

KERALA UNIVERSITY OF FISHERIES & OCEAN STUDIES
M.Sc. DISASTER MANAGEMENT
Credit & Semester System
SCHEME OF EXAMINATION

SEMESTER – I

Sl. No	COURSE CODE	COURSE TITLE	L	P	C	Internal Marks	External Marks
1	DM2101	Fundamentals of Geology	4	0	3	50	50
2	DM2102	Geophysics	4	0	3	50	50
3	DM2103	Meteorology and Oceanography	4	0	3	50	50
4	DM2104	Fundamentals of Disaster Management	4	0	4	50	50
5	DM2105	Institutional and Legal Framework on Disaster Management	4	0	4	50	50
6	DM2106	Natural Hazards	4	0	4	50	50
7	DM2107	Practical	0	6	3	50	50
		TOTAL			24		

SEMESTER – II

Sl. No	COURSE CODE	COURSE TITLE	L	P	C	Internal Marks	External Marks
1	DM2201	Marine and Atmospheric Hazards	4	0	3	50	50
2	DM2202	Anthropogenic Hazards	4	0	3	50	50
3	DM2203	Disaster Monitoring and Data Acquisition	4	0	4	50	50
4	DM2204	Geo-technology in Disaster Management	4	0	4	50	50
5	DM2205	Modelling of Disasters and Early Warning Strategy	4	0	4	50	50
6	DM2206	Chemical, Radiological and Biological Hazards	4	0	3		
7	DM2207	Practical	0	6	3	50	50
		TOTAL			24		

SEMESTER – III

Sl. No	COURSE CODE	COURSE TITLE	L	P	C	Internal Marks	External Marks
1	DM2301	Climate Change and Environmental Impact Due to Disaster Events	4	0	4	50	50
2	DM2302	Geospatial Technologies in Disaster Management	4	0	4	50	50
3	DM2303	Preparedness, Vulnerability and Risk Assessment of Disasters	4	0	4	50	50
4	DM2304	Rehabilitation and Mitigation Issues and Management of Resources	4	0	3	50	50
5	DM2305	Relevance of Actuarial Science and Public Sanitation and Health Care in Disaster Management (E)	4	0	3	50	50
6	DM2306	Socio-psychological Issues and Community Participation Disasters Management	4	0	3	50	50
7	DM2307	Fire and Safety (E)	4	0	3	50	50
8	DM 2308	Practical	0	6	3	50	50
		TOTAL			24		

SEMESTER – IV

Sl. No	COURSE CODE	COURSE TITLE	L	P	C	Internal Marks	External Marks
1	DM2401	Project Work and Viva voce	0	26	22	50	50
		TOTAL			22		

Total Credits = 94

Conditions

1. 15-21 days must be a field work as a part of practical during I & II semesters
2. Fire and Safety is brought into III semester.
3. The project oriented dissertation is alone kept in IV semester with 22 credits, having 540 hours.
4. All the papers have been assigned with five units uniformly keeping in mind the guidelines of the UGC and KUFOS so as to meet the perception of employment and research opportunity.
5. The teaching faculty may be pooled up from the allied departments since it is a multidisciplinary course and can be outsourced wherever it is essential.
6. The University should appoint Faculty members as per UGC norms with the specialization on Geology/Geophysics/Physical Oceanography/Disaster management/Earth and Atmospheric sciences.

SEMESTER – I

DM2101 Fundamentals of Geology

UNIT I

Introduction: Earth system-Origin of the Earth - Shape, size and structural composition - Rock types: Rock as an aggregate of minerals-Igneous-Sedimentary and Metamorphic rocks-Structure and textures and classification of these rocks- Associated landscapes- Outline of the Geology of India.

UNIT II

Weathering - Process: Types-Mechanical weathering-Chemical weathering-Factors affecting weathering-Weathering of Granite and Basalt- Karst topography-Mass wasting-Landslide- Soils-Formation-Types-Factors affecting soil formation-Soil profile and constituents.

UNIT III

Rocks: Introduction-Bedding in rocks; Dip-Strike -Use of Clinometer and Brunton compass. Engineering significance/Relevance of Dip & Strike in Disaster Management. Geologic structures: Folds – Faults – Lineaments –Dykes –Joints - Unconformities: Nomenclature-Classification-recognition-Engineering significance in site selection & Disaster Management. Geomorphology: Geomorphic processes - Endogenic and Exogenic forces - Work of river - Work of wind and waves - Glaciers, Underground water –Erosion-Transportation and Deposition- Coastal processes and landforms.

UNIT IV

Hydrological cycle: Precipitation- Evapotranspiration- Runoff –Seepage – Types of Aquifer – Groundwater -Seasonal and Regional fluctuations - Water Table, Cone of Depression - Water balance - Drainage basin characteristics-Recharge process-Water resource management and conservation.

UNIT V

Ocean: Structures - Relief and Continental shelf- Submarine geomorphology and mineral resources of the sea - Sediment Transport-Tides-Factors influencing ocean processes-Ocean resources-types, importance and distribution.

REFERENCE

1. Patwardhan, The Dynamic Earth System, Prince Hall Inc.
2. H.J. De Blij and Peter O. Muller "Physical Geography of the Global Environment", John Willey & Sons, New York. 1993
3. Howard J. Critchfield "General Climatology" 4th Ed, Prentice Hall of India, New Delhi, 1997

4. John E. Oliver and John J. Hidore, "Climatology: An Atmospheric Science", Pearson Education India
5. Philip Lake "Physical Geography" The Macmillan Co. of India Ltd., New Delhi, 1974
6. Sharma and Vittal "Oceanography - A view of the Earth", Prentice Hall, New Jersey, USA, 1972
7. Tom Garrison, "Essentials of Oceanography" 9th Ed, Cengage Learning, Brooks/Cole, USA, 2012. ISBN: 978-0-8400-6155-3
8. William D. Thornbury "Principles of Geomorphology" New Age International Publishers, New Delhi, 1996
9. John M. Wallace and Peter V. Hobbs "Atmospheric Science, Second Edition: An Introductory Survey (International Geophysics)", 2nd Ed, Academic Press, 2006. ISBN-13: 978-0127329512
10. James R. Holton and Gregory J Hakim "An Introduction to Dynamic Meteorology" 5th Ed, 2012. ISBN-13: 978-0123848666
11. Marland P. Billings, "Structural Geology" Third Edition, Pearson Education, 2016. ISBN-10: 9789332577565, ISBN-13: 978-9332577565
12. John Pethick, "Introduction to Coastal Geomorphology", John Wiley & Sons Inc, 1995. ISBN-13: 978-0470249611
13. Francis Parker Shepard, "Submarine Geology" 3rd Edition, Harper & Row, 1973. ISBN-13: 978-0060460914
14. James P. Kennett, "Marine Geology", Pearson Education, 1981. ISBN-13: 978-0135569368

DM2102 Geophysics

UNIT I

Introduction: Application of Geophysics in Disaster Management, Physical properties of earth materials, Active and passive methods, Basic Concepts of the Exploration Seismic Method: Stress and strain; Young's modulus, shear and bulk modules; Poisson's ratio; P and S waves; surface waves; seismic velocity; acoustic impedance; Snell's law ; wave fronts; ray paths; reflection and transmission coefficients; elastic constants.

