



Model Course Curriculum for Post Graduate Level

Disaster Risk Reduction and Management

India Universities and Institutions Network
(IUINDRR - NIDM)

2021

National Institute of Disaster Management

(Ministry of Home Affairs, Government of India)



Model Course Curriculum for Post Graduate Level

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National Institute of Disaster Management (NIDM)
(Ministry of Home Affairs, Government of India)

Plot No.15, Pocket 3, Block-B, Sector-29, Rohini, Delhi-110042
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Maj Gen Manoj Kumar Bindal
VSM

Executive Director



सत्यमेव जयते

राष्ट्रीय आपदा प्रबंधन संस्थान
(गृह मंत्रालय, भारत सरकार)
National Institute of Disaster Management
Ministry of Home Affairs, Govt. of India
Plot No.15, Pocket 3, Block-B, Sector-29,
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FOREWORD

Higher Education Institutions, with wide range of academic disciplines and autonomy in functioning can play an important role in disseminating the knowledge about disaster risk through students. They can also undertake researches in the field to enrich the subject knowledge and contribute in assisting the decision making by administrators.

Curriculum, being developed for PG level, besides the subject knowledge has to reflect the combination of knowledge and skills in order to integrate the holistic approach with practical applications, for addressing the concerns of masses related to the disaster. Curriculum has to accommodate certain basic knowledge which must be obtained by everybody undergoing the course leaving enough space for specializations according to regional issues of disaster.

The increased exposure of countries to both natural and human induced hazards pose a threat to lives and sustainable development efforts in addition to regional cooperation. By 2030, India is committed to reduce the disaster impact on life and property to its minimum and hence has given its global commitment for achieving the set targets and goals of Sendai framework. Being a huge task to be achieved in a very short period of time, it becomes imperative to involve every stakeholder and motivate them to contribute. Students, being an important cog in the wheel and large in number, become a potent force in achieving the goals. We must build the capacity of students on DRRM so that the impact of future disasters can be minimized. To effectively reduce disaster risks for communities, we need to recognize the important role education plays in reducing vulnerability and building resilience. Education can be instrumental in building the knowledge, skills, and attitudes necessary to prepare for and cope with disasters, as well as in helping learners and the community to return to a normal life.

India is one of the most disaster-prone countries of the world due to its geographical location and changing climatic conditions. About 56% of the subcontinent's landmass is vulnerable to earthquakes, whereas about 12% is vulnerable to floods, 28% is vulnerable to droughts and 8% of the land is vulnerable to cyclones. Due to climatic variations, there has been an increase in incidences of disasters in the recent decades and have generated the need to produce systematic knowledge on all aspects of disasters. Since the past two decades, the need and importance of scientifically validated knowledge on disasters has been felt and no other institution than universities, as a citadel of knowledge, are the right place where such scientific knowledge can be cumulatively and fruitfully generated.

In this direction, Agenda 6 of Hon'ble Prime Minister's 10-point agenda for DRR focused on the role of higher education in strengthening the field of disaster management in India. NIDM took an initiative to establish the network of Universities and Institutions working in DRR and

launched India Universities and Institutions Network for Disaster Risk Reduction (IUINDRR-NIDM) with an aim to mainstream DRR into higher education institutions. Hence, IUINDRR-NIDM took an initiative to develop the curriculum which can be utilized to educate students on the issues related to disaster management and can opt it as their career by undertaking degree programme. The proposed model curriculum of PG Diploma programme on Disaster Risk Reduction and Management has included elements of disaster related issues to build the knowledge, skills and capacity of the young generation. A recommendation was also made to permit flexibility by allowing the students to exit from a PG degree programme after the completion of first year as per NEP, 2020.

The National Institute of Disaster Management, Ministry of Home Affairs, GOI hosted meetings of the experts from across the country which led to constitution of working group in August 2021. Subsequently the development of the curriculum by the working group members. In the first meeting, Dr. Pankaj Mittal, General Secretary, AIU, New Delhi, suggested that curriculum must be based on the guidelines of New Education Policy, 2020 and each syllabus must be compact in nature where students can opt to gain the knowledge of theoretical aspects as well as practical exposure.

A sub committee of 9 members from across the country was constituted which made the draft report on the curriculum for further consideration of all the members of the IUINDRR-NIDM. The recommendations had been compiled by panel of experts, who had attempted to combine the practical requirements of teaching in the Indian academic context with the need to observe high standards to provide knowledge in the frontier areas discipline. It has also been aimed to build the trained professionals of knowledge of disaster management in global as well as Indian Context.

The National Institute of Disaster Management and IUINDRR-NIDM are grateful to the experts and core committee members, a large number of permanent and co-opted members' in different subjects and their sub disciplines for having worked seriously with committed devotion to produce a Model Curriculum as Post Graduate Diploma Programme.

The exercise would not have been possible without the support of our entire academic community. We hope that the results will fulfill their expectations and also those of university community and Indian society.

The Model Curriculum had been produced to take care of the new concept, skills and to build the capacity of students towards the disaster preparedness and management.

The Post Graduate Diploma Programme in Disaster Risk Reduction and Management would be offered in first year of Post-graduation degree programme. This programme has been designed to develop the skills required for careers in disaster Management. The student may exit from the first-year programme of Post graduate degree with the requirement of minimum credits and may be awarded the certificate of PG Diploma in DRRM. It may also be offered as an independent programme or as per university requirements. Curricula had been designed in the line of New Education Policy, 2020 and as per UGC guidelines.

To meet the need and requirement of the society and in order to enhance the capacity of youth and standards of education, new curriculum and updating of existing curriculum must continue as a perpetual process. If you need to seek any clarification, you may contact Major General Manoj Kumar Bindal, Executive Director, NIDM and secretariat of IUINDRR-NIDM who shall accordingly respond to you after due consultation with the respective experts of the working group.

The National Institute of Disaster Management, Ministry of Home Affairs, Government of India feels immense pleasure in forwarding this Model Curriculum to the UGC with a request to get its copies made, to be forwarded to the concerned Deans and Heads of Departments requesting them to initiate courses on disaster risk reduction and management at Post Graduate level.

