DEPARTMENT OF GEOGRAPHY & DISASTER MANAGEMENT
(DST-FIST and UGC-SAP Department)

COURSE STRUCTURE

FOR

M. A./M. Sc. GEOGRAPHY

Batch 2025 Onwards

Under

NATIONAL EDUCATION POLICY (NEP) 2020

School of Earth & Environmental Sciences
University of Kashmir
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ABOUT THE PROGRAMME

Geography is a broad discipline that enables the understanding of spatial distributions, interrelationships, interactions, and interdependences among the man and environment on the surface of the earth, aiming to plan an ideal spatial organization. Geography is inherently multidisciplinary, acting as a bridge between human and physical sciences. Initially focused on Earth's physical and human aspects, modern Geography now encompasses various disciplines that aid in understanding the Earth and its environment. Geography has evolved into a trans-disciplinary subject that integrates regional diversity with dynamic relations between space and time, providing comprehensive knowledge of ecological, economic, and societal transformations at local, regional to global scales. As everything under the sky having spatial dimensions comes within the ambit of Geography, it is an 'inclusive' subject drawing its contents from various fields requiring multipronged approaches, tools and techniques. Modern geography has evolved as a multidisciplinary and transdisciplinary subject. The advent of geospatial technologies such as Remote Sensing (RS), Geographic Information Systems (GIS), and Global Positioning System (GPS) have enabled a good understanding of spatial realities, plan a conducive spatial organization for economic, societal, and national wellbeing. The data and information generated and extracted from and using these technologies are vital for various applications, including natural resource management, urban sprawl, climate change, disaster response, human well-being, and spatial management.

The domain of Geography includes spatio-temporal analysis, skill development in mapping, geoinformation technology, sustainable development, human wellbeing and security studies. Its focus is on current socio-spatial problems to raise awareness among students about the practical applications of Geography in addressing societal issues. So, Geography must be studied from multi-dimensional perspectives.

Programme Learning Outcomes

Students after completing the Masters Degree in Geography programme will be capable to:

PLO 1: Communicate effectively on the objectives, philosophy and practical utility of their subject and its relevance to the society.

PLO2: Critically thinking, analyse and interpret the geographical data and information's, geographical phenomena, it's patterns, and processes.

PLO3: Acquire skills of spatial analysis and synthesize knowledge for solving the challenging issues of the environment and society taking the country to the 21st century

PLO4: Place themselves as regional and urban planners, environmental managers, resource planners and cartographers etc.

PLO5: Utilize Geospatial Technologies, AI and Machine Learning effectively in regional planning, urban planning, rural development, disaster management, and environmental planning for sustainable solutions.

PLO6: Conduct Action-Oriented Research to expand the frontiers of knowledge in order to enhance welfare of the present and need of the future
PLO7: Develop ethical awareness to make the society relevant for welfare and progress of the country.
PLO8: Work in a multidisciplinary environment and contribute their share in providing solutions to our day to day problems.
PLO9: make their careers as Remote Sensing and GIS professionals.
PLO10: Appear in various competitive examinations so that they can carve a niche for themselves in the civil services.

PEDAGOGY

The programme adopts a diverse and interactive pedagogical approach that includes: Lectures, Seminars, Group Discussions; Student Presentations, and Implant Training.

This two-year Master's programme comprises classroom instructions, practical training, supervised fieldwork, research, and report writing.

Modes of PG Programme

Programme	Eligibility	Entry/Lateral Entry	Exit Option/ Degree Completion	Award
2-year Masters Degree	3-year UG	Ist Year	1 Year	PG Diploma in Geography
			2 Year	Master's Degree in Geography
1-year Masters Degree	4-year UG (Honours/Honours with Research)	2nd Year	1 Year	Master's Degree in Geography

STRUCTURE OF THE PROGRAMME

The programme offers a flexible multi-level entry and exit system. Students enrolled in the full Master's programme can exit after completing the two semesters [1st and 2nd] with a Postgraduate Diploma in Geography.

Students from 4-year undergraduate programmes may enter directly into the third semester and upon completing the third and fourth semesters, will be awarded a 1-year Master's degree. Those from 3-year undergraduate programmes can enroll from the first semester and earn a 2-year Master's degree upon completion of all four semesters.

Candidates who opt for an early exit (after 1 or 2 years) retain the option to re-enter the programme within three years at the start of any academic year. However, the total time from

initial admission to final completion including any gap years must not exceed seven years, and the degree must be completed under the curriculum in effect at the time of re-entry.

The Master's in Geography is a 2-year postgraduate programme divided into four semesters. Students are required to complete a structured set of courses, which include 10 Core Courses (CC), 4 Laboratory Courses, along with a combination of Discipline-Centric Elective Courses (DCEC) and Skill Enhancement Courses. The programme covers six key components: Classroom Teaching, Tutorials, Practical Work, Seminars, Field Studies and Report Writing.

Each student must earn between 20 to 24 credits per semester. To qualify for the Master's Degree, students must acquire a total of 80 to 96 credits for a two-year programme and 40 to 48 credits for a one-year programme, typically for lateral entry students. Similarly, those exiting with a Postgraduate Diploma in Geography must complete 40 to 48 credits.

Of the total credits in any semester, at least 14 credits shall be from Core and Laboratory Courses. The remaining credits can be earned through a mix of elective courses, specializations, and skill-based modules.

The assessment structure for each course includes 28% marks for continuous internal assessment and 72% for the semester-end examination.

Note: There shall be two faculty members in-charge of the Field Studies Course **(MGEOLFS325)** in the 3rd semester to be conducted within or outside the J&K. In the said course, each student shall have to prepare a report as per nature and purpose of the project. All the faculty members shall provide supervision to the students for the preparation of the field study report. A faculty member shall have to supervise a maximum of three students for preparation of the field report.

The breakup of marks for the Internal Assessment shall be as under:

Breakup of marks for the internal assessment		
Item	28 Marks (4 Credits)	14 Marks (2 Credits)
Seminar, Assignment, and Group Discussion	8 Marks	4 Marks
Internal Test	20 Marks	10 Marks

Structure & Syllabus for 2-Year/1-Year Master's Programme in Geography (CW+CW & CW+R)

	Course Code	Course Title	Course Type	Credits
Semester I	MGEOCAG125	Advanced Geomorphology	C	4
	MGEOCRP125	Regional Planning & Development	C	2
	MGEOCGR125	Geography of Resources	C	4
	MGEOLDC125*	Digital Cartography	L	4
	Students shall have to opt six (06) credits from the following DCEC			
	MGEODRG125	Remote Sensing and GIS	D	2
	MGEODOC125	Oceanography	D	2
	MGEODGT125	Geography of Tourism	D	2
	MGEODDM125	Disaster Management	D	2
	MGEODLP125	Landuse Planning	D	2
	MGEODGI125	Geography of India	D	2
Semester II				
Semester II	**Course Code**	**Course Title**	**Course Type**	**Credits**
	MGEOCAC225	Advanced Climatology	C	4
	MGEOCEE225	Ecology & Environment	C	2
	MGEOCRM225	Research Methodology	C	4
	MGEOLRS225*	Remote Sensing & GIS	L	4
	Students shall have to opt six (06) credits from the following courses			
	MGEODWM225	Watershed Management	D	2
	MGEODUP225	Urban Planning	D	2
	MGEODIN225	Industrial Geography	D	2
	MGEODAG225	Agriculture Geography	D	2
	MGEODWG225	World Geography	D	2
	MGEOPGT225*	Geospatial Technology	P	2
Total Credits First Year = 40 (20 per semester)				

Note: (i) Laboratory Course (L) and Project (P) are Compulsory for all the students.

(ii) Exit option with Post-Graduate Diploma in Geography on completion of courses equal to a minimum of 40 credits

	Course Code	Course Title	Course Type	Credits
Semester III	MGEOCPM325	Philosophies and Methodologies in Geography	C	4
	MGEOCSC325	Social and Cultural Geography	C	4
	MGEOCST325	Advanced Statistical Techniques	C	2
	MGEOLFS325*	Field Studies (Geomorphic & Socio-Economic)	L	4
	Students shall have to opt six (06) credits from the following DCEC			
	MGEODAH325	Advanced Hydrology	D	2
	MGEODCC325	Climate Change	D	2
	MGEODSD325	Sustainable Development	D	2
	MGEODSG325	Soil Geography	D	2
	MGEODRD325	Rural Development	D	2
Semester IV				
	Course Code	**Course Title**	**Course Type**	**Credits**
Semester IV	MGEOCPS425	Population and Settlement Geography	C	4
	MGEOCBG425	Biogeography	C	2
	MGEOCEI425	Environmental Impact Assessment	C	4
	MGEOLAS425*	Advanced Land Surveying	L	4
	Students shall have to opt six (06)credits from the following DCEC			
	MGEODGH425	Geography of Health	D	2
	MGEODNH425	Natural Hazards	D	2
	MGEODGT425	Geography of Transport	D	2
	MGEODPG425	Political Geography	D	2
	MGEODHC425	Himalayan Cryosphere	D	2
Total Credits 2nd Year = 40 (20 per semester)				

Note: Laboratory Course (L) is Compulsory for all the students.

Note: Course Curriculum for (CW+CW) & (CW+R) shall be same upto 3rd semester. However, students who opt for CW+R shall have to follow the below structure in Semester IV.

(CW+R)

Total Credits= 20				
Semester IV	**Course Code**	**Course Title**	**Course Type**	**Credits**
	MGEOPDI425	Project Dissertation	P	16
	MGEOCRA425	Recent Advances in the Relevant Research Topic	C	4
	Total Credits = 20			

Structure for CW+R

1. Research Project: 16 credits

I. Project Dissertation: 16 credits → 400 marks total, evaluated as:

i. 100 marks by the Project Mentor

ii. 200 marks for the written dissertation (by external/internal members)

iii. 100 marks for Final Viva-Voce, jointly conducted by a panel:

1. Head of Department (HoD)
2. External/Internal Examiner (nominated by the Department)
3. Project Mentor
4. Senior Faculty Member (if HoD is a Mentor).

II

I. Theory Paper: 4 credits titled "Recent Advances in the Relevant Research Topic"

i. 100 marks (28 internal and 72 external marks)

ii. The course contents for this theory paper shall be designed by the concerned project mentor**.**

Master's (PG) Degree in Geography
[1st Semester]

Course Code	Course Title	Course Type	Credits
MGEOCAG125	Advanced Geomorphology	C	4
MGEOCRP125	Regional Planning & Development	C	2
MGEOCGR125	Geography of Resources	C	4
MGEOLDC125	Digital Cartography	L	4
MGEODRG125	Remote Sensing and GIS	D	2
MGEODOC125	Oceanography	D	2
MGEODGT125	Geography of Tourism	D	2
MGEODDM125	Disaster Management	D	2
MGEODLP125	Landuse Planning	D	2
MGEODGI125	Geography of India	D	2

Note: **Laboratory Course (L) is Compulsory for all the students**

Master's (PG) Degree in Geography
[1st Semester]

MGEOCAG125: Advanced Geomorphology

Credits: 04 **Total Contact Hours: 60** **Max. Marks: 100**

Course Learning Outcomes: After completion of the course, the student should be able to:
CLO1: Identify and interpret tectonics through structural landforms.
CLO2: Evaluate modern theories and models of landscape evolution.
CLO3: Explain hydrological properties of channels.
CLO4: Know applications of geomorphology.

Unit-I

Fundamental Principles: Uniformitarianism; Spatial Scale, Temporal Scale and related Concepts: Systems, Feedback, Equilibrium and Threshold; Fluvial and Aeolian Landforms; Geomagnetism & Geomagnetic Reversal; Plate Tectonics

Unit-II

Theory of Evolution of Landforms (Wilson Cycle); Models of Landscape Development: W.M. Davis, W. Penk & L. C. King; Mountain Building Theory: Kober; Earth Movements; Morphogenetic Regions; Models of Slope Evolution: King, Wood & Strahler; Geochronology Dating Techniques: OSL, Carbon-14 & Exposure Dating

Unit-III

Hydrological Properties of Channels: Regime, Velocity, and Discharge; Factors Controlling Entrainment, Transportation and Deposition by Running Water; Morphological Properties of Channels: Profiles, Planforms, Patterns and Classification; Effects of Floods in Channel Modification and Characterisation

Unit-IV

Morphometry of Drainage Basins: Linear Aspects, Areal Aspects, Relief Aspects; Application of Geomorphology in Ground Water and Mining; Application of Geomorphology in Terrain Evaluation, and Engineering

CLO-PLO Matrix for the Course MGEOCAG125: Advanced Geomorphology

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MGEOCAG125.1	3	2	2	1	0	3	3	2	2	3
MGEOCAG125.2	3	2	2	1	0	3	3	2	2	3
MGEOCAG125.3	3	3	2	3	3	3	3	3	3	3
MGEOCAG125.4	3	3	2	3	3	3	3	3	3	3
Average for MGEOCAG125	3	2.5	2	2	1.5	3	3	2.5	2.5	3

Suggested Readings:

- Anderson, R. S., & Anderson, S. P. Geomorphology: The Mechanics and Chemistry of Landscapes. Cambridge University Press. 2010.
- Bierman, P. R., & Montgomery, D. R. Key Concepts in Geomorphology. Macmillan Education. 2014
- Bloom, A. L. Geomorphology: A Systematic Analysis of Late Cenozoic Landforms. Prentice-Hall of India. 2013
- Dayal, P. A Text- book of Geomorphology. Kalyani Publishers, New Delhi. 1994
- Huggett, R. J. Fundamentals of Geomorphology. Routledge. 2011
- Kale, V. S., & Gupta, A. Introduction to Geomorphology. Orient Longman. 2001
- Singh, S. Geomorphology. Prayag Pustak Bhawan. 2004
- Sparks, B. W. Geomorphology. Longmans. 1996
- Thornbury, W. D. Principles of Geomorphology. John Wiley and Sons. 2005

Master's (PG) Degree in Geography
[1st Semester]

MGEOCRP125: Regional Planning & Development

Credits: 02 **Total Contact Hours: 30** **Max. Marks: 50**

Course Learning Outcome: After studying the course, the students will be able to:
CLO1: Analyse the relevance of regional planning in regional development.
CLO2: Understand levels of regional development and disparities in India and J&K.

