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UNIVERSITY OF MYSORE

Estd. 1916

Vishwavidyanilaya Karyasoudha
Crawford Hall, Mysuru- 570 005

No.AC.2(S)/31/2018-19

Dated: 28.04.2022

NOTIFICATION

Sub: Introduction of new PG Programme ESDM (Earth Science and Dissaster Management) under Scheme-B (Self Finance) at DoS in Earth Science from the Academic Year 2022-23.

Ref: 1. Decision of Special BoS Online Meeting in Earth Science (PG) meeting held on 20.01.2022 & 25.01.2022.
2. Recommendation by the Dean, Faculty of Science & Techonology dated: 19.02.2022.
3. Decision of the Academic Council meeting held on 31.03.2022.

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The Special Board of Studies in Earth Science (PG) which held on 20.01.2022 & 25.01.2022 has recommended to introduction of new PG Programme ESDM (Earth Science and Dissaster Management) under Scheme-B (Self Finance) at DoS in Earth Science from the Academic Year 2022-23.

Recommendation by the Dean Faculty of Science & Technology and the Academic Council meeting held on 31.03.2022 has approved the above said proposal and the same is hereby notified.

The syllabus of ESDM Programme is annexed. The contents may be downloaded **from the University Website i.e., www.uni-mysore.ac.in**.

Registrar,

Registrar
University of Mysore
Mysore

To:

1. The Additional Chief Secretary to Government, Department of Higher Education (University), M.S.Building, Bengaluru-1-for information.
2. Executive Director, KSHEC, Bengaluru-for information.
3. The Registrar (Evaluation), University of Mysore, Mysore.
4. The Dean, Faculty of Science & Technology, DOS in Earth Science, Manasagangotri, Mysore.
5. The Chairperson, BOS in Earth Science, DOS in Earth Science, Manasagangotri, Mysore.
6. The Chairperson, Department of Studies in Earth Science, Manasagangotri, Mysore.
7. The Director, PMEB, University of Mysore, Mysore.
8. The Director, College Development Council, Moulya Bhavan, Manasagangotri, Mysore.
9. The Deputy/Assistant Registrar/Superintendent, AB and EB, UOM, Mysore.
10. The, Special Officer, to Vice-Chancellor University of Mysore, Mysore.
11. The P.A. to the Vice-Chancellor/Registrar/Registrar (Evaluation), UOM, Mysore.
12. Office file.

UNIVERSITY OF MYSORE, MYSURU, KARNATAKA, INDIA

Syllabus for New Specialized Course for ESDM

(Starting year, 2022-2023)

Name of the Department: Department of Studies in Earth Science,
UGC Sponsored, Centre for Advanced Studies in Precambrian Geology,
University of Mysore, Karnataka State Universities, Manasagangothri, Mysuru

Program: MSc, EARTH SCIENCE AND DISASTER MANAGEMENT (ESDM)
Two Years (Four Semesters)
Code: MSESDM (CBCS)

2 Years MSc. Earth Science and Disaster Management (ESDM)

Program Outcome: The incidence of natural and human induced disasters have assumed alarming dimensions both over temporal and spatial scales resulting in widespread loss of lives and assets globally. Collaborative efforts involving all stakeholders are required at various levels for making Disaster Risk Reduction (DRR) mechanism effective. In this direction, the introduction of Earth Science and Disaster Management Program(MSc) by the Department of studies in Earth Science, University of Mysore is an academic initiative expected to be very valuable for addressing the various dimensions of Disaster Risk. The students of this program are given a comprehensive exposure to the various facets of Earth Science and disaster management ranging from prevention, mitigation, preparedness to disaster response, including Earth's environment, Earth's dynamics, and Ocean Monitoring, Geomorphological and Climatological changes in recent years forming the core components of the program. The program aims to prepare a pool of skilled human resource personnel who will become qualified and professional disaster managers. The graduates of the program are expected to be equipped with a sound knowledge of theory and practical domains of the subject with professional execution capabilities. In addition the course offers substantial career opportunities to graduates of the program in various regional, national, and international organizations.