The NIDM Model Curricula on PG Diploma in Disaster Risk Reduction and Management may be presented to the universities with options either to adopt it as a Diploma Course module of Postgraduate degree in the field of Disaster Management or as per suggestive model curriculum at First year Postgraduate degree programme. The Universities may adopt after making necessary amendments or after necessary deletion/ addition or after making any change whatsoever which the university may consider right.

May I request UGC chairman to kindly circulate present curriculum on DRR provided here.

NIDM looks forward for your collaboration in this joint venture to mainstream Disaster Risk Reduction in higher education sector to achieve National objective of agenda 6 of Hon'ble Prime Minister of India 10-point agenda for DRR.



(Manoj Kumar Bindal)

ACKNOWLEDGEMENT

We appreciate the trust laid in IUINDRR-NIDM by Hon'ble Minister of State for Home Affairs **Shri Nityanand Rai** and officials of DM Division, Ministry of Home Affairs, Government of India for encouraging and guiding NIDM for taking such initiatives.

We are grateful to the Secretary General, Association of Indian Universities, New Delhi, who provided inputs for the road map of course curriculum and also for giving valuable time in this important initiative. We are also obliged to the Vice Chancellors of Universities for the trust bestowed on Network to convene the working group Panel's activities. The Panel had two major national assignments. The Curriculum Reframe and Reform exercise which would give the path to the field of disaster management to develop the trained pool of professionals in India.


All national activities call for unstinted support of colleagues, which we received. We recognise, rejoice and deeply appreciate their support and work towards this assignment and thank them all - the faculties of NIDM and members of the working group panel and members of the IUINDRR-NIDM who took on the task of drafting instructional content for the curriculum. We are also thankful to the institutions for sharing their updated curriculum. Deep involvement, hectic activity and efforts of many professionals together with similarity in thought for curricula content for Educational Programmes for Disaster's Profession and has brought this curricula to a stage of completion.


An academic exercise of this nature, calls for continued activity in thought while in office, at home, or in meetings regardless to time or day. It indeed created near to full time activity and tasks of coordination to bring this report to close. To bring this report in drafts and to the final one, we thank Prof. Masood Siddiqui and Dr. Vignesh for their continued support and involvement.

We are thankful to the Vice Chancellors of Jamia Milia Islamia, New Delhi; Indira Gandhi National Open University, New Delhi, Central University of Kerala; University of Lucknow, Uttar Pradesh; SRM Institute of Science and Technology Tamil Nadu; Noida International University, Uttar Pradesh; Nazareth College of Arts and Science, Thiruvallur, Tamil Nadu and Dr. Bhimrao Ambedkar University, Agra, Uttar Pradesh; who had nominated their experts to provide their valuable knowledge and experiences for the development of syllabus on DRRM for Higher Education in India. We are grateful to the expert members for sparing their valuable time and giving their expertise for the initiative. It was only through the technical inputs given by the expert members that the present curriculum could be formulated within the stipulated time frame. We are also thankful to all the experts from universities/institutions across the country who have given their inputs and helped in finalization of the course curriculum. Surely, proposed curriculum will create the pool of trained professionals in near future in the field of disaster risk reduction and its management in India.

Special thanks to Major General Manoj Kumar Bindal, Executive Director, NIDM for recognizing the need of developing the Curriculum in the field of DRRM and for giving free hand to the Core Committee Members for the said initiative. We appreciate his important role in this matter.


Dr. Preeti Soni
(Nodal Officer)
Sr. Programme Consultant
(IUIIN-DRR)


Shri Shekher Chaturvedi
(Core Committee Member)
Assistant Professor, NIDM


Prof. Santosh Kumar
(Core Committee Member)
Head, GIDRR and Program Director

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PREAMBLE



Mechanism of Consultations

To capture experiences and knowledge at National level, IUINDRR-NIDM had invited nominations from across the country and constituted working group committee, for the development of zero draft of curriculum on DRRM for PG diploma. In second stage, suggestions on the zero draft prepared by core working group on Disaster Risk Reduction and Management were invited from expert's members of IUINDRR-NIDM from different parts of the country. This exercise was undertaken to get feedback from a wider cross section of the academia and organizations across the nation. Constructive responses were received from various universities/institutions members of IUINDRR-NIDM, which has been incorporated for final syllabus of the curriculums on Disaster Risk Reduction and Management.

Participants in Curriculum Development Committee (CDC) Meetings

Three meetings of the CDC for Disaster Risk Reduction curriculum for PG level were held on the virtual mode between August to October, 2021. These meetings were attended by experts representing different University and branches of higher education where they deliberated upon all aspects of Disaster Risk Reduction Curricula and identified the important topics which may taught as a PG diploma course curricula at Post graduate level. Considering the fact that every region of India having different issues related to disaster and its management, an attempt has been made by NIDM and present Committee to involve experts of different sub subjects related to disaster. Hence, a model syllabus has been developed to build the capacity of the students at Post Graduate level in the field of Disaster Risk Reduction and Management in India.

Basic Framework of the proposed PG Diploma Programme on Disaster Risk Reduction and Management

In order to get the trained professionals in the field of disaster management in India, there is an urgent need to provide an opportunity and exposure to the students on practical aspect of Disaster Management. Field-based study is very much necessary and required. Class room based exercises or practical must be there during the overall teaching process. Thus, the PG diploma programme has included the Practical/Application oriented curriculum to offer an opportunity to understand and build the trained professionals under the spectrum of disaster management related aspects. Hence, the Post Graduate Programme in Disaster Risk Reduction has been designed to develop the skills required for disaster management. The first part of programme is designed in such a way so that after completion of first year, students will get Post Graduate Diploma in Disaster Risk Reduction and after two years, they will get Master/MSc degree in specialized field related to Disaster Management. The student may choose to exit after one year with PGDDRR and may rejoin the second year of the PG programme in any specialized field related to Disaster Management within the specified years mentioned by the UGC.

Members of Working Group for Development of PG Diploma Course curriculums on Disaster Risk Reduction and Management.

The three meetings were held at different intervals in order to develop specific curriculums and consultation held with the larger group of IUINDRR-NIDM academia members to finalize the course.