UNIT II

Gravity Method and its application in Disaster Management-Basic Theory : Newton's Law of universal gravitation; acceleration and potential; units of acceleration; calculation of acceleration due to a spherical shell and to a solid sphere; concepts of density contrast; density of earth materials. The Gravity Method-Instrumentation Sensitivity requirements for gravity measurements, stable and unstable gravity meters, Worden, and Lacoste & Romberg gravimeters.

UNIT III

Magnetic Method and its significance in Disaster Management – Magnetic force; magnetic field strength; magnetic moment; intensity of magnetization; magnetic susceptibility. Magnetic Properties of Rocks; Classification of rocks on basis of magnetic susceptibility, para-magnetism, diamagnetism, ferromagnetism. The Geomagnetic Field, Intensity at a point due to a magnetic dipole; geomagnetic elements; magnetic anomalies.

UNIT IV

Radioactivity of the Earth: Radioactive elements in the earth; theory of radioactive decay; simple decay scheme; the Rubidium-Strontium, Potassium-Argon and Uranium-Lead dating methods. The Earth's Internal Heat Transfer Mechanisms; Fourier's law of heat conduction; heat transport in the earth; continental and oceanic heat flows; heat generation by radioactive isotopes.

UNIT V

Principles of electrical and electromagnetic method - Vertical loop (VLEM) - Horizontal loop - (HLEM) –Very Low Frequency (VLF) - Audio Frequency Magnetics (AFMAG) - Time Domain systems - Terrain Conductivity. Magneto Telluric (MT) and Transient Electromagnetic (TEM) methods of geophysical exploration. MT theory, origin of the MT and telluric fields. Processing and interpretation of MT and TEM data. Electrical methods and applications-Introduction to Ground Penetrating Radar (GPR).

REFERENCES

1. Keller, G.V. Electrical Methods in Geophysical Prospecting, Frischnett, Pergamon
2. Patra, H.P. and Mallick, K. Principles of Geoelectric Soundings
3. Telford, W. K and Geldart, L.P., Sheriff, R. F and Keys D.A Applied Geophysics Cambridge University Press
4. M. E. Best, Geological Association of Canada (1992) Resistivity mapping and electromagnetic imaging, Geological Association of Canada
5. Mikhail Semenovich Zhdanov, George Vernon Keller (1994) The geoelectrical methods in geophysical exploration, Elsevier
6. John D. Corbett (1991) Electromagnetic Methods in Applied Geophysics, Society of Exploration Geophysicists
7. Stanislav Mares et al., (1984) Introduction to Applied Geophysics, D. Reidel Publishing Company, Dordrecht/Boston
8. Telford, W.M., Goldart, L.P., Sheriff, R.E. and Keys, D.A., (1981) Applied Geophysics, Cambridge University Press, Cambridge.

DM2103 Meteorology and Oceanography

UNIT I

Atmosphere: Structure and Composition-Insolation-Radiation-Horizontal and Vertical distribution of temperature-Wind and Pressure System-Cyclone and anticyclone-Types-Formation. Monsoon- Clouds and Types-Formation of Thunder and types of Lightning-Characteristics-Precipitation-Climatic classifications-Weather information and forecasting

UNIT II

Physical Oceanography: Physical properties of sea waters; temperature, salinity, density. Thermal and optical properties of seawater. Water masses. Waves-generation, propagation and breaking, shoreline changes. Currents-Wave generated, Thermo-haline, Turbidity currents (gravity), Large-scale (gyres) oceanic circulation, Nearshore currents, Major currents of the world oceans. Circulation patterns and currents in the Indian Ocean. Coriolis forces upwelling. Dimensions of Oceans. General characteristics, effects of fields of pressure, gravity and mass on water. Upwelling and sinking. Tides: tide-producing forces and tide characteristics.

UNIT III

Chemical Oceanography: Water and Salts in the Sea, Major Constituents, Simple Gases & CO₂ System, Marine CO₂ System, Trace Elements, Nutrients, Sediment geochemistry, Dissolved and Particulate Carbon, Radioactive & Stable Isotopes, Organic Molecules, Organics & Marine Pollution, Anoxic Environments, Exchange at Boundaries, Ocean Resources, Geochemical History

UNIT IV

Biological Oceanography: The sea as a Biological environment: classification of marine environment; general characters of the populations of the primary biotic divisions (plankton, nekton and benthos). Introduction of plankton; general classification, composition and floating mechanism of plankton. Collection of plankton; general account of instruments and nets employed; methods of fixation and preservation of plankton; analysis of samples, methods of estimating standing crop of plankton. Plankton in relation to fisheries; general account. Distribution of plankton in space and time; horizontal distribution; neritic and oceanic plankton; geographical distribution; indicator species. Distribution, vertical migration; seasonal changes in plankton.

UNIT V

Marine Pollution: Definition by GESAMP, major sources of pollution, dynamics, transport paths and agents. Toxicology: Lethal and sub lethal effects of pollutants on marine organisms, evaluation of toxicity tolerance, bioassay. Enzymatic removal of hazardous organic substances from aqueous effluents. Sewage: composition and fate in the marine environment, toxicity and treatment methods, sewage disposal system. Environmental Impact Assessment Methods of aquaculture activities. Oil pollution: Sources and fate of oil, composition and toxicity of oil, biological effects treatment procedures. Thermal and radioactive pollutants: Source and characteristics, strategies for disposal of RNA and Heated effluents, biological effects and

alternative uses of waste dumping, mining and dredging operations, their effects on the organisms and marine environment.

REFERENCES

1. Svedrup H.U, Johnson, M.W. & R.H. Fleming (1942)The Oceans, Prentice Hall,
2. Tait, R.V (1972) Elements of Marine Ecology, 2nd edition, Butterworths
3. Pickard. G.L (1963) Descriptive physical – Oceanography, Pergamon Press,
4. King, C.A.H., (1975) Introduction to Physical and Biological oceanography, ELBS Ltd., London
5. Angel, M.V (1975) Biological Oceanography, Methuen
6. Nair, N.B. & D.M. Thampy (1980) A text book of Marine Biology, Macmillan
7. Ryamont, J.E.G., (1980) Plankton and productivity in Oceans. Vol. 1: Phytoplankton, Vol.II, Zooplankton, Pergamon Press
8. Parsons, T.R. Takahashi, M. and B. Hargrave (1977) Biological Oceanographic processes, Pergamon
9. Broecker W.S.2nd edition, (1974) Chemical Oceanography. Harcourt Brace, Jovanovich,
10. Riley O.P. & G.S.Skirrow (1975) Chemical Oceanography, 2nd edition, Vols. I-IV, Ademic Press,
11. A.M.Chakravarthy (1928) Biodegradation and detoxification of Environmental pollutants, CRC Press,
12. O.Kinne: (1984) Marine Ecology, Vol.V.Ocean Management 3&4, John Wiley & Sons,
13. Johnston R. (Ed.) : (1976).Marine Pollution, Academic Press
14. Patin. S.A (1982) Pollution and Biological resources of the Oceans, Butterworth & Co. Ltd.
15. Venugopalan, V.K. (1991) Pollution and Toxicology, CAS in Marine Biology
16. Hilary B. Moore (1958) Marine Ecology, John Wiley & Sons
17. C Donald Ahrens (2008) Meteorology Today: An Introduction to Weather, Climate, and the Environment-9th Edition, Wadsworth Publishing Co Inc
18. John M. Wallace & Peter V. Hobbs (2006), Atmospheric Science : An Introductory Survey (INTERNATIONAL GEOPHYSICS SERIES), Academic Press
19. Donald Ahrens (2014), Essentials of Meteorology : An Invitation to the Atmosphere, Cengage Learning
20. G.B Pant and Rupa Kumar (1997), Climates of South Asia, Wiley & Sons
21. Roger Barry and Richard Chorley (2004), Atmosphere, Weather and Climate, Taylor and Francis

