

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

COURSE STRUCTURE

for

M. A./M. Sc. Disaster Management

Batch 2025 Onwards

Under

NATIONAL EDUCATION POLICY (NEP) 2020



**School of Earth & Environmental Sciences
University of Kashmir
Srinagar-190006**

Contact details:

Email: geord@kashmiruniversity.ac.in

Website: <https://geogrd.uok.edu.in/Main/Default.aspx>



**UNIVERSITY OF
KASHMIR**



Department of Geography & Disaster Management

ABOUT THE PROGRAMME

The University of Kashmir's Master's Programme in Disaster Management provides an essential academic and practical foundation to understand the complex nature of disasters and equips students with the knowledge and skills needed for planning, preparedness, response, and recovery. The programme fosters interdisciplinary learning, integrating environmental science, policy, technology, and social sciences, while aligning with global frameworks like the Sendai Framework for Disaster Risk Reduction (DRR) and the Sustainable Development Goals. With growing demand across government, non-government, and international organizations, the programme not only addresses a critical gap in professional capacity but also offers diverse career pathways in disaster risk reduction, humanitarian aid, and sustainable development.

PROGRAMME LEARNING OUTCOME

Upon completion of Master's Programme in Disaster Management, students will be able to:

PLO1: Demonstrate a comprehensive understanding of disaster studies as an academic discipline, along with its interconnections to allied fields such as emergency and crisis management, climate change adaptation, risk mitigation, and sustainability.

PLO2: Design and conduct research using diverse methodologies and tools, interpret complex data sets, and generate evidence-based insights and solutions for disaster-related issues.

PLO3: Apply procedural and applied knowledge to become effective professionals across sectors including academia, government, industry, civil society, international/national organizations, and grassroots institutions.

PLO4: Critically assess research and policy frameworks in disaster and emergency management, with an informed understanding of the role and limitations of science, its societal implications, and ethical responsibilities in its application.

PLO5: Promote values of equity, inclusion, and human dignity by respecting and upholding the rights of all individuals and groups in disaster contexts.

PLO6: Demonstrate a range of transferable and global competencies such as critical thinking, problem-solving, communication, teamwork, ethical reasoning, project management, community engagement, and the ability to contextualize policy and practice.

PLO7: Recognize and analyze emerging challenges in disaster management that transcend traditional disciplinary boundaries, and respond with innovative, interdisciplinary approaches.

PLO8: Analyze and evaluate the environmental, social, cultural, legal, economic, and organizational factors that shape vulnerability and capacity in disaster-prone areas.

PLO9: Exhibit practical skills essential for active participation in disaster management efforts at local, regional, national, and global levels.

PLO10: Take ownership of one's continuous learning by engaging with cutting-edge research, policy documents, and professional resources relevant to the evolving field of management.



PEDAGOGY

The programme adopts a diverse and interactive pedagogical approach that includes: Lectures, Seminars, Group Discussions, Student Presentations, and Impart 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	1 st Year	1 Year	PG Diploma in Disaster Management
			2 Year	Master's Degree in Disaster Management
1-year Masters Degree	4-year UG (Honours/Honours with Research)	2 nd Year	1 Year	Master's Degree in Disaster Management

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 Disaster Management.

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 Masters in Disaster Management 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 is covering six key components: Classroom Teaching, Tutorials, Practical Work, Seminars, Field Studies and Report Writing. Moreover, a project is to be undertaken in the second semester.

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 Disaster Management 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 (MDMTLFW325) 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 Disaster Management
(CW+CW & CW+R)**

Semester I	Course Code	Course Title	Course Type	Credits
	MDMTCDM125	Disaster Management	C	2
	MDMTCNA125	Natural and Anthropogenic Hazards	C	4
	MDMTCRG125	Remote Sensing, GIS and Satellite Navigation System	C	4
	MDMTLRP125*	Remote Sensing, GIS and Satellite Navigation System	L	4
	Students shall have to opt six (06) credits from the following DCEC			
	MDMTDGE125	Geophysical Environment	D	4
	MDMTDEE125	Ecology and Environment	D	4
	MDMTDEW125	Early Warning Systems	D	2
	MDMTDDP125	Disasters and Developmental Planning	D	2
Semester II				
Semester II	Course Code	Course Title	Course Type	Credits
	MDMTCPM225	Prevention, Preparedness and Mitigation	C	4
	MDMTCER225	Emergency Response and Management	C	2
	MDMTCRR225	Rehabilitation, Recovery & Reconstruction	C	4
	MDMTLGT225*	Geospatial Technology for Disaster Risk Reduction	L	4
	Students shall have to opt six (06) credits from the following DCEC			
	MDMTDFR225	Flood Risk Management	D	2
	MDMTDLF225	Legal Frameworks	D	4
	MDMTDCB225	Community Based Risk Management	D	2
	MDMTDSR225	Seismic Risk Management	D	2
	MDMTDDA225	Drug Abuse and Human Trafficking	D	2
Total Credits First Year = 40 (20 per semester)				

Note: (i) Laboratory Course (L) is 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



Semester III	Course Code	Course Title	Course Type	Credits
	MDMTCDV325	Disaster Vulnerability	C	4
	MDMTCRA325	Disaster Risk Assessment	C	2
	MDMTLFW325*	Field Work	L	4
	MDMTCDE325	Disaster Economics and Financial Management	C	4
	Students shall have to opt six (06) credits from the following courses			
	MDMTDRM325	Research Methodology	D	4
	MDMTDST325	Statistical Techniques	D	2
	MDMTDSD325	Society and Disasters	D	2
	MDMTDUR325	Urban Resilience	D	2
	MDMTPMP325	Disaster Management Plan (Project)	P	2
	Semester IV			
Semester IV	Course Code	Course Title	Course Type	Credits
	MDMTCCI425	Crisis Management and Incident Response System	C	4
	MDMTCPR425	Psychosocial Response in Disaster Management	C	4
	MDMTCCA425	Climate Change Mitigation and Adaptation	C	2
	Students shall have to opt ten (10) credits from the following courses			
	MDMTDEE425	Environment Impact Assessment & EMP	D	4
	MDMTDGC425	Geopolitical Conflicts and Humanitarian Crisis	D	2
	MDMTDDP425	Disasters and Public Health	D	4
	MDMTDWD425	Waste and Debris Management	D	2
	MDMTDAI425	Artificial Intelligence in Disaster Risk Reduction	D	2
MDMTSTM425	Capacity Building and Training Measures	S	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= 24				
	Course Code	Course Title	Course Type	Credits
Semester IV	MDMTPDI425	Project Dissertation	P	16
	MDMTCRA425	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 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.



**Master's (PG) Degree in Disaster Management
[1st Semester]**

Course code	Course title	Course Type	Credits
MDMTCDM125	Disaster Management	C	2
MDMTCNA125	Natural and Anthropogenic Hazards	C	4
MDMTCRG125	Remote Sensing, GIS and Satellite Navigation System	C	4
MDMTLRP125*	Remote Sensing, GIS and Satellite Navigation System	L	4
MDMTDGE125	Geophysical Environment	D	4
MDMTDEE125	Ecology and Environment	D	4
MDMTDEW125	Early Warning Systems	D	2
MDMTDDP125	Disasters and Developmental Planning	D	2

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



**Master's (PG) Degree in Disaster Management
[1st Semester]**

MDMTCDM125: Disaster Management

Credits: 02

Total Contact Hours: 30

Max. Marks: 50

Course Learning Outcomes: After completion of the course, the students should be able to:

CLO1: Understand the key concepts and components in the preparation, response and recovery phase of disaster management continuum.

CLO2: Understand the policies and strategies of disaster management adopted at Local, National and International levels to mitigate the impacts of disasters for the sustainable development.

Unit-I

Disaster Risk Reduction Terminology: Hazard, Exposure, Vulnerability, and Risk; Capacity, Resilience, Prevention, Mitigation, Adaptation, and Disaster Risk Reduction (DRR); Disaster Management Continuum; Preparedness: Early Warning Systems, Contingency Planning; Response: Emergency Services, Logistics, Coordination Mechanisms, Recovery: Rehabilitation, Reconstruction, Build Back Better

Unit-II

International Frameworks: Hyogo Framework, Sendai Framework for DRR 2015-30, Sustainable Development Goals (SDGs) 2015-30, Paris Agreement (2015-50); Institutional Structure of Disaster Management in India; NGOs, UN Agencies, and Civil Society in DRR

CLO-PLO Matrix for the Course MDMTCDM125: Disaster Management

UNIT-WISE CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MDMTCDM125.1	3	3	2	3	2	1	1	3	1	2
MDMTCDM125.2	3	3	3	2	2	3	3	3	0	3
Average for MDMTCDM125	3	3	2.5	2.5	2	2	2	3	0.5	2.5

Suggested Readings:

- Alexander, D. (2002). Principles of Emergency Planning and Management. Oxford University Press.
- Coppola, D. P. (2020). Introduction to International Disaster Management (4th ed.). Butterworth-Heinemann.
- Hyndman, D., & Hyndman, D. (2013). Natural Hazards and Disasters (4th ed.). Cengage Learning.
- IFRC & UNDP (2015). The Handbook on Law and Disaster Risk Reduction.
- Kelman, I., Gaillard, J. C., & Mercer, J. (Eds.). (2017). The Routledge Handbook of Disaster Risk Reduction Including Climate Change Adaptation Routledge.
- National Disaster Management Authority (NDMA) – India (Recent Guidelines).



- Sphere Association. (2018). The Sphere Handbook: Humanitarian Charter and Minimum Standards in Humanitarian Response.
- United Nations Office for Disaster Risk Reduction (UNDRR). (2015). Sendai Framework for Disaster Risk Reduction 2015–2030.
- Tierney, K. (2014). The Social Roots of Risk: Producing Disasters, Promoting Resilience. Stanford University Press.
- United Nations. (2015). Paris Agreement. United Nations Framework Convention on Climate Change (UNFCCC).
- United Nations Office for Disaster Risk Reduction (UNDRR). (2022). Global assessment report on disaster risk reduction 2022: Our world at risk—Transforming governance for a resilient future. Geneva: UNDRR.
- Wisner, B., Blaikie, P., Cannon, T., & Davis, I. (2004). At Risk: Natural Hazards, People's Vulnerability and Disasters (2nd ed.). Routledge.
- <http://www.unisdr.org/>
- <http://www.ndma.gov.in/en/>
- <http://nidm.gov.in/default.asp>
- <https://www.fema.gov/>



**Master's (PG) Degree in Disaster Management
[1st Semester]**

MDMTCNA125: Natural and Anthropogenic Hazards

Credits: 04

Total Contact Hours: 60

Max. Marks: 100

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: Discuss the mechanisms, triggers, dynamics and impacts of various hydro-metrological hazards such as droughts storms, floods, tsunami etc.

CLO3: Interpret the mechanisms, triggers, dynamics, types and impacts of various climatological hazards such as climate change, heat waves weather extremes, etc.

CLO4: Comprehend the mechanisms, triggers, dynamics, types and impacts of various human made disasters such as urban fires industrial accidents, road accidents pandemics etc.

Unit-I

Natural Hazards: Characteristics, Classification, Susceptibility, Prevention, Cascades, Impacts, and Mitigation; 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

Cyclones: Formation, Characteristics and Seasonality; Tsunamis: Characteristics, Causes, Wave Propagation and Shoaling Effects, Early Warning; 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, Role of Terrain, Weather and Snowpack Properties

Unit-III

Climate Change, Weather Extremes, Energy Demands; Heat Waves: Duration, Intensity, Urban Heat Islands, Heat Index; Cold Waves: Meteorology of Cold Waves, Impacts of Extreme Cold, Cold Wave Alerts and Public Warning Systems; Wildfires: Fire Ecology, Role of Weather, Topography, and Fuel; Urban Fires, Building Fire Codes, Fire Detection and Suppression Systems

Unit-IV

Endemics, Epidemics, and Pandemic, Disease Transmission (R0, Incubation Period, Vectors); The One Health Approach (human-animal-environment interface); Epidemiological Triangle: Agent, Host, Environment, Environmental and Social Drivers of Endemicity, Global Surveillance Systems; Industrial, Chemical and Technological Hazards



CLO-PLO Matrix for the Course MDMTCNA125: Natural and Anthropogenic Hazards

UNIT-WISE CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MDMTCNA125.1	3	3	3	2	2	3	3	3	3	3
MDMTCNA125.2	3	3	3	2	2	3	3	3	3	3
MDMTCNA125.3	3	3	3	2	2	3	3	3	3	3
MDMTCNA125.4	3	3	3	2	2	3	3	3	2	3
Average for MDMTCNA125	3	3	3	2	2	3	3	3	2.75	3

Suggested Readings:

- Abbott, P. L. (2016). Natural disasters (10th ed.). McGraw-Hill Education.
- Bryant, E. (2008). Tsunami: The underrated hazard (2nd ed.). Springer.
- Chaussard, E. et al. (2014). Remote sensing of land subsidence: A global review. Remote Sensing of Environment
- Etkin, D. (2014). Disaster Risk Reduction: An Introduction. Oxford University Press.
- Galloway, D., Jones, D. R., & Ingebritsen, S. E. (1999). Land Subsidence in the United States – USGS Circular 1182
- Harrison, M. (2013). *The history of epidemics and pandemics*. Cambridge University Press.
- Keller, E. A., & DeVecchio, D. E. (2021). Natural hazards: Earth's processes as hazards, disasters, and catastrophes (6th ed.). Pearson.
- Klinenberg, E. (2015). Heat wave: A social autopsy of disaster in Chicago (2nd ed.). University of Chicago Press.
- McDonald, R. (2003). Introduction to natural and man-made disasters and their effects on buildings. Routledge.
- National Disaster Management Authority. (2007). Guidelines on management of earthquakes. Government of India.
- National Disaster Management Authority. (2009). Guidelines on management of landslides and snow avalanches. Government of India.
- National Disaster Management Authority. (2009). National policy on disaster management 2009. Government of India.
- National Disaster Management Authority. (2009). Guidelines on management of various hazards [drought, floods, urban flooding, cyclones, tsunami, heat wave]. Government of India.
- National Disaster Management Authority. (2018). Standard Operating Procedures (SOP) for handling outbreaks of infectious diseases. Government of India
- National Disaster Management Authority. (2020). Guidelines for management of pandemic outbreaks. Government of India.
- National Disaster Management Authority. (2020). National disaster management plan (NDMP). Government of India.
- Smith, K. (2013) Environmental Hazards: Assessing risk and reducing disaster. New York: Routledge, 6th Edn.
- United Nations. (2020). COVID-19: A UN framework for the immediate socio-economic response. United Nations.
- Wilhite, D. A. (Ed.). (2017). Drought and water crises: Integrating science, management, and policy (2nd ed.). CRC Press.