Unit-I

Relevance of Regional Planning in Regional Development; Regional Planning in India; Development: Concept & Measurement; Rostow's Stage Theory of Growth; Growth Pole Theory; Regional Income Inequality Model; Core Periphery Model

Unit-II

Measurement of Levels of Regional Development & Disparities; Indicators of Development; Construction of Composite Index; Levels of Regional Development & Disparities in India with special Reference to J&K; Planning Initiatives for Balanced Regional Development in India; Emerging Corridors of Development in India.

CLO-PLO Matrix for the Course MGEOCRP125: Regional Planning & Development

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MGEOCRP125.1	3	2	2	2	3	3	3	3	3	3
MGEOCRP125.2	3	3	2	1	3	3	3	3	3	3
Average for MGEOCRP125	3	2.5	2	1.5	3	3	3	3	3	3

Suggested Readings:

- Agarwal, A.G., Urban and Regional Models in Geography and Planning, John Wiley and Sons, 1974.
- Campbell, S. and Frankenstein, S., Planning Theory, Blackwell Publishers, 1997.
- Campbell, S., and Feinstein, S. Readings in Planning Theory, Blackwell Publishers, 1997.
- Carter, Harold., The Study of Urban Geography, Edward Arnold Publishers Ltd., 1982.
- Chadwick, George., A Systems view of Planning, Pergamum Press Oxford, New York., 1978.
- Clout, H.D., Rural Geography, Pergamum Press Oxford, New York. 1984.
- Gary Hack, et al. Local Planning: Contemporary Principles and Practice, Oxford Press London, 2009.
- Heredero, J.M., Rural Development and Social Change, Monahan Press Gujarat, 1979.
- Hugget, Richard., System Analysis in Geography, Clarendon Press Oxford, 1980.
- Issard, Walter., Methods of Regional Analysis, The M.I.T Press, 1976.

Master's (PG) Degree in Geography
[1st Semester]

MGEOCGR125: Geography of Resources

Credits: 04 **Total Contact Hours: 60** **Max. Marks: 100**

Course Learning Outcome: After studying the course, the students will be able to:
CLO1: Comprehend nature, significance, classification and approaches of resources.
CLO2: Discuss in detail about the models and theories of resources as well as problems of resource depletion.
CLO3: Understand principles of conservation of resources as well as resource appraisal.
CLO4: Understand natural resource management, resource governance and related issues.

Unit -I

Geography of Resources: Nature and Significance; Dynamics of Resources; Classification of Resources; Approaches in Geography of Resources: Ecological, Economic and Social; Concept of Resource Utilization, Accumulation and Degradation

Unit -II

Zimmermann's Primitive & Advance Model; Kirk's Decision Model; Brookfield's System Model; Dynamic Theory of Resource Wars; Problems of Natural Resource Depletion: National and Local

Unit-III

Meaning and Principles of Conservation and Management; Methods of Conservation of Natural Resources:-(i) Water (ii) Forests (iii) Soils (iv) Minerals; Integrated Resource Management and its applications with special Reference to J&K (IWDP); Resource Appraisal and Development; Use of GIS and Remote Sensing in Resource Appraisal

Unit-IV

Natural Resource Management: Concept and Need; Natural Resource Management and Development; Resource Governance in India; Community Based Natural Resource Management; Impact of Natural Disasters on Resources

CLO-PLO Matrix for the Course MGEOCGR125: Geography of Resources

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MGEOCGR125.1	3	2	2	1	1	3	3	3	2	3
MGEOCGR125.2	3	2	2	2	2	3	3	3	3	3
MGEOCGR125.3	3	3	1	1	3	3	3	3	3	3
MGEOCGR125.4	3	3	2	1	1	3	3	3	3	3
Average for MGEOCGR125	3	2.5	1.75	2.5	1.25	3	3	3	2.75	3

Suggested Readings:

- Harikesh N. Misra., Managing Natural Resources- Focus on Land and Water, Prentice Hall India Learning Private Limited, 2014.
- Jana, Bipal, & KR. Majumder, Impact of Climatic change on Natural Resource Management, Mrinmoy Publishing House, 2012.
- Konnethd, Frederick and Norman J. Rosenberg., Assessing the Impacts of Climate Change on Natural Recourses Management, Springer, 1994.
- Russell D. Taylor., Natural Resources Management and Local Development, Springer, 2010.
- Sundaram.M, and M. Mrityunjay., Natural Resources Management and livelihood Security – Survival Strategies and Sustainable Policies, BhoovigyanVikas Foundation, 2004.
- Teri., Global Sustainable Report 2015: Climate Change and Sustainable Development, Oxford University Press, 2015.

MGEOLDC125: Digital Cartography

Credits: 04 **Total Contact Hours: 90** **Max. Marks: 100**

Course Learning Outcome: After studying the course, the students will be able to:
CLO1: Proficiently utilize computer aided GIS
CLO2: Effectively use GPS based technologies for Geo-tagging, Geo-fencing and Digital Cartography in e-Governance and Smart Cities.
CLO3: Understand how geospatial features are represented by the help of maps.
CLO4: Generate and display the quantitative and qualitative spatial and non-spatial data by means of maps.

Unit-I

Introduction to Digital Cartography; Sources of Cartographic Data: Conventional & Non-Conventional; Elements of Map making; Map Designing and Layout; Cartographic Methods and Techniques: Graphs and Diagrams; Mapping Techniques: Dot, Choropleth, Chorochromatic; Compilation of Spatial Data

Unit-II

Modern Techniques of Map Production: Dynamic and Interactive Mapping; Representation of Geospatial Data: Histogram, Bar Graphs, Line Graphs, Scatter Diagram, Pie diagram; Preparation of Qualitative and Quantitative Maps for Physical and Socioeconomic Data; Representation of Climatic Data

Unit- III

Computer requirements for GIS Projects; Use of Excel and Spreadsheets for Tabular Spatial Data; Map Integration with Databases (DBMS,SQL); Dashboard Creation using Excel, Google Data Studio; Automation in GIS Using Python

Unit- IV

Computer Applications in Geographical Research; GPS-based Technologies: Geo-tagging, Geo-fencing; Web Mapping Platforms: Google Maps; Open Street Map; Digital Cartography in e-Governance and Smart Cities.

CLO-PLO Matrix for the Course MGEOLDC125: Digital Cartography

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MGEOLDC125.1	3	2	3	3	3	3	3	3	2	3
MGEOLDC125.2	3	1	3	3	3	3	3	3	2	3
MGEOLDC125.3	3	2	3	3	3	3	3	3	2	3
MGEOLDC125.4	3	3	3	3	3	3	3	3	2	3
Average for MGEOLDC125	3	2	3	3	3	3	3	3	2	3

Suggested Readings:

- Anson, R. W. & Ormelling F. J. Basic Cartography: For Students, Technicians; Exercise Manuals (International Cartographic Association). Elsevier. 1994
- Gupta, K. K. & Tyagi, V. C. Working with Map, Survey of India. DST. New Delhi. 1992
- Mishra, R. P. & Ramesh, A. Fundamentals of Cartography. Concept Publishing, New Delhi. 1989
- Monkhouse, F. J. & Wilkinson, H. R. Maps and Diagrams. Methuen Co Ltd. London. 1985
- Raisz, E. General Cartography. John Wiley and Sons. New York. 1962
- Rhind D. W. & Taylor D. R. F., (eds.). Cartography: Past, Present and Future. International Cartographic Association. Elsevier. 1989
- Robinson, Arthur H.; Morrison, Joel L.; Muehrcke, Phillip C.; Kimerling, A. John &Guptill, Stephen C. (eds.). Elements of Cartography. John Wiley and Sons, Inc. New York. 2010
- Sarkar, Ashish. Practical Geography: A Systematic Approach. Orient Black Swan Private Ltd. New Delhi. 1997
- Sharma, J. P. Prayogik Bhugol. Rastogi Publications. Meerut. 2001
- Singh, L. R. Fundamentals of Practical Geography. Sharda Pustak Bhawan, Prayagraj.2006

Master's (PG) Degree in Geography
[1st Semester]

MGEODRG125: Remote Sensing and GIS

Credits: 02 **Total Contact Hours: 30** **Max. Marks: 50**

Course Learning Outcome: After studying the course, the students will be able to:
CLO1**:** Develop skills and competence in data and information acquisition, extraction, management and analysis.
CLO2**:** Analyze GIS data and interpret it.

Unit -I

Fundamentals of Remote Sensing: EMR & EMS; Interaction of EMR with the Atmosphere & Earth Surface Features; Mechanism of Remote Sensing Data Acquisition & Processes; Resolution in Remote Sensing; Platforms and Sensors: Types & Characteristics; Aerial Photographs & its Types; Image Interpretation & its Elements; Multi Concept in Remote Sensing

Unit-II

GIS: Concept, Development & Components; Geographic Data: Types & Characteristics; Data Models: Raster & Vector; GIS Analysis: Queries, Reasoning, Measurements & Transformations; GIS DBMS: Concepts, Components & Quality; Topology Building

CLO-PLO Matrix for the Course MGEODRG125: Remote Sensing and GIS

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MGEODRG125.1	3	1	3	3	3	3	3	3	1	3
MGEODRG125.2	3	1	3	3	3	3	3	3	1	3
Average for MGEODRG125	3	1	3	3	3	3	3	3	1	3

Suggested Readings:

- Campbell, J.B., Introduction to Remote Sensing, (2nd ed.), Taylor and Francis, London, 1996.
- Curran, P., Principles of Remote Sensing, Longman, London, 1985.
- Fazal S., GIS Basics, New Age International Publishing, New Delhi, 2008.
- Fazal S., Remote Sensing Basics, Kalyani Publishers, New Delhi, 2009.
- Jenson, J.R., Remote Sensing and Environment. Pearson India, 2013.
- Joseph George., Fundamentals of Remote Sensing, (2nd ed.) University Press, Hyderabad, 2005.
- Kumar, S., Basics of Remote Sensing and GIS, Laxmi Pub, 2005.
- Lillesand T.M and Keifer R.W., Remote Sensing and Image Interpretation (6th ed.) John Wiley and Sons, New York, 2008.
- Lo, C.P. and Yeung AKW., Concepts and Techniques of GIS (2nd ed.), Prentice Hall of India, New Delhi, 2006
- Sabins, J.F.F., Remote Sensing: Principles and Interpretation, W.H. Freeman & Co., New York, 1997

Master's (PG) Degree in Geography
[1st Semester]

MGEODOC125: Oceanography

Credits: 02 **Total Contact Hours: 30** **Max. Marks: 50**

Course Learning Outcome: After studying the course, the students will be able to
CLO1: Learn the basic physical and chemical properties of ocean water, such as salinity, temperature, and density, and how these properties influence ocean dynamics.
CLO2: Comprehend and establish the relationship between human action and global ocean conditions.

Unit-I

Oceanography: Overview; Ocean's role in the Earth's System; Ocean Floor Topography: Relief Features of Atlantic Ocean; Physical and Chemical Properties of Sea Water: Temperature, Density and Salinity; Ocean Circulation: Surface Ocean Currents and Deep Ocean Currents; Ocean Deposits

Unit-II

Ocean Resources and its Management; Human Impact on the Oceans: Pollution and its impacts on Marine Ecosystem, Climate Change and Ocean Health; Coastal Zone Management and Planning: Law of the Sea & Exclusive Economic Zone; Ocean Hazards: Cyclone, Tsunami & Sea Level Rise

CLO-PLO Matrix for the Course MGEODOC125: Oceanography

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MGEODOC125.1	3	2	2	2	2	3	2	2	1	3
MGEODOC125.2	3	2	2	2	2	3	2	2	1	3
Average for MGEODOC125	3	2	2	2	2	3	2	2	1	3

Suggested Readings:

- Davis, R.J.A., Oceanography-An Introduction of the Marine Environment. Win C. Brown, Lowa, 1986.
- Douglas A. Segar., Introduction to Ocean Science, Wadsworth Pub., London, 1998
- Grald, S., General Oceanography-An Introduction, John Wiley & Sons, New York, 1980.
- Hussain Majid, Physical Geography, Anmol Publications, 2007
- Hussain, T. and Tahir, M., Oceanography, Jawahar, New Delhi, 2012.
- King, C.A.M., Oceanography for Geographers, Earnold, London, 1975.
- Kings, C.A.M., An Introduction to Oceanography, McGraw, New York, 1969.

- Paul R. Pinet, Oceanography, Jones and Bartelett Publishers, 1998. .
- Siddhartha, K., Oceanography-A Brief Introduction, Kisalya Pub., New Delhi, 2013.
- Singh, S., Physical Geography, Prayag Pub., Allahabad, 2013.
- Strahaler, A.H., Introducing Physical Geography, Wiley Pub, 2013.
- Trujillo, A.P & Thurnman, H.V., Essentials of Oceanography, Prentice Hall, 2016.
- Trujillo, A.P. & Thurnman, H.V., Introductory Oceanography, Prentice Hall, 2010.

Master's (PG) Degree in Geography
[1st Semester]

MGEODGT125: Geography of Tourism

Credits: 02 **Total Contact Hours: 30** **Max. Marks: 50**

Course Learning Outcome: After studying the course, the students will be able to
CLO1: Understand nature, characteristics of tourism and tourism resources.
CLO2: Assess impacts of tourism on environment and sustainable tourism.

Unit-I

Geography of Tourism: Nature & Characteristics; Typology of Tourism: Classification of Tourists; Tourism Motivation; Tourism Resources; Buttler's Theory of Tourism Development

Unit-II

Tourism Planning & its Approaches; Impact of Tourism: Environmental, Economic, Social & Cultural; Sustainable Tourism, Eco-tourism, Responsible Tourism & Concept of Carrying Capacity in Tourism; Tourism in J&K: Potential, Flow & Distributional Pattern; Application of Geospatial Technology in Tourism Development

CLO-PLO Matrix for the Course MGEODGT125: Geography of Tourism

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MGEODGT125.1	3	3	3	1	0	3	3	3	2	3
MGEODGT125.2	3	3	3	1	1	3	3	3	3	3
Average for MGEODGT125	3	3	3	1	0.5	3	3	3	3	3

Suggested Readings:

- Bhatia, A. K., International Tourism - Fundamentals and Practices, Sterling Publisher, New Delhi, 1991.
- Bhatia, A. K., Tourism Development: Principles and Practices, Sterling Publisher Ltd., Delhi, 1996.
- Das, M., India: A Tourist Paradise, Sterling Publishers, New Delhi, 1999.
- Hall, C Michael, and Page J. S. The Geography of Tourism & Recreation, Routledge, London, 2006.
- Kaul, R. K., Dynamics of Tourism and Recreation, Inter India, New Delhi, 1985.
- Lew, A. A., Hall, C. M. and Williams, A. M., (ed). Tourism, Wiley-Blackwell, Hoboken, 2014.
- Pearce, D., Tourism Today: A Geographical Analysis, Longman Scientific and Technical, NY, 1987.
- Pearce, D. G., Tourism Today: A Geographical Analysis, Longman, Harlow, 1987.
- Robinson, H. A., Geography of Tourism, Macdonald and Evans, London, 1996.
- Smith, L. J. S., Practical Tourism Research, CABI, Wallinford, 2010.
- Smith, L. J. S., Tourism Analysis: A Handbook, Halstead Press, Sydney, 2010.