DM2104 Fundamentals of Disaster Management

Unit I

Introduction: Disaster-Definition, Factors and Significance; Hazard and Disaster; Terminology in Disaster Management (vulnerability, risk, capacity building); Natural and Man-made Disasters: Types and Causes. Disaster Management Concepts: Elements of disaster management, Scope and objectives of disaster management, Approaches to disaster management, Disaster Management Cycle. Paradigm Shift: Past Initiatives by some States, Paradigm Shift in Disaster Management.

Unit II

Natural Disasters: History and global geographic distribution of Disasters: Earthquakes, Volcanoes, Cyclones, Tsunamis, Storm surge, Floods, Droughts, Famines, Landslides, Avalanches, Sea level rise and Coastal erosion.

Unit III

Man-Made Disasters: Chemical, Industrial (including mining) and Nuclear Accidents, Oil Slicks and Spills, Accidents(Air, boat & road accidents) & Environmental Disasters (Air, water & soil pollution- sources and remedial measures), War and Conflicts.

Unit IV

Impacts of Disasters: Economic Consequences, Loss of Human and Animal Lives, Destruction of Ecosystem and Environment. Impact on Health and Sanitation (Diseases and Epidemics)

Unit V

Disaster Prone Areas in India: Study of Seismic Zones; Areas Prone to Floods, Droughts, Landslides, Avalanches, Cyclones, Coastal Erosion and Tsunami.

Books Recommended

1. Bryant Edwards (2005): Natural Hazards, Cambridge University Press, U.K.
2. Carter, W. Nick, 1991: Disaster Management, Asian Development Bank, Manila.
3. Central Water Commission, 1987, Flood Atlas of India, CWC, New Delhi.
4. Central Water Commission, 1989, Manual of Flood Forecasting, New Delhi.
5. Government of India, 1997, Vulnerability Atlas of India, New Delhi.
6. Sahni, Pardeep Et.Al. (Eds.) 2002, Disaster Mitigation Experiences and Reflections. Prentice Hall of India, New Delhi.
7. R. Nishith, Singh AK 2012 Disaster Management in India: Perspectives, issues and strategies New Royal book Company, Lucknow
8. Sharma, Kadambari C, Avina 2010 Disaster Management in India Jnanada Prakashan [P&D], New Delhi

9. Mishra A 2012 New Dimensions of Disaster Management in India: Perspectives Approaches and Strategies (Set of 2 Vol) Serials publications, New Delhi
10. Dagur OS, Disaster Management: An Appraisal of Institutional Mechanisms in India Center for Land Welfare Studies.

DM2105 Institutional and Legal Framework on Disaster Management

UNIT I

Legal Systems and Judicial System, Constitution of India: Supremacy of Indian Constitution, Preamble, Fundamental Rights, DSPPS, Fundamental Duties, Constitutional Remedies, fundamental aspects of governance.

UNIT II

Legal Framework for Disaster Management in India: Disaster Management Act 2005, Genesis of the DM Act, Institutional Framework, under the DM Act , National Disaster Management Authority, State Disaster Management Authority, District Disaster Management Authority, National & State Executive Committees, National Institute for Disaster Management , National Crisis Management Committee, etc), Disaster Management Policy (National and State).

UNIT III

Chief Minister's Distress Relief Fund (CMDRF) & National Disaster Response Fund Norms and Regulations in Compensation for Relief, Recovery and Rehabilitation, SPHERE Minimum standards of Relief & Compensation, Disaster Law and Policy Features: legal analysis of issues emerging from disastrous events, the causes of disasters and their relationship to laws designed to protect health, safety, and the environment.

UNIT IV

Role of various stakeholders-Central Govt, State Govt, District Administration, Local Self Government, Police, Fire & Rescue services, Armed Forces, NGO, Private sector, Community Based Organisations etc, Human Rights issues in Disaster Management.

UNIT V

Other Acts and Policies relevant to Disaster Management in India: Environmental Protection Act, Air (Prevention and Control of Pollution) Act, Wildlife Act, Forest Act, Biological Diversity Act, Maritime Zones of India Act, Groundwater Act, Mines & Minerals Act, Atomic Energy Act, Oil & Natural Gas Act (including coal), Indian Maritime Law, Integrated Coastal Zone Regulation, Offshore Mining Regulation; The Mines and Minerals (Development and Regulation Act, 1957, ('MMDR') and the Mines Act, 1952; Kerala Minor Mineral Concession Rules in the year 2015 and Kerala Minerals (Prevention of illegal mining, storage and transportation) Rules 2015. Map policy of India, Remote Sensing Policy, RTI Act, Privacy Act, National Data Sharing & Accessibility Policy.

TEXT BOOKS:

1. Disasters and the law / Daniel A. Farber, Jim Chen./ Aspen Pub 2006.
2. Disaster Law and Policy, Wolters Kluwer Law & Business/Aspen Publishers, 2010
3. Disaster Management Act 2005 (India)
4. National Policy on Disaster Management 2009
5. P.G.Dhar Chakrabarti, Chandrani Bandyopadhyay & Karuna Raina 2009 Disaster Risk Reduction for Safe Development : A study of Corporate Practices in India
6. Anil K. Gupta, Sreeja S. Nair & Swati Singh (2013) Environmental Legislation for Disaster Risk Management: Training Module (Indian)
7. The Disaster Management Act (2005) National Act, Rules and Notifications) along with State DM Rules and Notifications

REFERENCES:

1. Hyogo Framework for Action 2005-2015, pp365
2. International Humanitarian Law Hans Peter Gasser, 1993pp 92
3. International Humanitarian Law, Larry May Bee, Benarjii Chakka,- pp92

DM2106 Natural Hazards

UNIT I

Earthquake – Types, Causes and Impacts, Earthquake Risk and Vulnerability in India, Earthquake Measurement (Magnitude & Intensity), Structural and Non-structural Mitigation Measures.

UNIT II

Landslide – Types, Causes and Impacts, Landslide Vulnerability in India and Risk Assessment, Landslide Monitoring and Forecasting, Early Warning Systems for Landslides, Control Strategies (Structural & Non-structural). Snow Avalanche – Types, Causes and Impacts, Early Warning Systems, Avalanche Control Strategies.