Members of Working Group

1st Meeting

Dr. (Mrs.) Pankaj Mittal, Secretary General, Association of Indian Universities, New Delhi.

Major General Manoj Kumar Bindal, Executive Director, National Institute of Disaster Management, Ministry of Home Affairs, GOI.

Prof. Santosh Kumar, Head, GIDRR, National Institute of Disaster Management, MHA, GOI.

Prof. Masood Ashan Siddiqui, Head, Department of Geography, Jamia Milia Islamia, New Delhi.

Prof. Anoop Kumar Bhartiya, Head, Department of Social Work, University of Lucknow, Uttar Pradesh.

Prof. Durgesh Nandini, Department of Public Administration, Indira Gandhi National Open University, New Delhi.

Prof. Geetha Bhavani, Head, Department of Chemistry, Noida International University, UP.

Dr. Mary Angeline Santhosam, Principal, Nazareth College of Arts and Sciences, Thiruvallur, Tamil Nadu.

Dr. K.S. Vignesh, School of Public Health, SRM Institute of Science and Technology, Chennai, Tamil Nadu, India.

Prof. Manoj Kumar Singh Rathore, DDU Institute of Rural Development (IRD), Dr. Bhim Rao Ambedkar University, Agra, UP.

Shri Shekher Chaturvedi, Assistant Professor, National Institute of Disaster Management, MHA, GOI.

Dr. Preeti Soni, Senior Programme Consultant, IUINDRR-NIDM, National Institute of Disaster Management, MHA, GOI.

2nd Meeting

Prof. Anoop Kumar Bhartiya, Head, Department of Social Work, University of Lucknow, Uttar Pradesh

Prof. Durgesh Nandini, Department of Public Administration, Indira Gandhi National Open University, New Delhi

Prof. Geetha Bhavani, Head, Department of Chemistry, Noida International University, UP

Dr. Mary Angeline Santhosam, Principal, Nazareth College of Arts and Sciences, Thiruvallur, Tamil Nadu

Prof. Manoj Kumar Singh Rathore, DDU Institute of Rural Development (IRD), Dr. Bhim Rao Ambedkar University, Agra, UP

Dr. K.S. Vignesh, School of Public Health, SRM Institute of Science and Technology, Chennai, Tamil Nadu, India.

Prof. Santosh Kumar, Head, GIDRR, National Institute of Disaster Management, MHA, GOI

Shri Shekher Chaturvedi, Assistant Professor, National Institute of Disaster Management, MHA, GOI

Dr. Preeti Soni, Senior Programme Consultant, IUINDRR-NIDM, National Institute of Disaster Management, MHA, GOI

3rd Meeting

Prof. Masood Ashan Siddiqui, Head, Department of Geography, Jamia Milia Islamia, New Delhi.

Prof. Anoop Kumar Bhartiya, Head, Department of Social Work, University of Lucknow, Uttar Pradesh.

Prof. Geetha Bhavani, Head, Department of Chemistry, Noida International University, UP.

Dr. Mary Angeline Santhosam, Principal, Nazareth College of Arts and Sciences, Thiruvallur, Tamil Nadu.

Dr. K.S. Vignesh, School of Public Health, SRM Institute of Science and Technology, Chennai, Tamil Nadu, India.

Prof. Santosh Kumar, Head, GIDRR, National Institute of Disaster Management, MHA, GOI.

Shri Shekher Chaturvedi, Assistant Professor, National Institute of Disaster Management, MHA, GOI.

Dr. Preeti Soni, Senior Programme Consultant, IUINDRR-NIDM, National Institute of Disaster Management, MHA, GOI

Consultation with academia / IUINDRR-NIDM Members

Apart from formal meetings, ideas were exchanged over e-mail with large number of experts and their suggestions have been incorporated in the final report of all the model curriculums. Informal discussion and exchange of notes with some members (Prof. Masood Ahsan Siddiqui, New Delhi; Prof. Anoop Bhartiya, Uttar Pradesh and Dr. Vignesh K.S, Tamil Nadu) were of great help in formulating the present curriculum. The wisdom contained in the new Syllabus was under the stewardship of Major General Manoj Kumar Bindal, Executive Director, National Institute of Disaster Management, New Delhi.

Contribution by Experts of Academia (members of IUINDRR-NIDM):

Dr R Sivakumar, Professor, Department of Civil Engineering & Coordinator Earthquake Research Cell, SRM Institute of Science and Technology, Kattankulathur, Tamil Nadu.

Prof. Harish Chandra Nainwal, Department of Geology, School of Earth Sciences, Central University HNB Garhwal, Srinagar, Garhwal, Uttrakhand.

Mohd. Masroor Alam, Professor, Department of Civil Engineering, Aligarh Muslim University, Aligarh, UP.

Prof. Masood Ahsan Siddiqui, Head, Department of Geography, Jamia Milia Islamia, New Delhi.

Prof. Ratnesh Kumar Jha, Agronomy and Project Director, Centre for Advance Studies on Climate Change, Dr. Rajendra Prasad Central Agricultural University, Pusa, Bihar.

Professor. A.P. Krishna, Department of Disaster Management, Birla Institute of Technology, Noida, UP.

Dr. Omvir Singh, Professor and Chairman, Department of Geoinformatics, Kurkshetra University, Haryana.

Dr. K. Dharanirajan, Head, Department of Disaster Management, Pondicherry University, Andaman & Nicobar.

Dr. Kiran Jalem, Assistant Professor, Centre for Natural Resource Management, Climate Change & Disaster Mitigation National Institute of Rural Development and Panchayati Raj, Ministry of Rural Development, Gol.

Dr. Jitendra Aherkar, Principal of women College, BL Amlani College of Commerce and Economics, University of Mumbai.

Professor Poonam R Naik, Head, Community Medicine, Yenepoya Medical College, Mangaluru, Karnataka.

Dr. Amit Sinha, Assistant Professor, Institute of Management, Commerce and Economics, Shri Ramswaroop Memorial University, Lucknow, Uttar Pradesh.