Course Description

MSc, Earth Science and Disaster Management (ESDM), two year course comprising of four semesters. The students are offered 18 papers that include Hard Core, Soft Core, Minor Project (Field Work) and Major Project (Dissertation). The M.Sc. Program in Earth Science and Disaster Management (ESDM) is based on 76 credits with six different components viz., (I) Teaching (II) Tutorial (III) Practical, (IV) Seminar, (V) Field Studies and (VI) Project Work (Dissertation) in fourth semester.

The course can offer any Science graduate including Engineering, Agricultural Sciences and Geography.

Maximum seats for the Course are fixed 40 Seats only (It may exceeds depend upon demand of the Candidates).

Seat Matrix: The total number of Seats admitted will be 40 Candidates.The selection criteria will be all India basis including NRI, and Foreign Nationals. The fee structures for specialize course ESDM is purely self financial, Rs. 30,000/- per year. (Which can be paid in the 2 installments) for 2nd year amount is 30,000/- . The total amount to be paid by the candidate for I& II year is Rs. 60,000/- along with University Prescribed fees per annum.
The fee structure for NRI and Foreign National candidates Rs. 50,000/- along with University prescribed fees.

University of Mysore or of any other UGC recognized University is eligible for admission to post graduate degree course in **EARTH SCIENCE AND DISASTER MANAGEMENT (MSc, in ESDM).**

Scope of the Subject
Two years MSccourse ESDM focuses on the causes of disasters and how to minimize their impact.The course enables student to learn different areas of disaster management, which includes management of the situation, response to the needs of the people and the area, evacuation process. During the course student will be introduced to environmental systems, field operations and organizational management, andas Disaster Management.

Career Prospects: There are good employment opportunities the government as well as in private organizations. Opportunities in Government agencies: Employment opportunities are offered in the disaster management departments of government agencies such as: Fire departments, drought management departments, law enforcement authorities, relief agencies etc and Insurance companies, industries in the high-risk fields like chemicals, mining, and petroleum which have their own disaster management cells. Jobs can also be available in the public sector. Various opportunities are also offered in the fields of teaching, research, consultancy, documentation, training organizer, field training and mock driller expert. One can serve as social workers, engineers, medical health experts, environmental experts, rehabilitation workers, etc. NGOs and International organizations such as World Bank, Asian Development Bank (ADB), United Nations Organizations (UNO), Red Cross, UNESCO offer various opportunities for professionally trained disaster management professionals Graduates in disaster management can start their own consultancy Designations: Network administrator Database analyst Administrator Security Administration Operations Analyst. Here are some organizations that offer jobs in the disaster management.

Job openings:

1. **National Institute of Disaster Management (NIDM), Ministry of Home Affairs, Govt. of India, New Delhi.**
2. **SAARC Disaster Management Centre, NIDM Building, New Delhi.**
3. **National Disaster Management Authority, Near Indira Gandhi International Airport, New Delhi.**
4. **Indian Institute of Public Administration (IIPA), Indraprastha Estate, Ring Road, New Delhi.**
5. **India Meteorological Department, Lodhi Road, New Delhi.**
6. **Centre of Disaster Management, HCMRIPA, JLN Marg, Jaipur.**
7. **Haryana Institute of Public Administration (HIPA), Gurgaon.**
8. **Ambedkar Institute of Public Administration, Chandigarh.**
9. **Shri Krishna Institute of Public Administration, Ranchi.**
10. **G.B.Pant Institute of Himalayan Environment and Development, Nainital, Uttarakhand.**
11. **Disaster Management Centre, Bhopal.**
12. **Disaster Mitigation Institute, Ahmedabad.**
13. **Centre for Disaster Management, Guru Govind Singh Indraprastha University, Kashmeri Gate, Delhi.**
14. **Indian Agriculture Research Institute (ICAR), New Delhi.**
15. **Indian Red Cross Society, New Delhi and States Units.**
16. **States Revenue and Disaster Management Ministry/Department.**
17. **State Government's Institute of Public Administration.**
18. **National Remote Sensing Centre, Department of Space, Govt. of India, Hyderabad.**
19. **Space Applications Centre, Department of Space, Govt. of India, Ahmedabad.**
20. **Indian Institute of Remote Sensing, Department of Space, Govt. of India, Dehradun.**
21. **National Institute of Ocean Technology, Chennai.**
22. **United Nations Development Programme (UNDP) of national level and State Units.**
23. **Faculty and research positions in universities/institutes and in foreign countries.**
24. **Organizations providing fellowships for Disaster Prevention and Management Study.**
25. **Indian and international level Non-Governmental Organizations (NGO) working in the field of Disasters Management.**
26. **State Remote Sensing Applications Centers.**
27. **Indian Red Cross Society, New Delhi**
28. **International organizations having research and job opportunities.**
29. **After completing the research, there is good scope of employment in universities, institutes, NGOs, policy and planning organizations within country and abroad.**
30. **All states Disaster Management Cells of Government and NGO's.**