UNIT III

Flood – Types, Causes and Impacts, Flood Risk Assessment, Flood Monitoring, Flood Forecasting and Warning in India, Control Strategies (Structural & Non-structural).

UNIT IV

Drought – Types, Causes and Impacts, Drought Assessment and Risk Analysis, Drought Monitoring, Early Warning and Forecasting of Drought in India, National Manual for Drought Management, Control Strategies (Structural & Non-structural).

UNIT V

Marine Hazards – Causes and Impacts of - Storm Surges, Tsunamis, Coastal Erosion and Sea Level Rise, Red Tides, Coral bleaching, Submarine Landslides.

TEXT BOOKS:

1. Amita Sinval 2013, Understanding Earthquake Disasters Jain Publishers, New Delhi
2. Anblagan, R, Bhoop Singh, D Chakraborty, Atul Kohli, "A Field Manual for Landslide Investigations", a guide for the beginners working on landslide Investigations
3. Avasthy, R.K, Bhoop Singh & Sivakumar, R "Landslides: A Perception and initiatives of DST", an effort has been made to highlight the studies carried out through DST's sponsored research programmes.
4. Gupta M. C. & Vinod K. Sharma Orissa Super Cyclone, NDMA
5. Victor Rajamanickam, G.V (2005) Landslides published by Department of Disaster Management, Thanjavur p.153
6. Victor Rajamanickam, G.V, Varma, O.P and Eugene Wilson (2010) Coastal hazards, p.301
7. Victor Rajamanickam, G.V (1990) Sea level variation and impact on Coastal environment, Tamil University publication, p.452
8. Firefly Guide to Global Hazards Robert Louis Kovach, Bill McGuire
9. Surya Parkash 2012 Comprehensive Landslides Risk Management: Training Module Jain Publishers, New Delhi
10. The earth: an introduction to physical geology, Volume 1, Edward J. Tarbuck, Frederick K. Lutgens
11. Essentials of Geology, Frederick K. Lutgens, Edward J. Tarbuck

REFERENCES:

1. Barbara W. and Murck et. al., Environmental Geology, John Wiley and Sons, New York, 1996. PP 535
2. Bohle, H. G., Downing, T. E. and Watts, M. J. Climate change and social vulnerability: The Sociology and geography of food insecurity, Global Environmental Change, 1996. No.4, pp. 3748.
3. Disaster Management. (EDS) RC Choudhry, K Prasada Rao, AC Jena and B Chakravarthy 2001, Publ. National Institute of Rural Development, Hyderabad. PP 348
4. Egbort Bocker and Rienk Van Grondille, Environmental Physics, John Wiley and Sons Ltd., 1999. PP 442
5. John M. Wallace and Peter V. Hobbs, Atmospheric Science: An Introductory Survey, Academic Press, New York, 1977. PP 467
6. William H. Dennen and Bruce R. Moore, Geology and Engineering, WCB Publishers, Iowa, 1986. PP 378

DM2107 Practical

Students can opt one from Section A and one from Section B

Section A

1. Identification of Fault/Fracture zones from Seismic/Resistivity/GPR images.
2. Identification of Horst and Graben structures with GPR/Resistivity imaging systems.

Section B

1. Identification of Landslide: Identification and monitoring of Slopes by Theodolite/ Total Station survey
2. Ground water quantity/quality assessment from data obtained by Vertical Electrical Sounding (VES) by adapting Wenner or Schlumberger Techniques.

SEMESTER – II

DM2201 Marine and Atmospheric Hazards

UNIT I

Introduction to Oceanography: Shore and coast, waves, currents & tides, coastal and submarine landforms, bathymetry, sea-air interaction, sediment movements (longshore & cross-shore), Bed load sediments, Wave refraction, diffraction, breakers. Tectonics & evolution of oceans, seafloor spreading & plate tectonics.

UNIT II

Tsunami - 26th December 2004 Indian Ocean Tsunami, Lessons Learnt and Analysis of Critical Gaps, Past Initiatives with reference to Coastal Areas, Issues for Priority Implementation of Integrated Coastal Zone Management (ICZM), National Initiatives, Recent Major International Developments, Critical Areas of Concern, Tsunami Early Warning, Risk Assessment and Vulnerability Analysis, Multi Hazard Situation in Coastal Areas of States/UTs, Tsunami Vulnerability Assessment, Role of the Indian Naval Hydrographic Department (INHD), Use of Satellite Imageries in Monitoring, Tsunami Preparedness.

UNIT III

Overview – Cyclogenesis, Frequency, Classification & Impact, Naming of Tropical Cyclones, Storm Surge Broad Scale Assessment, Past Initiatives: National Level, National Cyclone Risk Mitigation Project, National Guidelines: Genesis, Structure and Implementation Strategy, Early warning systems.

UNIT IV

Submarine Landslide Processes & Hazards: Causes-Weak geological layers, Over pressuring, Earthquakes, Storm surge, King wave, Groundwater seepage, Glacial loading, Volcanic island growth, Over steepening, Impacts of Gas hydrate mining.

UNIT V

Severe weather associated with thunderstorms- Squalls, Lightning, Hail storms, Dust storms, Tornadoes: Causes and their characteristics. Monitoring, forecasting and warning methods.

REFERENCES:

1. Anil K. Gupta, Sreeja S. Nair, Shiraz A. Wajih, Shashikant Chopde, Gautam Gupta & Garima Aggarwal (2014) Training Module Mainstreaming Climate Change Adaptation and Disaster Risk Reduction Into District Level Development Plans, NIDM report.
2. Disaster Management Act 2005
3. National Policy on Disaster Management 2009
4. <http://www.igcp585.org/home> (Submarine Mass Movements and Their Consequences; EMARSHAL project Earth's continental Margins assessing the geo Hazard from submarine Landslide)
5. Rajamanickam, G.V. (1990) Sea level variation and its Impact on Coastal environment Tamil University publication, Thanjavur, pp.452.
6. Rajamanickam, G.V. (2001). Quaternary Sea-Level Variation, Shoreline Displacement and Coastal Environment (with M.J. Tooley). Published by New Academic Law Serials, New Delhi, 259 pp.
7. Rajamanickam, G.V. (2005). Landslides. Published by Department of Disaster Management, SASTRA University, Thanjavur, 153 pp.
8. Rajamanickam, G.V. (2004). Tsunami causes, effects, remedial measures pre and post-Tsunami Disaster Management—A Geoscientific perspective. Publisher: New Academic Publishers, New Delhi, 236 pp.
9. Varma, O.P., Rajamanickam, G.V. and Eugene Wilson (2010) Coastal Hazards, M/s Anubhav Printers, Roorkee, (Uttarakhand), 301 pp.

DM2202 Anthropogenic Hazards

UNIT I

Understanding anthropogenic (man-made) disasters; Chemical, Environmental, and Biological disasters; Industrial and Technological Disasters: Fire, unplanned urbanization, e-waste, solid wastes & landfill.

UNIT II

Developmental activities and disasters: Mining and environment, acid mine drainage, land and environment degradation, mine land reclamation. Reservoir Induced Seismicity, Dam bursts and rehabilitation, Kumbakonam, Sri Rangam, Patna and Puttingal fire accidents and their impacts, Building Regulations for Fire Safety.