Dr. Vignesh K.S, Assistant Professor, Department of Civil Engineering & Disaster Management, SRM Institute of Science and Technology, Tamil Nadu.

Prof. Manoj Kumar Singh Rathore, DDU Institute of Rural Development (IRD), Dr. Bhim Rao Ambedkar University, Agra, UP.

Prof. K. Dharanirajan, Dept. of Coastal Disaster Management, Pondicherry University, Andaman and Nicobar, UT.

Dr. Renu Shah , Associate Professor, Department of Social Work, College of Nirmala Niketan, University of Mumbai, Maharashtra.

Faculty Members of National Institute of Disaster Management, Ministry of Home Affairs, New Delhi, GOI.

**P.G Diploma Programme in
Disaster Risk Reduction
and Management (DRRM)**

P.G Diploma Programme in Disaster Risk Reduction and Management (DRRM)



About the Program:

The Post Graduate Programme in Disaster Risk Reduction and Management will be offered under master degree programme or as per university requirements, designed to develop the skills required for careers in disaster management.

Program Structure:

Year 1: Post Graduate Programme in Disaster Risk Reduction and Management (PGDRRM)

Program Objectives (PO):

The objectives of PGDRRM are:

1. To remember the conceptual knowledge with an integrated approach to various functions of disaster cycle.
2. To develop effective communication and presentation skills required to become a successful professional.
3. To analyze and apply research and analytical skills in decision making.
4. To demonstrate the skills of organizing, planning, controlling, team-building and leadership in the challenging environments of Disaster Management.
5. To apply the various concepts, theories and models in the area of Disaster Risk Reduction, Disaster Prevention, Disaster Response and Rehabilitation etc.
6. To create the professionals in the field of Disaster Management in India.

Minimum Eligibility for admission

Minimum qualification should be graduate in any discipline with 45% marks or as per requirement of University for master program.

Programme Structure

PG Diploma on Disaster Risk Reduction and Management (DRRM)					
Course Code	Name of the Course	L	T	P	C
SEMESTER - I					
PG21101	Physical Geography	3	1	0	4
PG21102	Environment and Ecology	2	1	0	3
PG21103	Introduction to Disaster Management	3	1	0	4
PG21104	Disaster Vulnerability and Risk Assessment	2	1	2	4
PG21105	Research Methodology and Ethics	2	1	0	3
PG21106	Geoinformatics in Disaster Management	2	1	2	4
SEMESTER -II					
PG21201	Occupational Health and Fire Safety Management	3	2	0	5
PG21202	Pandemic Preparedness and Response	3	1	0	4
PG21203	Health Emergencies and Disaster Management	2	1	0	3
PG21204	Emergency, Humanitarian and Incident Response System	2	1	0	3
PG21205	Financial Resilience and Risk transformation	2	1	0	3
PG21206	Internship	1	2	4	5
Total Credits					45

Detailed Syllabus

PG21101	Physical Geography	3	1	0	4
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Unit -I: Weathering and Landforms

Scope and objectives - Geodynamic energy and landform evolution: Type of Weathering - physical, chemical and biological; internal heat energy and gravitational energy in the formation of landforms; Basic geomorphic concepts of landform evolution; Exogenic processes - weathering and geological controls in weathering- chemical weathering processes and products; weathering, erosion and landform alteration.

Unit -II: Fluvial and Glacial Systems

Fluvial system and processes - drainage basin, basin and stream characteristics, drainage types and patterns, Drainage morphometric, erosion, arid topography, transportation and deposition by running water, erosional landforms, depositional landforms; Glacial processes, types of glaciers and glacial landforms, permafrost.

Unit -III: Endogenic Landforms

Endogenic landforms: internal heat source, concept of plate tectonics and its role in the evolution of landforms, earthquakes and related landscape alterations, volcanic landforms, mountain building, rift valley formations; oceanic landforms.

Unit -IV: Oceanic weather pattern

Origin of ocean basins: Continental shelf, slope, rise and abyssal plains: bottom relief of Indian, Atlantic and Pacific Oceans; coral reefs; temperature and salinity of the Oceans; Density of Sea water; Waves, Tides and ocean currents: thermohaline circulation and the oceanic conveyor belt: sea-level changes; Ocean hazards: Sea-level changes - Pollution on marine environment including fisheries - climate change on marine bio-diversity - Coastal Zone Management.

Unit -V: Climate Resilience

Climatology: Origin, composition and structure of the atmosphere; insolation; Distribution of temperature, atmospheric pressure and motion general atmospheric circulation. Classification of world climates; Koppen's and Thornthwaite's Schemes; Heat Budget; Hydrological Cycle: Climate resilience: meaning and concept - indicator of climate resilience - causes and theories of climate resilience.

Books:

1. Huggett, R. H. (2009) "Fundamentals of Geomorphology" Second Edition, Taylor and Francis.
2. Singh, S. (2010), "Geomorphology" Fifth Edition Prayag Pustak Bhavan
3. Muller, O. P. (1993), "Physical Geography of the Global Environment", John Willey & Sons, New York.

References:

1. Critchfield, H. J. (1997), "General Climatology" 4th Ed, Prentice Hall of India, New Delhi
2. Oliver, J. E. and Hidore, J. J. "Climatology: An Atmospheric Science", Pearson Education India
3. Lake, P. (1974), "Physical Geography" The Macmillan Co. of India Ltd., New Delhi.

PG21102	Environment and Ecology	2	1	0	3
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Unit- I: Introduction to Environmental studies

The global concern. Natural Resources and Energy resources- Renewable and Non Renewable; Water resources and Forest resources, Biodiversity and conservation, Threats to biodiversity.

Unit- II: Introduction to ecology

Branches of ecology, habitat and Ecological niche, Ecosystem: Concepts, Types, component, function and structure. Biogeochemical cycles.

Unit- III: Energy flow in ecosystem

Law of thermodynamics, flow of energy in an ecosystem-Food chains-food web; ecological pyramids; Ecological balance; Community dynamics-hydrosphere, xerosere Population dynamics-structural and functional aspects of population-death rate, mortality rate-parasitism, antagonism.