**Master's (PG) Degree in Disaster Management
[1st Semester]**

MDMTCRG125: Remote Sensing, GIS and Satellite Navigation System

Credits: 04

Total Contact Hours: 60

Max. Marks: 100

Course Learning Outcomes: Upon completion of this course the students will be able to:

CLO1: Develop understanding of Remote Sensing, DIP and their applications.

CLO2: Develop basic skills to use GIS for various applications in Disaster Management and for dissemination of data to end users.

CLO3: Understand the GPS navigation system with respect to orbits, errors and accuracy.

CLO4: Understand the potential of RS, GIS & GPS and their integrated applications in different domains.

Unit-I

Fundamentals of Remote Sensing; Earth Observation Space Programmes; Platforms and Sensors: Types and Functions; Electromagnetic Spectrum (EMS); Energy Interactions with Atmosphere and Earth Surface Features; Digital Image Concepts: Pixels, Bands, Resolution; Image Interpretation; Digital Image Processing: Geometric Corrections and Image Registration; Image Enhancement Techniques: Contrast Stretching, Histogram Equalization; Spatial Filtering (low-pass and high-pass), Image Processing Softwares (ERDAS Imagine, ENVI)

Unit-II

Geographic Information System (GIS); Components of GIS; Spatial and Non-spatial Data; Data Models: Raster and Vector; Coordinate Systems and Georeferencing; Data Input, Editing, and Topology; Spatial Analysis: Overlay, Buffer, Query, and Proximity; Attribute Data and Database Management; Data Dissemination; GIS Softwares (QGIS, ArcGIS)

Unit-III

Introduction to Satellite Navigation; Overview of GNSS: GPS (USA), and NavIC (India); Constellation Design and Satellite Orbits; Signal Structures: L1, L2, L5 Frequencies; Types of Positioning: Absolute Positioning, Differential GPS (DGPS), Real-Time Kinematic (RTK), Precise Point Positioning (PPP); Sources of Error: Ionospheric, Tropospheric Delays, Multipath, Satellite Geometry (GDOP); Accuracy Assessment

Unit-IV

Application of Remote Sensing, GIS and Satellite Positioning Systems in: Geography, Urban Planning, Environmental Monitoring and Disaster Management; Mapping and Surveying: Land Use and Land Cover, Topography, and Natural Hazards (Earthquake, Flood, and Landslides)



CLO-PLO Matrix for the Course MDMTCRG125: Remote Sensing, GIS and Satellite Navigation System

UNIT-WISE CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MDMTCRG125.1	3	2	3	2	0	2	2	3	3	0
MDMTCRG125.2	2	3	3	2	1	2	2	2	3	1
MDMTCRG125.3	2	2	3	2	1	3	3	2	3	2
MDMTCRG125.4	3	3	3	2	0	3	2	3	3	3
Average for MDMTCRG 125	2.5	2.5	3	2	0.5	2.5	2.25	2.5	3	1.5

Suggested Readings:

- Burrough, P. A., & McDonnell, R. A. (1998). Principles of Geographical Information Systems (2nd ed.). Oxford University Press.
- Campbell, J. B., & Wynne, R. H. (2011). Introduction to Remote Sensing (5th ed.). Guilford Press.
- Chuvieco, E. (2016). Fundamentals of Satellite Remote Sensing: An Environmental Approach (2nd ed.). CRC Press.
- ESRI. (2020). GIS for Disaster Management (2nd ed.). CRC Press.
- Goodchild, M. F., & Janelle, D. G. (Eds.). (2004). Spatially Integrated Social Science. Oxford University Press.
- Heywood, I., Cornelius, S., & Carver, S. (2011). An Introduction to Geographical Information Systems (4th ed.). Pearson.
- Hofmann-Wellenhof, B., Lichtenegger, H., & Wasle, E. (2007). GNSS – Global Navigation Satellite Systems: GPS, GLONASS, Galileo, and more. Springer.
- Jensen, J. R. (2007). Remote Sensing of the Environment: An Earth Resource Perspective (2nd ed.). Pearson Education.
- Kaplan, E. D., & Hegarty, C. J. (Eds.). (2017). Understanding GPS/GNSS: Principles and Applications (3rd ed.). Artech House.
- Lillesand, T. M., Kiefer, R. W., & Chipman, J. W. (2015). Remote Sensing and Image Interpretation (7th ed.). Wiley.
- Longley, P. A., Goodchild, M. F., Maguire, D. J., & Rhind, D. W. (2015). Geographic Information Systems and Science (4th ed.). Wiley.
- Misra, P., & Enge, P. (2011). Global Positioning System: Signals, Measurements, and Performance (2nd ed.). Ganga-Jamuna Press.
- Richards, J. A., & Jia, X. (2006). Remote Sensing Digital Image Analysis (4th ed.). Springer.
- Schowengerdt, R. A. (2007). Remote Sensing: Models and Methods for Image Processing (3rd ed.). Academic Press.



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

MDMTLRP125: Remote Sensing, GIS and Satellite Navigation System

Credits: 04

Total Contact Hours: 90

Max. Marks:100

Course learning Outcome: After completion the student will be able to:

CLO1: Understand basic image processing techniques, perform visual and digital interpretation and generate spectral signatures using remote sensing applications.

CLO2: Generate and link spatial and non-spatial data, manage and manipulate spatial databases, spatial analysis techniques to solve real-world problems.

CLO3: Learn basic principles of GPS, its components, sources of error in positioning, record, store, and transfer data from GPS devices to GIS/remote sensing software.

CLO4: Work independently or in team for providing solutions to problems in GIS environment after having hands on training.

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 and Accuracy Assessment

Unit-II

Introduction to GIS Softwares (QGIS); Georeferencing Raster Data using Control Points; Creation and Editing of Vector Layers (Point, Line, Polygon); Spatial Data Analysis: Buffer, Overlay, Clip, Dissolve, Union; Data Interpolation; Import and Export of Data; Digital Elevation Model (DEM) for Terrain and Morphometric Analysis; Map Designing

Unit-III

Introduction to Satellite Positioning Systems; Handling and Operation of GNSS Devices; Data Collection; Field Exercises: Mapping Features (Roads, Trees, Buildings, Land Parcels); Post-Processing of GPS Data; GNSS Data Formats: NMEA, GPX, CSV; Generation of Map Layers

Unit-IV

Project on a selected theme to apply the knowledge and skills attained during hands-on sessions.



CLO-PLO Matrix for the Course MDMTLRP125: Remote Sensing, GIS and Satellite Navigation System

UNIT-WISE CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MDMTLRP125.1	3	3	3	2	1	1	3	3	3	2
MDMTLRP125.2	2	3	3	2	1	1	2	3	3	2
MDMTLRP125.3	3	3	3	1	1	2	3	2	3	2
MDMTLRP125.4	3	3	3	3	0	3	2	3	3	3
Average for MDMTLRP125	2.75	3	3	2	0.75	1.75	2.5	2.75	3	2.25

Suggested Readings:

- Burrough, P. A., & McDonnell, R. A. (1998). Principles of Geographical Information Systems (2nd ed.). Oxford University Press.
- Campbell, J. B., & Wynne, R. H. (2011). Introduction to Remote Sensing (5th ed.). Guilford Press.
- Chuvieco, E. (2016). Fundamentals of Satellite Remote Sensing: An Environmental Approach (2nd ed.). CRC Press.
- ESRI. (2020). GIS for Disaster Management (2nd ed.). CRC Press.
- Goodchild, M. F., & Janelle, D. G. (Eds.). (2004). Spatially Integrated Social Science. Oxford University Press.
- Heywood, I., Cornelius, S., & Carver, S. (2011). An Introduction to Geographical Information Systems (4th ed.). Pearson.
- Hofmann-Wellenhof, B., Lichtenegger, H., & Wasle, E. (2007). GNSS – Global Navigation Satellite Systems: GPS, GLONASS, Galileo, and more. Springer.
- Jensen, J. R. (2007). Remote Sensing of the Environment: An Earth Resource Perspective (2nd ed.). Pearson Education.
- Kaplan, E. D., & Hegarty, C. J. (Eds.). (2017). Understanding GPS/GNSS: Principles and Applications (3rd ed.). Artech House.
- Lillesand, T. M., Kiefer, R. W., & Chipman, J. W. (2015). Remote Sensing and Image Interpretation (7th ed.). Wiley.
- Longley, P. A., Goodchild, M. F., Maguire, D. J., & Rhind, D. W. (2015). Geographic Information Systems and Science (4th ed.). Wiley.
- Misra, P., & Enge, P. (2011). Global Positioning System: Signals, Measurements, and Performance (2nd ed.). Ganga-Jamuna Press.
- Richards, J. A., & Jia, X. (2006). Remote Sensing Digital Image Analysis (4th ed.). Springer.
- Schowengerdt, R. A. (2007). Remote Sensing: Models and Methods for Image Processing (3rd ed.). Academic Press.



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

MDMTDGE125: Geophysical Environment

Credits: 04

Total Contact Hours: 60

Max. Marks: 100

Course Learning Outcome: After completion the student will be able to:

CLO1: Understand the geophysical environment.

CLO2: Focus on internal structure of earth, tectonics, landform evolution, ocean bottom relief, and coastal geomorphology.

CLO3: Understand the ocean's topography, ocean currents, tides, weather, climate, the Earth's heat budget, and atmospheric pressure systems.

CLO4: Learn about processes governing the cryosphere, which includes ice and snow.

Unit-I

Internal Structure of the Earth; Concept of Landform Evolution; Continental Drift Theory; Plate Tectonics; Earth Movements; Classification of Landforms

Unit-II

Hydrosphere and Hydrological Cycle; Oceanic Bottom Relief and Coastal Geomorphology; Role of Oceans in Shaping the Ecology; Ocean Currents and their Importance; El Nino-Southern Oscillations and La-Nina Phenomena

Unit- III

Atmosphere: Climatic Controls; Climatic Zones and their Characteristics; Global Pressure Belts and Winds; Insolation and Heat-Budget of the Earth; Climatic Classification- Koeppen

Unit- IV

Cryosphere: Glaciers, Ice Sheets, Permafrost, Snowpack, Sea Ice and Frozen Land; Role of Cryosphere in the Earth System and Climate Regulation; Cryosphere and Global Water Security

CLO-PLO Matrix for the Course MDMTDGE125: Geophysical Environment

UNIT-WISE CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MDMTDGE125.1	3	2	2	3	1	2	3	2	1	2
MDMTDGE125.2	3	1	2	3	1	2	3	1	1	2
MDMTDGE125.3	3	1	2	3	1	2	3	2	1	2
MDMTDGE125.4	3	2	2	2	0	1	2	2	1	2
Average for MDMTDGE125	3	1.50	2	2.75	0.75	1.75	2.75	1.75	1	2



Suggested Readings:

- Barry, R. G., & Chorley, R. J. (2009). Atmosphere, Weather and Climate (9th ed.). Routledge.
- Christopherson, R. W., & Birkeland, G. H. (2018). Geosystems: An Introduction to Physical Geography (10th ed.). Pearson.
- Goudie, A. (2013). The Human Impact on the Natural Environment (7th ed.). Wiley-Blackwell.
- Huggett, R. J. (2011). Fundamentals of Geomorphology (3rd ed.). Routledge.
- IPCC (2021). Sixth Assessment Report – Working Group I: The Physical Science Basis. Intergovernmental Panel on Climate Change.
- Pidwirny, M. (2023). Fundamentals of Physical Geography [eBook edition]. PhysicalGeography.net.
- Skinner, B. J., & Murck, B. W. (2011). The Blue Planet: An Introduction to Earth System Science (3rd ed.). Wiley.
- Strahler, A. N., & Strahler, A. H. (2006). Physical Geography: Science and Systems of the Human Environment (3rd ed.). Wiley.
- Thornbury, W. D. (1969). Principles of Geomorphology (2nd ed.). Wiley.
- Tomczak, M., & Godfrey, J. S. (2003). Regional Oceanography: An Introduction (2nd ed.). Daya Publishing House.



**Master's (PG) Degree in Disaster Management
[1st Semester]**

MDMTDEE125: Ecology and Environment

Credits: 04

Total Contact Hours: 60

Max. Marks: 100

Course Learning Outcome: By the end of the course, students will:

CLO1: Analyze energy flow, food chains, ecological pyramids, and population dynamics within ecosystems.

CLO2: Understand human interaction with biodiversity.

CLO3: Understand the causes and types of environmental pollution and assess real-world pollution case studies.

CLO4: Explore ecosystem-based disaster risk reduction (EcoDRR), traditional environmental knowledge, and nature-based solutions for sustainable environmental and disaster management.

Unit –I

Ecology: Concept, Principles, Human Ecology, Ecological Niche, Environmental Ethics and Deep Ecology; Ecosystem: Components, Services, Geographic Classification, Structure & Functions; Ecological Production 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; Ecological Restoration: Principles and Techniques

Unit –III

Introduction to Environmental Pollution: Sources and Types of Pollution - Air, Water, Soil, Marine; Causes of Environmental Pollution; Cost of Pollution Management; Pollution Case Studies - London Smog Disaster, Ganga and Yamuna Pollution

Unit -IV

Ecosystem based Disaster Risk Reduction (EcoDRR): Introduction, Tools and Approaches; Natural Resources Management, Traditional Environmental Wisdom and Disasters; Disaster Risk Management: Partnership for Environment and DRR, Ecological Approaches and Integrated Ecosystem Management; Nature Based Solutions (NBSs)



CLO-PLO Matrix for the Course MDMTDEE125: Ecology and Environment

UNIT-WISE CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MDMTDEE125.1	3	2	3	3	2	2	3	3	1	3
MDMTDEE125.2	3	2	3	3	3	3	3	3	1	3
MDMTDEE125.3	3	2	3	3	3	2	3	3	1	3
MDMTDEE125.4	3	2	3	3	3	2	3	3	1	3
Average for MDMTDEE125	3	2	3	3	2.75	2.25	3	3	1	3

Suggested Readings:

- Chapin, F. S., Matson, P. A., & Vitousek, P. (2011). Principles of Terrestrial Ecosystem Ecology (2nd ed.). Springer.
- Cunningham, W. P., & Cunningham, M. A. (2017). Environmental Science: A Global Concern (13th ed.). McGraw-Hill Education.
- Dash, M. C. (2001). Fundamentals of Ecology. Tata McGraw-Hill.
- IPCC (2022). Climate Change and Land: Special Report. Intergovernmental Panel on Climate Change.
- Miller, G. T., & Spoolman, S. (2014). Environmental Science (14th ed.). Cengage Learning.
- Odum, E. P., & Barrett, G. W. (2005). Fundamentals of Ecology (5th ed.). Brooks/Cole.
- Primack, R. B. (2014). Essentials of Conservation Biology (6th ed.). Sinauer Associates.
- Raven, P. H., Hassenzahl, D. M., & Berg, L. R. (2018). Environment (9th ed.). Wiley.
- Singh, S. (2009). Environmental Geography. Prayag Pustak Bhawan.
- UNEP (2020). Ecosystem-based Disaster Risk Reduction: Implementing Nature-based Solutions for Resilience. United Nations Environment Programme.