UNIT III

Oil spills and their impact on marine environment, Acid rain, Nuclear Power and radiation disasters: Chernobyl disaster, 3 Mile Island accident and Fukushima Daiichi disaster.

UNIT IV

Biological Disasters: Biodiversity, Communicable diseases, factors contributing to vulnerability, bioterrorism, Health risks, biological weapons, -Armed conflicts, land mines.

UNIT V

Health hazards:- Communicable diseases, Air and Water borne diseases, Monsoon related diseases, Sun burns, Food poisoning, Zoonosis

REFERENCES:

1. Barbara W. and Murck et. al., Environmental Geology, John Wiley and Sons, New York, 1996. PP 535
2. Bohle, H. G., Downing, T. E. and Watts, M. J. Climate change and social vulnerability: the sociology and geography of food insecurity, Global Environmental Change, 1996. No.4, pp. 3748.
3. Disaster Management Publ. (Eds) Edmund Christopher. Publisher: Shils Publishers, Nagercoil, 2012.PP 857
4. Egbort Bocker and Rienk Van Grondille, Environmental Physics, John Wiley and Sons Ltd., 1999. PP 442
5. John M. Wallace and Peter V. Hobbs, Atmospheric Science: An Introductory Survey, Academic Press, New York, 1977.PP 487
6. Santosh Kumar, Arun Sahdeo & Sushma Guleria,2013. Bihar Floods: 2007 (A Field Report) Publ.NDMA, Govt. of India, New Delhi
7. Vogelbacher A. (2013) Flood Disaster Risk Management - Hydrological Forecasts Requirements and Best Practices: Publ.NDMA, Govt. of India, New Delhi Training Module

DM2203 Disaster Monitoring and Data Acquisition

UNIT I

Earthquake: Seismological network, seismic observatories in India, broadband seismometer network (local & global), strong motion array micro seismicity, thermal anomalies for seismic area classification, Global Positioning System for monitoring lithospheric deformation.

UNIT II

Landslide: Remote Sensing data products and applications in landslide prediction, GPR (Ground Penetration Radar) to determine the subsurface profile, Synthetic Aperture Radar (SAR) techniques for landslide risk assessments, LIDAR techniques for landslide monitoring (ALTM Areal Laser Terrain Mapping).

UNIT III

Tsunami, Cyclone, Storms: Tracking & monitoring through Doppler radar / Tide gauges, wave & current recorders, pressure sensor, sediment accumulation sensor, optical backscattered sensor (OBS), sediment traps, data buoys, navigation lights & signals, positioning systems (radio positioning & satellite), Multiband bathymetry, gravity & magnetic anomalies in sea and surveillance system.

UNIT IV

Network of Satellite linked automatic weather stations, weather and climate data supply and management. IMD Network. National Data Center and Database of related sectors. Disaster Monitoring Constellation.

UNIT V

Flood & Drought: Flood monitoring systems (gauge stations) along with rivers, rain gauge network (IMD & State Government), collection of water fluctuation data, and data logger for water level measurement, soil moisture, nutrient loads.

References:

1. Anil K. Gupta, Sreeja S. Nair, Shiraz A. Wajih & Sunanda Dey (2013) Flood Disaster Risk Management - Gorakhpur Case Study : Training Module
2. George Joseph (2005) Fundamentals of Remote Sensing 2nd Edition, Universities Press (India) Ltd, Hyderabad, pp 471
3. Gupta, M. C, Gupta, L. C. Anil Sinha & Vinod K. Sharma 2001 Gujarat Earthquake
4. Thomas Lillisand, Ralph W. Kiefer, and Jonathan Chipman (2007) Remote Sensing and Image Interpretation Wiley India, pp 756

DM2204 Geo-technology in Disaster Management

UNIT I

Geology and its importance in disaster management, Introduction to geo-technology and its application in disaster management, classification of rocks and minerals – Para genesis & petro genesis

UNIT II

Engineering Properties of rocks, soils & minerals, Evaluation of physical intact rock and rock mass properties – Uni-axial compressive strength, point load index, shear strength and Modulus of deformation. Rock as construction material – alkali aggregate reaction of concrete, geotechnical properties for the site selection of nuclear, thermal & hydropower plant.

UNIT III

Geological structures – collection of data, analysis using stereographic projection technique, Route location for roads and railways, stabilization techniques; Tunnels and underground caverns, geological and geotechnical characters of tunnelling, underground caverns, bridges & dams.

UNIT IV

Types of foundation, Earthquake resistant design and construction of new structures, Building Codes (BIS) for seismic design, Seismic strengthening and retrofitting of lifeline and priority structures.

UNIT V

Embankment design including check dams, disaster shelters and community halls, geospatial technological application in the rehabilitation measures, including selection of sites. Coastal Stabilisation structures (hard and soft)

REFERENCE

1. Principles of Engineering Geology and Geotechnics by D.P. Krynine and W.R. Judd 1998, ISBN: 81 2390603X, CBS Publishers, New Delhi, pp 730
2. Principles of Engineering Geology by R.B. Johnson 1988, John Wiley and sons Inc, pp 497.
3. Engineering Rock mass classifications: A complete manual for Engineers and Geologists in Mining. Civil and Petroleum Engineering By Z.T. Bieniawski, German Academic Publishers 1989, pp 251
4. Engineering Geology: Rock in Engineering Construction by R.E. Goodman Tunnel Engineering Handbook Edited by J.O. Bickel, T.R.Kuesel and E.H. King 2002. ISBN: 8123905432CBS Publisher New Delhi, pp 412
5. Engineering for Dams by W.P. Creager, J.D. Justin and J. Hinds 1995, ISBN: 818524574 Nem Chand Bros. Roorkee.
6. Fundamentals of Engineering Geology by F.G. Bell 1983, pp 648.
7. Pare Diwan, 2010, A Manual on Disaster Management, Publi. Jain Book house, New Delhi, India
8. Ajinder Walia & Sushma Guleria 2013 Village Disaster Management Plan: Training Module

Additional Study Materials:

1. Tunnels and underground structures [Ed] J. Zhao, J.N. Shirlaw, Krishnan R. Publisher, A A. Balkema, ISBN – 9058091716, Pages 696 November 2000 Netherlands.
2. Early Warning Systems for Natural Disaster Reduction, Zschau, J., Geo Forschungs Zentrum Potsdam (GFZ), Potsdam, Germany; Koppers, A.N., Geo Forschungs Zentrum Potsdam (GFZ), Potsdam, Germany (Eds.) P. 467 illus, 150 in color Springer Verlag. Pub
3. Numerical Simulation in Tunneling 2003 Approx 490 p. numerous figures, partly in color Hardcover 3211005153, Beer, G., Technische Universitat Graz Austria (Ed...) Springer Verlag. Pub
4. Environmental Hazards, K.S. Valdiya.