Unit- IV: Introduction to environmental pollution

Sources of pollution, Different types of pollution - Air, water, soil, marine, noise, thermal, water borne and water induced diseases. Pollution case studies-London smog disaster, Bhopal gas tragedy, Minamata tragedy, Ganga and Yamuna pollution, and cost of pollution management/ Causes of environmental pollution.

Unit- V: Social issues and the environment

Sustainable development urban problems related to energy - Climate change- global warming, Acid rains, Ozone layer depletion, nuclear accidents, urbanization - causes of urban growth and environmental problems in urban areas.

Books:

1. Misra, S. P. and Pandey, S. N. (2014), "Essential Environmental Studies" 4th Edition Anne books Pvt. Ltd.
2. Misra, S. P. and Pandey, S. N. (2014), "Environment Ecology" 4th Edition Anne books Pvt. Ltd.

References:

1. Begon, M., Townsend, C.R. and Harper J.L. (2006) Ecology: From Individuals to Ecosystems, 4th Edition, Balckwell Publishers, Malden - Oxford-Carlton.
2. Odum E.P. (2007) Ecology: A Bridge between Science and Society

PG21103	Introduction to Disaster Management	3	1	0	4
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Unit I: Introduction to Disaster Management

Disaster: Definition, Concepts of Disaster- Factors and Significance - Disaster cycle - Phases of Disaster.

Culture of safety, prevention, mitigation and preparedness community based DRR - Impact of Disasters and Hazards.

Unit II: Natural Hazard

Classification of Disaster in detail - History of Disasters and Types of Natural Hazards: Earthquakes,

volcanism, Cyclones, Tsunamis, Floods, Droughts and Famines, Landslides and Avalanches, and GLOF.

Environmental Impacts; Hailstorms, Heat waves and terminal heat, Cold waves, frost and fog.

Unit III: Human Induced Disaster

Classification of Man-made disasters; Socio-technical Disaster-Technological Disaster-Transportation Accidents- Structural Collapse- Nuclear - Industrial Accidents - Oil Slicks and Spills- War and Conflicts.

Unit IV: Disaster Management: Applications and Case Studies

Landslide Hazard Zonation: methodology, Case Studies, Earthquake Vulnerability Assessment of Buildings and Infrastructure: Case Studies, Drought Assessment: Case Studies, Coastal Flooding: Storm Surge Assessment, Floods: Fluvial and Pluvial Flooding: Case Studies; Forest Fire: Case Studies, Man Made disasters: Case Studies, Space Based Inputs for Disaster Mitigation and Management and field works related to disaster management. Outbreaks of Disease and Epidemics.

Unit II: Approaches to Disaster Risk Reduction (DRR)

Various approaches on DRR - Roles and responsibilities of- community, Panchayati Raj Institutions/Urban Local Bodies (PRIs/ULBs), States, Centre, and other stakeholders- State Disaster Management Authority(SDMA) - Early Warning System - Advisories from Appropriate Agencies.

Books

1. Singhal J.P. "Disaster Management", Laxmi Publications, 2010. ISBN-10: 9380386427 ISBN-13: 978- 9380386423
2. Tushar Bhattacharya, "Disaster Science and Management", McGraw Hill India Education Pvt. Ltd., 2012. ISBN-10: 1259007367, ISBN-13: 978-1259007361]
3. Gupta Anil K, Sreeja S. Nair. Environmental Knowledge for Disaster Risk Management, NIDM, New Delhi, 2011
4. KapurAnu Vulnerable India: A Geographical Study of Disasters, IIAS and Sage Publishers, New Delhi, 2010.

References

1. Govt. of India: Disaster Management Act, Government of India, New Delhi, 2005 Government of India, National Disaster Management Policy,2009.

PG21104	Disaster Vulnerability and Risk Assessment	2	1	2	4
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Unit - I: Introduction to Risk Concepts

Risk Concepts, Elements of Risk, Perception of Risk, Acceptable risk, Introduction to risk evaluation; Fundamentals and methodologies for risk analysis, assessment, evaluation and management- Definitions and Overview of risks and dangers- Assessment of risks for different disaster types, extreme event and environmental health risk, carcinogenic materials and environment. Discussion on selected case studies to analyze the potential impact of disasters.

Unit - II: Risk Assessment and Reduction

Risk analysis techniques; Process of Risk assessment, Analytical systems for risk assessment, Natural hazard/ risk assessment, Understanding climate risk, Mapping of risk assessment, Decision making for risk reduction, Problems in risk assessment Participatory risk assessment - Rationale for

people's participation, Role of civil society organizations, Impact of Globalization, Activities and roles for the community action Risk reduction, Participatory risk assessment methods; Requirements in Risk assessment - Risk Reduction-Mainstreaming "Risk" - Role of science and technology in Disaster Risk Reduction - Strategies of Risk reduction, International Mobilization of Risk reduction.

Unit - III: Hazard Vulnerability

Observation and perception of vulnerability- Vulnerability Identification, Vulnerability types and dimensions, Vulnerability- Social factors and economic factors - Vulnerability to shanty settlements; Vulnerability in the city, Risk in Urban areas, Issues in urban planning, Initiatives for risk reduction in India.

Unit - IV: Strategic Planning for vulnerability reduction

Data model for collection of information. Risk assessment applications for disaster mitigation and management problems, Training in Crisis management - Physical & Social infrastructure for Vulnerability reduction - Interactive areas for Vulnerability reduction & Policy making - Hazard resistant designs and construction - Systematic management and Strategic planning for vulnerability reduction.

UNIT- V: Policies and approaches

Prevention and response mechanism, Emergency Management teams, National and International disaster recovery policies and Programs- Institutional Framework and policies.

Books:

1. Wilson, R. and Crouch, A. C. (1987), "Risk assessment and comparisons: An Introduction" CRC Press Pvt. Ltd.
2. Petak, W. J. and Atkisson, A. A. (2010), "Natural Hazard Risk Assessment and Public Policy: Anticipating and Unexpected". Springer New York.

