Ch. Charan Singh University, Meerut-250004

S YLLABUS

for

Post Graduate Diploma in Disaster Management (PGDDM)

Effective From

ACADEMIC SESSION 2021-22

Department of Environmental Science

SYLLABUS
Post Graduate Diploma in Disaster Management (PGDDM)

Syllabus Effective from Academic Session 2021-22

Objectives:

It is innovative, skill and employment oriented to attract bright students to the discipline of Disaster Management. Thus, ensuring University – Industry/Administration interface in Skill-based education and community linked approach.

The course is intended to provide –

1. To provide basic conceptual understanding in the dimensions of disasters caused by nature beyond the human control as well as the disasters and environmental hazards induced by human activities.
2. To understand the approaches of Disaster Management.
3. To build skills to respond to disaster.

SEMESTER I		
Course	**Course Title**	**Credits**
Course I	Introduction to Disaster Management	6
Course II	Disaster Management & Community Linkage	6
Course III	Risk Assessment and Vulnerability Analysis	6
Course IV	Disaster Preparedness and Response	6
SEMESTER II		
Course V	Geographical Information System and Information Technology in Disaster Management	6
Course VI	Reporting, Information and Documentation in Disasters	6
Course VII	Recovery, Rehabilitation and Reconstruction	6
Course VIII	E-Governance and Emerging Technology in Disaster Management	6
	Total	48

Members of the Board of Studies-

1. Prof. MK Gupta, Dean Faculty of Science, CCS University, Meerut
2. Prof. AK Chaubey, Coordinator, Department of environmental Science, CCS University, Meerut
3. Prof. JK Tripathi, School of Environmental Sciences, Jawaharlal Nehru University, New Delhi
4. Prof. RP Singh, Department of Energy and Environment, BR Ambedkar University, Lucknow
5. Prof. SK Gupta, Law School, Banaras Hindu University, Varanasi
6. Dr. DK Sinha, Division of Epidemiology, ICAR-IVRI, Izatnagar, Bareilly
7. Dr. PV Malik (Retd. Principal), Sanjay Gandhi PG College, Sarurpur Khurd, Meerut

Sd.-
(AK Chaubey)
Coordinator

Sd.-
(MK Gupta)
Dean Science

Course I	**[6 Credits]**
Introduction to Disaster Management	
Unit 1	Introduction: Hazard, Risk, Vulnerability, Disaster Meaning, Nature, Importance, Dimensions & Scope of Disaster Management; Disaster Management Cycle
Unit II	Natural Disasters: Meaning and nature of natural disasters, their types and effects; *Hydrological Disasters* - Flood, Flash flood, Drought, cloud burst *Geological Disasters*- Earthquakes, Tsunamis, Landslides, Avalanches, Volcanic eruptions, Mudflow Types of Natural Disaster: earthquakes, floods drought, landside, land subsidence, cyclones, volcanoes, tsunami, avalanches, global climate extremes.
Unit III	Man-made Disaster: CBRN – Chemical disasters, Biological disasters, Radiological disasters, Nuclear disasters Fire – Building fire, Coal fire, Forest fire, Oil fire Types of man Made Disaster: : Accidents- road accidents, rail accidents, air accidents, Sea accidents, Pollution (air pollution, water pollution), Deforestation, Industrial waste
Unit IV	Disaster Determinants: *Factors affecting damage* – types, social status, habitation pattern, physiology and climate
Unit V	Factors affecting mitigation – measures, prediction, preparation, communication, area and accessibility, population, physiology and climate

Recommended Books

1. *Disaster Management* by Mrinalini Pandey. Publisher: Wiley India Pvt. Ltd.
2. *Disaster Management: Future Challenges and Opportunities* by Jagbir Singh. Publisher: K W Publishers Pvt. Ltd.
3. *Disaster Management* by Harsh K. Gupta.Publisher: Universities Press
4. *Introduction to International Disaster Management* by Damon, P. Copola. Publisher: Butterworth Heineman
5. *Disaster management and Risk Reduction, Role of Environmental Knowledge* by A.K. Gupta, S.S Niar and S. Chatterjee. Publisher: Narosa Publishing House
6. *Managing Natural Disasters* by S. Modh. Publisher: Mac Millan Publishers India Ltd.
7. *Natural Disasters and Indian History* (Oxford India Short Introductions Series) by Tirthankar Roy. Publisher: Oxford
8. *An Introduction to Disaster Management Natural Disasters and Man Made Hazards* by S Vaidyanathan. Publisher: CBS Publishers and Distributors