DM2205 Modelling of Disasters and Early Warning Strategy

UNIT I

Modelling concepts Causal and statistical models Characteristics Steps in model development Importance of model building. conservation of mass and mass balance –calibration and verification of models; Transport phenomena – Advection, diffusion, dispersion, simple transport models; chemical reaction kinetics – Law of mass action, Rate constants, reaction order, types of reactions, equilibrium principles

UNIT II

Seismic Wave (P & S) propagation, forward modelling and inverse modelling, response to various structures, model testing for structural design, Back analysis with historical data, Tsunami propagation, Storm surge & cyclone modelling.

UNIT III

Landslide modelling including deposition profile and distance travelled by the material, probability of landslide occurrence, statistical analysis, geospatial technology for scenario development, DEM generation, Artificial Neural Network (ANN), Genetic Algorithm (GA), Simulated Annealing (SA) for highly nonlinear models.

UNIT IV

Flood & drought hydrodynamic modelling, spatial data modelling for micro level planning & management, hydraulics of open channels, hydrological models, soil moisture modelling.

UNIT V

Monsoon meteorology, Boundary layer meteorology, Ocean-land-atmosphere-biosphere interaction, Air pollution meteorology, Atmospheric pollution modelling.

TEXT BOOK:

Dimri, V. P., Deconvolution and inverse theory application to geophysical problems, ELSEVIER, 1992.

REFERENCES:

1. Deaton and Wine Brake, "Dynamic Modelling of Environmental Systems", Wiley & Sons, 2002.
2. John R. Jensen (2009) Remote Sensing of the Environment: An Earth Resource Perspective. 2nd Edition, Dorling Kindersley (India) Pvt. Ltd, NODIA, India, pp 585
3. J.L.Schnoor, Environmental Modeling Fate and Transport of Pollutants in Water, Air and Soil, John Wiley & Sons Inc., New York, 1996.
4. Sekhar Chandra Dutta , Parthasarathi Mukhopadhyay,2012. Improving Earthquake And Cyclone Resistance Of Structures

DM2206 Chemical, Radiological and Biological Hazards**UNIT I**

Chemical Disasters Causative Factors Leading to Chemical Disasters, Initiators of Chemical Accidents, Process and Safety System Failures, Natural Calamities, Terrorist Attacks/Sabotage, Impact of Chemical Disasters, Major Chemical Accidents in India, Aims and Objectives of the Guidelines, Industrial (Chemical) Installations and Storages, Industrial (Chemical) Installations,

UNIT II

Good Engineering for Safety, Accident Reporting, Investigation and Analysis, Safety Promotional, Guidelines for Transport Accidents, Air Transportation, Maritime Transportation, Major Accident Hazards (MAH) Units in India.

UNIT III

Chemical Hazards, types of Chemical hazards, Acquisition and Delivery of Chemical Agents, Effects of Chemical Agents, Aims and Objectives of the Guidelines, Present Status and Context, Institutional Framework, Legislative and Regulatory Framework.

UNIT IV

Nuclear and Radiological Emergency/Disaster Scenarios-Accidents in Nuclear Power Plants and other Facilities, 'Criticality' of Accidents-Accidents during transportation of Radioactive Materials-Issues in nuclear fuel cycle.

UNIT V

Biological Agents as Causes of Mass Destruction, Sources of Biological Agents, Biosafety and Bio-security, Epidemics, Impact of Biological Disasters, Institutional and Regulatory Framework

REFERENCES:

1. National Disaster Management Guideline – Chemical Disaster (Industrial) – NDMA, Govt. of India
2. National Disaster Management Guideline – Chemical Disaster (Terrorism) – NDMA, Govt. of India
3. National Disaster Management Guideline – Biological Disasters – NDMA, Govt. of India
4. National Disaster Management Guideline – Nuclear & Radiological emergencies – NDMA, Govt. of India

DM2207 Practical

Hazard Assessment, Vulnerability Assessment, and Risk Analysis of any local area/Institution or Establishment/ Structural mapping using satellite imagery.

SEMESTER – III

DM2301 Climate Change and Environmental Impact Due to Disaster Events

UNIT I

Introduction to climate variability and climate change - Climate shifts- Global Wind Systems – Cloud Formation and Monsoon Rains – Storms - Cyclones, Typhoons and Hurricanes - The Hydrological Cycle – Global Ocean Circulation – El Nino and La Nina phenomena – ENSO- Indian Ocean Dipole –The Earth's Natural Green House Effect – Green House Gases and air pollution - Global Warming

UNIT II

Trends and projections of Climate Change – Global, regional and local changes in patterns of temperature, precipitation and sea level rise – 4th and 5th IPCC reports-IMD reports on climate change and projections- Observed effects of Climate Changes – Patterns of Large Scale Variability – Drivers of Climate Change – Climate Sensitivity and Feedbacks

UNIT III

Impacts of Climate Change on various sectors – Water –Agriculture includes animal husbandry and Fisheries, Forestry, biodiversity and Ecosystem – – Human Health – Industry, Settlement and Society – Methods and Scenarios – Projected Impacts for Different Regions

UNIT IV

Adaptation Strategies/Options in various sectors – Water – Agriculture – Infrastructure and Settlement including coastal zones – Human Health – Tourism – Transport – Energy – Key Mitigation Technologies and Practices. Energy Supply – Transport – Buildings – Industry – Forestry, Carbon Sequestration – Carbon Capture and Storage (CCS).

UNIT V

Mitigation strategies at Global level – Geo Engineering - Renewable energy - Bio-fuels - Green energy - Green buildings.

REFERENCES:

1. Jan C. van Dam, Impacts of “Climate Change and Climate Variability on Hydrological Regimes”, Cambridge University Press, 2003
2. Al gore ‘inconvenient truth” – video form
3. IPCC Fourth and Fifth Assessment Reports.
4. Dash Sushil Kumar, “Climate Change – An Indian Perspective”, Cambridge University Press India Pvt. Ltd, 2007
5. Anil Kumar Thakur, Gangadhar V Kayande Patil, 2012 Disaster Management and Climate Change, Puptl .NDMA, Govt of India, New Delhi.
6. Global Warming- the complete briefing (second edition): John Houghton, Cambridge University Press (2009)

DM2302 Geospatial Technologies in Disaster Management

UNIT I

Introduction to Remote Sensing, definition, physical basis of remote sensing, electromagnetic spectrum, radiation laws, atmospheric effects, basics of optical, thermal and microwave remote sensing, history of remote sensing. EMR interaction with earth surface materials, Spectral signatures of vegetation, water, soil, snow etc. in different regions of EMR, ground truth data.

UNIT II

Platforms, Sensors and Satellites Aerial and space borne platforms, orbits, sensors types – optical (multispectral, hyperspectral), thermal and microwave, resolutions, Satellites: Landsat, SPOT, IRS, ERS, RADARSAT, RISAT, Sentinel and other operational remote sensing satellites.

UNIT III

Image Analysis Visual interpretation, Interpretation keys; Image characteristics, media and formats of digital images, geometric and radiometric aspects of RS data, image enhancement, image transformations, classification – unsupervised and supervised classification, classifiers, accuracy estimation, change detection.

UNIT IV

Geographical Information System and GPS: Introduction, GIS definition and terminologies, data types, raster and vector data, GIS database design, spatial database creation – digitization, scanning; processing of data, GIS implementation and project management. Commercially available remote sensing and GIS software, GPS and its applications in disaster studies.