References:

3. Freeman, H. M. (1989), "Standard Handbook of Hazardous Waste treatment and Disposal", Tata McGraw Hill, New York.

PG21105	Research Methodology and Ethics	2	1	0	3
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Unit-I: Research Formulation

Research - types of research and Research problem - Selecting the problem - Necessity of defining the problem - Importance of literature review in defining a problem - Literature review - Primary and secondary sources - reviews, treatise, monographs-patents - web as a source - searching the web - Critical literature review - Identifying gap areas from literature review - Development of working hypothesis.

Unit-II: Research design and methods

Research design - Basic Principles- Need of research design -- Features of good design - Important concepts relating to research design - Observation and Facts, Laws and Theories, Prediction and explanation, Induction, Deduction, Development of Models. Developing a research plan - Exploration, Description, Diagnosis, and Experimentation. Determining experimental and sample designs.

Unit-III: Data Collection and analysis

Execution of the research - Observation and Collection of data - Methods of data collection - Sampling Methods- Data Processing and Analysis strategies - Data Analysis with Statistical Packages - Hypothesis- testing - Generalization and Interpretation.

Unit-IV: Reporting and thesis writing

Structure and components of scientific reports - Types of report - Technical reports and thesis - Significance - Different steps in the preparation - Layout, structure and Language of typical reports - Illustrations and tables - Bibliography, referencing and footnotes - Oral presentation - Planning - Preparation - Practice - Making presentation - Use of visual aids - Importance of effective communication - Research project and various funding agencies.

Unit-V: Application of results and ethics

Environmental impacts - Ethical issues - ethical committees - Commercialization - Copy right - royalty - Intellectual property rights and patent law - Trade Related aspects of Intellectual Property Rights - Reproduction of published material - Plagiarism - Citation and acknowledgement - Reproducibility and accountability.

Books

1. Garg, B.L., Karadia, R., Agarwal, F. and Agarwal, U.K., 2002. An introduction to Research Methodology, RBSA Publishers.
2. Kothari, C.R., 1990. Research Methodology: Methods and Techniques. New Age International. 418p.

References

1. Sinha, S.C. and Dhiman, A.K., 2002. Research Methodology, EssEss Publications. 2 volumes.
2. Trochim, W.M.K., 2005. Research Methods: the concise knowledge base, Atomic Dog Publishing. 270p.
3. Wadehra, B.L. 2000. Law relating to patents, trademarks, copyright designs and geographical indications. Universal Law Publishing.

PG21106	Geoinformatics in Disaster Management	2	1	2	4
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Unit -I: Basics of Remote Sensing

Remote Sensing: History, Development, Definition, Concept & Principles, Electromagnetic Radiation (EMR) and its Characteristics, Wavelength Regions and their Significance, Interaction of EMR with Atmosphere and Earth's Surface: Absorption, Reflectance and Scattering, Atmospheric Windows, Energy Balance Equation, Spectral Response and Spectral Signature, Spectral, Spatial, Temporal and Radiometric resolutions, Concept of Satellite, sensor, orbit. Satellite image and various interpretation techniques, digital image processing techniques.

Unit- II: Data Acquisition

Platform: Balloon, Rocket, Helicopter, Aircraft and Spacecraft, Aerial vs. Satellite Remote Sensing, Satellites and their Specifications: LANDSAT, SPOT, ENVISAT, RADARSAT, IRS, IKONOS, Sensors and their Specifications: MSS, TM, LISS (I,II,III,IV), PAN, WiFS, AWiFS, MODIS, Weather & Communication Satellites; Open data sources.

Unit- III: Basic Concepts of GIS

Definition, Philosophy & Historical evolution of GIS, Spatial vs. non-spatial data, Components of GIS, Spatial data models - Raster and Vector; advantages & disadvantages, Raster Data & its Representation: Data Structure & File format, Data Compression (block code, chain code, run length code, quadtree, MrSID), Vector data representation: Data Structure & File format, Topology, Advantage of DBMS in Context of GIS; Data input and projections, geometric transformation of raster and vector data.

Unit -IV: Satellite Positioning System - An Overview

Introduction to Global Navigation Positioning System, Various Global/Regional Satellite constellations, NAVSTAR GPS signals, Geo-positioning - Basic Concepts, Pseudo Range Measurement, Phase Difference Measurement, Sources of GNSS errors; Datum/Ellipsoid - definition and basic concepts, Global Datum vs. Indian Geodetic Datum, Coordinate Systems, Transformation of coordinates, GNSS Remote Sensing.

Unit- V: DRR using GIS and RS (Practical)

Hazard Evaluation and Zonation - Risk and Vulnerability Assessment, Damage assessment - Land use planning and regulation for sustainable development, Practices for Disaster Risk Management (Hydrological, Environmental and Health); Case Studies.

Books

1. Lillesand, Thomas M. and Kiefer, Ralph, W. (2007). "Remote Sensing and Image Interpretation", 4th Edition, John Wiley and Sons, New York
2. George Joseph & C. Jeganathan (2018). Fundamentals of Remote Sensing 3rd edition, Universities Press, India
3. Roy, P.S. (2000). Natural Disaster and their mitigation. Published by Indian Institute of Remote Sensing (IIRS).

References

1. Bhattacharya, T. (2012). Disaster Science and Management, McGraw Hill Education (India) Pvt. Ltd. ISBN-10: 1259061302; ISBN-13: 978-1259061301

PG21201	Occupational Health and Safety Management	3	2	0	5
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Unit- I: Occupational Hazard

Occupational Hazards - Physical Hazards, Chemical Hazards and Biological Hazards - Radiation Hazards - Psychological Hazards - Work Related Musculoskeletal Disorders -carpal tunnel syndrome CTS- Tendon pain disorders of the neck- back injuries - Indian Occupational Safety Scenario.

Unit - II: Occupational Health and Toxicology

Concept and spectrum of health - functional units and activities of occupational health services, pre-employment and post-employment medical examinations - occupational related diseases, levels of prevention of diseases, notifiable occupational diseases - effects and prevention - cardio pulmonary resuscitation, audiometric tests, eye tests, vital function tests - Industrial toxicology, local, systemic and chronic effects, temporary and cumulative effects, carcinogens entry into human systems.

