

**Detailed Syllabus
for
Minor (Degree) Course
in
Disaster Risk Reduction
(Under NEP-2020)
Offered by
Centre for Disaster Risk Reduction**

Table showing Semester-wise distribution of Credits for Minor Course

Semester	Course Code	Course Title	Max. Marks			Credit Distribution				Credits
			Internal*	Final	Total	L	T	P	S	
1 st	CDRR100MN	Introduction to Disasters	50	50	100	3	1	0	0	4
2 nd	CDRR101MN	Natural Disasters	50	50	100	3	1	0	0	4
3 rd	CDRR102MN	Anthropogenic Hazards and Disasters	50	50	100	3	1	0	0	4
4 th	CDRR103MN	Environmental Hazards	50	50	100	3	1	0	0	4
5 th	CDRR104MN	Managing Disasters	50	50	100	3	1	0	0	4
6 th	CDRR105MN	Strategies in Disaster Risk Reduction	50	50	100	3	0	0	1	4
7 th	CDRR106MN	Skills in DRR	50	50	100	2	0	2	0	4
8 th	CDRR107MN	Fieldwork & Report Writing	50	50	100	0	0	4	0	4
Total Credits										32

*(Internal = Midterm 30 marks + Assignment/Attendance 20 marks)



**Islamic University of Science and Technology
Kashmir
(Autumn-2025)**



**Syllabus
for
1st Semester**

Course Code	Course Title	Credits	L	T	P	S
CDRR100MN	Introduction to Disasters	04	3	1	0	0
Course Objectives: This course introduces core definitions and concepts in disaster studies, and provide an overview of natural, biological, technological, and anthropogenic hazards, with a focus on vulnerability.						
Course Outcomes: Students will be able to define key disaster terms, classify different hazard types, explain the risk-vulnerability-capacity relationship, and understand the vulnerability profile of Jammu and Kashmir.						
Course Content						
UNIT-I: Introduction to Disasters (15 Hours) Hazards and disasters; definition, key concepts in disaster studies, hazards and disasters, risk, exposure, preparedness, mitigation, adaptive capacity, resilience, etc. Types of vulnerability; physical, social, economic and environmental; inherent and chronic vulnerability. Relationship between risk, hazard, and vulnerability. Disaster vulnerability profile of India with special reference to Jammu and Kashmir.						
Unit-II: Natural Hazards (15 Hours) Definition and types of natural hazards. Geological hazards; earthquakes, landslides, volcanoes, land subsidence, liquefaction, soil erosion, loess-landslide and tsunamis. Hydro-meteorological hazards; floods, cloud bursts, flash-floods, glacier lake outburst floods (GLOFs), droughts, cyclones, snow avalanches, hailstorms, cold and heat waves, extreme rainfall events.						
Unit-III: Biological and Technological Hazards (15 Hours) Definition and types of biological hazards; pandemics, epidemics, pest attacks, and forest fires. Definition and types of technological hazards; chemical, industrial, radiological, and nuclear.						
Unit-IV: Anthropogenic Hazards (15 Hours) Definition and types of anthropogenic hazards; rural and urban fires. Pollution; water, air, and soil. Smog Disaster. Industrial pollution. Environmental degradation. War and terrorism. Accidents; air, water, rail, and roads.						
Suggested Reading: 1. Vaidyanathan, S. (2020). An introduction to disaster management. 2. Alexander, D. (2018). Natural disasters. Routledge. 3. Singh, R.B. (2012). Natural Hazards & Disaster Management Vulnerability and Mitigation. Rawat Publications. 4. Smith, K. (1997). Environmental hazards: assessing risk and reducing disaster. Environment International, 23(3), 422-422. 5. "Understanding Disasters" https://nidm.gov.in/PDF/Disaster about.pdf .						