Master's (PG) Degree in Geography
[1st Semester]

MGEODDM125: Disaster Management

Credits: 02 **Total Contact Hours: 30** **Max. Marks: 50**

Course Learning Outcome: After studying the course, the students will be able to:
CLO1: Learn spatial distribution of hazards at different spatial scales.
CLO2: Comprehend the institutional arrangements for disaster management.

Unit-I

Hazards, Disasters, Exposure, Vulnerability, and Risk; Capacity, Resilience, Prevention, Mitigation, Adaptation, and Disaster Risk Reduction; Types of Hazards and Multi-hazards; Physical Dimensions of Hazards; Spatial Distribution of Hazards at Global, Regional and Local Levels

Unit-II

Disaster Management Continuum; Preparedness: Early Warning Systems, Contingency Planning; Response: Emergency Services, Logistics, Coordination Mechanisms; Recovery: Rehabilitation, Reconstruction, Build Back Better; Community based Risk Management; Institutional Arrangements for Disaster Management; Hyogo Framework; Sendai Framework for disaster risk reduction

CLO-PLO Matrix for the Course MGEODDM125: Disaster Management

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MGEODDM125.1	3	3	2	1	1	3	3	3	2	2
MGEODDM125.2	3	3	2	1	1	3	3	3	3	3
Average for MGEODDM125	3	3	2	1	1	3	3	3	2.5	2.5

Suggested Readings:

- Coppola, D. P. Introduction to International Disaster Management (4th ed.). Butterworth-Heinemann. 2020
- Hyndman, D., & Hyndman, D. Natural Hazards and Disasters (4th ed.). Cengage Learning. 2013
- IFRC & UNDP. The Handbook on Law and Disaster Risk Reduction. 2015.
- Kelman, I., Gaillard, J. C., & Mercer, J. (Eds.).The Routledge Handbook of Disaster Risk Reduction Including Climate Change Adaptation.Routledge. 2017.
- National Disaster Management Authority (NDMA) – India (Various Guidelines).
- Sphere Association.The Sphere Handbook: Humanitarian Charter and Minimum Standards in Humanitarian Response. 2018
- United Nations Office for Disaster Risk Reduction (UNDRR).Sendai Framework for Disaster Risk Reduction 2015–2030, 2015
- Tierney, K.The Social Roots of Risk: Producing Disasters, Promoting Resilience. Stanford University Press.2015
- United Nations. Paris Agreement. United Nations Framework Convention on Climate Change (UNFCCC). 2015

Master's (PG) Degree in Geography
[1st Semester]

MGEODLP125: Landuse Planning

Credits: 02 **Total Contact Hours: 30** **Max. Marks: 50**

Course Learning Outcome: After studying the course, the students will be able to:
CLO1: Understand factors governing land utilization and drivers of landuse change.
CLO2: Explain principles, drivers, and methodology of land use planning.

Unit-I

Basic Concepts: Land Use and Abuse, Land Suitability, Land Capability Classification, Land Evaluation, Land Sensitivity & Land Reclamation; Factors Governing Land Utilization; Drivers of Land Use Changes

Unit-II

Land Use Planning: Concept; Types; Objectives; Principles; Tools & Techniques; Policy & Regulations; Rural & Urban Land Use Planning; Land Use Planning for Territorial Development and Disaster Risk Management

CLO-PLO Matrix for the Course MGEODLP125: Landuse Planning

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MGEODLP125.1	3	3	2	2	2	3	3	3	2	3
MGEODLP125.2	3	3	2	3	2	3	3	3	3	3
Average for MGEODLP125	3	3	2	2.5	2	3	3	3	2.5	3

Suggested Readings:

- Edward S. Kaiser and F. Stuart Chapin; Urban Land Use Planning, 4th Edition. 1957.
- Hok-Lin Leung; Land Use Planning Made Plain, University of Toronto Press. 2003
- Jane Silberstein, M.A., and Chris Maser; Land-Use Planning for Sustainable Development, Second Edition, CRC Press. 2013.
- John Randolph; Environmental Land Use Planning and Management. 2004.
- Julian Conrad Juergensmeyer and Thomas E Roberts; Land Use Planning and Development.2003
- Philip R. Berke, David R Godschalk; Urban Land Use Planning, 5th Ed., University of Illinois Press. 2006.
- T. William Patterson; Land Use Planning, Techniques of Implementation, Van Nostrand Reinhold Company. 1979.

Master's (PG) Degree in Geography
[1st Semester]

MGEODGI125: Geography of India

Credits: 02 **Total Contact Hours: 30** **Max. Marks: 50**

Course Learning Outcomes: By the end of course, students will be able to:
CLO1**:** Analyze the impact of physiography, drainage system and climate on distribution of natural vegetation and soil types.
CLO2: Ejuvaluate population and urbanization dynamics and critically assess the distribution, utilization, and policy implications of major mineral and energy resources.

Unit-I

Major Physiographic Divisions; Drainage System; Climate of India: Indian Monsoons, Western Disturbances; Natural Vegetation, Biodiversity Hotspots and Soils; Extreme Weather Events: Heat and Cold Waves, UHIs, Cloudburst & Urban Flooding

Unit-II

Population and Urbanization Dynamics; Mineral and Renewable Energy Resources: Iron Ore, Coal, Critical Minerals, Green Hydrogen, Ethanol Blending; Industries and Transportation: Industrial Clusters**,** Economic Corridors, Roads, Railways & E-Mobility Ecosystem

CLO-PLO Matrix for the Course MGEODGI125: Geography of India

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MGEODGI125.1	3	3	3	3	2	3	3	1	3	3
MGEODGI125.2	2	3	3	3	2	2	2	2	3	3
Average for MGEODLP125	2.5	3	3	3	2	2.5	2.5	2	3	3

Suggested Readings:

- Chandra Vijay Purty., Geography of India, ABD Publishers.
- D. R Khullar., India; A Contemporary Geography- Kalyani Publications New Delhi 2010.
- Government of India. *Economic Survey 2023-24*. New Delhi: Ministry of Finance, 2024.
- Hoyle, Brian, and Richard Knowles, editors. *Modern Transport Geography*. 2nd ed. Chichester: John Wiley & Sons, 1998.
- Husain, Majid. *Geography of India*. 4th ed. New Delhi: McGraw Hill Education, 2018.
- Leong, Goh Cheng. *Certificate Physical and Human Geography*. 15th ed. New Delhi: Oxford University Press, 2020.
- Majid Hussain, Geography of India, 2nd Ed. Tata McGraw Hill, 2011.
- Ministry of Coal. *Annual Report 2022-23*. New Delhi: Government of India, 2023.
- NITI Aayog. *India Energy Security Scenarios 2047*. New Delhi: NITI Aayog, 2023.
- R. L. Singh., India- A Regional Geography, National Geographical Society of India, 2003.
- Rodrigue, Jean-Paul. *The Geography of Transport Systems*. 5th ed. New York: Routledge, 2020.
- Sharma, H.S., and M.L. Sharma. *Geography of Industries*. 3rd ed. New Delhi: Kedar Nath Ram Nath, 2019.

- Singh, Gopal. *Economic Geography of India*. 2nd ed. Jaipur: Rawat Publications, 2018.
- Singh, R.L., India, Regional geography, Banarus Hindu University, 1987.
- Singh, Savindra. Physical Geography of India. 2nd ed. New Delhi: Prayag Pustak Bhawan, 2019.
- Spate, O.H.K., India and Pakistan, Mac Million & Co. 1967.
- Tiwari, R.C. Geography of India: Economic, Social and Regional. 5th ed. New Delhi: Prayag Pustak Bhawan, 2020.

POSTGRADUATE PROGRAMME IN GEOGRAPHY
[2nd Semester]

Course Code	Course Title	Course Type	Credits
MGEOCAC225	Advanced Climatology	C	4
MGEOCEE225	Ecology & Environment	C	2
MGEOCRM225	Research Methodology	C	4
MGEOLRS225	Remote Sensing & GIS	L	4
MGEODWM225	Watershed Management	D	2
MGEODUP225	Urban Planning	D	2
MGEODIN225	Industrial Geography	D	2
MGEODAG225	Agriculture Geography	D	2
MGEODWG225	World Geography	D	2
MGEOPGT225*	Geospatial Technology	P	2

Note: Laboratory Course (L) and Project (P) are Compulsory for all the students.

Master's (PG) Degree in Geography
[2nd Semester]

MGEOCAC225: Advanced Climatology

Credits: 04 **Total Contact Hours: 60** **Max. Marks:100**

Course Learning Outcomes: By the end of this course, students will be able to:
CLO1: Understand evolution, structure, heat budget and behaviour of atmosphere.
CLO2: Discern global circulation systems, GCM and RCPs along with climatic classifications.
CLO3: Explain weather forecasting methods, Climate change causes and theories.
CLO4: Understand the impact of climate on agriculture, hydrology, runoff and biosphere.

Unit-I

Evolution of Earth's Atmosphere and its Significance; Insolation, Heat Budget & Latitudinal Heat Balance; Vertical & Horizontal Distribution of Temperature; Stability & Instability of Atmosphere; Precipitation: Collision-Coalescence Theory of Precipitation

Unit-II

Global Circulation System Jet Streams: Origin & Types; Tri-cellular Meridonial Pattern of Atmosphere; General Circulation Models: (GCP), Representative Concentration Pathways (RCP); Climatic Classification Schemes: Koppen & Thornthwaite

Unit-III

Climatic Variability: Climate Change; Karoll Milankovitch Theory of Climate Change; El- Nino, Southern Oscillation, La Nina, NAO; Artificial Precipitation and Techniques of Cloud –Seeding, Weather Forecasting: Concept & Methods

Unit-IV

Climate and Water Resources; Climate and Agriculture; Droughts and its Management, Impact of Climate on Crop Diseases and Pest Incidence; Climatic Causes of Floods: Runoff Forecasting; Climate and Biome; Modifying Microclimates

CLO-PLO Matrix for the Course MGEOCAC225: Advanced Climatology

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MGEOCAC225.1	3	2	3	0	2	2	3	2	2	1
MGEOCAC225.2	3	3	2	2	1	1	3	2	2	2
MGEOCAC225.3	3	3	2	1	2	1	3	2	2	2
MGEOCAC225.4	3	3	2	2	1	3	3	3	3	3
Average for MGEOCAC225	3	2.75	2.25	1.25	1.5	1.75	3	2.25	2.25	2

Suggested Readings:

- A.K. Barua., Climatology, Dominant Publishers and Distributors, 2005.
- Anthony J. Vega & Robert V. Rohil., Climatology, 2008.
- Critchfield,H., General Climatology, Prentice Hall, New York, 1975.

- Edward Aguada & J. E. Brat., Understanding Weather and Climate, Pearson International 2016.
- Fedrick K Lutgen., The Atmosphere an introduction to Meteorology, Princeton Hall, 2006.
- J.T. Houghton., Global Warming A Complete Briefing (5Th Ed.), Cambridge University Press, 2015.
- S.K. Paneersalvam., Global Warming and Climate Change, AHP Publishing Co., 2012.
- Stringer, E.T., Foundation of Climatology, Surjeet Publication, Delhi, 1982.

Master's (PG) Degree in Geography
[2nd Semester]

MGEOCEE225: Ecology & Environment

Credits: 02 **Total Contact Hours: 30** **Max. Marks: 50**

Course Learning Outcomes: At the completion of the course, the student should be able to:
CLO1: comprehend components and functions of ecosystem.
CLO2: develop critical thinking on threats and conservation of biodiversity.

Unit – I

Ecology: Concept and Principles; Human Ecology, Ecological Niche, Environmental Ethics and Deep Ecology; Ecosystem: Components, Services, Geographic Classification, Structure & Functions; Ecological Productivity and Energy Flow: Trophic Levels, Food Chains, Food Web, Ecological Pyramids; Biogeochemical Cycles: Carbon, Nitrogen and Oxygen

Unit -II

Human Interaction and Impacts, Biodiversity: Elements, Types, Status & Significance; Threats & Conservation of Biodiversity; Biodiversity of India: Hotspots and Coldspots; Biosphere Reserve; Impact of Climate Change on Ecology

CLO-PLO Matrix for the Course MGEOCEE225: Ecology & Environment

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MGEOCEE225.1	3	3	1	0	1	2	2	2	2	2
MGEOCEE225.2	3	3	2	1	0	3	3	3	3	3
Average for MGEOCEE225	3	3	1.5	0.5	0.5	2.5	2.5	2.5	2.5	2.5

Suggested Readings:

- Chapman and Reiss; Ecology Principles and Applications, Cambridge University Press, 1999.
- E.P. Odum, Fundamentals of Ecology, Thomas Business Information India Pvt. Ltd. 2006
- John L. Harper., Ecology-From Individuals to Ecosystems, Wiley Blackwell.
- P.D. Sharma., Ecology and Environment (11th Edition), Rastogi Publications, 2005.
- Paul Lauris and W.G. Mosely., An Introduction to Human - Environmental Geography, Whiley Blackwell, 2013.

MGEOCRM225: Research Methodology

Credits: 04 **Total Contact Hours: 60** **Max. Marks: 100**

Course Learning Outcomes: At the completion of the course, the student should be able to:
CLO1: understand methods of scientific research.
CLO2: formulate hypothesis and research design.
CLO3: collect and process the primary and secondary data.
CLO4: draw meaningful conclusions from the research problem.