Unit - III: Accident Investigation and Reporting

Incident Recall Technique (IRT), disaster control, Job Safety Analysis (JSA), safety survey, safety inspection, safety sampling, Safety Audit. Concept of an accident, reportable and non-reportable accidents, unsafe act and condition - principles of accident prevention- Role of safety committee - Accident causation models - Cost of accident. Overall accident investigation process - Response to accidents, India reporting requirement, Planning document, Planning matrix, Investigators Kit, functions of investigator, four types of evidences, Records of accidents, accident reports.

Unit - IV: Fire Safety

Fire properties of solid, liquid and gases - fire spread - toxicity of products of combustion - theory of combustion and explosion- Sources of ignition - fire triangle - principles of fire extinguishing - active and passive fire protection systems - various classes of fires - A, B, C, D, E - types of fire extinguishers - Sprinkler-hydrants-stand pipes - special fire suppression systems.

Unit - V: Regulations for Health, Safety and Environment

Factories act and rules - Workmen compensation act. Indian explosive act - Gas cylinder rules - SMPV Act - Indian petroleum act and rules. Environmental pollution act Manufacture, Storage and Import of Hazardous Chemical rules 1989 Indian Electricity act and rules. Overview of OHSAS 18000 and ISO 14000.

Books

1. Derek, James, "Fire Prevention Hand Book", Butter Worths and Company, London, 1986.
2. Loss Prevention in Process Industries-Frank P. Less Butterworth-Hein UK 1990 (Vol.I, II & III)

References

1. The Factories Act 1948, Madras Book Agency, Chennai, 2000
2. Handbook of Occupational Health and Safety, NSC Chicago, 1982

PG21202	Pandemic Preparedness and Response	3	1	0	4
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Unit I: Emerging and Re-Emerging diseases

Emerging diseases, Remerging diseases, Factors that favour emergence of new diseases, Zoonotic diseases, Overview of most common emerging and Re-Emerging diseases, Epidemic and Pandemic.

Unit II: Outbreak Investigation

Definition of Outbreak, criteria for establishing outbreak, steps of Outbreak infection, Prevention of outbreaks, Trigger alerts, Principles and methods of investigations Food, Water, Air, Vector borne outbreaks.

Unit III: Disease surveillance

Concept of surveillance, Types of surveillance, Surveillance design, IDSP, Surveillance, Surveillance Evaluation, Components of Surveillance system, EWARS, Indicator based surveillance, Event based surveillance system, Application Big data and Artificial intelligence as early warning systems.

Unit IV: Pandemic Disease

Influenza epidemiology, How diseases become Pandemics, Impact of Pandemic to global security and economics, WHO Pandemic Stages, International Health Regulations.

Unit V: Pandemic preparedness

Developing Early warning systems, Rapid Response teams, Capacity building, Importance of Training, Rumor Reporting, Public Health emergencies of International concern.

Books

1. Principles of Epidemiology in Public Health Practice Third Edition. An Introduction to Applied Epidemiology and Biostatistics 2012. Third edition.

References

1. WHO. International Health Regulations (2005 & 2007)
2. Integrated Disease Surveillance Programme <https://idsp.nic.in/index.php>
3. WHO Pandemic Preparedness and Response
https://www.who.int/csr/disease/swineflu/guidance/pandemic_preparedness/en/
4. Epidemic and Pandemic Preparedness and Response, international Red cross, 2015

PG21203	Health Emergencies and Disaster Management	2	1	0	3
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Unit I: Health systems and infrastructure

Introduction; Prioritizing health services; Supporting national and local health systems - Coordination; Primary Healthcare services; Clinical Services; Health Information System Human resources; Financial management for humanitarian response; Monitoring and evaluating the systems.

Unit II: Emergency health services

Introduction; Resilient Health Systems and Infrastructure; Planning Emergency Health services; Mass casualty management; Emergency medical care; Mass event with long-term major implications; Mass event of immediate, limited implication; Intermediate events causing temporary displacement; Mass event long term displacement; Managing essential drug supplies; Post-emergency phase.

Unit III: Emergency Mental Health and Psychosocial Support

Introduction; Stressors, protective factors, and mental health disorder in emergencies; General measures and psychosocial support; Risk factors and intervention strategies; The minimum initial services package (MISP); Maternal health and safe motherhood; Infant and young child feeding in emergencies.

Unit IV: Control of Communicable Diseases

Introduction; Communicable diseases as public health threats; Principles of communicable disease control; General approach for setting up disease control programmes; Major disease in emergency and non-emergency settings; Diseases from the animal sector and other emerging diseases; Monitoring, evaluation and research for disease control programmes.

Unit V: Water, Sanitation and Hygiene in Emergencies

Introduction; Diseases related to water, sanitation and hygiene; Community involvement in disease prevention and mitigation; Improving environmental conditions; Excreta disposal; Water quantity and Water quality; Hygiene and Food safety; Vector borne diseases control; Solid waste

management ; Drainage Lineation; Water and sanitation in cholera outbreak response; Planning guidelines for institutions.

Books

1. International Federation of Red Cross and Red Crescent Societies, 1997. Handbook for Delegates.
2. UNICEF. Assisting in Emergencies: A resource handbook for UNICEF field staff. Prepared by Ron Ockwell, 1986.
3. The Johns Hopkins, Red Cross and Red Crescent “Public Health Guide in Emergencies” Second Edition (2008), International Federation of Red Cross and Red Crescent Societies, Switzerland

References

1. Steve Peak and Paul Fischer. Media Guide 1999. Published by Fourth Estate
2. Dennis Barker. The Craft of the Media Interview. Published by Robert Hale.
3. International Federation of Red Cross and Red Crescent Societies. Guide for Communication.

PG21204	Emergency, Humanitarian and Incident Response System	2	1	0	3
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UNIT I: Emergency Response

Emergency response - Standard Operation Procedure (SOP) for disaster response; Information Management System; Warning Dissemination; Evacuation; Search and Rescue operations; Relief operations; Emergency Operation Center (EOC); Resource Management & Networking - India Disaster Resource Network; Role of Disaster Response Forces and Community Based Organizations (CBO) in emergency response mechanism; Incident Response System.