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**Syllabus
for
2nd Semester**

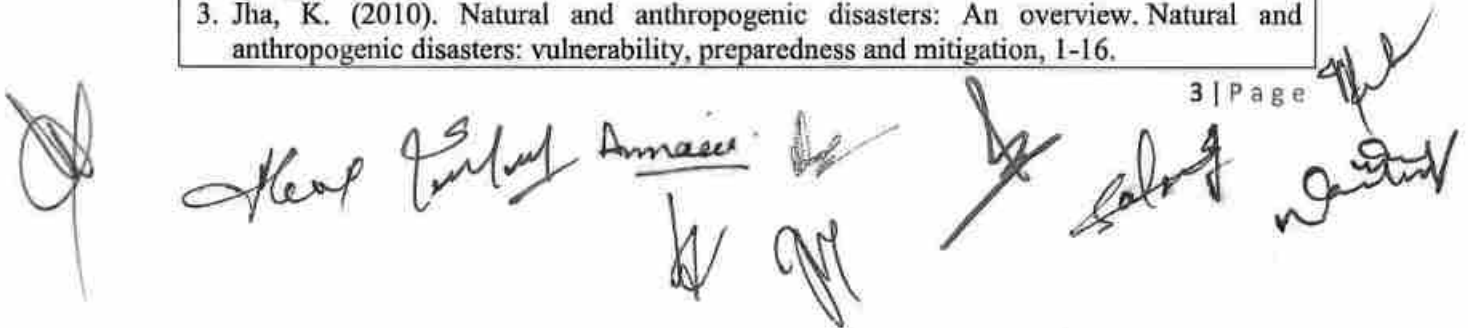
Course Code	Course Title	Credits	L	T	P	S
CDRR101MN	Natural Disasters	04	3	1	0	0
Course Objectives: This course introduces students to understand the causes, impacts, risk assessment, preparedness, and mitigation of key geological and hydro-meteorological disasters, with a focus on the Indian context.						
Course Outcomes: Students will understand the concepts, causes, and effects of major natural disasters; analyse associated risks and mitigation strategies; and recognize India's specific disaster vulnerabilities.						
Course Content						
UNIT-I: Endogenic Disasters (15 Hours) Earthquakes; key concepts, genesis, types and causes of earthquakes, primary and secondary effects, and associated hazards. Seismic zonation of India; J&K. Case studies; 2005 Kashmir Earthquake, historical records. Volcanism; key concepts, origin, types, and causing factors. Effects and associated hazards of volcanism. Case studies. Tsunami; characteristics, causing factors, and effects. Case study of the 2004 Indian Ocean Tsunami.						
Unit-II: Exogenic Disasters (15 Hours) Mass Wasting; types of mass movements (falls, slides, flows, creep), mechanics of slope failure, role of gravity, triggering mechanisms (rainfall, earthquakes, anthropogenic activities). Weathering and Erosion; physical, chemical, and biological weathering processes; agents of erosion (water, wind, ice), soil erosion types. Landslides; types, causing factors, and effects. Landslide hazard in J&K. Land subsidence; causes (groundwater withdrawal, mining, tectonics, sediment compaction), effects.						
Unit-III: Hydrological Disasters (15 Hours) Floods and drainage patterns; origin, types, causes and impacts of floods. Case study of 2014 Kashmir Floods. Glacial lake outburst floods (GLOFs); causing factors and effects. Snow avalanches; types, causes and impacts. Sea level rise; causes and impacts.						
Unit-IV: Meteorological Disasters (15 Hours) Droughts; types, causes and effects. Drought management in India. Lightning, thunderstorms, and hailstorms. Cyclones; origin, types, and effects. Heat and cold waves; causes and impacts. Frost and fog. Extreme weather events; causes and impacts. Climate change; global warming, acid rains, ozone depletion, climate variability and resilience.						
Suggested Reading: 1. Akbar, S., Singh, S.K., & Kanga, S. (2024). Disaster Management: Preparedness and Mitigation. John Wiley & Sons. 2. Keller, E.A., & DeVecchio, D.E. (2019). Natural hazards: earth's processes as hazards, disasters, and catastrophes. Routledge. 3. Alexander, D. (2018). Natural disasters. Routledge. 4. Bryant, E. (2008). The underrated hazard. Springer. 5. Government of India, National Disaster Management Authority (NDMA) Publications.						