After completion of Ist and IInd Semesters (Ist year), if the candidate is leaving the course he/she will be given PG Diploma1 in Earth Science and Disaster Management.

There is a lateral entry to this course for the 2nd Year along with the M.sc/MS in any Science Subjects and Engineering Candidates are eligible to get PG Dipolma2 in Earth Science and Disaster Management.

Course Structure

I Semester	Course	Paper	LTP	Credit	Paper Code	Total credits
1	Introduction to Disasters	Hard Core	400	4		24
2	Mitigation-Response-Recovery and Preparedness.	Hard Core	400	4		
3	Diasater Management, Climate Change and Adaptation	Hard Core	400	4		
4	Geomorphology and Structural features of Earth.	Soft Core	301	4		
5	Dynamics of the Earth	Soft Core	400	4		
6.	Disaster Management Plans	Soft Core	004	4		
II Semester	**Course**	**Paper**	**LTP**	**Credit**	**Paper Code**	**Total credits**
7	Planning-Modeling-Sensitivity and Preventions of Disasters.	Hard Core	301	4		24
8	Geospatial tools in Disaster Management.	Hard Core	301	4		
9	Field Training for Disaster Management (Minor Project)	Hard Core	004	4		
10	Geo-Political Issues in Disaster Management.	Soft Core	400	4		
11	Statistical Techniques for Disaster Management.	Soft Core	301	4		
12	Earth & its Disasters.	Open elective	400	4		

The BOS of ESDM finalized and considered Ist and IInd Semester only for (Ist year MSc.) Syllabus to start the course of academic year 2022-2023.

I SEMESTER

Paper 1: Introduction to Disasters. (HC) 60 (15 hrs each unit) Hrs

Unit 1: Introduction to Disasters, Basic principles of disasters management, Hazard, risk, vulnerability, disaster, concepts and fundamentals, classification of hazards, their strength and weaknesses, hazard characteristics, Categorization of Disasters. Introduction, Lithosphere, Atmosphere, Hydrosphere, Biosphere.

Unit 2: Disaster management, concept, disaster management components, scope, disaster management cycle, paradigm shift in disaster management, disasters and development interface. Desertification and drought, Types and classifications of drought. Early warning systems, Crisis management and Atmospheric dispersion.

Unit 3: Natural and Geological Disasters (earthquakes, landslides, tsunami, mining); Hydro-Meteorological Disasters (floods, cyclones, lightning, thunder-storms, hail storms, avalanches, droughts, cold and heat waves) Biological Disasters (epidemics, pest attacks, forest fire); Technological Disasters (chemical, industrial, radiological, nuclear) and Global Disaster Trends – Emerging Risks of Disasters.