Course II	**[6 Credits]**
Disaster Management & Community Linkage	
Unit I	International Case Studies in Disaster Management Japan's Tohoku Earth Quake (2011); Nepal Earthquake (2015); China floods (2016); Thailand floods (2017); Hurricane Katrina (2005); East Africa Drought (2017); Volcanic Eruptions: Case Studies Of Italy (2019)
Unit II	National Case Studies in Disaster Management Indian Ocean Earthquake (2004)(Tsunami) and Gujarat Earthquake (2001); Uttarakhand Flash Floods (2021) and Kashmir Floods (2014); Drought Management in Gujarat & Rajasthan; Landslides in Shiwalik Hills; Avalanches in Jammu and Kashmir; Bhopal Gas Tragedy (1984)
Unit III	Community based Approach Community Based Disaster Management Human Behavior and Response: Individual, Community, Institutional Community Participation and Awareness
Unit IV	Community Health Community Health During Disasters; Drinking Water; Food and Nutrition; Hygiene and Sanitation; Community Health Management
Unit V	Soft skills for Disaster Manager Disaster Manager; Leadership and Coordination in Disaster Management; Life skill and Time Management Skills

Recommended Books

1. *Disaster Science and Management* by Tushar Bhattacharya. Publisher: McGraw Hill
2. *Crisis and Disaster Management Turbulence and Aftermath* by A K Mukhopadhyay. Publisher: New Age International (P) Ltd.
3. *Disasters 2.0: The Application of Social Media Systems for Modern Emergency Management* by Adam Crowe. Publisher: CRC Press
4. *Seismic Microzonation using Remote Sensing and GIS: Earthquake disaster management of Coimbatore district - A modern approach* by Aneesh Kochukrishnan K. and Kartic Kumar. Publisher : LAP LAMBERT Academic Publishing
5. *Disaster Risk Communication: A Challenge from a Social Psychological Perspective* (Integrated Disaster Risk Management) by Katsuya Yamori (Editor). Publisher : Springer

Course III	**[6 Credits]**
Risk Assessment and Vulnerability Analysis	
Unit I	Introduction: Risk Concepts, Elements Of Risk, Perception of Risk, Acceptable risk, 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 II	Risk Assessment & 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; Participatory risk assessment methods
Unit III	Vulnerability Observation and perception of vulnerability: Vulnerability Identification; Vulnerability types and dimensions; - Social factors and economic factors of Vulnerability; Vulnerability in the rural and Urban areas; Issues in urban planning; Initiatives for risk reduction in India
Unit IV	Strategic development for Vulnerability reduction I Physical & Social infrastructure for Vulnerability reduction Hazard resistant designs and construction
Unit V	Strategic development for Vulnerability reduction II Interactive areas for Vulnerability reduction & Policy making Systematic management and Strategic planning for vulnerability reduction

Recommended Books

1. Human System response to Disaster: An Inventory of Sociological Findings by TE Drabek. Publisher NY-Springer-Verlag.
2. *Disaster Management in India* by RK Pandey. Publisher: SAGE Publications India Pvt Ltd.
3. *Disaster, Vulnerabilities and Risks - Trends, Concepts, Classifications & Approaches* by PC Sinha, Publisher: SBS Publishers and Distributors Pvt Ltd.
4. *Threat Assessment and Risk Analysis: An Applied Approach* by Gregory Allen & Rachel Derr. Publisher: Butterworth-Heinemann
5. *Vulnerability Analysis of Ambient Air Quality in Industrial Zone* by Rameeja Shaik, Kaizar Hossain. Publisher: LAP LAMBERT Academic Publishing

Course IV	**[6 Credits]**
Disaster Preparedness and Response	
Unit I	Disaster Preparedness Disaster Preparedness: concept and significance; Disaster Preparedness Measures; Institutional Mechanism for Disaster Preparedness; Disaster preparedness with special needs/ vulnerable groups; Disaster Preparedness: Policy and Programmes
Unit II	Disaster Preparedness Plan Concept and Significance of Disaster Preparedness Plan; Disaster Preparedness Plan essentials; Community Based Disaster Preparedness plan; Prediction, Early Warnings and Safety Measures of Disaster
Unit III	Role of Different Organizations / Institutions Role of Information, Education, Communication, and Training; Role of Government, International and NGO Bodies; Role of Information Technology (IT) in Disaster Preparedness; Role of Geographers on Disaster Management
Unit IV	Disaster Response Essential Components of Disaster Response; Disaster Response Plan; Resource Management- Financial, Medical, Communication, Transportation, Food and essential commodity (Identification, Procuring, Propositioning and deployment); Directing and controlling functions; Communication, Participation & activation of Emergency Preparedness Plan; Logistics Management; Emergency support functions; Need and damage assessment
Unit V	Coordination in Disaster Response Disaster Response Plan - Communication, Participation, and Activation of Emergency; Preparedness Plan; Search, Rescue, Evacuation and Logistic Management