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Syllabus
for
3rd Semester

Course Code	Course Title	Credits	L	T	P	S
CDRR103MN	Anthropogenic Hazards and Disasters	04	3	1	0	0
Course Objectives:						
This course introduces students to the study of human caused disasters. It aims to provide a foundational understanding of the key concepts related to disasters, their various types, underlying causes, and diverse impacts on society and the environment.						
Course Outcomes:						
Upon successful completion of this course, students will be able to; define key concepts and terminology related to disasters, particularly anthropogenic disasters, identify and classify different types of anthropogenic disasters, explain the nature, origin, and causes of various anthropogenic disasters, and understand the principles and strategies for enhancing resilience against anthropogenic disasters.						
Course Content						
Unit-I: Biological Hazards (15 Hours)						
Epidemics and pandemics; large-scale disease outbreaks (e.g., COVID-19, swine flu, SARS). Effects; contaminated food products, shortage of food supply, and public health implications. Preventive measures (vaccination, hygiene, etc). Management strategies and sustainable agricultural practices. Biological weapons; intentional, or accidental release of viruses, bacteria, or pathogens (e.g., laboratory accidents or bioterrorism). Health systems and Infrastructure. Forest fires; prevention and control, controlled burning techniques, early detection systems, and effective firefighting strategies. Case studies on biological disasters.						
Unit-II: Technological and Industrial Hazards (15 Hours)						
Industrial hazards; explosions, fires, or structural failures in factories, mines, or manufacturing plants. 1984 Bhopal gas tragedy. Nuclear and radiological hazards; radioactive radiation exposure at power plants or research facilities and their impacts. Nuclear accidents and their consequences. 1986 Chernobyl disaster. Radioactive material waste management. Transport accidents; air, rail, road, and sea. Causes of transportation accidents. Safety regulations. Emergency response mechanisms. Case studies on accidents.						
Unit-III: Chemical Hazards (15 Hours)						
Understanding chemical hazard. Release and dispersion mechanisms of hazardous chemicals. Release of toxic chemicals; accidental, production, and storage. Improper disposal of hazardous chemicals. Chlorine gas leaks and cyanide spills. Oil spills; transportation or pipeline accidents. Health and environmental impacts. Safety protocols.						
Unit-IV: Societal and Environmental Hazards (15 Hours)						
Conflicts and war; terrorism, bombings, and riots. Impacts of armed conflicts on society and infrastructure. Long-term recovery challenges in conflict zones. Rural and urban fires; causes and impacts. Fire safety measures and response. Environmental degradation; deforestation, and desertification. Water, air, and soil pollution; sources of pollutants, impacts, and control measures.						
Suggested Reading:						
1. Rai, P.K., Singh, P., Mishra, V.N., & Resilience, S.C. (2021). Recent technologies for disaster management and risk reduction. Springer International Publishing.						
2. Twigg, J. (2015). Disaster risk reduction.						
3. Jha, K. (2010). Natural and anthropogenic disasters: An overview. Natural and anthropogenic disasters: vulnerability, preparedness and mitigation, 1-16.						