Unit 4: Man-made Disasters (building collapse, rural and urban fire, Air, road and rail accidents, nuclear, radiological, and chemicals disasters) gas and radiations leaks, toxic waste disposal, oil spills, forest fires. Seismic zones of India, major fault systems of Indian plate, social economics and environmental impact of disasters. Industrial accidents, Technological accidents. Conflicts and Case studies.

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1. Disaster Management Guidelines, GOI-UND Disaster Risk Program (2009-2012)
2. Damon, P. Copola, (2006) Introduction to International Disaster Management, Butterworth Heineman. 3. Gupta A.K., Niar S.S and Chatterjee S. (2013) Disaster management and Risk Reduction, Role of Environmental Knowledge, Narosa Publishing House, Delhi.
3. Murthy D.B.N. (2012) Disaster Management, Deep and Deep Publication Pvt. Ltd. New Delhi.
4. Modh S. (2010) Managing Natural Disasters, Mac Millan publishers India Ltd.
5. A Manual on Disaster Management. ParagDiwan (2010), PentagonEarth.
6. Bryant Edwards., Natural Hazards, Cambridge University Press, U.K,2005.
7. Handbook of Disaster Risk Reduction & Management. Christian N Madu and Chu-HuaKuei (2017). WorldScientific.
8. Handbook of Hazards and Disaster Risk Reduction. Ben Wisner, J.C. Gaillard, Ilan Kelman(2012) Routledge.
9. H.K. Gupta., Disaster Management,2003.
10. Disaster Administration and Management, Text & Case studies- SL Goel-Deep and Deep Publications.

11. Disaster Management- G.K Ghosh-A.P.H. Publishing Corporation.
12. Disaster management – S.K.Singh, S.C. Kundu, Shobha Singh A – 119, William Publications, New Delhi.
13. Disaster Management – Vinod K Sharma- IIPA, New Delhi, 1995.
14. Encyclopedia of Disaster Management- Goel S.L. - Deep and Deep Publications, New Delhi, 2006.

Paper 2: Mitigation-Response-Recovery and Preparedness. (HC) 60 (15 hrs each unit) Hrs

Unit 1: Definitions, Disaster management Cycle, Rescue and relief (response), Recovery and reconstruction, Preparedness and Capacity building, Mitigation, Administrative guidelines of all the four above points. Health and Safety of Workers, Physical exposures, Chemical exposures. Biological exposures, psychosocial exposures. Mitigation assessment and Management techniques of Disaster. Disaster Management cycle, Disaster management policy, National and State Bodies for Disaster Management, Early Warming Systems, building design and construction in highly seismic zones, retrofitting of buildings.

Unit 2: Global perspective, Disaster Management in India – perspective and progress; Need for new investments and performance review. Response, Introduction, Common Objectives of Disaster Responders, Disaster response planning, Search, Rescue, Evacuation and Logistic Management, Role of Government, International and NGO Bodies. Psychological Response and Management (Trauma, Stress, Rumor and Panic). Relief and Recovery. Medical Health Response to Different Disasters.

Unit 3: International Decade for Natural Disaster Reduction (IDNDR) (1990's), Yokohama Declaration (1994), Hyogo framework for action (HFA, 2005-2015), Sendai Framework for Disaster Risk Reduction (2015-2030). IDRL Guidelines, Sphere humanitarian standards, International NGOs and their best practices. Recovery, Introduction, Disaster Recovery Plan, Recovery plan considerations, Types of disaster recovery plans, Scope and objectives of Disaster planning, How to build a disaster recovery plan, Disaster recovery plan template, incident management plan vs. disaster recovery plan.

Unit 4: Case studies of: Disaster management policy of United States of America. Disaster management policy of Bangladesh, The Cuban Model of Hurricane Risk Management, Japan's Emergency Management and response System. Disaster Preparedness, Concept and Nature, Disaster Preparedness Plan, Prediction, Early Warnings and Safety Measures of Disaster, Role of Information, Education, Communication, and Training.