UNIT V

Geo-informatics in Disaster Management, Ecosystem inventory and monitoring, Forest Fires; Geospatial techniques in urban disaster management-Case studies.

REFERENCES:

1. Anandita Sengupta, Debanjan Bandyopadhyay, Nilanjan Paul, Sreeja S. Nair & Anil K. Gupta (2013) Geoinformatics Applications in Chemical Risk Management : Publ.NDMA Govt. of India,New Delhi,Training Module
2. Burrough, P.A. (2007) Principles of Geographical Information system. Oxford University Press USA, pp 193
- 3.George Joseph (2005) Fundamentals of Remote Sensing 2nd Edition, Universities Press (India) Ltd, Hyderabad, pp 471
- 4.Lo C.P. and Albert K.W. Young (2009) Concepts and Techniques of Geographic Information Systems, 2nd Edition, PHI Learning Pvt. Ltd., New Delhi, pp 532
5. John R. Jensen (2009) Remote Sensing of the Environment: An Earth Resource Perspective. 2nd Edition,Dorling Kindersley (India) Pvt. Ltd, NODIA, India, pp 585
6. Thomas Lillisand, Ralph W. Kiefer, and Jonathan Chipman (2007) Remote Sensing and Image Interpretation Wiley India, pp 756
7. John R. Jensen (2004) Introductory Digital Image Processing: A Remote Sensing Perspective Prentice Hall, pp 104

DM2303 Preparedness, Vulnerability and Risk Assessment of Disasters

UNIT I

Introduction to risk evaluation; Fundamentals and methodologies for risk analysis, assessment, evaluation and management. Definitions and Overview of risks and dangers, Impact of globalization.

UNIT II

Assessment of risks for different disaster types, extreme event analysis, hazard ecology, chemical load and environmental health risk, carcinogenic materials and environment. Discussion on selected case studies to analyze the potential impact of disasters.

UNIT III

Data model for collection of information. Risk assessment applications for disaster mitigation and management problems, Training in Crisis management, Crowd management-introduction, causes and triggers for crowd disasters, planning for crowd management strategy & arrangements, execution of plan, use of ICT in crowd management, case studies in crowd management. Role of Communication and Media in Disaster Management.

UNIT IV

Design of Risk management, Different type of risks and solutions, Emergency Management Teams, Emergency Support Functions (ESF).

UNIT V

Gender Issues- Understanding gender issues, Gender roles in society, gender sensitive planning and programming in Disaster management –Basic approaches in gender issues, Practical & strategic needs, Tools for analyzing gender issues, Applying gender lens to policies & programs.

REFERENCES:

1. Anil K. Gupta, Shekher Chaturvedi, Rajnish Goswami & Anupama Sethi Risk to Resilience : Strategic Tools for Disaster Risk Management, 2009
2. Freeman, H. M. (ed.) 1989 Standard Handbook of Hazardous Waste treatment and Disposal, McGraw H, New York, pp 1168
3. Petak, W. J. and Atkisson, A, A. Natural Hazard Risk Assessment and Public Policy: Anticipating and Unexpected, Springer; New York. Pp 489
4. Muckhopadhyaya, A.K., 2005, Crisis and disaster management: tuberculose and aftermath”, Newage International Publications, New Delhi. PP 91
5. William, P. L.; and J. L. Burson, 1985, Industrial Toxicology, Safety and Health Applications in the work place, Van Nostrand Reinhold, New York, pp512
6. Wilson, R; and E. A. C. Crouch, 1987, Risk assessment and comparisons: An Introduction, Science 17, 1987, pp 267270.

7. National Disaster Management Guideline – Managing Crowd at Events and Venues of Mass Gathering – A Guide for State Government, Local Authorities, Administrators and Organizers – NDMA, Govt. of India
8. Handbook on Crowd Management, First Edition, 2019 (Malayalam Version) - Institute of Land and Disaster Management, Govt. of Kerala

DM2304 Rehabilitation and Mitigation Issues and Management of Resources

UNIT I

Disaster Preparedness Planning, Community based disaster management plan. Incident Response System-Introduction to IRS, Principles & Features of IRS, Organisation & Staffing, Incident Facilities.

UNIT II

Hazard monitoring, warning protocols, India Disaster Resource Network, public health aspects (for example: epidemic) of disaster management and emergency services systems. Shelter environments/requirements.

UNIT III

Emergency Management: Operational decision making, Difference between Damage & Loss, Types of damages and their assessment, Short, medium and long term recoveries and rehabilitation. Development of physical and socioeconomic infrastructure.

UNIT IV

Principles of natural hazard reduction, Nature of damage to utilities and dwelling units; retrofitting of buildings; training and awareness; case studies of disaster preparedness and rehabilitation.

UNIT V

Introduction to Environmental Impact Assessment, Environmental management Planning, Environmental auditing; Regional and strategic EIA, Cost benefit analysis, Public participation in environmental decision making.

REFERENCES:

1. Collins Larry R. and Schneid Thomas D., Disaster Management and Preparedness Taylor and Francis 2000 PP 264
2. Goel S.L. and Kumar Ram, Disaster Management, Deep and Deep Publications, 2001PP 434
3. Risk 21 – Living with Risk. The global review of disaster reduction initiatives 2004 vision United Nations PP 255

4. Parasuraman S., India Disasters Report: Towards Policy Initiatives, Oxford University Press, and 2004.PP 384
5. Managing disaster risk in emerging economies by Arnold, Margaret and Kreimer, Alcira, 2000, Report to World Bank PP 193
6. Technical Report on “Geotechnical/Geophysical investigations for Seismic Microzonation Studies of Urban Centres in India”, National Disaster Management Authority, New Delhi, August 2011.
7. 26th December 2004,Tsunami by Dr. GK Victor Rajamanickam Et.al. 2006 Science and Technology Government of India, New Academy Publishers, New Delhi PP 186
8. Harsh K Gupta, Induced Seismicity Publ.Springer, 1995 PP 219
9. R.K.Avasthy, Bhoop singh &R.Sivakumar, “landslides: A Perception and initiatives of DST”, an effort have been made to highlight the studies carried out through DST’ sponsored research programmes.
10. SM Ramaswamy,CJ Kumanan,R Sivakumar & Bhoop Singh, “ Geomatics in Tsunami”, scientific studies have been undertaken for mapping of damaged areas for recording the possible damages occurred to the building, infrastructure, flora & fauna and associated issues.
11. R Anblagan, Bhoop Singh, D Chakraborty, Atul Kohli, “A Field Manual for Landslide investigations”. A guide for the beginners working on landslide investigations.
12. Bhoop Singh, RA Chansarkar,Ashok, Kaushal, Asmia Mishra, R Manavalan, “ Landslide Hazard Zonation Atlas”,a study of Landline Hazard Zonation Mapping over parts of Western Himalayas, Gharwal,Kumayun,North Eastern States, Western Ghats and Nilgiri Hills
13. Pardeep Sahni , Alka Dhameja,2013. Disaster Mitigation Experiences and Reflections
14. National Disaster Management Guidelines – Incident Response System –National Disaster Management Authority, Government of India. ISBN: 978-93-80440-03-3
15. Training Module: Incident Response System: Basic & Intermediate, National Institute of Disaster Management, Government of India, New Delhi

DM2305 Actuarial Science in Disaster Management (E)

UNIT I

Introduction to Banking & Finance: Theory of money & credit, money and banking systems; Bank credit and clearing operations; Banking law; Bank operations analysis; Tax administration; Public budgeting and finance systems; state and local finances.

