical models related to geopolitics and geo-strategy.
4. To understand how geography influences political issues and their spatial dimensions.
5. To evaluate the contemporary geopolitical and geostrategic issues of India

Topic No.	Topic Name	Sub Topic	No. of periods
1	**Introduction to Political Geography**	i. Definition, nature, and scope ii. Historical background of Political Geography iii. Importance of Political Geography	04
2	**Concepts in Political Geography**	i. Territory and territoriality ii. Concept of State and Nation iii. Frontiers and Boundaries vi. Buffer zones, Buffer states	06
3	**Theories of Political Geography**	i. Heartland Theory (Halford J. Mackinder), ii. Rimland Theory (Nicholas J. Spykman), iii. Sea Power (Alfred Thayer Mahan),	06
4	**Geopolitics**	i. Concept of Geopolitics ii. Geopolitical Significance of the Indian Ocean iii. Geopolitics of the Middle East.	07
5	**Contemporary Issues Related to India**	i. International Border disputes: - a. India and China b. India and Pakistan ii. International Water disputes:- a. Indus and Brahmaputra	07
		Total	**30**

Course Outcome:

By the end of the course, student will be able to -

COs 1 : Understand the historical evolution, development, and recent trends in Political Geography.

COs 2 : Familiar with fundamental concepts of political geography.

COs 3 : Critically examine the theoretical models and their applications within geography.

COs 4 : Aware of current geopolitical issues and understand the significance of the Indian Ocean within them.

COs 5 : Use the ideas of political geography to develop a position on a contemporary issue and take a public stance on that issue.

References:

1. Alexander, L.M (1963): World Political Patterns, Ram McNally, Chicago.
2. Adhikari, S. (2008) Political Geography of India, ShardaPustakBhavan Allahabad
3. Adhikari S. (1997): Political Geography, Rawat Publication, Jaipur.
4. Dikshit R D. (1996): Political Geography – A Contemporary Perspective, Tata McGraw Hill, New Delhi.
5. Dikshit R.D. (2000): Political Geography: The Spatiality of Politics, Tata McGraw New Delhi.
6. Dodds, Klaus (2007): Geopolitics, New York: Oxford University Press.
7. Dwivedi R. L. (1996): Political Geography. Chaitanya Prakashan, Allahabad.
8. K. Siddhartha (1998) Nation State theory and Geopolitics: An introductory Political Geography, Kisalaya Publication, Patana.
9. Moor, R. (1981): Modern Political Geography. McMillan, London.
10. Taylor Peter (1985): Political Geography, Longman, London.

M. A. / M. Sc. Geography – I (Semester -II)

GEO 565 MJP: Practicals in Digital Cartography

(Major Elective Group C –Practical)

Year	Semester	Group Vertical (V)	Course Type	Course and Course Code	Course Title	Total Credits	No. of Practicals	Total lectures per week
I	II	Major Elective	Practical	GEO 565 MJP	Practicals in Digital Cartography	02	30	04

Objectives of the Course:

1. To understand the concept and significance of digital cartography and its applications in various fields.
2. To explain the fundamental principles and components of GIS.
3. To acquire knowledge and skills in data collection techniques.

Topic No.	Topic Name	Sub Topic	No. of Practicals
1	**Digital Cartography and GIS**	i. Overview of digital cartography ii. Data types iii. Data acquisition and management using GIS software's	07
2	**Coordinate systems and Georeferencing**	i. Raster and vector data ii. Coordinate Systems iii. Georeferencing of SOI Toposheet or satellite image iv. Mosaic and image subset	08
3	**Cartographic Design**	i. Digitization of three features i.e. Point, line and polygon ii. Data editing and attribute attachment iii. Symbolization iv. Color selection in map layout	07
4	**Map Layout**	i. Labeling ii. Elements of Maps iii. Effective map layout and composition iv. Creation of maps using GIS software's	08
		Total	**30**

Course Outcome:

By the end of the course, student will be able to -

COs 1 : Obtain knowledge about importance and applications of digital cartography.

COs 2 : Implement skill of open source GIS software for data acquisition and management.

COs 3 : Apply the skill about Georeferencing, and map layout tool.

COs 4 : Prepare digital map.

References:

1. Borden Dent and Jeffrey Torguson (2021) "Cartography: Thematic Map Design" (McGraw-Hill Education)
2. Chris B. Jones (2014) "Geographical Information Systems and Computer Cartography" (Taylor & Francis)
3. Cynthia A. Brewer (2015) "Designing Better Maps: A Guide for GIS Users" (Esri Press)
4. Dana Tomlin (2019) "Geographic Information Systems and Cartographic Modeling" (ESRI Press)
5. David O'Sullivan and David J. (2010) "Geographic Information Analysis" Unwin (Wiley)
6. Ian Muehlenhaus (2018) "Web Cartography: Map Design for Interactive and Mobile Devices" (CRC Press)
7. Ian Muehlenhaus and Keith (2020) "Digital Cartography" by Clarke (Pearson)
8. J. Ariza- López (2012) "Open Source Approaches in Spatial Data Handling" (Springer)
9. Jennifer George- Palilonis (2016) "A Practical Guide to Graphics Reporting: Information" (Taylor & Francis)
10. John Jensen (2013) "Principles of Geographic Information Systems" (McGraw-Hill Education) Jon Kimerling (2009) "Map Use: Reading, Analysis, Interpretation" (ESRI Press)
11. John P. Snyder (1995) "Map Projections: A Reference Manual" (CRC Press)
12. Kurt Menke (2020) "Mastering QGIS" (Packt Publishing)
13. Markus Neteler (2018) "Open Source GIS: A GRASS GIS Approach" (Springer)

M. A. / M. Sc. Geography – I (Semester -II)

GEO 581 OJT: On Job Training

Year	Semester	Group Vertical (V)	Course Type	Course & Course Code	Course Title	Total Credits	No. of Periods
I	II	On Job Training	Practical	GEO 581 OJT	On Job Training	04	60

Objectives of the Course:

1. To give hands-on experience and practical training to students in different sectors related to geography
2. To develop marketable skills among students
3. To expose students to different industrial, educational and research institutes and future employers
4. To apply their knowledge in real situations
5. To gain experience in writing technical reports

Guidelines

- For on-job training, the students will be attached with the local institutions and employing establishments, which have laboratory/workshop, other related facilities and where adequate supervision by qualified personnel will be available.
- A student is expected to spend not less than 60 working hours on On-job training and related activities.
- On-job training will be carried in the summer vacation after the students complete their second semester examinations.
- Students need to provide the confirmation letter from the organization or the institute where they have joined for on-job training.
- The continuous evaluation of the students' performance in the on job-Training will be carried out with the assistance of the personnel of training institutions/employing establishments where this training will be imparted.
- The proof of completion of on-job training (work experience certificate and field report) should be submitted during examination to the parent institution, duly issued and signed by the concerned training authority.

Course Outcome:

By the end of the course, the students will be able to:

COs 1 : Embrace different pathways of learning, including experiential learning

COs 2 : Understand the social, economic and administrative considerations that influence the working environment of different organizations

COs 3 : Learn new strategies like time management, multi-tasking and new skills

COs 4 : Get an opportunity to meet new people and learn networking skills

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