Unit-I

Research: Meaning, Significance, Types and Approaches; Methods of Scientific Research; Research Ethics; Limitations

Unit-II

Research Design: Concepts, Types and Significance; Research Process: Identification and Formulation of Research Problem; Literature Review; Identification of Research Gap; Research Questions; Formulation of Hypothesis; Data Collection; Analysis and Interpretation

Unit-III

Data Sources and Methods of Data Collection: Nature of Data: Qualitative and Quantitative; Primary Data: Field survey and Ethics, Sampling Methods; Questionnaire preparation; Secondary Data

Unit-IV

Data Analysis and Processing: Tabulation, Graphical Representation; Referencing; Designing the Dissertation, Field Report and Manuscript: Methodology, Analysis, Interpretation and Writing

CLO-PLO Matrix for the Course MGEOCRM225: Research Methodology

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MGEOCRM225.1	3	2	3	3	1	3	3	3	2	3
MGEOCRM225.2	3	3	3	3	3	3	3	3	3	3
MGEOCRM225.3	3	3	3	3	3	3	3	3	3	3
MGEOCRM225.4	3	3	3	3	3	3	3	3	3	3
Average for MGEOCRM225	3	2.75	3	3	2.5	3	3	3	2.75	3

Suggested Readings:

- Ahuja, R. Research Methods. Rawat Publications, Jaipur and New Delhi. 2001.
- Bhattacharyya, D. K. Research Methodology. Excel Books, New Delhi. 2005.
- Black, J. A. and Champion, D.J. Methods and Issues in Social Research. John Wiley and Sons, New York. 1976.

- Creswell, J. Research Design: Qualitative and Quantitative Approaches. UK: Sage Publications. 1994.
- Dikshit, R. D. The Art and Science of Geography: Integrated Readings. New Delhi, India: Prentice-Hall of India. 2003.
- Evans, M. Participant Observation: The Researcher as Research Tool, in Eylesand, J and D. Smith (eds). Qualitative Methods in Human Geography. Cambridge, UK: Polity. 1988.
- Gopal, K. and Singh, N. Researching Geography: The Indian Context. Routledge, Delhi. 2016.
- Kothari, C. R. Research methodology: Methods and techniques. New Age International. 2004.
- Kumar R. Research Methodology: A Step-by-Step Guide for Beginners, Sage Publications, Ltd. London. 2010.
- Misra, R. P. Research Methodology: A Handbook. Concept Publishing Company, New Delhi. 2015
- Mukherjee, N. Participatory Rural Appraisal: Methodology and Application. Concept Publication, Delhi, India. 1993.

MGEOLRS225: Remote Sensing and GIS

Credits: 04 **Total Contact Hours: 90** **Max. Marks: 100**

Course Learning Outcomes: At the completion of the course, the student should be able to:
CLO1: understand satellite imagery, metadata, interpretation, image display and enhancement techniques.
CLO2: create & edit vector layers and perform spatial data analysis.
CLO3: import and export of data for geographical analysis.
CLO4: make a project on a selected theme.

Unit-I

Introduction to Remote Sensing Softwares; Understanding Satellite Imagery and Metadata; Interpretation of Satellite Data; Formats and Exchange; Image Display and Enhancement Techniques: Contrast Stretching, Filtering; Image Composites: FCC, TCC; Image Classification: Supervised and Unsupervised; Accuracy Assessment

Unit-II

Introduction to GIS Softwares (QGIS, ArcGIS); Georeferencing Raster Data using Control Points; Creation and Editing of Vector Layers; Spatial Data Analysis: Buffer, Overlay, Clip, Dissolve and Union

Unit-III

Data Interpolation; Import and Export of Data; Using Digital Elevation Model (DEM) for Terrain and Morphometric Analysis; Map Designing

Unit-IV

Project on a selected theme (LULC Change Detection Analysis; Multi-criteria Overlay Analysis for Disaster Risk Assessment) to apply the knowledge and skills attained during hands-on sessions.

CLO-PLO Matrix for the Course MGEOLRS225: Remote Sensing and GIS

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MGEOLRS225.1	3	1	3	3	1	1	3	2	3	3
MGEOLRS225.2	3	1	3	3	1	2	3	2	3	3
MGEOLRS225.3	3	1	3	3	1	1	3	2	3	3
MGEOLRS225.4	3	1	3	3	1	2	3	2	3	3
Average for MGEOLRS225	3	1	3	3	1	1.5	3	2	3	3

Suggested Readings:

- Burrough, P. A., & McDonnell, R. A. Principles of Geographical Information Systems (2nd ed.). Oxford University Press. 1998.
- Campbell, J. B., & Wynne, R. H. Introduction to Remote Sensing (5th ed.). Guilford Press. 2011.

- Chuvieco, E. Fundamentals of Satellite Remote Sensing: An Environmental Approach (2nd ed.). CRC Press. 2016.
- ESRI. GIS for Disaster Management (2nd ed.). CRC Press. 2020.
- Heywood, I., Cornelius, S., & Carver, S. An Introduction to Geographical Information Systems (4th ed.). Pearson. 2011.
- Jensen, J. R. Remote Sensing of the Environment: An Earth Resource Perspective (2nd ed.). Pearson Education. 2007.
- Lillesand, T. M., Kiefer, R. W., & Chipman, J. W. Remote Sensing and Image Interpretation (7th ed.). Wiley. 2015.
- Longley, P. A., Goodchild, M. F., Maguire, D. J., & Rhind, D. W. Geographic Information Systems and Science (4th ed.). Wiley. 2015.
- Misra, P., & Enge, P. Global Positioning System: Signals, Measurements, and Performance (2nd ed.). Ganga-Jamuna Press. 2011.
- Richards, J. A., & Jia, X. Remote Sensing Digital Image Analysis (4th ed.). Springer. 2006.
- Schowengerdt, R. A. Remote Sensing: Models and Methods for Image Processing (3rd ed.). Academic Press. 2007

MGEODWM225: Watershed Management

Credits: 02 **Total Contact Hours: 30** **Max. Marks: 50**

Course Learning Outcomes: After completion of the course, students shall be able to,
CLO1: Comprehend watershed management approaches and modelling.
CLO1: Develop watershed management plan and strategies for solving watershed problems.

Unit - I

Watershed: Definition and Significance as a Planning Unit; Watershed: Delineation, Characteristics, and Coding; Impact of Land Use and Land Cover Changes on Watershed Health; Watershed Management Approaches (Integrative & Consortium); Watershed Management Modelling: The Water Resources System Model (WRSM)

Unit - II

Watershed Management Plan: Preventive & Restorative Strategies; Techniques for Evaluating Watershed Conditions; Best Management Practices (BMPs): Structural, Non-Structural, Erosion Control, Riparian Buffers, and Stormwater Management; Analysis of Successful Watershed Management Projects

CLO-PLO Matrix for the Course MGEODWM225: Watershed Management

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MGEODWM225.1	3	1	2	3	0	0	3	3	3	2
MGEODWM225.2	3	3	2	0	0	1	3	3	3	3
Average for MGEODWM225	3	2	2	2	0	0.5	3	3	3	2.5

Suggested Readings:

- Chandra, S. Water Resources of Himalaya in Himalayan Ecosystem, Ed DN Tiwari IBD Dehradun. 1995.
- Food and Agriculture Organization (FAO). Watershed Management Field Manual – Volume 1–5. FAO Conservation Guide No. 1–5. FAO, Rome. 1986.
- Ghosh, A. Natural Resource Conservation and Environmental Management, APH Publishing Corporation, Ansari Road New Delhi. 2003.
- Gregersen, H.M., Brooks, K.N., & Dixon, J.A. Institutional and Economic Issues in Watershed Management. CABI Publishing, Wallingford, UK. 2007.
- Kerr, J., Pangare, G., & Pangare, V.L. Watershed Development Projects in India: An Evaluation. Research Report 127. International Food Policy Research Institute (IFPRI), Washington, D.C. 2002.
- M.K. Maitra. Watershed Management Project Planning, Development and Implementation, OMEGA Scientific Publishers. 2001.
- Murthy, J.V.S. Watershed Management in India. New Age International Publishers, New Delhi. 1998.

MGEODUP225: Urban Planning

Credits: 02 **Total Contact Hours: 30** **Max. Marks: 50**

Course Learning Outcomes: At the completion of the course, the student should be able to:
CLO1: Develop a comprehensive perspective on urban growth and development.
CLO2: Develop skill in preparing master, structural and strategy plan.

Unit - I

Urban Planning: Concept, Evolution, Goals; Growth of Cities; Cities as Engine of Growth; Urban Environmental Problems; Special Area Planning: Types, Attributes, Planning Process; Urban Sprawl and Planning Approaches; Smart City: Features, Planning Approach and Strategies, Policy Efforts in India; Growth of Informal Sector and Slum Improvement

Unit - II

Theories of Urban Structure and Landuse: Central Place Theory of Christaller & Losch, Urban Realm Model, Core Frame Theory; Rural Urban Fringe: Delimitation and Characteristics; Emerging Rural Urban Relationship Models: Urban-rural Linkages, Expanding City; Territoriality of Rural–urban Interaction; Plan Preparation Approaches: Master Plans, Structure Plans and Strategy Plan; Public Participation and Plan Implementation; Techniques of Urban Renewal and Redevelopment

CLO-PLO Matrix for the Course MGEODUP225: Urban Planning

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MGEODUP225.1	3	3	2	1	1	0	3	3	3	2
MGEODUP225.2	3	3	2	2	1	1	3	3	3	3
Average for MGEODUP225	3	3	2	1.5	1	0.5	3	3	3	2.5

Suggested Readings:

- Carter, H. The Study of Urban Geography. London: Edward Arnold. 1972
- Fyfe, N. and Kenny, J. (Eds.). The Urban Geography Reader. London: Routledge. 2005.
- Garg, H. S. Nagariya Bhugol (Urban Geography) - SBPD Publications. SBPD Publications. 2021.
- Gibbs, J.P. Urban Research Methods. New Jersey: Princeton University Press. 1961.
- Gilbert and Joseph G. Cities, Poverty and Development-Urbanization in the 3rdWorld. Oxford: Oxford University Press. 1982
- Hall, P. Urban and Regional Planning. London: Routledge. 1992.
- Pacione, M. Urban Geography: A Global Perspective. Oxford: Routledge. 2009.
- Ramachandran, R. Urbanization and Urban Systems in India. Oxford University Press. 2005.
- Schwanen, T. and Van Kempen, R. (eds.). Handbook of Urban Geography. Cheltenham: Edward Elgar Publishing. 2019
- Shen, Z. Geospatial Techniques in Urban Planning. Verlag: Springer Science & Business Media.2012
- Short, J.R. An Introduction to Urban Geography. Oxford: Routledge.2017.
- Siddhartha, K. and Mukherjee, S. (2016). Cities, Urbanisation and Urban Systems. New Delhi: Kitab Mahal Publisher.2016

MGEODIN225: Industrial Geography

Credits: 02 **Total Contact Hours: 30** **Max. Marks: 50**

Course Learning Outcomes: By the end of course, students will be able to:
CLO1: Identify and measure factors responsible for establishment and localization of industry at national and global level.
CLO2: Evaluate the role of different attractive and repulsive forces within relevant models to explain the international flows of goods, capital and work force.

Unit-I

Spatial Organization of Economic Activities; Classification of Industries; Indian Industrial Regions: Spatial Distribution; Emerging Industries in India: Automobile, Fast-moving Consumer Goods & Information & Communications Technology; Special Economic Zones/Micro, Small & Medium Enterprises (MSME)

Unit- II

Theories of Industrial Location: A. Weber; E.M Hoover; A. Pred & D.M Smith. Contemporary Industrial Location Considerations: Political Considerations, Just-in-time and Flexible Production, Offshoring and Transnational Corporations; Industrial Policies of India: 1956, 1977; 1991

CLO-PLO Matrix for the Course MGEODIN225: Industrial Geography

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MGEODIN225.1	3	1	2	2	1	2	1	2	1	2
MGEODIN225.2	3	1	2	2	1	1	2	2	1	3
Average for MGEODIN225	3	1	2	2	1	1.5	1.5	2	1	2.5

Suggested Readings:

- Boesch, H., A Geography of World Economy, D. Van-Nostrand Co., New York, 1964.
- Britton, John N.H., Regional Analysis and Economic Geography, G. Bell & Sons.
- Eastall, R.C. and R.O. Buchanan, Industrial Activity and Economic Geography, Hutchinson, London.
- Hoover, E.M., The Location of Economic Activity, McGraw Hill, New York, 1948.
- Joshi, Hemlata, Industrial Geography of India: A Case History of Fertiliser Industry, Rawat Publishers, Jaipur.
- Losch, August, The Economics of Location, Yale University Press, London, 1973.
- Miller, E.W., A Geography of Manufacturing, Prentice Hall, New York, 1962.
- Riley, R.C., Industrial Geography, Chatto and Windus, London, 1973.
- Saushkin, Yu G., Economic Geography: Theory and methods, Progress Publishers,Moscow, 1980.

MGEODAG225: Agricultural Geography

Credits: 02 **Total Contact Hours: 30** **Max. Marks: 50**

Course Learning Outcomes: By the end of course, students will be able to:
CLO1: Integrate theory and practice by connecting geographical models with real-world agricultural systems
CLO2: Evaluate role of sustainable farming, policies and digitization in modernizing the agricultural sector.