**Master's (PG) Degree in Disaster Management
[1st Semester]**

MDMTDEW125: Early Warning Systems

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 technology based Disaster Forecasting, Prediction and Early Warning System with respect to various geological, hydro metrological disasters.

CLO2: Deduce the functioning of the various national and international nodal agencies for the Disaster Prediction, Forecasting and Early Warning Systems.

Unit - I

Early Warning Systems (EWS): Concept, Evolution, Significance and Challenges; Components of Early Warning System: Risk Knowledge, Monitoring and Prediction, Dissemination and Communication, Response Capability; Communication and Response Strategies for Early Warning Systems; Community EWS: Guiding Principles; Common Alerting Protocol

Unit - II

National Nodal Agencies for Forecasting and Early Warning; Roles and Functioning: National Seismological Centre (NSC), Indian National Center for Ocean Information Services (INCOIS), Geological Survey of India (GSI), Forest Survey of India (FSI), Central Water Commission (CWC); India's Advancements in Early Warning Systems: EWSs for Earthquakes, Tsunami, Landslides, Avalanches, Cyclones and Wildfires, Floods and GLOF

CLO-PLO Matrix for the Course MDMTDEW125: Early Warning Systems

UNIT-WISE CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MDMTDEW125.1	3	3	3	3	3	3	3	3	3	3
MDMTDEW125.2	3	2	3	2	2	3	3	3	3	3
Average for MDMTDEW125	3	2.5	3	2.5	2.5	3	3	3	3	3

Suggested Readings:

- Basher, R. (2006). Global Early Warning Systems for Natural Hazards: Systematic and People-Centred. Philosophical Transactions of the Royal Society A, 364(1845), 2167–2182.
- Bhatt, M. R. (2008). Community-Based Disaster Risk Reduction: Issues and Challenges. National Institute of Disaster Management (NIDM), India.
- Central Water Commission (CWC). (2023). Flood Forecasting and Early Warning Manual. Ministry of Jal Shakti.
- Forest Survey of India (FSI). (2021). State of Forest Report. Ministry of Environment, Forest and Climate Change.
- Geological Survey of India (GSI). (2022). Annual Report on Landslide Hazard Zonation and Early Warning.
- Gupta, H. K. (2011). Disaster Management. Universities Press.



- INCOIS (Indian National Centre for Ocean Information Services). (2023). Services and Activities Report. Ministry of Earth Sciences, India.
- Indian Meteorological Department (IMD). (2023). Annual Report. Ministry of Earth Sciences, Government of India.
- United Nations Office for Disaster Risk Reduction (UNDRR). (2022). Early Warning Systems: Checklist and Guide. UNDRR.
- WMO (World Meteorological Organization). (2023). Multi-Hazard Early Warning Systems: A Checklist. WMO & UNDRR.



**Master's (PG) Degree in Disaster Management
[Ist Semester]**

MDMTDDP125: Disasters and Developmental Planning

Credits: 02

Total Contact Hours: 30

Max. Marks: 50

Course learning Outcome (CLOs): Upon the completion the student will be able to:

CLO1: Explain the fundamental concepts, principles, and frameworks of Disaster Risk Reduction (DRR) and sustainable development.

CLO2: Understand DRR in development planning in India.

Unit-I

Evolution and Objectives of DRR; Global practices on mainstreaming DRR; Case Studies of DRR Initiatives at National and Regional Level; DRR Master Planning for Sustainable Development; Relationship between Disasters and Development; Disasters as Development Setbacks; Development as a Cause of Vulnerability and BBB

Unit-II

Development Planning Process in India; DRR in Development Planning in India: Constraints and Opportunities; Mainstreaming DRR in Development Planning in India; Local Disaster Risk Reduction Strategies and Plans in Urban Areas; Community Based DRR

CLO-PLO Matrix for the Course MDMTDDP225: Disasters and Developmental Planning

UNIT-WISE CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MDMTDDP125.1	3	3	3	3	2	2	3	2	2	3
MDMTDDP125.2	3	3	2	3	2	2	3	3	2	3
Average for MDMTDDP125	3	3	2.5	3	2	2	3	2.5	2	3

Suggested Readings:

- Government of Nepal, (2008), National Strategy for Disaster Risk Management in Nepal
- Government of Pakistan, (2003), National Disaster Risk Management Framework Pakistan
- Government of the Philippines, (2009), Strengthening Disaster Risk Reduction in the Philippines: Strategic National Action Plan (SNAP) 2009 - 2019
- Government of Vanuatu, (2007), Disaster Risk Reduction and Disaster Management National Action Plan (2006 - 2016)
- ISDR, (2003), a Draft Framework to Guide and Monitor Disaster Risk Reduction
- ISDR, (2007) Guidance note on the Costs and Benefits of Disaster Risk Reduction
- National Committee for Disaster Management and Ministry of Planning, (2008), Strategic National Action Plan for Disaster Risk Reduction 2008-13
- NEDA/ UNDP/ ECHO, (2008), Mainstreaming Disaster Risk Reduction in Sub-national Development and Land Use/Physical Planning in the Philippines

Master's (PG) Degree in Disaster Management



[2nd Semester]

Course Code	Course Title	Course Type	Credits
MDMTCPM225	Prevention, Preparedness and Mitigation	C	4
MDMTCER225	Emergency Response and Management	C	2
MDMTCRR225	Rehabilitation, Recovery & Reconstruction	C	4
MDMTLGT225*	Geospatial Technology for Disaster Risk Reduction	L	4
MDMTDFR225	Flood Risk Management	D	2
MDMTDLF225	Legal Framework	D	4
MDMTDCB225	Community Based Risk Management	D	2
MDMTDSR225	Seismic Risk Management	D	2
MDMTDDA225	Drug Abuse and Human Trafficking	D	2

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

Master's (PG) Degree in Disaster Management



MDMTCPM225: Prevention, Preparedness and Mitigation

Credits: 04

Total Contact Hours: 60

Max. Marks:100

Course Learning Outcomes: Upon completion of this course the students will be able to:

CLO1: Understand the fundamental concepts and evolving knowledge of disaster prevention, preparedness, and mitigation.

CLO2: Learn about the community based preparedness and mitigation and its concepts.

CLO3: Understand the frameworks of prevention and preparedness, including international efforts and agreements.

CLO4: Comprehend the policies and strategies in Prevention, Preparedness and Mitigation with focus on India.

Unit - I

Disaster Prevention, Preparedness, and Mitigation in the context of Disaster Management: Concept and Significance; Prevention and Mitigation Strategies: Structural, and Non-Structural with respect to Earthquakes, Floods, Cyclones, Landslides; Emerging Trends and Technologies in Disaster Prevention, Preparedness and Mitigation; Analysis of Real-World Disaster Prevention and Mitigation Efforts; Institutional Frameworks (International and National Programs)

Unit - II

Disaster Preparedness Plan: Concept, Significance and Components; Community-Based Disaster Preparedness (Voluntaries, Civil Society, Task Force, Training and Capacity Strengthening); Culture of Safety, Prevention, Mitigation and Preparedness; Disaster Preparedness through Collaboration, Consensus, and Social Inclusion; Early Warning Systems and Common Alert Protocols: Components and Effectiveness

Unit -III

Preparedness for Vulnerable Groups based on Gender, Age, Disability; Preparedness, and Mitigation; Global Best Practices in Mitigation and Preparedness; National Mitigation and Preparedness Framework; International Agencies/Strategies in Disaster Mitigation and Preparedness

Unit - IV

Policy, Planning and Strategies in Prevention, Preparedness and Mitigation in India; Disaster Mitigation and Preparedness through Multi-Media and NGO's; Applications of Information and Communication and other Emerging Technologies; Mitigation and Preparedness Challenges in India; Indian Knowledge System in Prevention, Preparedness and Mitigation



CLO-PLO Matrix for the Course MDMTCPM225: Prevention, Preparedness and Mitigation

UNIT-WISE CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MDMTCPM225.1	3	0	0	2	0	2	1	1	1	2
MDMTCPM225.2	3	2	2	2	2	2	3	1	1	2
MDMTCPM225.3	3	3	3	3	1	1	1	1	2	3
MDMTCPM225.4	3	3	3	3	2	2	3	2	1	3
Average for MDMTCPM225	3	2	2	2.5	1.25	1.75	2	1.25	1.25	2.5

Suggested Readings:

- Alexander, D. (2002). Principles of Emergency Planning and Management. Oxford University Press.
- Andrew E. Colins, (2009). Disaster and Development; Routledge.
- Anna K. Schwab, Dylan Sandler, et al. (2016). Hazard Mitigation and Preparedness: An Introductory Text for Emergency Management and Planning Professionals; 2nd Edition; CRC. Press.
- Coppola, D. P. (2015). Introduction to International Disaster Management (3rd ed.). Elsevier.
- Greg Bankoff and Georg Frerks, (2013). Disasters, Development and People; Mapping Vulnerability.
- Jack Pinkowski, (2008). Disaster Management Handbook.
- PardeepSahni, (2003). Disaster Risk Reduction in South Asia; Prentice Hall of India, New Delhi.
- RajdeepDasgupta, (2007). Disaster Management and Rehabilitation.
- Rajib Shaw, (2012). Community Based Disaster Risk Reduction.
- Shaw, R. (2014). Community Practices for Disaster Risk Reduction in Japan. Springer.
- Twigg, J. (2015). Disaster Risk Reduction: Mitigation and Preparedness in Development and Emergency Programming.
- UNDRR (2015). Sendai Framework for Disaster Risk Reduction 2015–2030.
- UNISDR (2009). Terminology on Disaster Risk Reduction.
- Wisner, B., Gaillard, J. C., & Kelman, I. (2012). Handbook of Hazards and Disaster Risk Reduction and Management. Routledge.



**Master's (PG) Degree in Disaster Management
[2nd Semester]**

MDMTCER225: Emergency Response and Management

Credits: 02

Total Contact Hours: 30

Max. Marks:50

Course Learning Outcomes: Upon completion of this course the students will be able to:

CLO1: utilize appropriate safety resources and tools, ensuring availability and quality during an emergency response.

CLO2: develop emergency response plan at local level.

Unit -I

Emergency Response: Concept; Emergency Response Framework: ICS; Emergency Response Plan: Components and Significance; Activation of Emergency Plans: Trigger Mechanism, Standard Operating Procedure, Emergency Operation Centre, Supply and Management System; Emergency Response Communication Plan: Techniques and Problems; Emergency Participation Stakeholders

Unit -II

Logistic Management: Search and Rescue, Search Teams, Search Plan, Rescue Operations, Evacuation, Supplies, Transportation, Equipment, Documentation, Clearance of Debris; Needs Assessment: Characteristics and Types; Role of Disaster Response Forces in Emergency Response; Minimum Standards of Relief: Food and Nutrition, Water Supply and Sanitation, Shelter and Site Planning, Health Services; Disaster Relief Funding: Genesis and Sources

CLO-PLO Matrix for the Course MDMTCER225: Emergency Response and Management

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MDMTCER225.1	3	2	3	3	2	2	3	1	1	3
MDMTCER225.2	3	2	3	3	2	1	3	3	2	3
Average for MDMTCER225	3	2	3	3	2	1.5	3	2	1.5	3

Suggested Readings:

- Alexander, D. (2002). Principles of Emergency Planning and Management. Oxford University Press.
- Alfred Scott, (2016). Disaster Response and Emergency Management; Syrawood Publishing House.
- Basic Search & Rescue Skills Emergency Response International; www.erionline.com.
- FEMA (2020). Emergency Operations Center (EOC) Handbook. Federal Emergency Management Agency (FEMA), USA.



- Haddow, G., Bullock, J., & Coppola, D. (2020). Introduction to Emergency Management (7th Edition). Butterworth-Heinemann.
- IRS Guidelines by NDMA; Available at NDMA website.
- Nicolas A. Valcik and Paul E.Tracy, (2012). Case Studies in Disaster Response and Emergency Management. 2nd Ed; American Society for Public Administration.
- O. P. Dutta.(2014). Safety and Disaster Management. Methods, Techniques, Recent Approach. Lotus Press.
- Purohit Jyoti, (2013). Disaster Management in India: Structure and Challenges; Lambert Publication.
- Reepunjaya Singh, (2016). Disaster Management Guidelines for Incident Response Information and Communication System; Horizon Press.
- UNISDR (2006). Developing Early Warning Systems: A Checklist. United Nations Office for Disaster Risk Reduction (UNDRR).
- Whitman, M. E., & Mattord, H. J. (2006). Principles of Incident Response and Disaster Recovery. International Ed.. Course Technology Inc.



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

MDMTCRR225: Rehabilitation, Recovery and Reconstruction

Credits: 04

Total Contact Hours: 60

Max. Marks:100

Course Learning Outcome: After completion the student will be able to:

CLO1: Analyze the short-term and long-term impacts on communities, infrastructure, and economy. Apply strategies for restoring essential services and community functions.

CLO2: Investigate the social, economic, psychological impacts of disasters, community needs and available resources. Design strategies and skills for planning livelihood restoration, housing reconstruction and social infrastructure development.

CLO3: Learn the principles, policies, and frameworks guiding post-disaster reconstruction. Evaluate the needs of affected communities to design inclusive and participatory reconstruction strategies.

CLO4: Integrate disaster-resilient design, environmental sustainability, and cultural sensitivity into reconstruction projects.