UNIT II: Communication System

Disaster and Communication: Role of Communication in Disaster, - Nature and Scope of Communication- Sender and Receiver Oriented Views-Models and Processes of Communication as Applied to Disaster Management-Seven Traditions of Communication and Its relevance to Disaster Management-Normative Perspective on Disaster Communication.

UNIT III: Communication Risk

Risk Communication Models of Risk Communication, Theoretical Basis for Risk Communication-Risk Reduction Communication Cycle, Disaster Warnings as Risk Communication-Risk Perception, Hazard Awareness as Risk Communication-Cultural Influences on Risk Communication, Cultural Cognition Theory of Risk-Approaches Influencing Hazard Adjustment and Adoption.

UNIT IV: Media and Public Affairs

Overview of the Media and Public Affairs; Role of Media in Disaster Management: Role of Media in Humanitarian Crisis, Objectives of Mass Media Ethical Issues in Disaster Communication-Understanding News Media Coverage of Disaster, Biases and Stereotypes- Reporting on Disaster-Issues and Challenges, Newsworthiness, News Treatment-Phases of Disaster Reporting, Sources of News-Checklist for Disaster Reporting- Media Relations during Emergency Situations, Alternative Media During Crisis, During Crisis-Tools for Social Media-Applications and Use (Ushahidi, Google Maps).

UNIT V: Risk Management

Living with Risk: Policy Perspectives Sendai Framework for Disaster Risk Reduction-Conflict

Resolution through Collaboration and Consensus-Citizens Forum, Public Voices and Public Sphere, Social Justice Challenges-Media Advocacy for Disaster Management, Building Resilience for Disaster Risk-Case studies in Disaster Communication, Disaster Reporting Assignment.

Books:

1. Calif, T. O., “Effective Health Risk Messages: A Step-By-Step Guide. 1st Edition SAGE Publications, Inc. 2001
2. Singh, R. “Risk Communication: A Handbook for Communicating Environmental, Safety, and Health”. Oxford University Press Pvt. Ltd. (2016)

References:

1. Heinemann, B. (2014), “Disaster Communications in a Changing Media World” 2nd Ed. Amsterdam
2. Disasters and the Media. (2012) Peter Lang Publishing Inc.

PG21205	Financial Resilience and Risk transformation	2	1	0	3
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UNIT - I: Quality Management Systems

Quality Assurance- Definition, Principles, Components; Quality Monitoring Cycle, Quality Assurance Projects-PRICOR and CCCD Approaches: Plan-Do-Check-Act Model, Quality Control, Benchmarking, Best Practice, Auditing, Risk Management, Modular Kaizen method. -ISO Standards - Case Studies.

UNIT - II: Strategic Disaster Management

Introduction Strategy - various definitions- major concepts and frameworks in strategic disaster management: SWOT - experience curve - portfolio theory - strategic thinking and decision making - Environmental - scenario- implementation and evaluation - sustainability - various sources for financing a new venture: finalize your target audience - Identifying Strategies to Reduce the Gap between Financial Vulnerability and Capacity.

UNIT - III: Financial Planning for Natural Disasters

Identifying the natural disasters with Potential Financial Implications in the Community; Measuring Local Government Financial Vulnerability to Natural Disasters; Measuring the Financial Capacity of Local Governments to Address Natural Disasters; Identifying Regional Financial Vulnerabilities.

UNIT - IV: Disaster Financial Management

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; and maintaining accurate financial records and documents in preparation for audits; Supply Chain Management; Knowledge of Procurement and Contracting Practices - performing financial analysis; and maintaining accurate financial records and documents in preparation for audits.

UNIT - V: Disaster Financial Management Activities

Disaster Financial Management Activities - Pre-Disaster Activities - Initial Post-Disaster Activities - Longer- Term Post-Disaster Activities. Disaster Financial Accounting Systems and Management Processes - Disaster Financial Assistance Programs- Case studies.

Books

1. L.M. Bouwer., W.J.W. Botzen., J.C.J.M. van den Bergh., and C.J.H. Aerts “Financial arrangements for disaster losses under climate change”
3. Disaster Financial Management Guide (2020) Federal Emergency Management Agency

References

1. Botzen, W.J.W. and Van den Bergh, J.C.J.M. (2009). Managing natural disaster risk in a changing climate. Environmental Hazards, 8 (3): 209-225
2. Bouwer, L.M., Crompton, R.P., Faust, E., Höpfe, P. & Pielke Jr., R.A. (2007). Confronting disaster losses. Science, 318, 753

PG21206	Internship	1	2	4	5
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Each candidate has to spend at least 8 weeks in an institution / industry /educational Institution/ business house /IT industries or any institute who is working in the field of disaster management, where they need to explore various disaster risk reduction ideologies and methods. At the end of the internship the candidate has to produce an experience certificate, a detailed presentation and a dissertation report.

About the Institute

National Institute of Disaster Management (NIDM) was constituted under an Act of Parliament with a vision to play the role of a premier institute for capacity development in India and the region. The efforts in this direction that began with the formation of the National Centre for Disaster Management (NCDM) in 1995 gained impetus with its redesignation as the National Institute of Disaster Management (NIDM) for training and capacity development. Under the Disaster Management Act 2005, NIDM has been assigned nodal responsibilities for human resource development, capacity building, training, research, documentation and policy advocacy in the field of disaster management.

NIDM is proud to have a multi-disciplinary core team of professionals working in various aspects of disaster management. In its endeavour to facilitate training and capacity development, the Institute has state-of-the-art facilities like class rooms, seminar hall and video-conferencing facilities etc. The Institute has a well-stocked library exclusively on the theme of disaster management and mitigation. The Institute provides training in face-to-face, on-line and self-learning mode as well as satellite based training. In-house and off-campus face-to-face training to the officials of the state governments is provided free of charge including modest boarding and lodging facilities.

NIDM provides Capacity Building support to various National and State level agencies in the field of Disaster Management & Disaster Risk Reduction. The Institute's vision is to create a Disaster Resilient India by building the capacity at all levels for disaster prevention and preparedness.



National Institute of Disaster Management
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