Recommended Books

1. *Disaster Management and Preparedness* by NG Dhawab & AS Khan. Publisher: CBS Publication
2. *Disaster Management and Preparedness* by Larry R. Collins. Publisher: CRC Press
3. *Disaster management: medical preparedness, response and homeland security* by R Arora & P Arora. Publisher: CABI
4. *Improving Disaster Management: The Role of IT in Mitigation, Preparedness, Response, and Recovery* by Ramesh R. Rao, Jon Eisenberg, et al. Publisher: National Academic Press
5. *Development and Implementation of Disaster Management System* by Mohd. Abu Kausar & Mohd. Nasar. Publisher : LAP LAMBERT Academic Publishing

Course V	**[6 Credits]**
Geographical Information System and Information Technology in Disaster Management	
Unit I	Geographical Information System (GIS) Definition of GIS, Concept of Space and Time, Spatial data Unit - 2 Map Projection and Datum; Domains of Spatial information system; Components of GIS (/Hardware, Software, Data, People and Process); GIS Functionalities for end user / system (Data Acquisition, Data Input, Data Management, Data Analysis, Data Modeling and Data Output)
Unit II	Remote Sensing Introduction; Fundamentals of Remote Sensing; Electromagnetic Radiation; Electromagnetic Spectrum; Energy interaction with Atmosphere; Energy interaction with Earth Surface; Platform and Sensors; Characteristics of Image; Image Interpretation and Analysis (Visual Image Interpretation; Digital Image Processing; Microwave Remote Sensing; Remote Sensing Application in Disaster Management; Scenario of Indian Remote Sensing Satellites in future
Unit III	Advanced Technologies for Warning System Definition of Early Warning System; Community Early Warning System; Core Components of People centered Early Warning System; Emergency Communication System; Wireless Communication; Bluetooth Wireless Technology; GPS Application in Emergency Communication; Remote Sensing and GIS Application in Warning System; Cyclone Warning System and Tsunami Warning System
Unit IV	Role of Information Technology in Disasters Disaster management Information System; Organizing and effective dissemination of information (feedback for improving information); Role of Communication in Disasters; Types of communication in case of disasters (HAM radio, Satellite, Video Conferencing, Electronics devices)
Unit V	Computer Application Introduction to computer (components and functions); Data Storage (Primary and Secondary storage); Introduction to various computer devices (keyboard, mouse, printers, disk files, floppies etc.); Operating systems (DOS, Windows and UNIX) Use of MS-Office Package, MS Word, MS Excel, MS Access; Use of Internet

Recommended Books

1. ***The Role of Geographic Information Systems/Remote Sensing in Disaster Management*** by Deborah S.K. ThomasKivanc¸ Ertuˆgay Serkan Kemec
2. ***Remote Sensing: Principles and Applications*** by B C Panda. Publisher: Viva Books
3. ***Advanced ICTs for Disaster Management and Threat Detection: Collaborative and Distributed Frameworks*** by Eleana Asimakopoulou and Nik Bessis (Eds). Publisher: IGI Global
4. ***Geospatial Information Technology for Emergency Response*** by Sisi Zlatanova & Jonathan Li (Eds). Publisher: CRC Press
5. ***Information Technology in Disaster Risk Reduction*** by Murayama, Yuko, Velev, Dimiter, Zlateva, Plamena (Eds.). Publisher: Springer International Publishing

Course VI	**[6 Credits]**
Reporting, Information and Documentation in Disasters /Project	
Unit I	Media Types of Media Importance of role of media – informative, suggestive and analytical Role of Media in Disaster Mitigation
Unit II	Reporting Factual and Ethical Reporting Impact of Media Coverage and Public Communication and Handling of Media
Unit III	Documentation Principles of Report Writing and Guidelines according to style manuals Writing and Presentation of Preliminary, Main body and Reference section of Report,
Unit IV	Evaluation of Research Report
Unit V	Topic / Case Study Disaster Affected Area: Cyclone – Odisha 1999 Super Cyclone, Flood – Bihar floods, Assam; Tsunami – Tsunami of South India; Heat waves – Heat waves of Andhra Pradesh, Odisha; Cold waves – Cold waves of U.P.; Earthquakes – Bhuj Earthquakes; Landslides – landslides in North East, Uttarakhand; Air Pollution – Bhopal Gas Tragedy; Shelter Home: Cyclone OR Any topic relevant to either Natural Disaster or Man-Made Disaster.