Unit-I

Recovery: Concept, Scope and Phases; Short- term and Long-term Recovery; Core Principles and Factors Disaster Recovery Priorities; Disaster Recovery Planning: Components; Pre disaster and Post Disaster Recovery Planning Principles; Information Management during Recovery; Role of Risk Assessment in Recovery; Community-based Disaster Recovery Strategies; Capacity Building and Self-Help Initiatives

Unit -II

Rehabilitation: Concept and Principles; Components of Rehabilitation: Physical, Economic, Social, Psychological, Legal and Administrative; Post-Disaster Needs Assessment (PDNA): Methodologies and Tools; Resource Mobilization Cycle; Sustainable and Resilient Rehabilitation linking to “Build Back Better”; Government Programs for Rehabilitation; Community-Based Rehabilitation (CBR): Local participation and Ownership

Unit -III

Reconstruction: Concept and Significance; Strategies for Effective Disaster Reconstruction; Creation of Long-term Job Opportunities and Livelihoods; Monitoring and Evaluation of Rehabilitation Work; Sector-specific Strategies to Restore Critical Infrastructure; Funding Arrangements for Reconstruction

Unit -IV

Disaster - Development Relationship; Capacity Building and BBB Approach for RRR; Successes and failures after RRR; Challenges and Risks in RRR; Importance of RRR in Disaster Risk Reduction; Participatory Planning in RRR: Methods and Challenges; Case Studies of BBB



CLO-PLO Matrix for the Course MDMTCRR225: Recovery, Rehabilitation and Reconstruction

UNIT-WISE CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MDMTCRR225.1	2	3	3	2	1	2	2	2	1	2
MDMTCRR225.2	3	3	2	2	2	1	2	2	2	3
MDMTCRR225.3	3	2	2	2	3	2	2	3	2	2
MDMTCRR225.4	3	2	3	3	2	2	3	3	2	3
Average for MDMTCRR 225	2.75	2.5	2.5	2.25	2	1.75	2.25	2.5	1.75	2.5

Suggested Readings:

- Aitsi-Selmi, A., & Murray, V. (2016). Building Resilience through Disaster Recovery. *Journal of Disaster Risk Reduction*, 16, 59-70.
- Cernea, M. M., & McDowell, C. (Eds.). (2000). *Risks and Reconstruction: Experiences of Resettlers and Refugees*. The World Bank.
- FEMA (Federal Emergency Management Agency). (2011). *National Disaster Recovery Framework*. U.S. Department of Homeland Security.
- International Federation of Red Cross and Red Crescent Societies (IFRC). (2015). *Guidance for Recovery*. IFRC Disaster Management Policy.
- Jha, A. K., Miner, T. W., & Stanton-Geddes, Z. (Eds.). (2013). *Building Urban Resilience: Principles, Tools, and Practice*. The World Bank.
- Schneider, J., & Ulrich, J. (2014). *Disaster Recovery: Strategies and Case Studies*. Springer.
- Smith, G., & Wenger, D. (2007). Sustainable Disaster Recovery: Operationalizing an Existing Agenda. In H. Rodríguez, E. L. Quarantelli, & R. R. Dynes (Eds.), *Handbook of Disaster Research* (pp. 234–257). Springer.
- Twigg, J. (2015). *Disaster Risk Reduction: Good Practice Review 9*. Overseas Development Institute.
- UNISDR. (2017). *Building Back Better in Recovery, Rehabilitation and Reconstruction*.
- United Nations Development Programme (UNDP). (2010). *Post-Disaster Needs Assessment*.



**Master's (PG) Degree in Disaster Management
[2nd Semester]**

MDMTLGT225: Geospatial Technology for Disaster Risk Reduction

Credits: 04

Total Contact Hours: 90

Max. Marks: 100

Course Learning Outcomes: On completion of the course, students will be able to:

CLO1: Use RS, GIS, and GPS for Collecting and Managing Geographic Data.

CLO2: Perform Hazards, Exposure, Vulnerability, and Disaster Risk Analysis.

CLO3: Use Geoinformatics as a Decision Support System in Disaster Risk Management (DRM)

CLO4: Apply geospatial tools and techniques in selected case study.

Unit-I

Overview and Applications of Geoinformatics: Remote Sensing, Geographic Information System (GIS), Numerical Modelling, and Global Navigation Satellite System (GNSS) in Disaster Risk Management (DRM); Visualization, Interpretation, and Analysis of Geographic Data; Using Satellite Data Sources: NASA (USA), ESA (Europe), and ISRO (India); Use of Satellite for Studying Natural Hazards (e.g., Floods); Computing Image Indices: Normalized Difference Vegetation Index (NDVI), Normalized Difference Water Index (NDWI), Normalized Difference Snow Index (NDSI); Map Composition.

Unit-II

Working with 3D Terrain Data: Using Digital Elevation Models (DEMs); Hypsometric and Bathymetric Analysis; Identification and Interpretation of Landforms, Characterization of Natural Hazards (e.g., Landslides and GLOFs) using DEMs, Integrating Optical Images, DEMs, and Field Data for Exposure, Vulnerability, and Disaster Risk Assessments.

Unit-III

Geoinformatics in Relief, Recovery, and Rehabilitation: Application of Satellite Data, Drone (UAVs) Images and GPS in Rapid Damage, Loss and Needs Assessment; Site Selection of Shelters and Emergency Facilities, Mapping Routes and Tracking Distribution of Supplies, and Monitoring Progress in Recovery and Rehabilitation.

Unit-IV

Project work: Students will work in groups of five on a small project. The topic will be decided in consultation with the teacher in charge to ensure relevance and clarity. This activity will help develop teamwork, creativity, and practical understanding of the subject.



CLO-PLO Matrix for the Course MDMTLGT225 Geospatial Technology for Disaster Risk Reduction

UNIT-WISE CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MDMTLGT225.1	3	3	2	3	1	1	2	3	3	1
MDMTLGT225.2	2	3	3	3	2	1	3	2	3	3
MDMTLGT225.3	3	3	3	2	1	1	2	2	3	1
MDMTLGT225.4	2	3	3	3	2	3	3	3	3	3
Average for MDMTLGT225	2.5	3	2.75	2.75	1.5	1.5	2.5	2.5	3	2

Suggested Readings:

- Burrough, P. A., & McDonnell, R. A. (1998). Principles of Geographical Information Systems (2nd ed.) Oxford University Press.
- Campbell, J. B., & Wynne, R. H. (2011). Introduction to Remote Sensing (5th ed.). Guilford Press.
- Choudhury, M., & Awasthi, S. (2016). Geospatial Technologies for Natural Hazards and Disaster Risk Reduction. Springer.
- Coppock, J. T., & Rhind, D. W. (1991). The History of GIS and Its Use in Disaster Management.
- Cutter, S. L. (2003). The vulnerability of science and the science of vulnerability. Annals of the Association of American Geographers, 93(1), 1-12.
- ESRI (2020). GIS for Disaster Management (2nd ed.) by Esri Press.
- Jensen, J. R. (2007). Remote Sensing of the Environment: An Earth Resource Perspective (2nd ed.).
- Kafle, S. K., & Murshed, Z. (2006). Community-Based Disaster Risk Management for Local Authorities. ADPC
- Li, Z., Chen, J., & Baltsavias, E. (2008). Advances in Photogrammetry, Remote Sensing and Spatial Information Sciences. CRC Press.
- Longley, P. A., Goodchild, M. F., Maguire, D. J., & Rhind, D. W. (2021). Geographic Information Science and Systems (5th ed.). Wiley.
- UNDRR (2015). Sendai Framework for Disaster Risk Reduction 2015–2030. United Nations Office for Disaster Risk Reduction. <https://www.undrr.org>



**Master's (PG) Degree in Disaster Management
[2nd Semester]**

MDMTDFR225: Flood Risk Management

Credits: 02

Total Contact Hours: 30

Max. Marks:50

Course Learning Outcomes: Upon completion of this course the students will be able to:

CLO1: Understanding of flood phenomena, including various types of floods, methods for peak flow estimation, and flood frequency analysis using techniques.

CLO2: Explore structural and non-structural flood mitigation measures, floodplain zoning, disaster monitoring, forecasting methods, and early warning systems essential for effective flood risk management.

Unit-I

Floods: Types and Causes; Climate Variability and its Implications for Flood Dynamics; Peak Flow Estimation; Flood Hazard Assessment: Rainfall-Runoff Modeling, Frequency Analysis, Gumbel's Method; Hydrological and Hydraulic Principles of Flood Modeling; GIS and Remote Sensing Applications; Flood Zoning and Mapping; Flood Risk Assessment and Evaluation

Unit-II

Flood Control and Management: Flood Routing, Flood Design; Flood Risk Mitigation: Structural and Non-Structural Measures; Levees, Dams, Floodwalls; Nature-Based Solutions (Wetlands, Green Roofs); National Flood Mitigation Strategies; Case Studies: Historical Flood Events and Mitigation Strategies

CLO-PLO Matrix for the Course MDMTDFR225: Flood Risk Management

UNIT-WISE CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MDMTDFR225.1	3	2	3	3	0	2	2	3	3	3
MDMTDFR225.2	3	3	3	3	2	2	1	1	2	3
Average for MDMTDFR225	3	2.5	3	3	1	2	1.5	2	2.5	3

Suggested Readings:

- European Commission (2007). EU Floods Directive.
- IPCC Reports (2021). Climate Change and Water/Flood Risk Sections.
- Jongman, B., et al. (2012). Global exposure to river and coastal flooding: Long term trends and changes (Global Environmental Change).
- Kundzewicz, Z.W. (2005). Flood Risk Management – Research and Practice. Springer Science.
- Merz, B., et al. (2010). Assessment of flood risk – A framework and review (Natural Hazards and Earth System Sciences).
- Penning-Rowsell, E. & Johnson, C. (2015). The Benefits of Flood and Coastal Risk Management: A Manual of Assessment Techniques.
- Plate, E. (2002). Flood Risk and Flood Management (in Natural Hazards). Nova Science Publishers.
- Raghunath, H.M., (1986). Hydrology – Principles, Analysis and Design. Wiley.
- Smith, K. & Ward, R. (1998). Floods: Physical Processes and Human Impacts. John Wiley & Sons Inc.
- UNISDR (2015). Sendai Framework for Disaster Risk Reduction (2015–2030).



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

MDMTDLF225 : Legal Frameworks

Credits: 04

Total Contact Hours: 60

Max. Marks: 100

Course Learning Outcomes: Upon completion of this course the students will be able to:

CLO1: Explain the International Legal Frameworks in disaster management.

CLO2: Explain legal provisions of National Disaster Management Act, 2005

CLO3: Discuss National Policy on Disaster Management and Initiatives.

CLO4: Interpret the institutional arrangements in disaster management at national, state and district levels.

Unit-I

Disaster Risk Reduction (DRR) in International Legal Frameworks; International Decade for Natural Disaster Reduction, 1990's: Resolution, Roles of UN Agencies & Member States, Critical Evaluation; Yokohama Strategy, 1994: Provisions, Legal Implications & Evaluation; Hyogo Framework, 2005-2015: Provisions, Legal Implications & Evaluation; Sendai Framework for Disaster Risk Reduction, 2015-2030: Provisions, Legal Implications & Evaluation

Unit-II

Environmental Protection Act, 1986: Provisions, Legal Implications & Evaluation; National Disaster Management Act, 2005: Need, Provisions, Legal Implications, Amendments & Evaluation; State Disaster Management Acts; National Building Codes, 2016: Provisions and Critical Evaluation; Dam Safety Act, 2021: Provisions and Critical Evaluation

Unit-III

National Policy on Disaster Management and Initiatives: Need, Provision and Critical Evaluation, Prime Minister's 10-Point Agenda; National Disaster Management Plan 2016 & 2019: Provision and Critical Evaluation; State Disaster Management Plans; District Disaster Management Plan

Unit-IV

National Disaster Management Authority (NDMA): Composition, Powers and Functions; National Institution of Disaster Management (NIDM): Organizational Structure, Functions; State Disaster Management Authority (SDMA): Composition, Powers and Functions; District Disaster Management Authority (DDMA): Composition, Powers and Functions



CLO-PLO Matrix for the Course MDMTDLF225: Legal Framework

UNIT-WISE CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MDMTDLF225.1	3	3	3	2	3	3	3	3	1	2
MDMTDLF225.2	3	3	3	2	3	3	3	3	1	2
MDMTDLF225.3	3	3	3	2	3	2	3	1	1	2
MDMTDLF225.4	3	3	3	2	3	3	3	0	1	2
Average for MDMTDLF225	3	3	3	2	3	2.75	3	1.75	1	2

Suggested Readings:

- Alexander, D. (2002). Principles of Emergency Planning and Management. Oxford University Press.
- Bureau of Indian Standards (2016). National Building Code of India.
- Coppola, D. P. (2015). Introduction to International Disaster Management (3rd ed.). Butterworth-Heinemann.
- Disaster Management (Amendment) Act, 2025
- Government of India (1986). The Environment (Protection) Act, 1986. Ministry of Environment, Forest and Climate Change.
- Government of India (2005). The Disaster Management Act.
- Government of India (2019). The Dam Safety Act,. Ministry of Jal Shakti.
- Mishra, P. K. (2019). Transforming Disaster Risk Governance in India: A Policy Perspective.
- UN (1994). Yokohama Strategy and Plan of Action for a Safer World.
- UNISDR (2005). Hyogo Framework for Action 2005–2015: Building the Resilience of Nations and Communities to Disasters.
- UNDP (2016). Sustainable Development Goals and Disaster Risk Reduction: Integrating Agenda 2030 and the Sendai Framework.
- UNDRR (2015). Sendai Framework for Disaster Risk Reduction 2015–2030.
- UNDRR (2023). Disaster Risk Reduction in the 21st Century: A Compilation of Key Frameworks.
- United Nations Office for Disaster Risk Reduction (UNDRR).
- United Nations General Assembly (1989). Resolution A/RES/44/236: International Decade for Natural Disaster Reduction (IDNDR).



**Master's (PG) Degree in Disaster Management
[2nd Semester]**

MDMTDCB225: Community Based Risk Management

Credits: 02

Total Contact Hours: 30

Max. Marks: 50

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

CLO1: Understand the key principles and components of Community-based Risk Management (CBDM), including vulnerability and capacity assessment, indigenous resilience practices, and community-based early warning systems.

CLO2: Design and implement community action plans, including Community Disaster Management Plans (CDMPs), with a focus on inclusive, locally-led, and sustainable approaches to disaster risk reduction.

Unit-I

Concept of CBRM; Components of CBRM; Community Vulnerability and Capacity Assessment; Indigenous Adaptive Capacities and Resilience; Resource Inventory; Community Awareness; Community Training Programmes; Community-based Early Warning Systems (CBEWS)

Unit-II

Community Empowerment through CBRM; Community led Development Planning; Inclusive and Participatory Planning; Designing and Implementing Community Action Plans; Preparation of Community Disaster Management Plan

CLO-PLO Matrix for the Course MDMTDCB225: Community Based Risk Management

UNIT-WISE CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MDMTDCB225.1	3	3	3	3	2	1	1	3	2	2
MDMTDCB225.2	3	3	3	2	2	3	3	3	3	3
Average for MDMTDCB225	3	3	3	2.5	2	2	2	3	2.5	2.5

Suggested Readings:

- ADPC (Asian Disaster Preparedness Center). (2006). Community-Based Disaster Risk Management for Local Authorities. Bangkok, Thailand.
- Bankoff, G., Frerks, G., & Hilhorst, D. (Eds.). (2004). Mapping Vulnerability: Disasters, Development and People. Earthscan.
- Benson, C., & Twigg, J. (2007). Tools for Mainstreaming Disaster Risk Reduction: Guidance Notes for Development Organizations. ProVention Consortium.
- IFRC (International Federation of Red Cross and Red Crescent Societies) (2007). Vulnerability and Capacity Assessment (VCA) Toolbox. Geneva: IFRC.
- Maskrey, A. (1989). Disaster Mitigation: A Community-Based Approach. Oxfam.
- Shaw, R., Pulhin, J. M., & Pereira, J. J. (Eds.). (2010). Climate Change Adaptation and Disaster Risk Reduction: Issues and Challenges. Emerald Group Publishing.
- Twigg, J. (2015). Disaster Risk Reduction. Humanitarian Practice Network, Overseas Development Institute (ODI)



**Master's (PG) Degree in Disaster Management
[2nd Semester]**

MDMTDSR225: Seismic Risk Management

Credits: 02

Total Contact Hours: 30

Max. Marks: 50

Course Learning Outcomes: Upon completion of this course the students will be able to:

CLO1: understand the fundamentals of seismic processes, measurement, and approaches.