Unit -I

Agricultural Geography: Development & Approaches; Development Model of Agriculture: Grigg's & Boserup's; Agricultural Land Use Models: Von Thünen's Model, Walter Isard & Lars Jonasson; World's Agricultural Systems (D.S Whittlesey, FAO/UN); Concept of Cropping Intensity & Crop Combination; Agricultural Productivity & Crop Diversification

Unit-II

Agro-climatic & Crop Combination Regions of India; Major Agricultural Revolutions in India; Sustainable Farming in India: Precision Farming, Climate-Smart Agriculture, Organic, Natural, Vertical & Urban Farming; Agri- Digitization & Marketing: MSP, APMC/FPOs, e-NAM, Agri-Startups, Digital Agriculture Mission, AgriStack

CLO-PLO Matrix for the Course MGEODAG225: Agricultural Geography

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MGEODAG225.1	3	3	3	2	3	3	2	3	3	3
MGEODAG225.2	2	3	2	2	3	3	3	3	3	3
Average for MGEODAG225	2.5	3	2.5	2	3	3	2.5	3	3	3

Suggested Readings:

- Grigg, D.B., The Agricultural Systems of the World: An Evolutionary Approach, Cambridge
- Hussain, M., Systematic Agricultural Geography, Rawat Publications, Jaipur, 1996.
- Ilbery. B. W., Agricultural Geography, Oxford University Press, Oxford, 1985.
- Morgan, B.W. and Munton, J.C., Agricultural Geography, Methuen, London, 1971.
- Pringle, T. G. Agricultural Systems: An Introduction. 1st ed. Prentice Hall, 1993.
- Shafi, M., Agricultural Productivity and Regional Imbalances, Concept, New Delhi, 1984.
- Singh, J. An Agricultural Atlas of India: A Geographical Analysis. 1st ed. Vishal Publications, 1974.
- Singh, J. and Dhillon, S.S., Agricultural Geography, Tata McGraw Hill, New Delhi, 1984.
- Singh, Jasbir., Agricultural Geography, 3rd edition, Oxford, New Delhi, 2003.
- Singh, Jasbir., Dynamics of Agricultural Change, Oxford, New Delhi, 1990.
- Symons, L., Agricultural Geography, G. Bells, London, 1967.
- Symons, Leslie. Agricultural Geography. 2nd ed. Westview Press, 1979.

MGEODWG225: World Geography

Credits: 02 **Total Contact Hours: 30** **Max. Marks: 50**

Course Learning Outcome: At the completion of the course, the students will be,
CLO1: Understand global distribution of landforms, climate, drainage, mineral resources and industries.
CLO2: Appear in various competitive examinations.

Unit- I

Physiography and Climate of North America; Major Industrial Regions of North America; Physiography of South America; Mineral Resources of South America: Coal & Iron Ore; Drainage of Africa: Nile and Congo; Mineral Resources of Africa: Gold and Diamond

Unit- II

Physiography of Europe; Drainage of Europe: Danube & Volga; Industrial Setup in Europe; Physiography of Asia; Drainage of Asia: Indus, Ganga & Mekong; Natural Resources in Asia: Iron Ore, Coal, Petroleum and Natural Gas; Physiography & Climate of Australia

CLO-PLO Matrix for the Course MGEODWG225: World Geography

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MGEODWG225	3	3	2	2	1	2	2	2	1	2
MGEODWG225	3	2	2	1	1	2	2	2	1	2
Average for MGEODWG225	3	2.5	2	1.5	1	2	2	2	1	2

Suggested Readings:

- Clark, Earl & Danel Rockman Bergsmark., Modern World Geography, J.B. Lippincott Company, 2009.
- Bradley, John Hudgon., World Geography; Gin & Co.
- Gautam, Alka., Regional Geography of the World, 2018
- Khullar, D. R., World Geography, Acess Publishing, 2016.
- Kumar, Mahesh., World Geography, Cosmos Publications, 2020
- Hussain, Majid: World Geography; Rawat Publication, 2012.
- Hussein, Majid., Indian and World Geography, 5th Ed. TataMcGrah Hills, New Delhi, 2020
- Sharma, Vivek and Singh, Deepika, Magbook India and World Geography, Arihant Pubilcations, 2020
- Simon Adams: Geography of the world; Dorling Kindersly, 2006.

MGEOPGT225: Geospatial Technology

Credits: 02 **Total Contact Hours: 30** **Max. Marks: 50**

Course learning outcomes: This course introduces students to utilization of Geospatial Technology in the research.
CLO1: In consultation with their mentors, students select a research problem or topic of their interest. They conduct a comprehensive review of relevant literature, develop a research synopsis, and present it before an expert committee.
CLO2: Based on the feedback received, students refine their proposals and proceed with the approved topic and will undertake an in-depth investigation and produce a full-length dissertation over a three-month period.

The students will select a research problem or topic of their interest from the following themes.

- Urban Planning and Development
- Public Health
- Economic and Social Geography
- Agriculture Geography
- Rural Development
- Climate Change Analysis
- Conservation and Natural Resource Management
- Hazard and Disaster Management
- Glaciology
- Tourism

CLO-PLO Matrix for the Course MGEOPGT225: Geospatial Technology (Project)

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MGEOPGT225.1	3	3	2	2	3	3	3	3	3	3
MGEOPGT225.2	3	3	3	3	2	3	3	3	2	3
Average for MGEOPGT225	3	3	2.50	2.75	2.25	3	3	3	2.5	3

Suggested Readings:

- Gopal Singh., Map World and Practical Geography, Vikas Publishing House, 2000.
- Pal, S.K., Statistics for Geographers- Techniques and App1ications, Concept, New Delhi, 1998.
- Robinson, et al., Elements of Cartography, John Wiley and Sons, U.S.A, 1995.
- Sarkar, A.K., Practical Geography: A Systematic Approach, Oriental Longman, Calcutta, 1997.
- Singh, R.L, and Dutt, P.K., Elements of Practical Geography, Kalyani Publishers, New Delhi, 1979.

POSTGRADUATE PROGRAMME IN GEOGRAPHY
[3rd Semester]

Course Code	Course Title	Course Type	Credits
MGEOCPM325	Philosophies and Methodologies in Geography	C	4
MGEOCSC325	Social and Cultural Geography	C	4
MGEOCST325	Advanced Statistical Techniques	C	2
MGEOLFS325	Field Studies (Geomorphic & Socio-Economic)	L	4
MGEODAH325	Advanced Hydrology	D	2
MGEODSD325	Sustainable Development	D	2
MGEODCC325	Climate Change	D	2
MGEODSG325	Soil Geography	D	2
MGEODRD325	Rural Development	D	2

Note: Laboratory Course (L) is Compulsory for all the students.

Master's (PG) Degree in Geography
[3rd Semester]

MGEOCPM325: Philosophies & Methodologies in Geography

Credits: 04 **Total Contact Hours: 60** **Max. Marks:100**

Course Learning Outcomes: After the completion of the course, the student should be able to:
CLO1: Understand the new paradigms in the study of geography
CLO2: Comprehend the modern philosophies of geography.
CLO3: Analyze the routes of scientific explanations in geography.
CLO4: Trace the recent trends in the development of Geography.

Unit-I
Paradigm Shift in Geography: Modern & Postmodernism; Development of Geography from Areal to Spatial Analysis; Role of Darwin's Theory on Development of Geography; Quantitative Revolution: The Search for Scientific Method in Geography; General System Theory

Unit-II
Key Concepts and Methods in Geography; Perspectives in Geography: Positivism, Pragmatism, Idealism, Realism, Areal Differentiation, Spatial Organization, Spatial Diffusion, Social Wellbeing; Recent Approaches: Radical, Humanistic & Behavioral

Unit-III
Explanations in Geography; Need of Explanations; Types of Explanations; Problems of Explanations in Geography; Routes of Scientific Explanations: Inductive Route and Deductive Route

Unit-IV
Models in Geography: Concept of Model; Features of a Model; Types of Models; Classification of Models; Role of Models in Geography; Theory, Types of Theories, Role of Theories in Geography; Laws, Criteria for Identification of Law, Types of Laws and Role of Laws in Geography

CLO-PLO Matrix for the Course MGEOCPM325: Philosophies & Methodologies in Geography

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MGEOCPM325.1	3	1	2	1	0	3	3	3	0	2
MGEOCPM325.2	3	3	1	2	0	3	3	3	0	1
MGEOCPM325.3	3	2	0	0	0	3	3	3	0	1
MGEOCPM325.4	3	2	2	1	1	2	3	3	2	3
Average for MGEOCPM325	3	2	1.25	1.25	0.25	2.75	3	3	0.50	1.75

Suggested Readings:

- Harvey, D., Explanations in Geography. Rawat Publications, Jaipur 1969.
- Dikshit, R.D., Geographical Thought, A Contextual History of Ideas, IPH, New Delhi. 1999.
- Dikshit, R.D., Art and Science of Geography, 1994.

- Freeman T.W., Hundred Years in Geography, 1961.
- Hartshone, R., The Nature of Geography, Lancaster, 1935.
- Hartshone, R., Perspectives on Nature of Geography. Rondo Macrolly, Chicago, 1959.
- Husain, M., Evolution of Geographical Thought, Rawat Publications, Jaipur. 1984..
- Jenson, H., Geography-Its History and Concepts, Harper Publishers, New York, 1981.
- Lalita, R., Geographical Thought – A Systematic record of evolution, Concept Publishing, New Delhi, 2008.
- Stodard, D.R. Darwin's impact on Geography, A.A.A.G.Vol.58, 1966.

Master's (PG) Degree in Geography
[3rd Semester]

MGEOCSC325: Social & Cultural Geography

Credits: 04 **Total Contact Hours: 60** **Max. Marks:100**

Course Learning Outcomes: By the end of course, students will be able to:
CLO1: critically analyze the evolution of social geography and apply key concepts of space, place, and scale to understand social structures, inequalities, and spatial processes
CLO2: evaluate social indicators and indices to measure social well-being
CLO3: explain evolution of cultural geography; examine cultural processes, transformations, and landscapes
CLO4: evaluate globalization, digital culture etc and apply quantitative methods to measure cultural similarities and differences.

Unit-I

Social Geography: Evolution and Paradigms; Concepts of Space, Place, Territory and Scale; Theoretical Contributions: Lefebvre, Harvey, Massey & Foucault; Concept of Society, Social Structures, Processes & Social Capital; Stratification in Indian Societies: Tribe & Caste; Geographies of Inequalities: Exclusion, Inclusion, Segregation and Gentrification, Ethnic Enclaves; Social Pathology in Spatial Context

Unit–II

Concept of Social Indicators, Social Well-being and Quality of Life; Social and Spatial Justice & the Right to the City: Criteria for attaining Social Justice; Social Area Analysis & Factorial Ecology**;** Social Impact Assessment; Indices in Social Geography: SEI-HS Index, Index of Dissimilarity, Exposure Index, Entropy Index & others

Unit–III

Cultural Geography: Evolution and Paradigms; Concept of Culture, Civilization, Cultural Traits and Complexes, Cultural Hearth & Evolution of Indian Culture; Processes in Cultural Change: Convergence, Divergence, Diffusion, Assimilation, Acculturation, Transculturation, Creolization; Concept of Cultural & Virtual Landscape; Heritage & Cultural Ecology

Unit–IV

Cultural Regions and Realms: Concepts and Delimitation; Racial, Religious and Linguistic Diversity in India; Cultural Globalization, Digital Cultural Geographies & Digital Activism; Indices in Cultural Geography: Jaccard Similarity Index, Euclidean Distance Method, Index of Linguistic Diversity, Cultural Landscape Index & others

CLO-PLO Matrix for the Course MGEOCSC325: Social & Cultural Geography

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MGEOCSC325	3	2	3	2	2	3	3	3	3	3
MGEOCSC325	3	3	3	3	3	3	3	3	3	3
MGEOCSC325	3	2	3	2	1	3	3	3	3	3
MGEOCSC325	3	2	3	3	3	3	3	3	3	3
Average for MGEOCSC325	3	2	3	2.5	2.25	3	3	3	3	3

Suggested Readings:

- Ahmad, I. Caste and Social Stratification among Muslims in India (2nd ed.). Manohar Publications. 1978.
- Aijazuddin Ahmed., Social Geography, Rawat Publications, New Delhi, 1999.
- Anthropological Survey of India. People of India (Multiple vols.). Oxford University Press. 1985-2003
- Ash, J., Kitchin, R., & Leszczynski, A. Digital Geographies. SAGE Publications. 2018.
- Berry, B. J. L. Factorial Ecology. Prentice-Hall. 1971.
- Crong Mike., Cultural Geography, Routledge Publications, London, 1998.
- Golumbia, D. The Cultural Logic of Computation. Harvard University Press. 2009.
- Harvey, D. Social Justice and the City (Rev. ed.). University of Georgia Press. 2009
- Jackson, P. An Introduction to Cultural Geography. Unwin Hyman. 1989.
- Johnson, N. C. (Ed.). Cultural Geography: Critical Concepts in the Social Sciences (4 vols.). Routledge. 2008.
- Jones Emrys, and Eyles John., An Introduction to Social Geography, Oxford University Press, 1977.
- Knox P. L., Social Well-being: A Spatial Perspective, Oxford University Press, London, 1975.
- Lefebvre, H. (1996). *The Right to the City*. In E. Kofman & E. Lebas (Eds.), *Writings on Cities* (pp. 63-181). Blackwell Publishers. 1996.
- Lefebvre, H. The Right to the City. In E. Kofman & E. Lebas (Eds.), *Writings on Cities* (pp. 63-181). Blackwell Publishers.
- Massey, D. (1995). Spatial Divisions of Labour: Social Structures and the Geography of Production (2nd ed.). Macmillan. 1995.
- May, T., Perry, B., & Woodward, K. Social Geography: Society, Space and Place. Open University Press. 2017.
- Mitchell, D. Cultural Geography: A Critical Introduction. Blackwell Publishers.2000
- Rubenstein, J. M. The Cultural Landscape: An Introduction to Human Geography (12th ed.). Pearson. 2017.
- Shevky, E., & Bell, W. Social Area Analysis: Theory, Illustrative Application and Computational Procedures. Stanford University Press. 1955.
- Smith, S. J., Pain, R., Marston, S. A., & Jones III, J. P. (Eds.). *The SAGE Handbook of Social Geographies*. SAGE Publications. 2009.
- Soja, E. W. Seeking Spatial Justice. University of Minnesota Press. 2010

Master's (PG) Degree in Geography
[3rd Semester]

MGEOCST325: Advanced Statistical Techniques

Credits: 02 **Total Contact Hours: 30** **Max. Marks: 50**

Course Learning Outcomes: At the completion of the course, the students should be able to:
CL01: Identify and apply suitable sampling techniques for hypothesis building.
CLO2: Develop skills in data processing, interpretation and information generation.