UNIT II

Insurance and Risk Management: Introduction on importance of insurance, risks, risk identification and evaluation; Exposure to property loss; Life, health and loss of income exposures; Risk management techniques; insurance principles and policy provisions; insurance industry and regulatory framework.

UNIT III

Insurance Policies for Disaster Management: Evaluation of risk funding and risk transfer policies; catastrophe insurance pool; Reserve funds and contingent credit policies; Role of Government and market participants; Insurance policy design; Fiscal cost of relief and reconstruction; Grants and low interest loan for reconstruction; Case Studies and review of Disaster insurance models.

UNIT IV

Basic statistics- Measures of central tendency-Mean, Median Mode-standard deviation-coefficient of variation-Correlation and Regression-Simple and multiple Regression; Sampling Techniques- Statistical Inference-Estimation and Testing of hypothesis, Critical test statistics for Z, T, F and Chi square distribution, Analysis of Variance-one way and two way. Application of Statistics in Disaster Management.

UNIT V

Actuarial modelling; Binomial and Poisons models – graduation and statistical tests methods of graduation, different insurance schemes available, Annuity and its applications.

REFERENCES:

1. Anil K. Gupta, Shekher Chaturvedi, Rajnish Goswami & Anupama Sethi 2012.Safeguard Environment for Disaster Risk Reduction: Poem & Slogan Book, Publ.NDMA, Govt of India, NewDelhi,
2. Anil K. Gupta, Sreeja S. Nair, Shiraz A. Wajih & Sunanda Dey 2013 Flood Disaster Risk Management - Gorakhpur Case Study: Training Module Publ.NDMA,Govt of India, New Delhi.
3. ADB, “Finance for the Poor: Micro finance Development Strategy”, Asian Development Bank, Manila, 2000.pp347
4. Bouman, FJA, “Small, Short and Unsecured: Informal Rural Finance in India”, Oxford
5. Hulme, David and Paul Mosley, “Finance against Poverty”, Routledge London, 1996.pp218
6. Meyer, Richard L, “Micro finance, Poverty alleviation and Improving Food Security: Implications for India” in Food Security and Environmental Quality, CRC Pres LLC, Boca Raton, FL. 2002.pp347
7. Tushar Bhattacharya, 2012. Disaster Science and Management Publ. NDMA, Govt. of India, New Delhi,

DM2306 Socio-psychological Issues and Community Participation in Disaster Management

UNIT I

Community and social solidarity; Role of local community in Disaster Management, Disaster resilient community, habitualization and culturalization of Disaster Management practices, Community based disaster management practices – case studies. Utilization of public property during disasters, Community response to disasters.

UNIT II

Professionalism and humanitarianism in Disaster Management, The role of voluntary organizations in disaster management, Ethical issues in Disaster Management- Role of academics and media in disaster management.

UNIT III

Trends in Resource Mobilization for Disaster Management, Disaster Management Budgeting, Risk Sharing and risk transfer systems, Sustainable Disaster Management Budgeting, Disaster Management and Economic Development, Local government disaster evaluation process.

UNIT IV

Post Disaster Counselling - Significance of Psychosocial Support and Mental Health Services (PSSMHS) in Disaster Management, Aims and Objectives of the Guidelines, Institutional and Policy Framework, National Policy of PSSMHS.

UNIT V

The National Mental Health Programme (NMHP), National Rural Health Mission (2005), Panchayat Raj Act (1992), Resources for PSSMHS, PSSMHS in Disaster Management.

REFERENCES:

1. OHO Lerbinger, (1986) The Crisis manager, facing risk and responsibility, Lawrence Erlbaum associates.pp292
2. Horowitz, M Stress response syndromes, Northvale, N.J. Jason Anderson (1996) PP 451.
3. Peter, K. Hodgkinson, (1998) Coping with Catastrophe, A handbook of post disaster psychological after care. Routledge. pp249
4. Kazimiera Adamowski (1998) Creating Excellence in Crisis Care, John Wiley and Sons Inc. Psychosocial Support for Disaster Affected population in India, World Health Organization, India PP 278

5. Joseph O, Prewitt Diaz, (2004) Disaster Mental Health in India, Voluntary Health Association of India PP 267
6. Samir Dasgupta (2010) Women's Encounter with Disaster, Publ.Jain book house , New Delhi, India
7. Narendra Malhotra, (2009) World Famous Disasters ,Publ.Jain book house , New Delhi, India
8. Narendra Padhan,(2009) Disaster Management With Case Studies Publ.Jain book house, New Delhi, India

DM2307 Fire and Fire Safety (E)

UNIT I

Introduction to fire, Types of combustion rapid, spontaneous, explosion; Development of fire incipient, smoldering, flame and heat stages; Explosion physical explosion, chemical explosion; Special kinds of combustion Flash fire, Pool fire, Deep seated fire, Spillover, Boil over, Dust explosion, Classification of fire based on material.

UNIT II

Product of combustion flame, heat, smoke, fire gases; Flame and its characteristics, Effect of heat exposure to human body, Smoke – constituents of smoke, smoke movement in buildings, modelling of smoke movement; Smoke control in buildings natural and mechanical ventilation, pressurization; Design principles of smoke control using pressurization technique; Principles of smoke vent design.

UNIT III

Fire ground operations preplanning, action on arrival and control, methods of rescue, methods of entry. Personnel safety. Control procedure and use of other safety equipment. Ventilation and salvage operations, mine fires, Safety procedures.

UNIT IV

Electrical fires – hazards of static electricity. Safe procedures for electrical maintenance statutory requirements. Safety provisions in Indian Electricity Act & Rules.

UNIT V

Medical fire aid; Radioactive and explosives-Occupational health and first aid.

REFERENCES:

1. David L. Goetsch, Occupational Safety and health, Prentice Hall Ron Hirst, "Underdowns Practical Fire Precautions", Gower Publishing Company Ltd., England, 1989
2. Rao .S.,and Saluja,H.L. : Electrical Safety, Fire Engineering and Safety Management, Khanna Publishers, Delhi.
3. Standard & Ashutosh D. Kaushik,(2013) Forest Fire Disaster Management

DM2308 Practical

Section A (Geographical Information System)

1. Onscreen digitizing (point, line and polygon)
2. Data base design
3. Layout preparation
4. Querying data base
5. Displaying data
6. Editing data
7. Working with layers and map symbology
8. Thematic Map preparation:
 - a) Road Map
 - b) Drainage map
 - c) Contour map
 - d) Land use map
 - e) Vulnerability map

Section B

Standard Operating Procedure (SOP) for any school/ industrial unit/Government office/Panchayath Raj Institution. (Students are required to visit any School/Establishment/Industrial Unit/Government office/Panchayath Raj Institution to prepare SOP)