CLO2: comprehend the seismic risk and the mitigation measures with case studies.

Unit - I

Seismic Hazard and Risk: Concepts and Importance; Earthquake: Magnitude, Intensity, and Energy Release; Epicenter and Focal Mechanism; Moment Magnitude, Measurement and Analysis; Seismological data (PGA, PGV, PGD, Spectral Acceleration); Seismic Hazard Assessment: Deterministic and Probabilistic Approaches (DSHA & PSHA); Seismic Microzonation of India

Unit - II

Liquefaction: Concept and Types; Liquefaction Assessment: Liquefaction Severity Index (LSI) and Liquefaction Hazard Mapping; Seismic Risk Assessment Using Rapid Visual Analysis of Structures; Seismic Risk Mitigation Strategies; Retrofitting Techniques and Indigenous Earthquake-Resistant Construction Techniques; Use of GIS, Remote Sensing, and other tools (SHAKE, DEEPSOIL or OpenQuake)

CLO-PLO Matrix for the Course MDMTDSR225: Seismic Risk Management

UNIT-WISE CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MDMTDSR225.1	3	3	3	2	0	2	3	2	0	3
MDMTDSR225.2	3	3	3	3	1	2	2	3	3	3
Average for MDMTDSR225	3	3	3	2.5	0.5	2	2.5	2.5	1.5	3

Suggested Readings:

- Bolt, B.A. (2003). Earthquakes (5th ed.). W.H. Freeman.
- Douglas, J. (2003). Earthquake Ground Motion Estimation Using Strong-Motion Records: A Review of Empirical Approaches.
- Federal Emergency Management Agency (FEMA). FEMA 154/155 – Rapid Visual Screening of Buildings for Potential Seismic Hazards.
- Kramer, S. L., & Stewart, J. P. (2024). *Geotechnical earthquake engineering*. CRC Press.
- Kramer, S.L. (1996). Geotechnical Earthquake Engineering. Prentice Hall.
- L. Reiter (1991). Earthquake Hazard Analysis: Issues and Insights. Columbia University Press.
- Lay, T., & Wallace, T. C. (1995). *Modern global seismology* (Vol. 58). Elsevier.
- National Disaster Management Authority (NDMA), India. Guidelines on Seismic Retrofitting and Strengthening of Buildings.



**Master's (PG) Degree in Disaster Management
[2nd Semester]**

MDMTDDA225: Drug Abuse and Human Trafficking

Credits: 02

Total Contact Hours: 30

Max. Marks: 50

Course Learning Outcomes: Upon completion of this course the students will be able to:

CLO1: Learn about drug addiction scenario in India and J&K.

CLO2: Understand how Human Trafficking is a Social Hazard

Unit -I

Drugs and Narcotics: Introduction, Causes and Consequences; Drug Addiction and Illegal Use of Substances: National and International Scenario; Drug Addiction Scenario in India and J & K; Legal Provision of Narcotics Act; Drug De-addiction and Psychosocial Rehabilitation of Drug Addicts

Unit-II

Human Trafficking as a Social Hazard: Causes and Consequences; Role of International Agencies in Combating Human Trafficking; Human Trafficking in South East Asia, Central America, Central Africa, Middle East and North Africa

CLO-PLO Matrix for the Course MDMTDDA125: Drug Abuse and Human Trafficking

Unit-wise CLOS	PLO 1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MDMTDDA225.1	3	2	3	3	3	2	3	3	3	3
MDMTDDA225.2	3	3	2	3	2	2	2	3	3	3
Average MDMTDDA225	3	2.5	2.5	3	2.5	2	2.5	3	3	3

Suggested Readings:

- Christopher Dines, (2019). Drug Addiction Recovery: The Mindful Way. Sheldon Press.
- Louise Shelley, (2010). Human Trafficking: A Global Perspective; Cambridge University Press.
- National Household Survey of Alcohol and Drug abuse. (2003) New Delhi, Clinical Epidemiological Unit, All India Institute of Medical Sciences, 2004.
- Ross Coomber. (2013), Key Concept in Drugs and Society. New Delhi: Sage Publications.
- Sain, Bhim (1991), Drug Addiction Alcoholism, Smoking obscenity New Delhi: Mittal Publications.
- Sussman, S and Ames, S.L. (2008). Drug Abuse: Concepts, Prevention and Cessation, Cambridge University Press.
- Veerendra Mishra, (2015). Combating Human Trafficking: Gaps in Policy and Law;. SAGE India Pub. .
- Virginia M. Kendall, and T. Markus Funk,(2012). Child Exploitation and Trafficking;.
- World Drug Report (2022), United Nations office of Drug and Crime.
- World Drug Report (2023), United Nations office of Drug and Crime.



**Master's (PG) Degree in Disaster Management
[3rd Semester]**

Course Code	Course Title	Course Type	Credits
MDMTCDV325	Disaster Vulnerability	C	4
MDMTCRA325	Disaster Risk Assessment	C	2
MDMTLFW325*	Field Work	L	4
MDMTCDE325	Disaster Economics and Financial Management	C	4
MDMTDRM325	Research Methodology	D	4
MDMTDST325	Statistical Techniques	D	2
MDMTDSD325	Society and Disasters	D	2
MDMTDUR325	Urban Resilience	D	2
MDMTPMP325	Disaster Management Plan (Project)	P	2

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



**Master's (PG) Degree in Disaster Management
[3rd Semester]**

MDMTCDV325: Disaster Vulnerability

Credits: 04

Total Contact Hours: 60

Max. Marks:100

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

CLO1: Understand the foundational concepts of vulnerability and frameworks.

CLO2: Learn about the vulnerability with respect to floods, earthquakes, landslides using some statistical methods.

CLO3: Learn vulnerability indices and modeling.

CLO4: Vulnerability assessment of the Himalayan Ecosystem.

Unit -I

Vulnerability: Characteristics; Types of Vulnerability: Physical, Environmental, Economic, Social; Hazard Dependent and Hazard Independent Vulnerability; Relationship between Risk, Perception, and Vulnerability; Vulnerability, Coping Capacity and Resilience; Inherent, Chronic and Induced Vulnerabilities and their Intersection; Conceptual Frameworks of Vulnerability: Bohle, Pelling, MOVE, BBC

Unit -II

Vulnerability Assessment: Objectives, Assumptions and Importance; Approaches of Assessment; Types of Assessment: Empirical and Analytical; Vulnerability Assessment in case of Floods, Earthquakes, Landslides; Spatial Multi Criteria Vulnerability Assessment: AHP Method; Presentation of Vulnerability; Vulnerability Hotspot Mapping; Vulnerability Evaluation and Application in Disaster Management Planning

Unit- III

Vulnerability Indices: Indicators, Data, and Metadata; Vulnerability Modeling; Relevant Vulnerability Models: Pressure and Release/Access (PRA), Social Vulnerability Model (SVM), Environmental Vulnerability Model (EVM), Household Economy Approach (HEA), and IPCC's Socio-Ecological Model; Gender-Inclusive and Gender-Sensitive Models; Vulnerability Modeling: Case Studies

Unit- IV

Rural-Urban Differences in Social Vulnerability; Community Vulnerability Scoping; Vulnerability and Challenges of Weaker Sections and Shanty Settlements; Vulnerability Assessment of the Himalayan Ecosystem: A Case of Floods, Landslides, Earthquakes; Vulnerability Reduction vis-à-vis Development; Strategic Planning and Capacity Building



CLO-PLO Matrix for the Course MDMTCDV325:Disaster Vulnerability

UNIT-WISE CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MDMTCDV325.1	3	3	3	3	2	3	3	3	1	1
MDMTCDV325.2	3	3	3	3	1	3	3	3	0	1
MDMTCDV325.3	3	3	3	2	0	2	3	3	3	1
MDMTCDV325.4	3	0	2	1	2	0	3	2	0	0
Average for MDMTCDV325	3	2.25	2.75	2.25	1.25	2	3	2.75	1	0.75

Suggested Readings:

- Adger, W.N. (2006). Vulnerability. *Global Environmental Change*, 16(3), 268–281.
- Bankoff, G., Frerks, G., & Hilhorst, D. (Eds.). (2004). *Mapping Vulnerability: Disasters, Development and People*. Earthscan.
- Birkmann, J. (Ed.). (2006). *Measuring Vulnerability to Natural Hazards: Towards Disaster Resilient Societies*. United Nations University Press.
- Chowdhury Emdadul Haque, David Etkin (2012). *Disaster Risk and Vulnerability: Mitigation Through Mobilizing Communities and Partnerships*. Canada, McGill-Queen's University Press.
- Cutter, S.L. (1996). *Vulnerability to Environmental Hazards*. *Progress in Human Geography*.
- Damon, P.Copploa, Errin, K. Maloney (2009). *Communicating Emergency Preparedness, Strategies for creating a Disaster Resilient Public*; CRC Press London.
- Greg Bankoff and Georg Frerks, (2013). *Mapping Vulnerability: Disasters, Development and People*;
- J.B. Singh. (2006). *Natural Hazards and Disaster Management: Vulnerability and Mitigation*. Rawat Publications; Reprint edition.
- Pedro Santos et.al. (2020). *Understanding Disaster Risk, A Multidimensional Approach*. 1st Edition. Elsevier Publications.
- Turner, B.L. et al. (2003). *A Framework for Vulnerability Analysis in Sustainability Science*. PNAS.
- UNDRR (United Nations Office for Disaster Risk Reduction). (2019). *Global Assessment Report on Disaster Risk Reduction (GAR)*.
- Wisner, B., Blaikie, P., Cannon, T., & Davis, I. (2004). *At Risk: Natural Hazards, People's Vulnerability and Disasters (2nd ed.)*. Routledge.



**Master's (PG) Degree in Disaster Management
[3rd Semester]**

MDMTCRA325: Disaster Risk Assessment

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 important components, approaches and other process involved in risk assessment and familiarization with various disaster data sources.

CLO2: interpret the various national and international methodologies for conducting of disaster risk assessment at national, regional and local levels.

Unit-I

Disaster Risk: Concept, Components and Characteristics; Disaster Risk Assessment: Concept and Significance; Disaster Risk Drivers; Disaster Risk Data Sources and Methodologies: CRED-EM-DAT, UNDRR- DesInventer, ADRC-GLIDE Number, MunichRe NatCat SERVICES, SwissRe-Sigma Explorer; Global Risks Trends; UNDP Approach in Risk Assessment; Disaster Risk Management: Components and Types

Unit-II

UNDRR endorsed National Disaster Risk Assessment (NDRA); Cross-border Risk Assessment Methodology; Methods for Disaster Risk Assessment: Event Tree Analysis; Risk Matrix Approach; Indicator based Approach; Tools for Disaster Risk Assessment (SWOT, TWOS, Survey, Geospatial)

CLO-PLO Matrix for the Course MDMTCRA325: Disaster Risk Assessment

UNIT-WISE CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MDMTCRA325.1	3	3	3	3	2	1	1	1	2	2
MDMTCRA325.2	3	3	3	2	2	3	3	2	3	3
Average for MDMTCRA325	3	3	3	2.5	2	2	2	1.5	2.5	2.5

Suggested Readings:

- Akshaya K. & Sharma, K. (2010). Risk Assessment And Disaster Management: Publishers JNANADA
- Anil K Gupta Vnod, K. Sharma, Sreeja (2018). Disaster Risk and Impact Management, Approches Tools and Strategies Daya Pub House/Unit of Intl. Pvt. Ltd.
- Pardeep Sahni and Madhavi Malalgoda Ariyabandu, (2003), Disaster Risk Reduction in South Asia. Publisher, PHI Learning Pvt. Ltd.
- Siddhartha Gautam (2012). Risk assessment and disaster response Vista International Publishing House



- Stephan Baas, (2008), Disaster Risk Management Systems Analysis: A Guide Book Food and Agriculture Organization of the United Nations
- UNDRR- National Disaster Risk Assessment www.undrr.org
- Vishwa Bahar Prasad Sati (2012). Disaster Management and Risk Reduction 1st edition Raj Publications;
- Rajib Shaw, (2012), Community-Based Disaster Risk Reduction. Emerald Insight
- Wisner, B., Blaikie, P., Cannon, T., & Davis, I. (2004). At risk: Natural hazards, people's vulnerability and disasters (2nd ed.). Routledge
- EM-DAT The international disaster database. <https://www.emdat.be>
- ADRC-GLIDE Number <https://glidenumbers.net/glide/public/search/search.jsp>
- UNDRR- DesInventar <https://www.desinventar.net/>
- MunichRe NatCat SERVICES <https://www.munichre.com/en.html>
- SwissRe-Sigma Explorer <https://www.sigma-explorer.com/>
- Global Risk trends. <https://www.weforum.org>.



**Master's (PG) Degree in Disaster Management
[3rd Semester]**

MDMTLFW325: Field Work

Credits: 04

Total Contact Hours: 90

Max. Marks: 100

Course Learning Outcome: In the course the students will delve into the disaster management science through field-based projects where they will

CLO1: Understand the geophysical environment and socio-economic conditions of the populations prone to hazards or any hazard hit site.

CLO2: Acquire first hand insights into real-world disaster challenges of the communities through 'Learn by Doing' philosophy.

CLO3: Plan and execute targeted field-study tours with sound research design and safety measures.

CLO4: Document and present field findings with clarity and rigor and propose context-specific disaster risk reduction strategies for the area.