Unit-I

Statistics: Descriptive and Inferential Statistics; Sampling: Types, Size and Frame; Probability Distribution: Binomial, Poisson and Normal; Hypothesis Testing: Formulation, Significance Level, Test Statistic & Degree of Freedom; Goodness of Fit Tests: T -Test, Chi -Square Test;ANOVA Test; Mann Kendall Test

Unit-II

Correlation: Multiple & Partial; Regression Analysis: Linear & Multiple; Multivariate Analysis: Principal Component Analysis & Cluster Analysis; Measures of Inequality: Lorenz Curve, Gini's Coefficient & Location Quotient; Time Series: Moving Average & Line of Best Fit

CLO-PLO Matrix for the Course MGEOCST325: Advanced Statistical Techniques

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MGEOCST325.1	2	1	1	3	3	3	3	3	3	3
MGEOCST325.2	2	1	1	3	3	3	3	3	3	3
Average for MGEOCST325	2	1	1	3	3	3	3	3	3	3

Suggested Readings:

- Alvi Z. Statistical Geography: Methods and Applications. Rawat Publications, Jaipur. 1995.
- Mahmood A. Statistical Methods in Geographical Studies. Rajesh Publications, New Delhi.1999.
- Pal S. K. Statistics for Geoscientists. Tata McGraw Hill, New Delhi. 1998
- Rogerson P.A. Statistical Methods for Geography: A Student's Guide. Sage, New Delhi. 2014
- Ebdon D. Statistics in Geography: A Practical Approach. Oxford, UK. Blackwell.
- Singh D. Elementary Statistical Methods. R K Books, New Delhi. 2018
- Walford N. Practical Statistics for Geographers and Earth Scientists. WileyBlackwell, West Sussex, United Kingdom. 2011

MGEOLFS325: Field Studies (Geomorphic & Socioeconomic)

Credits: 04 **Total Contact Hours: 60** **Max. Marks: 100**

Course Learning Outcomes: At the completion of the course, the student should be able to:
CLO1: Develop skills in developing questionnaire and conducting field study.
ClO2: Make appropriate maps and diagrams and investigating research questions.
CLO2: Demonstrate the ability to analyze and interpret geomorphic and social features in the field.
CLO3: Prepare good field reports.

Credits= 04

1. Fieldwork in Geographical Studies: Role & Significance, Selection of Study Area & Objectives, Pre-Field Academic Preparations, Ethics of Fieldwork
2. Field Techniques & Tools: Observation (Participant, Non-Participant), Questionnaires (Open, Closed, Structured, Non-Structured), Interview
3. Field Techniques & Tools: Landscape Survey Using Transects & Quadrants, Constructing a Sketch, Photo & Video Recording
4. Positioning & Collection of Samples, Preparation of Inventory from Field Data
5. Post-Field Tabulation, Processing & Analysis of Quantitative & Qualitative Data
6. Fieldwork: Logistics & Handling of Emergencies

CLO-PLO Matrix for the Course MGEOLFS325: Field Studies (Geomorphic & Socioeconomic)

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MGEOLFS325.1	3	3	2	2	3	3	3	3	2	3
MGEOLFS325.2	3	3	3	3	2	3	3	3	2	3
MGEOLFS325.3	3	3	2	3	3	3	3	3	2	3
MGEOLFS325.4	3	3	3	3	3	3	3	3	3	3
Average for MGEOLFS325	3	3	2.50	2.75	2.25	3	3	3	2.25	3

Suggested Readings:

- Gopal Singh., Map World and Practical Geography, Vikas Publishing House, 2000.
- Pal, S.K., Statistics for Geographers- Techniques and App1ications, Concept, New Delhi, 1998.
- Robinson, et al., Elements of Cartography, John Wiley and Sons, U.S.A, 1995.
- Sarkar, A.K., Practical Geography: A Systematic Approach, Oriental Longman, Calcutta, 1997.
- Singh, R.L, and Dutt, P.K., Elements of Practical Geography, Kalyani Publishers, New Delhi, 1979.

Every student needs to participate in fieldwork and prepare a field report according to the following guideline, failing which he/she will not be evaluated.

1. Each student will prepare a report based on primary data collected from field survey and secondary data collected from different sources.
2. Students will select either one rural area or an urban area (municipal ward) for the study, with the primary objective of evaluating the relation between physical and cultural landscape.
3. A specific problem or a special feature should be identified based on which, the study area will be selected.

4. The report should be typed in Times New Roman, Font Size 12 and Spacing 1.5 in English on A4 size paper in candidate's own words within 5,000 words (Introductory Chapter: 1000 words; Physical Aspects: 1500 words;
Socio-economic Aspects: 1500 words; Concluding Chapter: 500 words, approximately) excluding tables, photographs, maps, diagrams, references and appendices.
5. Photographs, maps and diagrams should not exceed 15 pages.
6. A copy of the bound report, duly signed by the concerned teacher, will be submitted during examination.
7. The field work and post-field work will include:
a. Collection of primary data on physical aspects (relief and soil) of the study area.
b. Collection of soil samples from different land cover land use regions of the study area
c. Collection of socio economic data at the household level (with the help of a questionnaire) in the selected study area.
d. Plot to plot land use survey for preparation of a land use map, covering whole or part of the selected area.
e. Visit to different organisations and departments for collection of secondary data.
f. Any other survey relevant to the objective of the study.
8. The Field Report should contain the following sections (a–e).
a. Introduction: Study area extent and space relations, reasons for selection of the study area on the basis of a specific problem or special feature, objectives, methods of data collection, analyses and presentation, sources of information, etc.
b. Physical aspects: Lithology and geological structure, relief, slope, drainage, climate, soil, vegetation, environmental issues, proneness to natural hazards, etc.
c. Socio-economic aspects:
i. Population attributes: number, sex ratio, literacy, occupational structure, ethnic and religious composition, language, per capita income, etc.
ii. Settlement characteristics: Number of houses, building materials, number and size of rooms, amenities, etc.
iii. Agriculture: General land use, crop-combination, use of fertiliser and irrigational facilities, production and marketing etc.
iv. Other economic activities: Fishing, horticulture, brick-making, household and other industries, etc.
d. Conclusions: Relation between physical and cultural landscape. Evaluation of problems and prospects. General recommendations.
e. Bibliography.
9. The students will prepare (i) a chorochromatic land use land cover map on the basis of plot to plot survey; (ii) a profile of 250–1000 m, surveyed and plotted, with different land use land cover superimposed on it.
10. All sections of the report should contain relevant maps, diagrams and photographs using primary and secondary data, clearly citing sources.
11. All surveys should pertain to the objective of the study. Surveys not relevant for establishing the relation between physical and cultural landscape should be avoided.
12. Marks division: 50 on report + 22 on viva-voce +28 Internal = 100 marks

MGEODAH325: Advanced Hydrology

Credits: 02 **Total Contact Hours: 30** **Max. Marks: 50**

Course Learning Outcomes: At the completion of the course, the student should be able to:
CLO1: Understand the formation of surface water.
CLO2: Explain concepts related to groundwater hydrology.

Unit-I

Hydrology: Meaning & Scope; Formation of Surface Water Resources; Streams, Rivers, Lakes, Runoff, Virgin Flow, Surface Runoff; Drainage Basin & its Characteristics; Sediment Discharge, Sediment Transportation, Sediment Yield of Watersheds; Hydrographs: Types, Components & Factors Influencing its Shape; Flood Frequency Analysis & Flood Design

Unit-II

Groundwater Hydrology, Occurrence of Groundwater: Aquifer, Aquiclude, Aquifuge and Aquitard, Porosity, Effective Porosity, Vertical Distribution of Groundwater; Zone of Aeration, Zone of Saturation, Division of Subsurface Water Specific Retention, Specific Yield; Darcy's Law; Permeability, Intrinsic Permeability; Hydraulic Conductivity, Transmissivity

CLO-PLO Matrix for the Course MGEODAH325: Advanced Hydrology

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MGEODAH325.1	3	3	1	3	3	3	3	2	2	3
MGEODAH325.2	3	3	1	3	3	3	3	2	2	3
Average for MGEODAH325	3	3	1	3	3	3	3	3	2	3

Suggested Readings:

- Andrew D. Ward and Stanley Trimble., Environmental Hydrology (2nd ed.), Lewis Publishers, 2004.
- Chow V.T., Applied Hydrology, Tata McGraw Hill Publishing Co, 1988.
- Hendriks Martin., Introduction to Hydrology. Oxford University Press, London, 2010.
- Patra K.C., Hydrology and Water Resources Engineering, Narosa Publishing House, 2010.
- Jain S.K., Agarwal P.K. and Singh V.P., Hydrology and Water Resources of India, Springer, The Netherlands, 2007.
- Raghunath H.M., Hydrology, Newage International (P) Ltd., New Delhi, 2006.
- Shaw E.M., Hydrology in Practice, 3rd Ed, Routledge, 2004.
- Singh V.P., Elementary Hydrology, Prentice Hall, Englewood, New Jersey, 1993.
- Suresh R., Watershed Hydrology, Standard Publishers Distributors, New Delhi, 2005.
- Ward A.D. and Elliot W.J. (eds.) Environmental Hydrology, Lewis Publishers, 1995.
- Madan Mohan das and Mimi Das Saikia., Hydrology, Prentice Hall of India, 2013.
- Timothy, Davie., Fundamentals of Hydrology, Routledge, Taylor and Francis Group, U.K. 2003.
- Todd, D.K., Groundwater Hydrology. John Wiley & Sons Inc. 2009.

MGEODCC325: Climate Change

Credits: 02 **Total Contact Hours: 30** **Max. Marks: 50**

Course Learning Outcomes: Upon completion of this course the students will be able to:
CLO1: Explain climate change, its causes, implications and indicators as well the future scenarios.
CLO2: Interpret the policy frameworks and action plans for mitigation & adaptation.

Unit-I

Drivers of Climate Change; Evidences of Climate Change; Spatial Scale of Climate Change; Solar Variations, GHGs Emissions Sources, Radiative Forcing; Earth's Energy Budget: Indicators of Climate Change; Feedbacks; Trends in Climatic Hazards; Future Scenario of Climate Change: Representative Concentrations Pathways and Shared Socioeconomic Pathways

Unit-II

Climate Change Mitigation; Carbon Capturing and Sequestration Adaptation: Reactive and Transformative; Nature based Solutions to Climate Change; Key Initiatives by UNFCC (IPCC; Kyoto Protocol, Paris Agreement); Progress in Climate Action: COPs; Nationally Determined Contributions; Climate Resilience: Key Aspects and Success Stories

CLO-PLO Matrix for the Course MGEODCC325: Climate Change

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MGEODCC325.1	3	3	1	0	3	3	1	1	1	3
MGEODCC325.2	3	3	1	2	3	3	3	3	3	3
Average for MGEODCC325	3	3	1	1	3	3	2	2	2	3

Suggested Readings:

- Bailey summers and Ross A Diaz. Climate Change: Legal Issues & Contexts (Climate Change and Its Causes, Effects and Prediction: Laws and Legislation); Nova Science Publisher UK. Ed. 2103.
- Climate Change Science Compendium; UNEP. 2009.
- Climate in Peril,. A Popular Guide to the Latest IPCC Report; UNEP 2009.
- Greenhouse gasses: Sources and Sinks https://www .ipcc.ch /site /assets /uploads /2018 /05/ipcc _wg_I_1992_suppl_report_section_a1.pdf 2009
- Guidance on Integrating Climate Change Adaptation into Development Co-operation. OECD, 2009.
- IEA Training Material. Vulnerability and Climate Change Impact Assessment for Adaptation; IISD, UNITAR & UNEP.2009.
- IPCC. The Physical Science Basis - Summary for Policymakers; Climate Change,.2013
- James Rodger Fleming. Historical Perspectives on Climate Change. Oxford University Press. 1998.
- Lackner M., Sajjadi B., & Chen W.-Y. (Eds.). Handbook of climate change mitigation and adaptation, New York: Springer. 2024.
- Mark Maslin. Climate Change: A Very Short Introduction. Oxford University Press. 2014.
- UNEP & UNDP. Mainstreaming Climate Change Adaptation into Development Planning: A Guide for Practitioners. 2011.
- William Kininmonth. Climate Change: A Natural Hazard. Multi-science Publishing Co. Ltd. 2011.

Master's (PG) Degree in Geography
[3rd Semester]

MGEODSD325: Sustainable Development

Credits: 02 **Total Contact Hours: 30** **Max. Marks: 50**

Course Learning Outcomes: At the completion of the course, the student should be able to

CLO1: Understand the interconnectedness of social, economic and environmental systems in the context of sustainable development.

CLO2: Analyse and evaluate the sustainable development policies, strategies and practices at local, national and global levels.

Unit-I

Sustainable Development: Concept, Components, Approaches & Limitations; Events in Sustainability (Agenda 21); Natural Resources Accounting & Valuation of Ecosystem Services; Role of International Organizations in Sustainable Development (FAO, WHO, UNEP) & Relevant Treaties; Moving Towards Sustainability: An Indian Perspective

Unit-II

Limits to Growth: Concept & Significance; Carrying Capacity: Concept & Measurements; Ecological Foot-Print Analysis; Global Environment Issues: Industrialization, Urbanization & Pollution; Millennium Development Goals & Sustainable Development Goals (2015-2030).

CLO-PLO Matrix for the Course MGEODSD325: Sustainable Development

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MGEODSD325.1	3	2	2	3	1	3	3	2	1	3
MGEODSD325.2	3	2	2	3	1	3	3	2	1	3
Average for MGEODSD325	3	2	2	3	1	3	3	2	1	3

Suggested Readings:

- Jaffrey D. Sachs., The Age of Sustainable Development, Columbia University Press, 2015.
- Jennifer A. Elliot., An Introduction to Sustainable Development, Routledge Publishers, 2015
- K.V. Sundaram., Sustainable Development and Sustainable Life Styles, Northern Book Centre, 2003.
- M.C Dash., Concepts of Environmental Management for Sustainable Development, I.K International Publishing House Pvt. Ltd. 2013.
- Peter Rogers., An Introduction to Sustainable Development, Routledge Publishers, 2007
- R.B Singh., Environment and Sustainable Development: Emerging Challenges, World Focus. 2017
- Teri., Global Sustainable Report 2015: Climate Change and Sustainable Development, Oxford University Press, 2015.

Master's (PG) Degree in Geography
[3rd Semester]

MGEODSG325: Soil Geography

Credits: 02 **Total Contact Hours: 30** **Max. Marks: 50**

Course Learning Outcomes: At the completion of the course, the student should be able to:
CLO1: Explain approaches, formation, pedogenic regimes and properties of soil.
CLO2: Explain soil classifications, land degradations and soil conservation.