**Syllabus
for
4th Semester**

Course Code	Course Title	Credits	L	T	P	S
CDRR/03MN	Environmental Hazards	04	3	1	0	0
Course Objectives: This course aims to introduce students to environmental geoscience, exploring the interactions between Earth's systems and their relevance to current environmental challenges.						
Course Outcomes: Students will be able to understand fundamental geological processes, geochemical cycles, and the impacts of human activities on the environment.						
Course Content						
UNIT-I: Environmental Geoscience (15 hours) Fundamental concepts of environmental geoscience. Earth systems and their interactions (atmosphere, hydrosphere, lithosphere, biosphere). Endogenic and exogenic earth processes. Concept of sustainability in environmental geosciences.						
UNIT-II: Health Geochemistry (15 hours) Essential and toxic elements in the environment; sources, pathways, and impacts. Geochemical cycling of elements within the Earth system. Radon emission and its health impacts. Heavy metal pollution and its effects on ecosystems and human health.						
Unit-III: Global Environmental Issues (15 hours) Atmospheric and oceanic changes. Ozone hole depletion. Ocean acidification and coral bleaching. Climate change and sea-level rise. Pollution; eutrophication, acid rain, microplastics. Deforestation and desertification. Resource depletion.						
UNIT-IV: Environmental Impacts Assessment (15 hours) Environmental impacts and assessment; urbanization, mining, and hydropower projects. Soil erosion and land degradation. Geoscientific investigations for environmental impact assessment. Environmental legislation. Water quality criteria for different uses. <u>Managing natural resources and disaster risk.</u>						
Suggested Reading: 1. Subramanian, V. (2001). Textbook in Environmental Science. Narosa International. 2. Siegel, F.R. (2001). Environmental Geochemistry of Potentially Toxic Metals. Springer, pp.226. 3. Keller, E.A. (2021). Introduction to Environmental Geology. 5 th Edition; Pearson Education. 4. De Leon, D.A. and Aragon, P.R. (2012). Trace Elements: Environmental Sources, Geochemistry and Human Health. Nova Science Publishers, Incorporated, New York. 5. Smith, K. (1992). Environmental Hazards. Routledge, London.						





**Syllabus
for
5th Semester**

Course Code	Course Title	Credits	L	T	P	S
CDRR104/MN	Managing Disasters	04	3	1	0	0
Course Objectives: This course introduces students about the basic principles of disaster management. It aims to provide a comprehensive understanding of the key concepts related disaster management cycle, communication and planning in disaster preparedness.						
Course Outcomes: Upon successful completion of this course, students will be able to understand the fundamental principles of disaster management, explain the key concepts associated with the disaster management cycle, critical role of communication in disaster preparedness and response, and cyclical nature of disaster management.						
Course Content						
Unit-I: Introduction to Disaster Management (15 Hours) Disaster Management; basic principles of Disaster Management. Disaster Risk Reduction (DRR) and resilience. Vulnerable group identification. Disaster Management Cycle; pre, syn-, and post disaster. Disaster Management in India. DM Act 2005, policies and plans. International frameworks in DRR, SDGs, and the Paris Agreement. Role of Institutions and Financial Management. Local Knowledge and Community-Based Disaster Preparedness.						
Unit-II: Pre-Disaster Measures (15 Hours) Pre-disaster measures; Risk and vulnerability assessment with reference to earthquakes, landslides & floods. Common Alert Protocols (CAP). Hazard risk mapping; zonation and microzonation. Disaster mitigation measures; early warning system, preparedness, capacity development, and awareness. <u>Indigenous Early Warning Systems</u> . Ecosystem-based DRR.						
Unit-III: Syn-Disaster Measures (15 Hours) Syn-disaster measures; response, evacuation, search and rescue, relief and rehabilitation with reference to earthquakes, landslides and floods. Communication during disasters. Emergency operation centre. Mental Health and Psychological Support.						
Unit-IV: Post-Disaster Measures (15 Hours) Post-disaster measures during earthquakes, floods, and landslides. Damage and needs assessment. Restoration of critical infrastructure. Reconstruction and development. Build back better. Hazard-specific management. <u>Ancient Kashmiri Resilient Architecture</u> . Best practices and lessons learned.						
Suggested Reading: 1. Subramanian, R. (2018). Disaster Management. Vikas Publishing House. 2. Sulphery, M.M. (2016). Disaster management. PHI Learning Pvt. Ltd. 3. Coetzee, C. (2010). The development, implementation and transformation of the Disaster Management Cycle. 4. Coppola, D. (2006). Introduction to international disaster management. Elsevier.						