Unit-I

Purpose and Scope of Field work; Methodology of Fieldwork; Introduction to Basic Tools, Instruments, and Software's

Unit-II

Activities: Preparation of Field Visit Plan, Aims and Objectives of the Fieldwork, Questionnaire Designing; Preparation of the Trip, Travel Plans, Accommodation, Safety Measures, Field Groups

Unit-III

Visit to Hazard Prone/Disaster-Hit Areas; Visit to Specific Sites or Socio-Economic Groups, Understanding Geophysical Environment, Field Observation, Collection of Data, Identification and Interpretation of Geomorphic Features, Geological Structures in the Field, Day-to-Day Assessment of Activities Carried; Damage And Loss Estimations

Unit-IV

Compilation and Preparation of Filed Report: Format of the Report, Writing of Chapters, Compilation of Results and Discussion; Suggestion of Measures for the Disaster related Problem

CLO-PLO Matrix for the Course MDMTLFW325: Field Work

UNIT-WISE CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MDMTLFW325.1	3	3	3	3	1	3	3	3	3	3
MDMTLFW325.2	3	3	3	3	3	3	3	3	3	3
MDMTLFW325.3	1	3	3	3	3	1	3	3	0	3
MDMTLFW325.4	1	2	3	3	3	3	1	0	3	3
Average for MDMTLFW325	2	2.75	3	3	2.5	2.5	2.5	2.25	2.25	3



Suggested Readings:

- Bracken, L. and Mawdsley, E. (2004) “‘Muddy glee’: Rounding out the picture of women and physical geography fieldwork’, *Area*, 36, 280–286. <https://doi.org/10.1111/j.0004-0894.2004.00225.x>.
- D.J. (1991) *Teaching Geography in Higher Education: A Manual of Good Practice*. Oxford: Blackwell, Institute of British Geographers Special Publication 24.
- Driver, F. (2000) ‘Field-work in geography’, *Transactions of the Institute of British Geographers*, 25, 267–268.
- France, D. and Haigh, M. (2018) ‘Fieldwork@40: Fieldwork in geography higher education’, *Journal of Geography in Higher Education*, 42(4), 498–514. <https://doi.org/10.1080/03098265.2018.1515187>.
- Gold, J.R., Jenkins, A., Lee, R., Monk, J.R., Riley, J., Shepherd, I.D.H., and Unwin,
- Katz, C. (1994) ‘Playing the field: Questions of fieldwork in geography’, *The Professional Geographer*, 46, 67–72. <https://doi.org/10.1111/j.0033-0124.1994.00067.x>.
- Kent, M., Gilbertson, D., and Hunt, C. (1997) ‘Fieldwork in geography teaching: A critical review of literature and approaches’, *Journal of Geography in Higher Education*, 21, 313–332.
- Kohn, M. and Reddy, K. (2024) ‘Colonialism’, in *The Stanford Encyclopedia of Philosophy* (summer 2024 edition), Edward N. Zalta and Uri Nodelman (eds), <https://plato.stanford.edu/archives/sum2024/entries/colonialism/>.
- Rose, D.H., Meyer, A., and Hitchcock, C. (2005) *The Universally Designed Classroom: Accessible Curriculum and Digital Technologies*. Boston, MA: Harvard Education Press.



**Master's (PG) Degree in Disaster Management
[3rd Semester]**

MDMTCDE325: Disaster Economics and Financial Management

Credits: 04

Total Contact Hours: 60

Max. Marks: 100

Course learning Outcome (CLOs): Upon the completion the student will be able to:

CLO1: Understand the fundamental concepts of disaster economics, losses and interpret economic modeling tools used in disaster impact assessment.

CLO2: Know the vision, mission, and strategic priorities of GFDRR in supporting developing countries through technical assistance, financing and knowledge sharing.

CLO3: Assess different financial instruments for disaster risk management and financial planning tools to disaster preparedness, response, and recovery programs.

CLO4: Evaluate national and international financial mechanisms for disaster risk financing to strengthen resilience and sustainability.

Unit -I

Economic and Financial Implication of Disasters; Catastrophe Modelling (Cat Modelling); Estimation of Disaster Losses; Economic Impacts, Models and Empirical Studies; Disaster Deficit Index and Economic Resilience

Unit -II

Global Facility for Disaster Reduction and Recovery (GFDRR); Identifying the Natural Disasters with Potential Financial Implications; Assessing the Financial Capacity of National and Local Governments to Address Natural Disasters; Identifying Regional Financial Vulnerabilities (Himalayan Region); Strategies to Reduce the Gap between Financial Vulnerability and Financial Capacity.

Unit -III

Disaster Financial Management Team Composition; Cash Flow Management, Debt Monitoring, Risk Avoidance; Disaster Assessment and Expense Reimbursement Pertaining to Damage, Emergency Protective Measures; Project and Portfolio Management - Performing Financial Analysis, Maintaining Accurate Financial Records and Documents in Preparation for Audits; Supply Chain Management; Knowledge of Procurement and Contracting Practices.

Unit -IV

Pre Disaster Financial Management Activities; Initial and Long-term Post-disaster Financial Management Activities; Disaster Financial Accounting Systems and Management Processes; Disaster Financial Assistance Programs; Disaster Mitigation Fund and Disaster Response Fund at Central and State Levels



CLO-PLO Matrix for the Course MDMTCDE325: Disaster Economics and Financial Management

UNIT-WISE CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MDMTCDE325.1	3	2	3	2	0	1	2	0	2	3
MDMTCDE325.2	3	3	3	3	2	1	3	2	1	2
MDMTCDE325.3	2	3	3	3	2	2	2	2	1	2
MDMTCDE325.4	2	3	3	3	1	2	3	1	1	3
Average for MDMTCDE325	2.5	2.75	3	2.75	1.25	1.5	2.5	1.25	1.25	2.5

Suggested Readings

- Alexander, D. (2012). Principles of Emergency Planning and Management (2nd ed.). Terra Publishing.
- Benson, C., & Clay, E. (2004). Understanding the Economic and Financial Impacts of Natural Disasters. The World Bank.
- Carter, M. R., & Janzen, S. A. (2019). Disaster Risk Financing and Insurance: Protecting Growth and Development. World Bank Policy Research Working Paper.
- Coppola, D. P. (2015). Introduction to International Disaster Management (3rd ed.). Butterworth-Heinemann.
- Global Facility for Disaster Reduction and Recovery (GFDRR). (2018). GFDRR Annual Report and Resources. World Bank Group.
- International Federation of Red Cross and Red Crescent Societies (IFRC). (2018). Financial Management in Emergencies: Guidelines and Best Practices. IFRC Publication.
- Kousky, C. (2014). Financing Flood Losses: A Discussion of the National Flood Insurance Program. Risk Analysis, 34(9), 1538-1547.
- Mechler, R. (2005). Cost-benefit Analysis of Natural Disaster Risk Management in Developing Countries. Disasters, 29(4), 426-439.
- Schmidt, J. J., & Zinke, T. (2017). Supply Chain Management in Disaster Relief Operations. Journal of Humanitarian Logistics and Supply Chain Management, 7(1), 22-45.
- United Nations Development Programme (UNDP) (2010). Disaster Risk Financing and Insurance Program.



**Master's (PG) Degree in Disaster Management
[3rd Semester]**

MDMTDRM325: 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 research methods related to health emergency and Disaster Risk Management (Health-edrm) & Natural and Environmental Disasters

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 Methods: Health Emergency and Disaster Risk Management (Health-edrm) & Natural and Environmental Disasters; Geographical Methods for Disaster Research; Community-based Participatory Research (CBPR); 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 MDMTDRM325: Research Methodology

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MDMTDRM325.1	3	2	3	3	1	3	3	3	2	3
MDMTDRM325.2	3	3	3	3	3	3	3	3	3	3
MDMTDRM325.3	3	3	3	3	3	3	3	3	3	3
MDMTDRM325.4	3	3	3	3	3	3	3	3	3	3
Average for MDMTDRM325	3	2.75	3	3	2.5	3	3	3	2.75	3



Suggested Readings:

- Ahuja, R. (2001). Research Methods. Rawat Publications, Jaipur and New Delhi.
- Bhattacharyya, D. K. (2005). Research Methodology. Excel Books, New Delhi.
- Black, J. A. and Champion, D.J. (1976). Methods and Issues in Social Research. John Wiley and Sons, New York.
- Creswell, J. (1994). Research Design: Qualitative and Quantitative Approaches. UK: Sage Publications.
- Dikshit, R. D. (2003). The Art and Science of Geography: Integrated Readings. New Delhi, India: Prentice-Hall of India.
- Evans, M. (1988). Participant Observation: The Researcher as Research Tool, in Eylesand, J and D. Smith (eds). Qualitative Methods in Human Geography. Cambridge, UK: Polity.
- Gopal, K. and Singh, N. (2016). Researching Geography: The Indian Context. Routledge, Delhi.
- Kothari, C. R. (2004). Research methodology: Methods and techniques. New Age International.
- Kumar R. (2010). Research Methodology: A Step-by-Step Guide for Beginners, Sage Publications, Ltd. London.
- Misra, R. P. (2015). Research Methodology: A Handbook. Concept Publishing Company, New Delhi.
- Mukherjee, N. (1993). Participatory Rural Appraisal: Methodology and Application. Concept Publication, Delhi, India.



**Master's (PG) Degree in Disaster Management
[3rd Semester]**

MDMTDST325: 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:

CLO1: Know the basics of statistical methods and their application in Disaster Management.

CL02: Identify and apply suitable sampling techniques for hypothesis building.

Unit - I

Statistical Analysis in Disaster Management: Concept and Importance; Data Collection: Objectives and Scope, Types of Data: Primary and Secondary, Methods of Collecting Primary Data, Sources of Secondary Data; Data Classification; Tabulation: Importance and Types; Diagrammatic and Graphic Representation of Data: General Rules for Constructing Diagrams, Types of Diagrams

Unit- II

Correlation Analysis: Introduction, Types, Methods, Scatter Diagram; Regression Analysis: Linear & Multiple; Time Series Analysis: Components, Measurement of Trend; Chi-square Test: Applications; Tests of Significance based on T, F and Z Distributions: Applications; Composite Index: Applications; Analytical Hierarchy Process (AHP): Applications

CLO-PLO Matrix for the Course MDMTDST325: Statistical Techniques

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MDMTDST325.1	3	3	3	2	1	2	3	1	3	3
MDMTDST325.2	3	3	3	3	1	2	3	1	3	3
Average for MDMTDST325	3	3	3	2.5	1	2	3	1	3	3

Suggested Readings:

- Chatfield, C. (2003). The Analysis of Time Series: An Introduction (6th ed.). Chapman & Hall/CRC.
- Goh, T. T., & Wong, S. H. (2015). Statistical Techniques for Disaster Risk Management. Springer.
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). Multivariate Data Analysis (7th ed.). Pearson.
- Kottogoda, N. T., & Rosso, R. (2008). Statistics, Probability, and Reliability for Civil and Environmental Engineers. McGraw-Hill Education.
- Levin, R. I., & Rubin, D. S. (1998). Statistics for Management (7th ed.). Prentice Hall.
- Saaty, T. L. (2008). Decision Making with the Analytic Hierarchy Process. International Journal of Services Sciences, 1(1), 83-98

Master's (PG) Degree in Disaster Management



MDMTDSD325: Society and Disasters**Credits: 02****Total Contact Hours: 30****Max. Marks:50**

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

CLO1: Answer how social factors like caste, gender, age, and disability influence vulnerability in disasters.

CLO2: Evaluate gender-sensitive and disability-inclusive approaches to disaster risk reduction, focusing on the unique challenges faced by women, children, the elderly, and persons with disabilities.

Unit -I

Civilization and Disasters; Differential Vulnerability of People based on Caste, Class, Gender, Age, Location, and Religion; Disaster Challenges due to Multiple Vulnerabilities; Gender-Sensitive DRR and Best Practices; Women, Work and Livelihood Issues in Disasters; Vulnerability of Children and Elderly in Disasters: Coping Strategies and Resilience; Elderly-Inclusive and Elderly-Sensitive DRR

Unit-II

Types and Models of Disability; Vulnerability of Persons with Disabilities (PwD); Differential impact of Disasters on PwD; Coping Strategies and Resilience of PwD; Disability inclusive DRR Approaches; Identifying PwD; Disability Frameworks and their References to Disasters Convention on the Rights of Persons with Disabilities (CRPD); Rights of Persons with Disabilities Act (2016)

CLO-PLO Matrix for the Course MDMTDSD325: Society and Disasters

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MDMTDSD325.1	3	2	2	3	2	2	3	2	2	2
MDMTDSD325.2	3	2	2	2	3	2	2	2	1	3
Average for MDMTDSD325	3	2	2	2.5	2.5	2	2.5	2	1.5	2.5

Suggested Readings:

- CBM International. (2018). Disability Inclusive Disaster Risk Reduction: Voices from the Field and Good Practices.
- Enarson, E., & Chakrabarti, P. G. D. (2009). Women, Gender and Disaster: Global Issues and Initiatives. SAGE Publications.
- Government of India. (2016). The Rights of Persons with Disabilities Act, 2016.
- Handicap International. (2015). Disability Inclusive Disaster Risk Reduction: Toolkit.



- HelpAge International. (2014). Disaster Resilience in an Ageing World: How to Make Policies and Programmes Inclusive of Older People.
- Plan International. (2016). Children in Disasters: Building Resilience through Child-Centred DRR.
- UN Women. (2014). Gender Equality in the 2030 Agenda for Sustainable Development.
- United Nations Office for Disaster Risk Reduction (UNDRR). (2017). Words into Action: Guidelines on National Disaster Risk Assessment – Inclusive of Age, Gender, and Disability Perspectives.
- United Nations. (2006). Convention on the Rights of Persons with Disabilities (CRPD).
- Wisner, B., Blaikie, P., Cannon, T., & Davis, I. (2004). At Risk: Natural Hazards, People's Vulnerability and Disasters (2nd ed.). Routledge.



**Master's (PG) Degree in Disaster Management
[3rd Semester]**

MDMTDUR325: Urban Resilience

Credits: 02

Total Contact Hours: 30

Max. Marks: 50

Course Learning Outcome: By the end of this course, students will

CLO1: have a clear understanding of the concept and evolution of urban resilience and the ability to critically assess urban risks and vulnerabilities linked to climate change, infrastructure, and social systems.

CLO2: develop practical skills in resilience assessment, participatory planning, and policy analysis to support disaster risk reduction and sustainable urban transformation.

Unit-I

Concept and Evolution of Urban Resilience; Natural Hazards; Critical Infrastructure; Interdependence of Urban Systems (Healthcare, Education, Transport, Housing, Energy, Water, Municipal Waste); Tools for Assessing Urban Resilience; Urban Resilience Indicators

Unit-II

Urban Planning for Resilience: Land Use, Zoning, and Climate-responsive Design; Nature-based Solutions and Resilient Infrastructure; Inclusive and Participatory Governance in Resilience Planning; Financing Urban Resilience

CLO-PLO Matrix for the Course MDMTDUR325: Urban Resilience

UNIT-WISE CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MDMTDUR325.1	3	0	0	3	2	0	2	2	0	1
MDMTDUR325.2	3	3	3	2	2	2	3	0	2	3
Average for MDMTDUR325	3	1.5	1.5	2.5	2	1	2.5	1	1	2

Suggested Readings:

- Campanella, T. J. (2006). Urban resilience and the recovery of New Orleans. *Journal of the American Planning Association*, 72(2), 141–146.
- Davoudi, S., Brooks, E., & Mehmood, A. (2013). Evolutionary resilience and strategies for climate adaptation. *Planning Practice & Research*, 28(3), 307–322.
- Frantzeskaki, N., Kabisch, N., & McPhearson, T. (2019). *Nature-Based Solutions for Cities: The Urban Greening Handbook*. Springer.
- Leichenko, R. (2011). Climate change and urban resilience. *Current Opinion in Environmental Sustainability*, 3(3), 164–168.
- Meerow, S., Newell, J. P., & Stults, M. (2016). Defining urban resilience: A review. *Landscape and Urban Planning*, 147, 38–49.
- Shaw, R., & Krishnamurthy, R. R. (Eds.). (2009). *Disaster Management: Global Challenges and Local Solutions*. University Press.
- UN-Habitat. (2018). *City Resilience Profiling Tool (CRPT)*.