Unit-I

Soil: Concept & Approaches (Pedological & Edaphalogical); Soil Formation; Soil Profile; Pedogenic Regimes; Physical and Chemical Properties of Soil

Unit-II

Soil Classification: Zonal Scheme & National Bureau of Soil Survey & Land Use Planning; United States Department of Agriculture System (USDA): Soil Classification; Soil Erosion & Land Degradation: Concept and Types; Soil Loss Models: Modified Universal Soil Loss Equation (MUSLE); Soil Conservation: Significance & Methods

CLO-PLO Matrix for the Course MGEODSG325: Soil Geography

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MGEODSG325.1	3	3	1	1	1	2	3	2	3	2
MGEODSG325.2	3	3	2	2	2	3	3	2	2	3
Average for MGEODSG325	3	3	1.5	1.5	1.5	2.5	3	2	2.5	2.5

Suggested Readings:

- Daniel Hillel., Soil in the Environment; Crucible of Terrestrial Life, Academic Press, 2007.
- Edward J. Plaster; Soil Science & Management, Delmar Cengage Learning; 6th edition, 2013.
- Garrison Sposito., The Chemistry of Soils, Oxford University, 1989.
- James B. Nardi., Life in the Soil: A Guide for Naturalists and Gardeners, University of Chicago Press, 2007.
- Nyle Briday., The Nature and Properties of soil, Macmillon Publishing Company USA 1990.

MGEODRD325: Rural Development

Credits: 02 **Total Contact Hours: 30** **Max. Marks: 50**

Course Learning Outcomes: At the completion of the course, the student should be able to:
CLO1: Explain how *atamanirbhar* village is necessary for *atamanirbhar* Bharat.
CLO2: Know about government policies and programs for rural development.

Unit-I

Rural Development: Concept; Objectives; Constraints; Influencing Factors and Approaches; Rural Livelihoods and Poverty; Rural Development Institutions and Governance Institutions of Rural Development; *Atamanirbhar* Village for *Atamanirbhar* Bharat

Unit-II

Rural Infrastructure & Services; Agriculture and Rural Development; Community Participation and Empowerment; Government Policies and Programs: Bharat *Nirman*, Provisions of Urban Amenities in Rural Area (PURA), MGNREGA, DAY-NRLM, PMAY-G, NHRM; Sustainable Rural Development

CLO-PLO Matrix for the Course MGEODRD325: Rural Development

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MGEODRD325.1	3	3	1	1	1	3	3	3	3	3
MGEODRD325.2	3	3	1	1	1	3	3	3	3	3
Average for MGEODRD325	3	3	1	1	1	3	3	3	3	3

Suggested Readings:

- A.Vinayak Reddy and M. Yadagira Charyulu, Rural Development in India: Policies and Initiatives, New Century Publications, New Delhi, 2009.
- George H. Axinn and nancy W. Axinn., Collaboration in International Rural Development, Sage Publication, New Delhi, 1997
- Katar Singh., Rural Development, principles, polices and Management, Sage Publication, New Delhi,1986.
- Laxmi Devi., Encyclopedia of rural Development, Anmol Publications Pvt. Ltd. New Delhi.
- N. Lalitha, Rural Development in India: Emerging Issues and Trends- Dominant Publishers, Delhi, 2004.
- Ram K. Parma., Policy Approach to Rural Development, Print well, Jaipur., 1996.
- Venkatta Reddy. K., Rural Development in India, Himalaya Publishing House, New Delhi. 2000.

POSTGRADUATE PROGRAMME IN GEOGRAPHY
[4th Semester]

Course Code	Course Title	Course Type	Credits
MGEOCPS425	Population and Settlement Geography	C	4
MGEOCBG425	Biogeography	C	2
MGEOCEI425	Environmental Impact Assessment	C	4
MGEOLAS425	Advanced Land Surveying	L	4
MGEODGH425	Geography of Health	D	2
MGEODNH425	Natural Hazards	D	2
MGEODGT425	Geography of Transport	D	2
MGEODPG425	Political Geography	D	2
MGEODHC425	Himalayan Cryosphere	D	2

Note: Laboratory Course (L) is Compulsory for all the students.

Master's (PG) Degree in Geography
[4th Semester]

MGEOCPS425: Population and Settlement Geography

Credits: 04 **Total Contact Hours: 60** **Max. Marks:100**

Course Learning Outcomes: At the completion of the course, the student should be able to:
CLO1: Understand spatial and structural dimensions of population and the emerging issues.
CLO2: Analyze and understand different vital components of population.
CLO3: Explain evolution and development of settlements.
CLO4: Comprehend theories of the morphological structure of settlements.

Unit-I

Population Geography: Evolution & Subject Matter; Population Theories: Malthus, Neo Malthusianism, Demographic Transition; Factors Influencing Growth, Distribution & Density of Population; Population Dynamics of India and J&K; Population Projection Techniques

Unit-II

Fertility: Determinants & World Patterns; Mortality: Determinants & World Patterns; Migration: Measures, Determinants & Consequence; Human Development: Concept of Human Development Index & its Components; Population Challenges in Developed & Developing Countries: Ageing & Declining Sex Ratio

Unit-III

Settlement Geography; Evolution, Size & Growth of Human Settlement; Diffusion of Settlements; Site & Situation Factors in the Development of Settlements; Rural Settlement, Patterns & Forms; Urban Settlements: Emerging Issues & Challenges

Unit-IV

Classification of Settlements; Theories of the Morphological Structure of Cities: Concentric Zone, Sector Theory, Multi- Nuclei Theory; Social Area Analysis Model & Exploitative Model; Origin of Towns & Cities; Settlement & Environmental Interface

CLO-PLO Matrix for the Course MGEOCPS425: Population and Settlement Geography

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MGEOCPS425.1	3	3	2	1	1	2	2	3	2	2
MGEOCPS425.2	3	3	2	2	2	2	3	3	3	3
MGEOCPS425.3	3	3	2	1	1	3	2	2	2	2
MGEOCPS425.4	3	3	2	2	2	3	3	3	3	3
Average for MGEOCPS425	3	3	2	1.50	1.50	2.5	2.5	2.75	2.50	2.50

Suggested Readings:

- Agarwala, S.N., India's Population Problems, Tata McGraw Hill, New Delhi, 1985.

- Beaujeu Garnier, J., Geography of Population, Longman, London, 1966.
- Bhende, A. A. and Kanetkar T., Principles of Population Studies, Himalaya Publishing House, Mumbai, 2003.
- Bhende, A.A. and Kanetkar, T., Principles of Population Studies, Himalayan, 1978.
- Bose, A. (ed.)., Population in India's Development, 1947-2000. Vikas Publications, New Delhi, 2001.
- Carter, H., The Study of Urban Geography, Edward Arnold, London, 1975.
- Champion, T. (ed.) Population Matters. Paul Chapman, London, 1993.
- Chandna, R. C., Geography of Population. Kalyani Publishers., New Delhi, 2006.
- Chandna, R.C., Geography of Population, Kalyani Publishers, New Delhi, 1986.
- Clark, J. I., Population Geography. Pergamon Press, Oxford, 1972.
- Daniel, P., Geography of Settlement. Rawat Publications., Jaipur and New Delhi, 2002.
- Ehrlich, P.R. and Ehrlich, A.H. , Ecoscience: Population, Resources, Environment. 6th ed. W.H. Freeman and Company, San Francisco, 1996.
- Eidt, R. C., Singh, K. N. and Singh, Rana, P.B., (eds.), Man, Culture and Settlement. Kalyani Publishers., New Delhi, 1977
- Garnier, B.J., Geography of Population. 3rd edition. Longman, London, 1993.
- Ghosh, S., A Geography of Settlements. Orient Longman, Kolkata, 1999.
- Hassan, M.H., Population Geography, Rawat Publications, New Delhi, 2005.
- Hudson, F. S., A Geography of Settlements. MacDonald and Evans, New York, 1976.
- Jones, H. R., Population Geography. 3rd edition. Paul Chapman, London. Pathak, L. P. (ed.) (1998):
- Population Studies. Rawat Publications., Jaipur and New Delhi, 2000.
- Mitra, A., Report on House Types and Village Settlement Patterns in India. Publication Division, Govt. o India, New Delhi, 1960.
- Mosley, M.J., Rural Development: Principles and Practice. Sage Publication, London, 2005.
- Oliver, P., Dwellings. The House across the World. University of Texas, 1987.
- Ross, John A,. (ed.) International Encyclopaedia of Population. Free Press, New York, 1982.
- Singh, K.N. and Singh, D.N., (eds.) Population Growth, Environment and Development. EDSC, Varanasi, 1992.
- Singh, R.Y., Geography of settlements. Rawat Publications., Jaipur and New Delhi, 2003.
- Srinivasan, K, and Vlassoff, M., Population Development Nexus in India: Challenges for the New
- Millennium. Tata McGraw Hill, New Delhi, 2001.
- Trewartha, G.T., A Geography of Population. World Patterns. John Wiley and Sons, New York, 1985.
- Trewartha, G.T., A Geography of Population- World Patterns, John Wiley, 1969.
- Woods, R., Population Analysis in Geography, Longman, London, 1979.
- Zelinsky, W., A Prologue to Population Geography. Prentice Hall, Englewood Cliffs, New Jersey.

MGEOCBG425: Biogeography

Credits: 02 **Total Contact Hours: 30** **Max. Marks: 50**

Course Learning Outcomes: At the completion of the course, the student should be able to:
CLO1: Explain rules of biogeography, geographic template, evolution and bio-geographic pattern.
CLO2: Understand major biomes, phtyto and zoo- geographic realms and conservation biogeography.

Unit-I

Principles of Biogeography: Biotic Succession; Components of Geographic Template: Climate, Soil, Aquatic Environment; Evolution of Species: Speciation, Diversification & Extinction; Dispersal: Mechanism, Routes & Barriers; Bio-geographic Patterns: Cosmopolitanism & Endemism

Unit-II

Major Biomes of the World: Forest, Aquatic & Desert; Phyto & Zoo-geographic Realms of the World; Theory of Island Biogeography; Conservation Biogeography: Biosphere Reserves, National Parks, Wildlife Sanctuaries; Bio-geographic Regions of India

CLO-PLO Matrix for the Course MGEOCBG425: Biogeography

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MGEOCBG425.1	3	3	1	1	1	2	2	2	1	2
MGEOCBG425.2	3	3	1	2	1	2	3	3	3	3
Average for MGEOCBG425	3	3	1	1.5	1	2	2.5	2.5	2	2.5

Suggested Readings:

- E.O. Wilson and R. H Macarther., The Theory of Island Biogeography, Princeton University Press, 1976.
- James Brown., Biogeography – An Ecological and Evolutionary Approach, Sinauer Associates Inc; 3rd edition, 2005.
- M.V Limolinov, & B. R. Riddle, Biogeography, Sinauer Associates Inc. Massachusetts USA, 2005.

MGEOCEI425: Environmental Impact Assessment

Credits: 04 **Total Contact Hours: 60** **Max. Marks: 100**

Course Learning Outcomes: At the completion of the course, the student should be able to:
CLO1: Understand the core concepts, methodology, and historical evolution of environmental impact assessment.
CLO2: Gain knowledge of the bio-physical, socioeconomic aspects relevant to a project's impact.
CLO3: Learn to propose and design mitigation measures to reduce or prevent adverse effects.
CLO4: Resolve complex environmental issues arising from development projects on the environment.

Unit-I

EIA: Concept, Evolution, Need, Objectives; Legal and Policy Framework: Environmental Protection Act, EIA Notification 1994 and its Amendment, 2006 EIA Notifications & its Amendment in India; EIA Process; EIA Report and its Content

Unit-II

EIA Methodologies: Ad-hoc Methods, Checklists, Matrices, Networks, Overlay Mapping, Cost Benefit Analysis, Modeling Techniques; RFCTLARR Act, 2013: Need, Features and Provisions

Unit-III

Social Impact Assessment: Characteristics, Advantages; Public Participation in Environmental Decision Making; Air Quality Assessment; Water Quality Assessment; Ecological Assessment

Unit-IV

Strategic Environment Assessment (SEA): Concept and Process; SEA Principles; Application of SEA in Urban Planning; SEA; Environmental Management Plan (EMP): Elements and Preparation; Case studies of SEA/ EIA: Hydel Power Project and Tourism Township

CLO-PLO Matrix for the Course MGEOCEI425: Environmental Impact Assessment

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MGEOCEI425.1	3	3	2	2	3	3	3	3	3	3
MGEOCEI425.2	3	3	2	3	3	3	3	3	3	3
MGEOCEI425.3	3	3	2	2	1	3	3	3	3	3
MGEOCEI425.4	3	3	2	2	1	3	3	3	3	3
Average for MGEOCEI425	3	3	2	2..25	2	3	3	3	3	3

Suggested Readings:

- Anjaneyulu, Y. Environmental Impact Assessment Methodology. B.S Publications. 2002

- Alan Gilpin, Environmental Impact Assessment: Cutting Edge for the 21st, 1995.
- Charles H. Eccleston., Environmental Impact Assessment: A Guide to Best, 2011.
- John Glasson, Riki Therivel, & Andrew Chadwick., Introduction to Environmental Impact Assessment, 2013.
- Neil Craik., The International Law of Environmental Impact Assessment, 2010.
- O.V. Nandimath, Handbook of Environmental Decision Making in India: An EIA Model, Oxford Publishing, 2008
- V. S. Kulkarni, Dr. S. N. Kaul, et al., A Handbook of Environment Impact Assessment, Scientific Publishers, 2002

MGEOLAS425: Advanced Land Surveying

Credits: 04 **Total Contact Hours: 60** **Max. Marks:100**

Course Learning Outcomes: At the completion of the course, the student should be able to:

CLO1: Utilize advanced land surveying for field measurements.

CLO2: Gain skill of using total station for land measurement in the field.

CLO3: Perform GPS Survey in the field.

CLO4**:** Perform drone mapping in the accessible and inaccessible areas.