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- A Manual on Disaster Management. Parag Diwan (2010), PentagonEarth.
- Bryant Edwards., Natural Hazards, Cambridge University Press, U.K, 2005.
- Carter, W. Nick., Disaster Management: A Disaster Manager's Handbook Asian Development Bank, 2008.

- Damon Coppola. Introduction to International Disaster Management 3rd Edition, 2015.
- David Etkin Disaster Theory: An Interdisciplinary Approach to Concepts and Causes, 2014.
- Disaster Risk Management Systems Analysis: A Guide Book. Stephan Baas (2008). Food and Agriculture Organization of the United Nations.
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- http://www.ndma.gov.in/en/
- http://nidm.gov.in/default.asp
- https://www.fema.gov/
    - Blaikie, P., Cannon, T., Davis, I., Wisner, B. (1997). At Risk Natural Hazards, Peoples' Vulnerability and Disasters. Routledge.
    - Carter, N. (1991). Disaster Management: A Disaster Manager's Handbook. Manila Philippines: Asian Development Bank

Paper 3: Disaster Management, Climate Change and Adaptation. (HC)
60 (15 hrs each unit) Hrs

Unit 1: Definition of Climate and weather. Climatology, its meaning, aims and methods. Climatology as distinguished from meteorology. The Climatic elements. Order of treatment of climatic elements. Earth's Atmosphere-Structure and properties of Atmospheric layers. Solar Climate and Physical Climate. Continental and Marine Climate. Climatic factors viz., Temperature, Relative Humidity, Rainfall, wind, moisture and cloudness, Green house gasses. Temperature as a climatic element. Atmospheric Moisture, humidity, precipitation, and cloudiness. Types of clouds and Fogs. Major circulation of air as local winds.

Unit 2: Atmospheric distribution of pressure. Climatic factors on Evaporation and Condensation. Factors influencing global climate. Dust content in air and principles of atmospheric visibility. Climatic zones and their subdivisions. Classification of climates,-Koppen's and Thornthwaite's scheme of climatic Classifications. Characteristics of various climatic zones. Changes of Climate-Natural factors- Geological and secular changes, periodic variations and Role of Anthropogenic activities in climatic changes with case studies. Impact of climate change on Agriculture and also on terrestrial and aquatic ecosystems.

Unit 3: Climate Observations, Automatic weathers stations and networks. Climate data management. Instruments and climatic measurements. Climate monitoring and climate records. Tools/gadgets used in measuring weather parameters viz. Thermometers, barometers, hygrometers, rain and snow gauges, Sunshine recorders. Weather maps and charts. Extreme climatic events- Cyclones, Jet Streams, Western Disturbances, Ozone Depletion, Storms, Hurricanes and Tornadoes. Droughts. Elements of Weather forecast and methods. Global Climate Models. General Weather Systems of India. Monsoon systems. Green house effect. Effect of climate change in terms of elevated CO2 and temperature on crops can be studied under Open Top chambers (OTC's), Close Top chambers (CTC's), Free Air Temperature enrichment (FATE) technology, Free Air Carbon dioxide Enrichment (FACE) technology.

Unit 4: History of Earth climate, Temperature and precipitation trends, Carbon cycle: Greenhouse effect, carbon stocks and flows, El Nino-Southern Oscillation (ENSO) Simulations models (GCM/RCM): Projections and uncertainties, Extreme weather events, climate change and biosphere, climate change adaptation and mitigation, economics of climate change, climate change policy framework.