- The Rockefeller Foundation & Arup. (2015). City Resilience Framework – 100 Resilient Cities Initiative.
- United Nations Office for Disaster Risk Reduction (UNDRR). (2015). Sendai Framework for Disaster Risk Reduction 2015–2030.
- United Nations. (2015). Transforming our world: the 2030 Agenda for Sustainable Development (SDGs).
- Vale, L. J. & Campanella, T. J. (Eds.). (2005). The Resilient City: How Modern Cities Recover from Disaster. Oxford University Press.
- World Bank. (2017). Investing in Urban Resilience: Protecting and Promoting Development in a Changing World.



**Master's (PG) Degree in Disaster Management
[3rd Semester]**

MDMTPMP325: Disaster Management Plan (Project)

Credits: 02

Total Contact Hours: 30

Max. Marks: 50

Course Learning Outcome: By the end of this course, students will be able to do

CLO1: Risk Assessment in their local areas.

CLO2: Prepare disaster management plan.

The emergency response plan is a vital in minimizing immediate impacts of disasters and incorporates the 'culture of quick response'. The students will undertake a research problem of their choice and will prepare a plan in a particular context.

Preparing Disaster Management Plan

The students will be asked to prepare a disaster management plan in different socioeconomic, cultural, political, environmental and technological keeping in mind different types of hazards and likely disaster impacts. The structure of disaster management plan would have following broad outline:

CLO-PLO Matrix for the Course MDMTPMP325: Disaster Management Plan

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MDMTPMP325.1	3	2	3	3	2	2	3	1	1	3
MDMTPMP325.2	3	2	3	3	2	1	3	3	2	3
Average for MDMTPMP325	3	2	3	3	2	1.5	3	2	1.5	3

Suggested Readings:

- Alexander, D. (2002). Principles of Emergency Planning and Management. Oxford University Press.
- Haddow, G., Bullock, J., & Coppola, D. (2020). Introduction to Emergency Management (7th Edition). Butterworth-Heinemann.
- IRS Guidelines by NDMA; Available at NDMA website.
- Nicolas A. Valcik and Paul E.Tracy, (2012). Case Studies in Disaster Response and Emergency Management. 2nd Ed; American Society for Public Administration.



**Master's (PG) Degree in Disaster Management
[4th Semester]**

Course Code	Course Title	Course Type	Credits
MDMTCCI425	Crisis Management and Incident Response System	C	4
MDMT CPR425	Psychosocial Response in Disaster Management	C	4
MDMTCCA425	Climate Change Mitigation and Adaptation	C	2
MDMTDEE425	Environment Impact Assessment & EMP	D	4
MDMTDGC425	Geopolitical Conflicts and Humanitarian Crisis	D	2
MDMTDDP425	Disasters and Public Health	D	4
MDMTDWD425	Waste and Debris Management	D	2
MDMTDAI425	Artificial Intelligence in Disaster Risk Reduction	D	2
MDMTSTM425	Capacity Building and Training Measures	S	2



**Master's (PG) Degree in Disaster Management
[4th Semester]**

MDMTCCI425: Crisis Management and Incident Response System

Credits: 04

Total Contact Hours: 60

Max. Marks: 100

Course Learning Outcomes: Upon completion of this course the students will be able to:

CLO1: Explain the concepts of Crisis and identification of potential crisis situations various indicators of crisis.

CLO2: Interpret crisis management theories and prepare Crisis Management Plan.

CLO3: Discuss the crisis and risk communication theories and role of media in humanitarian crisis

CLO4: Interpret the incident response system, and incident resources management.

Unit-I

Crisis: Concept, Characteristics (Wang Tangjia & Marie Mikusova); Crisis, Emergencies and Disasters; Crisis as an Opportunity (Chinese Tradition); Types of Crisis (Perrow, Hwang & Lichtenthal, Mitroff & Anagnos, Otto Lerbinger and Coombs); Potential Crisis Situations: Indicators, Causes and Response; Environmental, Social, Political and Financial Crisis Situations

Unit-II

Crisis Management: Concept; Crisis Management Theories: Chaos, Apology and Attribution; Approaches: Life cycle (Gonzalez-Herrero and Pratt, Fink & Mitroff) and Relational Approach (Tony Jaques); Crisis Preparedness (Crisis Preparedness Gap Analysis); Crisis Training and Testing: Concept, Significance & Types of Exercise; Preparation of Crisis Management Plan: Significance and Components

Unit-III

Crisis Communication: Principles, Techniques, Crisis and Risk Communication (CERC) Lifecycle; Situational Crisis Communication Theory; Seven Traditions of Communication and its Relevance to Crisis; Role of Media in DM and Humanitarian Crisis; Alternative Media during Crisis.

Unit-IV

Incident Response System: Concept, Development; Features and Facilities; Organizational Structure; Incident Resources Management and Networking; Indian Disaster Resource Network: Objectives, Need, Structure, Maintenance & Monitoring, Data Collection and Data Inventory

CLO-PLO Matrix for the Course MDMTCCI425: Crisis Management and IRS

UNIT-WISE CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MDMTCC1425.1	3	2	2	3	2	1	3	2	0	1
MDMTCC1425.2	3	3	3	2	3	3	2	2	0	2
MDMTCC1425.3	3	3	3	2	3	2	3	1	0	1
MDMTCC1425.4	3	2	3	3	2	3	3	0	3	3
Average for MDMTCC1425	3	2.5	2.75	2.5	2.5	2.25	2.75	1.25	0.75	1.75



Suggested Readings:

- Mikušová, M., & Horváthová, P. (2019). Prepared for a crisis? Basic elements of crisis management in an organisation. *Economic research-Ekonomska istraživanja*, 32(1), 1844-1868.
- Mikušová, M. (2014). Crisis Management Modeling. *WSEAS Transactions on Business and Economics*, 11, 635-647.
- Ziakas, V., Antchak, V., & Getz, D. (2021). Theoretical perspectives of crisis management and recovery for events. 92y3x.
- Boberg, S., Quandt, T., Schatto-Eckrodt, T., & Frischlich, L. (2020). Pandemic populism: Facebook pages of alternative news media and the corona crisis--A computational content analysis. arXiv preprint arXiv:2004.02566.
- Anderson, B. (2018). Opportunity in Crisis: Alternative Media and Subaltern Resistance. *From Financial Crisis to Social Change: Towards Alternative Horizons*, 115-127.
- Mikušová, M., & Horváthová, P. (2019). Prepared for a crisis? Basic elements of crisis management in an organisation. *Economic research-Ekonomska istraživanja*, 32(1), 1844-1868.
- Tangjia, W. A. N. G. (2014). A philosophical analysis of the concept of crisis. *Frontiers of philosophy in China*, 9(2), 254-267.
- Hwang, P., & Lichtenthal, J. D. (2000). Anatomy of organizational crises. *Journal of Contingencies and Crisis management*, 8(3), 129-140.
- Elsubbaugh, S., Fildes, R., & Rose, M. B. (2004). Preparation for crisis management: A proposed model and empirical evidence. *Journal of contingencies and crisis management*, 12(3), 112-127.
- Mitroff, I. & Anagnos, G. (2000). Managing crises before they happen: What every executive and manager needs to know about crisis management. AMACOM/American Management Association.
- Herrero, A. G., & Pratt, C. B. (1996). An integrated symmetrical model for crisis-communications management. *Journal of Public Relations Research*, 8(2), 79-105.
- Mitroff, I. I., Shrivastava, P., & Udwadia, F. E. (1987). Effective crisis management. *Academy of management Perspectives*, 1(4), 283-292.
- Pearson, C. M., & Mitroff, I. I. (1993). From crisis prone to crisis prepared: A framework for crisis management. *Academy of Management Perspectives*, 7(1), 48-59.
- Fink, S. (1986). Crisis management: Planning for the inevitable.
- Jaques, T. (2007). Issue management and crisis management: An integrated, non-linear, relational construct. *Public relations review*, 33(2), 147-157.
- Hariyanto, D., Dharma, F. A., & Sukmana, H. (2021). Public Communication Model of The Sidoarjo Regency Government in Facing the New Normal Covid-19. *Al-Balagh: Jurnal Dakwah Dan Komunikasi*, 6(2), 329-356.



**Master's (PG) Degree in Disaster Management
[4th Semester]**

MDMTCPR425: Psychosocial Response in Disaster Management

Credits: 02

Total Contact Hours: 30

Max. Marks:50

Course learning Outcome: Upon the completion the student will be able to:

CLO1: Highlights psychological and social impacts of disasters on individuals, families, and communities.

CLO2: Understand the basic Principles and essentials of psychosocial care.

CLO3: Integrate psychosocial support with health, education, livelihood initiatives and demonstrate empathy, active listening, and effective communication in providing psychosocial support.

CLO4: Contribute to building community resilience by promoting mental health awareness and peer-support mechanisms.

Unit-I

Psychological Care and Psychosocial-Support; Trauma and Stress: Concept, Factors and their Management; Psychological Reactions to Disasters, Psychosocial Response of Vulnerable Groups; Post-Traumatic Stress Disorder (PTSD); Mental Health Triage

Unit II

Psychological Care Essentialities; Psychological Care Ethics and Standard by American Psychological Association (APA); Psychological Debriefing Approach and Objectives; Understanding Psychological Needs of Victims, Vulnerable People, Rescuer and Relief Workers; Significance of Psychological Intervention

Unit-III

Understanding Psychological First Aid (PFA), Principles and Models of PFA; Basic Counseling Techniques; Psychological First Aid: Techniques; Core Action in PFA, Monitoring and Evaluation of PFA; Challenges in Monitoring and Evaluation

Unit-IV

Community based Psychosocial Care, Community Resilience and Recovery; Designing Sustainable Support Systems for Psychosocial Care; Traditional and Cultural Healing Practices; Psycho-social Care Management at International and National Level; Real-world Case Studies: COVID-19 Pandemic, Earthquakes, Floods, Landslide and Snow Avalanche



CLO-PLO Matrix for the Course MDMTCPR425: Psychosocial Response in Disaster Management

UNIT-WISE CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MDMTCPR425.1	3	2	3	3	2	3	3	2	2	3
MDMTCPR425.2	3	3	3	2	3	2	3	3	1	3
MDMTCPR425.3	3	2	3	2	2	3	2	2	1	3
MDMTCPR425.4	3	3	2	3	3	3	3	2	1	2
Average for MDMTCPR 425	3	2.5	2.75	2.5	2.5	2.75	2.75	2.25	1.25	2.75

Suggested Readings:

- Benedek, D. M., Fullerton, C., & Ursano, R. J. (2007). First responders: mental health consequences of natural and human-made disasters for public health and public safety workers. *Annu. Rev. Public Health*, 28, 55-68.
- Brannen, D. E., Barcus, R., McDonnell, M. A., Price, A., Alsept, C., & Caudill, K. (2013). Mental health triage tools for medically cleared disaster survivors: an evaluation by MRC volunteers and public health workers. *Disaster medicine and public health preparedness*, 7(1), 20–28.
- Geldard, K., Geldard, D., & Foo, R. Y. (2017). *Counselling children: A practical introduction*. Sage.
- <https://interagencystandingcommittee.org/iasc-reference-group-mental-health-andpsychosocial-support-emergency-settings/iasc-guidance-operational-considerationsmultisectoral-mental-health-and-psychosocial-support> (accessed on 6 May 2022)(In Multiple Languages).
- National Disaster Management Guidelines: Psycho-Social Support and Mental Health Services in Disasters, (2009). A publication of the National Disaster Management Authority, Government of India. ISBN 978-93-80440-00-2, December 2009, New Delhi.
- NDMA. (2021). Annual Report. New Delhi: National Disaster Management Authority.
- New South Wales (NSW) Health, Disaster mental health response handbook. North Sydney, NSW: NWS Health, 2000.
- Roxane Richter, E. M. T., & Flowers, T. (2008). Gendered dimensions of disaster care: critical distinctions in female psychosocial needs, triage, pain assessment, and care. *American journal of disaster medicine*, 3(1), 31-37.
- Seto, M., Nemoto, H., Kobayashi, N., Kikuchi, S., Honda, N., Kim, Y., ...& Tomita, H. (2019). Post-disaster mental health and psychosocial support in the areas affected by the Great East Japan Earthquake: A qualitative study. *BMC psychiatry*, 19, 1-13.
- World Health Organization. (2011). *Psychological first aid: Guide for field workers*. World Health Organization.



**Master's (PG) Degree in Disaster Management
[4th Semester]**

MDMTCCA425: Climate Change Mitigation and Adaptation

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

Earth's Climate History; Climate Change Science: Natural and Anthropogenic Drivers of Climate Change: Geologic and Extraterrestrial Drivers; Solar Variations, GHG Emission 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: Green House Gases Sources and Sinks; Carbon Capturing and Sequestration Adaptation: Reactive and Transformative; Nature based Solutions to Climate Change; Key Initiatives by UNFCCC (IPCC; Kyoto Protocol, Paris Agreement); Progress in Climate Action: COPs; Nationally Determined Contributions; Climate Change Action Plan for India (NAPCC) and J&K (SAPCC), Climate Resilience: Key Aspects and Success Stories; Climate Risk Index

CLO-PLO Matrix for the Course MDMTCCA425: Climate Change Mitigation and Adaptation

UNIT-WISE CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MDMTCCA425.1	3	3	2	1	1	1	3	3	1	3
MDMTCCA425.2	3	2	3	3	2	3	3	3	2	3
Average for MDMTCCA425	3	2.5	2.5	2	1.5	2	3	3	1.5	3

Suggested Readings:

- Bailey summers and Ross A Diaz, (2013).Climate Change: Legal Issues & Contexts (Climate Change and Its Causes, Effects and Prediction: Laws and Legislation); Nova Science Publisher UK. Ed.
- Climate Change Science Compendium; UNEP (2009).
- Climate in Peril, (2009). 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



- Guidance on Integrating Climate Change Adaptation into Development Co-operation. OECD, 2009.
- IEA Training Material, 2009. Vulnerability and Climate Change Impact Assessment for Adaptation; IISD, UNITAR & UNEP.
- IPCC, 2013. The Physical Science Basis - Summary for Policymakers; Climate Change
- James Rodger Fleming, (1998). Historical Perspectives on Climate Change. Oxford University Press.
- Lackner M., Sajjadi B., & Chen W.-Y. (Eds.), (2024). Handbook of climate change mitigation and adaptation, New York: Springer.
- Mark Maslin, (2014). Climate Change: A Very Short Introduction. Oxford University Press.
- UNEP & UNDP, (2011). Mainstreaming Climate Change Adaptation into Development Planning: A Guide for Practitioners.
- William Kininmonth, (2004). Climate Change: A Natural Hazard. Multi-science Publishing Co. Ltd.