Unit-I

Advanced Land Surveying: Concepts and Development; Types of Scale; Linear and Angular Measurements; Surveying: Methods & Instruments; Map Projections & Types; Coordinate System, Datums & Transformations

Unit-II

Surveying Instruments: Total Station (ETS), Total Station: Functions & Characteristics; Handling & Setting-up Total Station: Levelling, Centering & Orientation, Measuring Angles, Distances & Heights, Land Parcel Area Calculation

Unit-III

Introduction of GPS: Concepts, Mechanism and Pre requirements of the GPS Survey; Coordinate and Time Systems, Satellite Orbital Motions, GPS Observables, GPS Structure; Fundamentals of GPS Positioning; Types of GPS Survey; Errors & Accuracy

Unit-IV

GPS Survey: Autonomous, Differential & Real Time Kinematics (RTK); Creating Point, Line & Polygon Data, Data Transfer, Post Processing of GPS Data, Map Layouts; Drone Mapping

CLO-PLO Matrix for the Course MGEOLAS425: Advanced Land Surveying

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MGEOLAS425.1	0	3	1	3	2	3	3	3	2	3
MGEOLAS425.2	0	3	3	3	2	3	3	3	2	3
MGEOLAS425.3	0	3	3	3	2	3	3	3	2	3
MGEOLAS425.4	0	3	2	3	2	3	3	3	2	3
Average for MGEOLAS425	0	3	2	3	2	3	3	3	2	3

Suggested Readings:

- Basak, N. N. Surveying and Levelling, Tata McGraw-Hill Education, Delhi. 1994.
- Bhavikatt , S. S. Surveying and Levelling, I. K. International, New Delhi.2009.
- Mohinder, S. G., Lawrence, R. W. and Angus, P. A. Global Positioning Systems, Inertial Navigation and Integration, John Wiley and Sons Inc., New York.2001.
- Satheesh, G., Sathikumar, R. and Madhu, N. Advanced Surveying: Total Station, GIS and Remote Sensing, Pearson Education, Delhi.2007.

MGEODGH425: Geography of Health

Credits: 02 **Total Contact Hours: 30** **Max. Marks: 50**

Course Learning Outcomes: At the completion of the course, the student should be able to:
CLO1**:** Critically evaluate the spatial distribution of various health and health care facilities.
CLO2: Understand geo-ecology, spatial pattern, causes of diseases.

Unit-I

Development of Healthcare Geography; Relevance of Health & Healthcare Geography in Contemporary World; Classification of Diseases; Omran's Epidemiological Transition Model; Disease Ecology & Disease Ecology Model, Disease Diffusion: Processes & Types

Unit-II

Environment & Health; Physical, Socio-cultural & Economic Factors Affecting Health; Geo-ecology & Spatial Pattern of Diseases: Cardio-metabolic, Malaria, TB, Goiter and Cancer; Nutritional Deficiency Diseases; Health and Wellbeing; Healthcare Planning & Policies in India

CLO-PLO Matrix for the Course MGEODGH425: Geography of Health

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MGEODGH425	3	3	2	3	2	2	3	2	3	3
MGEODGH425	3	3	2	3	2	2	3	2	3	3
Average for MGEODGH425	3	3	2	3	2	2	3	3	3	3

Suggested Readings:

- A. Learmoth., Disease Ecology; Blackwell Pub, 1987.
- Akhtar, R. and A.T.A. Learmonth., Geographical Aspects of Health and Disease in India, Concept Publishing Company, New Delhi, 1985
- Akhtar, R., Environment and Health, Ashish Pub. House, 1991.
- Amy J. Blatt, Perspectives in Medical Geography, Routledge, London 2012
- Anthony C. Gatrell, Susan J. Elliott; Geographies of Health: An Introduction, Wiley Publishing, 2014
- Gerald, F. Pyle., Applied Medical Geography, V.H. Winston, 1979.
- Melinda S., Medical Geography, Guilford Press, 2010.

MGEODGT425: Geography of Transport

Credits: 02 **Total Contact Hours: 30** **Max. Marks:50**

Course Learning Outcomes: After completion of the course, the student will be able to:
CLO1. Understand transportation networks with the help of specialized models of transport development.
CLO2. Learn about the transport means and transportation policy in India.

Unit -I

Geography of Transport: Concept & Significance; Principles of Spatial Interaction: Ullman and Hurst; Transport Network Analysis; Transport: Patterns & Modes; Models of Transport Development: Taaffe, Morrill & Gould (TMG) Model (1963) and The Rimmer Model (1977)

Unit - II

Rail Transport: Organization & Types; Road Transport: National Highway Authority of India (NHAI), Major Highways and Expressways; Air Transport: Introduction, Organization & Significance; Water Transport in India, Significance of Ports, Interlinking of Rivers; Transportation Policy & Planning in India

CLO-PLO Matrix for the Course MGEODGT425: Geography of Transport

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MGEODGT425.1	3	2	3	1	3	3	3	3	3	3
MGEODGT425.2	3	2	2	1	3	2	1	3	3	2
Average for MGEODGT425	3	2	2.5	1	3	2.5	2	3	3	2.5

Suggested Readings:

- B. C. Vaidya. Geography of Transport Development in India, Concept Publishing company, New Delhi.2003.
- C. D. Foster. The Transport Problem, Revised edition, Croom Helm Ltd. London.1975.
- H. M. Saxena. Transport Geography, Rawat Publications, Jaipur.2005.
- H. Robinson and C. G. Baniford. Geography of Transport, Macdonald & Evans Ltd.1978.
- P.S. Gautam. Transport Geography of India, New Gian Offset Press, Delhi-1992.
- Raza and Aggarwal. Transport geography of India, Commodity Flows and the Regional Structure of Indian Economy, Concept Publishing Company, New Delhi.1986.

MGEODNH425: Natural Hazards

Credits: 02 **Total Contact Hours: 30** **Max. Marks:50**

Course learning outcomes: Upon completion of this course the students will be able to:

CLO1: Explain the mechanisms, triggers, dynamics and impacts of various geological and geomorphological hazards such as earthquakes, landslides, volcanic eruption, land subsidence etc.

CLO2: Interpret the mechanisms, triggers, dynamics and impacts of various hydro-metrological hazards such as droughts storms, floods, tsunami, climate change, heat waves weather extremes, etc

Unit-I

Natural Hazards: Characteristics, Classification and Impacts; Earthquakes: Mechanism and Fault Systems, Seismic Waves, and Ground Motion, Distribution, Measurement Scales, and Prediction; Landslides: Types, Mechanics, Conditioning Factors, and Triggers; Volcanoes: Types, Compositions, Magma Formation and Movement, Eruption Styles, Precursors and Cycles, Monitoring; Land Subsidence: Causes, Impacts, and Monitoring

Unit-II

Floods: Types, Distribution, Frequency, Impacts and Management; Glacial Lake Outburst Flood (GLOF): Formation and Types of Glacial Lakes; Droughts: Types and Indices, Drought Early Warning; Snow Avalanches: Types, Terrain, Weather and Snowpack Properties and Stability Test; Climate Change, Weather Extremes, Cold Waves; Wildfires: Fire Ecology, Role of Weather, Topography, and Fuel

CLO-PLO Matrix for the Course MGEODNH425: Natural Hazards

UNIT-WISE CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MGEODNH425.1	3	2	2	2	3	2	1	2	1	3
MGEODNH425.2	3	2	2	2	3	2	1	2	1	3
Average for MGEODNH425	3	2	2	2	3	2	1	2	1	3

Suggested Readings:

- Abbott, P. L. Natural disasters (10th ed.). McGraw-Hill Education. 2016.
- Bryant, E. Tsunami: The underrated hazard (2nd ed.). Springer. 2008.
- Chaussard, E. et al. Remote sensing of land subsidence: A global review. Remote Sensing of Environment. 2014.
- Etkin, D. Disaster Risk Reduction: An Introduction. Oxford University Press. 2014.
- Galloway, D., Jones, D. R., & Ingebritsen, S. E. Land Subsidence in the United States – USGS Circular 1999.
- Harrison, M. *The history of epidemics and pandemics*. Cambridge University Press.2013.
- Keller, E. A., & DeVecchio, D. E. Natural hazards: Earth's processes as hazards, disasters, and catastrophes (6th ed.). Pearson. 2021.
- Klinenberg, E. Heat wave: A social autopsy of disaster in Chicago (2nd ed.). University of Chicago Press. 2015.

Master's (PG) Degree in Geography
[4th Semester]

MGEODPG425: Political Geography

Credits: 02 **Total Contact Hours: 30** **Max. Marks:50**

Course Learning Outcomes: After completion of the course, the student will be able to:
CLO1: Understand the concepts, approaches, and major schools of thought in political geography.
CLO2: Gain an understanding of global political actions.

Unit-I

Political Geography: Approaches, Major Schools of Thought in Political Geography: German, British & American; Global Strategic Views of Heartland & Rim Land Theories; State & its Elements: Physical, Social & Economic; Concept of Frontiers, Boundaries & Buffer State

Unit-II

Geopolitics: Concept; Significance of SAARC & Indian Ocean; International Boundary of India & Related Issues; Water Sharing Disputes: Kaveri; Global Groups & Organizations: ASEAN, EU, BRICS; Electoral Geography: Spatial Analysis

CLO-PLO Matrix for the Course MGEODPG425: Political Geography

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MGEODPG425.1	3	3	1	0	0	2	3	3	3	2
MGEODPG425.2	3	3	1	1	2	3	3	3	3	2
Average for MGEODPG425	3	3	1	0.5	1	2.5	3	3	3	2

Suggested Readings:

- Agnew J., Political Geography: A reader London: Arnold, 1997.
- Cox KR, Low M. & Robinson J., Handbook of Political Geography, London, 2008.
- Edward, F., Modern Political Geography, Brown Company Publishers, 1975.
- Harvey, D., Justice, Nature and the Geography of difference, Oxford Blackwell, 1996.
- Hussain, M., Political Geography, Anmol Publishers, New Delhi, 1994.
- John Agnew, Political Geography Reader, Arnold Hodder, 1995.
- Johnston, R.J., Political, Electoral and Spatial Systems Oxford: Clarendon Press, 1979.
- Painter, J., Politics, Geography and 'Political Geography': A Critical Perspective London, 1995.
- Peter, J. Taylor., Political Geography, Long man Group, England, 1985.
- Spykman, N. J., The Geography of the Peace, New York: Harcourt, Brace and Co.1944.
- Sutton, I., 'The Political Geography of Indian Country' American Indian Culture and Research Journal, 1991
- Taylor P.J & Flint C., Political Geography: World-Economy, Nation-state and Locality, Harlow: Pearson Education Limited, 2007

Master's (PG) Degree in Geography
[4th Semester]

MGEODHC425: Himalayan Cryosphere

Credits: 02 **Total Contact Hours: 30** **Max. Marks:50**

Course Learning Outcomes: After completion of the course, the student will be able to:
CLO1: Understand glacier processes, formation, dynamics and mass balance.
CLO2: Assess the impacts of glacier changes on the environment and society including related hazards.

Unit - I

Cryosphere: Definition, Scope; Cryosphere Elements: Glaciers, Snow Cover, Permafrost, and Ice Features; Glacier Types and Distribution; Glacier Formation; Glacier Dynamics and Movement: Mechanisms of Ice Flow, Velocity Patterns, Basal Sliding; Snow and Glacier Mass Balance: Energy, Mass Balance and Measurement Methods; Permafrost: Processes, Mass Movements, and Environmental Implications

Unit - II

Cryosphere Hydrology and its Significance in Himalayan Water Budget: River Flow, Downstream Water Availability, Groundwater Recharge, and Ecosystem Interplay; Analysis of Recent Cryosphere Changes in the Himalaya; Glacial Hazards: Glacial Lake Outburst FLoods (GLOFs), Ice Avalanches and Triggers; Cryosphere Research: Field Measurement Techniques, Ice Core Analysis, and Modeling

CLO-PLO Matrix for the Course MGEODHC425: Himalayan Cryosphere

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MGEODHC425.1	3	0	1	1	0	3	3	3	0	0
MGEODHC425.2	3	3	1	2	3	3	3	3	3	3
Average for MGEODHC425	3	1.5	1	1.5	1.5	3	3	3	1.5	1.5

Suggested Readings:

- Benn, D.I. & Evans, D.J.A. Glaciers and Glaciation (2nd ed.). Routledge. 2010.
- Haeberli, W. et al. Snow and Ice-Related Hazards, Risks, and Disasters (2nd ed.). Elsevier. 2021.
- Hooke, R. LeB. Principles of Glacier Mechanics (2nd ed.). Cambridge University Press. 2005.
- Huggel, C. (Ed.). The high-mountain cryosphere. Cambridge University Press. 2015.
- Kaushik Pradepika. Geomorphological Studies of the Himalayan Glaciers in Brief, Lambat Academic Press. 2013.
- Knight, P.G. Glacier Science and Environmental Change. Blackwell. 1999.
- Micheal Hambrey and Jueg Alean. Glaciers (2nd edition). Cambridge University Press. 2004.
- Naseerudin Ahmad and Sarwar, Rais. Himalyan Glaciers, APH Publishing House.1998.
- Pant, N. C., Ravindra, R., Srivastava, D., & Thompson, L. G. (Eds.). The Himalayan Cryosphere: Past and Present. Geological Society of London. 2018.

- Paterson, W.S.B. & Cuffey, K.M. The Physics of Glaciers (4th ed.). Elsevier. 2010.
- Sugden, D.E. & John, B.S. Glaciers and Landscape: A Geomorphological Approach. Edward Arnold. 1976.
- V.K Raina and Deepak Srivastava. Atlas of Glaciers in India, Geological Society of India. 2008.

Course Curriculum for (CW+CW) & (CW+R) shall be same upto 3rd semester. However, students who opt for CW+R shall have to follow the below structure in Semester IV.

	Course Code	Course Title	Course Type	Credits
Semester IV	MGEOPDI425	Project Dissertation	P	16
	MGEOCRA425	Recent Advances in the Relevant Research Topic	C	4
	Total Credits = 20			

Structure for CW+R

1. Research Project: 16 credits

I. Project Dissertation: 16 credits → 400 marks total, evaluated as:

i. 100 marks by the Project Mentor

ii. 200 marks for the written dissertation (by external/internal members)

iii. 100 marks for Final Viva-Voce, jointly conducted by a panel:

1. Head of Department (HoD)
2. External Examiner (nominated by the Department/University)
3. Project Mentor
4. Senior Faculty Member (if HoD is a Mentor).

II

I. Theory Paper: 4 credits titled "Recent Advances in the Relevant Research Topic"

i. 100 marks (28 internal and 72 external marks)

ii. The course contents for this theory paper shall be designed by the concerned project mentor**.**