Recommended Books

1. ***Global Aerospace Monitoring and Disaster Management*** by Valery A. Menshikov, Anatoly N. Perminov & Yuri M. Urlichich. Publisher: Publisher : Springer
2. ***Handbook of Disaster Research*** by Havidán Rodríguez, Enrico L. Quarantelli, Russell R. Dynes. Publisher: Spriger
3. **Disaster Management And Preparedness** by NG Dhawan & AS Khan. Publisher: CBS Publisher & Distributor.
4. **Disaster and Development** by Sanjay Rohilla**.** Publisher: Scitus Academics.
5. ***Handbook of Disaster and Emergency Management (PDF)*** **by Amir Khorram-Manesh.. https://www.researchgate.net/publication/316622206**

Course VII	**[6 Credits]**
Recovery, Rehabilitation and Reconstruction	
Unit I	Rehabilitation, Reconstruction and Development Concept, Meaning, Types of Rehabilitation and Reconstruction; Importance of Disaster Mitigation; Cost – benefit analysis; Relationship between vulnerability and development; Damage Assessment- Post Disaster Damage assessment, estimated damage assessment due to probable disasters; Epidemiological Surveillance; Nutrition Centered Health Assessment; Remote sensing and Aerial photography; Nature and damage to houses and infrastructure due to different disasters
Unit II	Role of Different Organizations in Rehabilitation The Government and Disaster Recovery and rehabilitation; Disaster and Non-Governmental efforts; Role of Local Institutions (Insurance, Police, Media)
Unit III	Reconstruction & Disaster Resistant House Construction Speedy Reconstructions- Essential services, Social infrastructures, Immediate shelters/camps, Contingency plans for reconstructions; Developing Physical and Economic Infrastructure; Guidelines for Disaster resistant construction (traditional techniques, seismic strengthening of houses in low rain/High rainfall area, earthquake resistant construction technique) Funding arrangements- Funding arrangements at state level and central level, Fiscal discipline, role of International agencies, mobilization of community for resource generation
Unit IV	Rehabilitation Socio- economic Rehabilitation- Temporary Livelihood Options and Socio-Economic Rehabilitation; Education and awareness and role of Information Dissemination; Participative Rehabilitation; Role of various agencies in Recovery Work (Monitoring and Evaluation of rehabilitation work, Rehabilitation process)
Unit V	Recovery Concept of recovery, livelihood and approach to reconstruction; Livelihood restoration speedy recovery; Linking Recovery with safe development; Creation of Long-term job opportunities

Recommended Books

1. ***Post-Disaster Reconstruction*** *by Mathew Clarck et al.* Publisher: Taylor & Francis Ltd
2. ***Post-Disaster Reconstruction and Change*** by Jenifer F Duine, Barestein & E Leemann. Publisher: CRC Press
3. ***Disaster and Rehabilitation Management*** by Rajbir Singh & Rajesh K. Yadav. Publisher: Oxford Book Company
4. ***A Safer Future: Reducing the Impacts of Natural Disasters*** *by US National Committee for the Decade for Natural Disaster Reduction.* Publisher: National Academy of Sciences, USA
5. ***Disaster Response and Recovery: Strategies and Tactics for Resilience*** by David A. McEntire. Publisher: WILEY

Course VIII	**[6 Credits]**
E-Governance and Emerging Technology in Disaster Management	
Unit I	E-Governance E-Governance : Concept and Significance; E-Governance in Urban Development; E-Governance in Rural Development; ICT Implementation in Governance (issues and Challenges)
Unit II	Disaster Epidemiology Epidemiological Study of Disaster; Education and Training in Health Management of Disasters; Role of Information and Communication Technology in Health Response;
Unit III	Emerging trends in Disaster Management 1 Use and Application of Emerging Technologies in Disaster Preparedness-I Use and Application of Emerging Technologies in Disaster Preparedness-II Disaster Management (Recent Trends)
Unit IV	Emerging trends in Disaster Management 2 Emerging Trends in Disaster Mitigation-I Emerging Trends in Disaster Mitigation-II Disaster and Development
Unit V	Prevention of Risk

Recommended Books

1. ***Natural Hazards and Disaster Management: Vulnerability and Mitigation*** by R B Singh. Publisher:Rawat Publication
2. ***Disaster Mitigation: Experiences and Reflections*** by Pradeep Sahni, Alka Dhameja & Uma Medury. Publisher: PHI Learning Pvt. Ltd
3. ***Advanced ICTs for Disaster Management and Threat Detection: Collaborative and Distributed Frameworks*** by Eleana Asimakopoulou & Nik Bessis. Publisher: IGI Global
4. ***Disaster Risk Management Through Ict*** by S.R.Boselin Prabhu. Publisher: Eviencepub Publishing
5. ***Disaster management and risk reduction*** by Vishwambhar Prasad Sati. Publisher: Aaviskar Publishers