**Master's (PG) Degree in Disaster Management
[4th Semester]**

MDMTDEE425: Environment Impact Assessment & EMP

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, social, cultural, economic, and health aspects relevant to a project's impact.

CLO3: Learn to propose and design mitigation measures, including project modifications or environmental management plans, to reduce or prevent adverse effects.

CLO4: Develop critical thinking and problem-solving skills applicable to complex environmental issues arising from development projects

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; Disaster-Environment Matrix

Unit-IV

Strategic Environment Assessment (SEA): Concept and Process; SEA Principles; SEA Contribution towards Sustainability; SEA & EIA Relationship; Environmental Management Plan (EMP): Elements and Preparation; Case studies of SEA/ EIA: Hydel Power Project, Tourism Township

CLO-PLO Matrix for the Course MDMTDEE425: Environment Impact Assessment & EMP

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MDMTDEE425.1	3	2	2	3	2	2	3	3	2	3
MDMTDEE425.2	3	3	3	3	2	2	3	3	2	3
MDMTDEE425.3	3	3	2	3	1	3	3	3	1	3
MDMTDEE425.4	3	3	2	3	2	3	3	3	1	3
Average for MDMTDEE425	3	2.75	2.25	3	1.75	2.5	3	3	1.50	3



Suggested Readings:

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



**Master's (PG) Degree in Disaster Management
[4th Semester]**

MDMTDGC425: Geopolitical Conflicts and Humanitarian Crisis

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 disaster-conflict interface and global refugee crisis.

CLO2: Analyze humanitarian crisis and role of international agencies.

Unit-I

Concepts of Geopolitics and Global Polarity; Buffer Zone: Evolution and Dynamics; Understanding Conflicts; Disaster-Conflict Interface; Conflicts–resilience Nexus; Management of Trans-Boundary Disasters in Conflict Settings; Challenges of SAARC Member Countries; Global Refugee Crisis

Unit-II

Role and Mandate of UNHCR, UNICEF and ICRC in Geopolitical Conflicts; Conflict Analysis; Humanitarian Crisis Analysis: INFORM Severity Index; Disaster Displacement Risk Model. Humanitarian Issues: Middle East, Rohingya Crisis, Ukraine Conflict, Lake Chad Basin Crisis, Sahel Region Crisis

CLO-PLO Matrix for the Course MDMTDGC425: Geopolitical Conflicts and Humanitarian Crisis

UNIT-WISE CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MTMTDGC425.1	3	1	1	2	1	0	2	0	0	2
MTMTDGC425.2	3	3	3	3	2	3	2	3	0	3
Average for MDMTDGC425	3	2	2	2.5	1.5	1.5	2	1.5	0	2.5

Suggested Readings:

- Colin Flint, (2021), Introduction to Geopolitics. Routledge Publication
- Amos N. Guiora, (2013), Modern Geopolitics and Security: Strategies for Unwinnable.
- Michael Don Ward, (1992). The New Geopolitics.
- UNICEF www.unicef.org
- UNDRR www.undrr.org
- UNHCR - The UN Refugee Agency www.unhcr.org
- International Committee of the Red Cross www.icrc.org
- <https://www.unocha.org/>
- <https://www.usip.org/sites/default/files/pwks6.pdf>
- https://humanitarianadvisorygroup.org/wpcontent/uploads/2021/03/EmergingHumIssuesBrief_SouthAsiafinal.pdf
- <https://www.orfonline.org/english/expert-speak/dilemmas-in-disaster-management-saarc-under-scrutiny>



**Master's (PG) Degree in Disaster Management
[4th Semester]**

MDMTDDP425: Disasters and Public Health

Credits: 04

Total Contact Hours: 60

Max. Marks: 100

Course Learning Outcome: At the end of the course students will:

CLO1: Get thorough knowledge about disaster epidemiology, medical and health response to different disasters

CLO2: Role of IEC and technology in health management during disasters.

CLO3: Able to know about disaster site management and community health management

CLO4: Analyze event based surveillance and Integrated Disease Surveillance Project.

Unit - I

Disaster-related Exposures, Mortality and Morbidity; Endemic, Epidemic and Pandemic: Basics, Stages, Risks, Impacts, Mitigation and Case Studies; Outbreak, Steps of an Outbreak Investigation; Prevention of outbreaks; Trigger alerts; Principles and methods of investigations for Food, Water, Air, Classification of diseases; Factors for Emergence of New Diseases; Zoonotic Diseases; Occupational Diseases, One Health approach for DM

Unit- II

Basic Concepts of Epidemiology; Epidemiological Triad; Role of the Epidemiology in Disasters; Methods and Methodological Challenges in Disaster Epidemiology; Disaster Registries; Epidemiological Survey; Post-disaster Epidemiological Investigations; Influenza Epidemiology, Mass Vaccination Programs and Issues; Mass Casualty Management; Emergency Medical Preparedness and Response; Hospital emergency disaster management plan; Hospital Safety and Preparedness

Unit- III

International Health Regulations (IHR); Public Health Emergencies of International Concern (PHEIC); Global Health Security Agenda (GHSA); National and Local Health Systems; Tiers of Healthcare Services; Clinical Services; Health Management Information System (HMIS); Human Resources for Health; Resilient and Sustainable Health Systems & Infrastructure

Unit-IV

Concept and Types of Surveillance; Indicator & Event based Surveillance; Surveillance: Design, Evaluation and Common Problems; Components of Surveillance System; Integrated Disease Surveillance Project (IDSP), Early Warning, Alert and Response System (EWARS); Public Health Emergency Operations Centre (PHEOC): Framework



CLO-PLO Matrix for the Course MDMTDDP425: Disasters and Public Health

Unit-wise CLOS	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MDMTDDP425.1	3	1	2	2	1	1	2	2	2	3
MDMTDDP425.2	3	2	2	2	2	2	3	2	2	3
MDMTDDP425.3	3	3	2	2	1	1	2	2	2	2
MDMTDDP425.4	3	2	2	2	1	3	2	2	2	2
Average for MDMTDDP425	3	2	2	2	1.25	1.75	2.25	2	2	2.5

Suggested Readings:

- Centers for Disease Control and Prevention (CDC). (2012). Principles of Epidemiology in Public Health Practice (3rd ed.).
- Global Health Security Agenda (GHSA). (2020). Action Packages and Strategic Roadmaps.
- Government of India – National Centre for Disease Control (NCDC). (2023). Integrated Disease Surveillance Programme (IDSP) – Annual Report.
- Kelen, G. D., & McCarthy, M. L. (2006). The Science of Surge: Detection and Lessons from the Field. *Academic Emergency Medicine*, 13(11), 1158–1161.
- Lechat, M. F. (1990). The Epidemiology of Disasters. *Proceedings of the Royal Society of Medicine*, 73(9), 702–705.
- Noji, E. K. (Ed.). (1997). *The Public Health Consequences of Disasters*. Oxford University Press.
- Pan American Health Organization (PAHO). (2021). Hospital Safety Index: Evaluation of Health Facilities in the Context of Disaster Risk Reduction.
- Watson, J. T., Gayer, M., & Connolly, M. A. (2007). Epidemics after Natural Disasters. *Emerging Infectious Diseases*, 13(1), 1–5.
- World Health Organization (WHO). (2015). Public Health Emergency Operations Centre (PHEOC) Framework.
- World Health Organization (WHO). (2017). One Health: Joint Plan of Action (2022–2026).
- World Health Organization (WHO). (2018). Early Warning, Alert and Response System (EWARS) in Emergencies: Operational Guidance.



**Master's (PG) Degree in Disaster Management
[4th Semester]**

MDMTDWD425: Waste and Debris Management

Credits: 02

Total Contact Hours: 30

Max. Marks: 50

Course learning Outcome (CLOs): After completion the student will be able to:

CLO1: understand the role of waste and debris management in ensuring rapid recovery, reducing secondary risks, and supporting Build Back Better (BBB).

CLO2: evaluate policies, legal frameworks, institutional mechanisms and design sustainable practices, debris management plans that address operational efficiency, environmental safety, and community participation

Unit -I

Disaster Debris: Sources and Types; Hierarchy of Debris and Waste Management, Sorting, Recycling, and Disposal Methods; Disasters and Waste Characteristics; Disaster Debris Management Plan: Need, Significance and EPA's Guidelines; Challenges and Issues in Disaster Debris Management

Unit -II

Disaster Debris Management Cycle; Temporary Debris Management Areas (TDMA's); Methods for Identifying Debris Management Sites; Debris Estimation: Methods, Safety Protocols for Workers and the Public; Technologies and Tools in Debris Management, Remote Sensing and GIS, Equipment for Handling Debris, Monitoring Systems; Debris Management and its Impacts: Case Studies.

CLO-PLO Matrix for the Course MDMTDWD425: Waste and Debris Management

UNIT-WISE CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MDMTDWD425.1	3	2	3	2	2	3	2	3	2	2
MDMTDWD425.2	3	3	3	2	2	3	2	3	2	3
Average for MDMTDWD425	3	2.5	3	2	2	3	2	3	2	2.5

Suggested Readings:

- Ahmed, S., & El-Sayegh, S. (2016). Technologies for Disaster Debris Management. International Journal of Disaster Risk Reduction, 17, 220-227
- Bruneau, M., & Reinhorn, A. M. (2013). Disaster Waste Management and Resiliency. Journal of Disaster Research, 8(1), 109-121.
- Cooper, J. A., & Booth, C. A. (2017). Disaster Debris Management. CRC Press.
- Environmental Protection Agency (EPA). (2020). Disaster Debris Management: A Resource Guide.
- Federal Emergency Management Agency (FEMA). (2016). Debris Management Guide (FEMA 325).



- Johnston, D., & Leonard, J. (2014). *Managing Disaster Debris: Practical Approaches and Case Studies*. Springer.
- National Institute of Building Sciences (NIBS). (2014). *Post-Disaster Debris Management and Clearance*.
- Papadopoulos, G., & Dimitriou, E. (2018). *Application of GIS and Remote Sensing in Disaster Management*. In *Handbook of Disaster Risk Reduction & Management*.
- Twigg, J. (2015). *Disaster Risk Reduction: Good Practice Review 9*. Overseas Development Institute.
- United Nations Office for Disaster Risk Reduction (UNDRR). (2021). *Guidance on Waste Management in Disaster Response and Recovery*.



**Master's (PG) Degree in Disaster Management
[4th Semester]**

MDMTDAI425: Artificial Intelligence in Disaster Risk Reduction

Credits: 02

Total Contact Hours: 30

Max. Marks:50

Course learning Outcome (CLOs): Upon the completion the student will be able to:

CLO1: understand the fundamentals of Artificial Intelligence, Machine Learning, and Data Science in the context of disaster risk reduction.

CLO2: analyze the role of AI techniques, tools to process and interpret multi-source disaster data for hazard detection, monitoring and early warning systems.

Unit-I

Introduction to Artificial Intelligence (AI); Overview of AI in DRR; Machine Learning: Supervised, Unsupervised, Reinforcement Learning; Deep Learning Basics; Natural Language Processing for Emergency Communication; Computer Vision for Satellite Image Analysis

Unit-II

Data Types and Sources: Remote Sensing, Sensor Networks, Social Media, Mobile Data; Pre-processing and Challenges: Noise, Imbalance, Missing Data; AI for Risk Modelling, Damage Assessment and Recovery Paths; AI for Community Engagement and Misinformation Detection; Ai-driven Logistics and Resource Optimization

CLO-PLO Matrix for the Course MDMTDAI425: Artificial Intelligence in Disaster Risk Reduction

UNIT-WISE CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MDMTDAI425.1	3	3	3	2	1	1	3	2	3	2
MDMTDAI425.2	2	3	3	3	1	1	3	2	3	2
Average for MDMTDAI425	2.5	3	3	2.5	1	1	3	2	3	2

Suggested Readings:

- Goodfellow, I., Bengio, Y., & Courville, A. (2016). Deep Learning. MIT Press.
- ITU & UNESCO. (2020). Artificial Intelligence for Natural Disaster Management. International Telecommunication Union.
- Liu, L. & Weng, Q. (Eds.). (2021). Artificial Intelligence and Earth Observations for Disaster Management. Springer.
- Russell, S., & Norvig, P. (2020). Artificial Intelligence: A Modern Approach (4th ed.). Pearson.
- United Nations ESCAP (2021). Ready for the Dry Years: Building Resilience to Drought in South-East Asia with AI.
- World Meteorological Organization (WMO). (2023). Artificial Intelligence for Disaster Risk Reduction: Opportunities and Challenges.



**Master's (PG) Degree in Disaster Management
[4th Semester]**

MDMTSTM425: Capacity Measures and Training Measures

Credits: 02

Total Contact Hours: 30

Max. Marks:50

Course learning Outcome (CLOs): Upon the completion the student will be able to:

CLO1: Students in collaboration with collaboration with DSDRF/ NGOS/ Government agencies/Departments will undertake a capacity building and training programme in a hazard prone locality on the given themes.

CLO2: Under the guidance of the allotted Mentors students will prepare community capacity building plan/ Training Report

Total Credits: 2

Multi hazard risk awareness/Community awareness/ Mass awareness; Operation of Emergency Operations Centers; Mock Drills; Rapid Visual Screening of Buildings; Fire Safety Auditing; Search and Rescue; Evacuation; Emergency First Aid; Cardio Pulmonary Resuscitation; Onsite Triage; Psychological Debriefing, Table Top Exercises;

CLO-PLO Matrix for the Course MDMTSTM425: Capacity Measures and Training Measures

UNIT-WISE CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
MDMTSTM425.1	3	2	3	2	3	3	3	3	3	1
MDMTSTM425.2	3	2	3	2	3	3	3	3	3	1
Average for MDMTSTM425.2	3	2	3	2	3	3	3	3	3	1

Suggested Readings:

- Disaster Awareness. <https://ndrf.gov.in/en/disaster-awareness>
- Guidelines for establishment of Emergency Operations Center. https://ndma.gov.in/sites/default/files/PDF/Guidelines/EOC_Guidelines_Oct_2024.pdf
- School Safety: Mock Drills & Basic Community Search and Rescue Training. https://ndma.gov.in/sites/default/files/PDF/Guidelines/EOC_Guidelines_Oct_2024.pdf
- Search and Rescue. <https://idrn.nidm.gov.in/ItemDetails?pagenum=2&Next=15&Previous=0>
- CPR & First aid. <https://cpr.heart.org/en/resources/what-is-cpr>
- Psychological debriefing. <https://div12.org/treatment/psychological-debriefing-for-post-traumatic-stress-disorder/>
- Traige. <https://pmc.ncbi.nlm.nih.gov/articles/PMC7127292/>



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= 24				
	Course Code	Course Title	Course Type	Credits
Semester IV	MDMTPDI425	Project Dissertation	P	16
	MDMTCRA425	Recent Advances in the Relevant Research Topic	C	4
	Total Credits = 20			

Structure for CW+R

I. 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)
 - 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.