Reference

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2. Advances in Meteorology, Climatology and Atmospheric Physics, Costas Helmis, Panagiotis T. Nastos, Springer Science & Business Media, 2012, 1278p.
3. Remote Sensing Applications in Meteorology and Climatology, Robin A. Vaughan, Springer Science & Business Media, 2012, 480p.
4. Applied Climatology: An Introduction, John F. Griffiths, Oxford University Press, Incorporated, 1976, 136 p.
5. Principles of climatology: a manual in earth science, Hans Hermann Neuberger, John Cahir, Holt, Rinehart and Winston, 1969, 178p.
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7. Global Physical Climatology, Dennis L. Hartmann,Academic Press, 1994, 411p.
8. Weather, radar and Flood forecasting, Collings. V. K (1987) John Wiley andsons.
9. General Climatology, Crithfield. H. J, (1996) Prentice Hall, NewJersey.
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12. Climatology by Miller, A. Austin Publication: London Methuen And Co 1938. x,304pp
13. Climatology by Haurwitz, Bernhard Publication: New York McGraw-Hill 1944. xi,409p.
14. Methods in climatology by Conrad, Victor Publication: Cambridge Harvard University Press 1946. Xx, 228p.
15. Climatology by Kendrew, W G Publication: Oxford the Clarendon Press 1957. xv,400p.
16. Climatology by Blair, Thomas A Publication: New York Prentice-Hall 1942. xvi,484p.
17. James Rodger Fleming (1998). Historical Perspectives on Climate Change. Oxford University Press.
18. Mark Maslin (2014). Climate Change: A Very Short Introduction. Oxford University Press.
19. William Kininmonth (2004). Climate Change: A Natural Hazard. Multi-science Publishing

co. Ltd.
20. Cambridge University (2013). Climate Change: Action, Trends and Implications for Business.
21. IISD, UNITAR & UNEP (2009). IEA Training Material: Vulnerability and Climate Change Impact Assessment for Adaptation.
22. IPCC (2013). Climate Change 2013. The Physical Science Basis - Summary for Policymakers.
23. OECD (2009): Guidance on Integrating Climate Change Adaptation into Development Co-operation.
24. UNEP (2009). Climate Change Science Compendium
25. UNEP (2009). Climate in Peril, a Popular Guide to the Latest IPCC Report.
26. UNEP & UNDP (2011). Mainstreaming Climate Change Adaptation into Development Planning: A Guide for Practitioners.

Paper 4: Geomorphology-Structure and Earth features. (SC) 60 (15 hrs each unit) Hrs

Unit 1: Introduction to Geomorphology, Principles of geomorphology, Meaning and Historical Development. Relief orders of Earth. Exogenetic and endogenetic processes. Concepts Relating to Processes and agents. Landsides, erosional features, geological land forms. Rock slides soil related studies.

Unit 2: Weathering, Physical, Chemical and Biological, Evolution of Landforms through Fluvial, Glacial, Karst, Aeolian and Coastal, Erosion, Transportation and Deposition. Principles of terrain classification- landscape and parametric divisions. Role of geomorphology in selecting sites irrigation in arid and semi arid regions- advantages and reclamation processes, Interpretation of drainage patterns.

Unit 3: Structural aspects of rocks like Outcrop, Dip and strike, classification and types of Folds, Faults, Joints and cleavage. Stress and strain ellipsoid geometric classification of litho units. Structural features of earth and their influence on Engineering Projects/structures like dam, tunnels, slope treatment.

Practical: Construction of geological cross section, Problems related to Structural geology, contour maps, Tracing of outcrops, Interpretation of underground structure from borehole data, Solution to fault problems, Use of stereographic projection in structural calculation, Construction of rose diagram for structural data. Drainage, contour, slopes, shears, land forms and land use/cover related problems and maps.

Reference

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3. Dayal. P – A Text book ofGeomorphology.
4. Modern Physical Geography by Arthur N. Strahler & Alan H. Strahler.
5. Applied Geomorphology by Hails.
6. Billings, M.P. (1978) Structural Geology – Prentice – Hall of India Private Ltd. New Delhi.

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8. Price, N.J. and Cosgrove, J.W. (1990) Analysis of Geologiucal Structure. Camb. Univ. Press.
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10. Ramsay, J.G. (1967) – Folding and fracturing of rocks. Mc.Graw Hills New Yark.
11. Badgley P.C. – Structural Geology for the exploration geologist.
12. Whitten, T- Structural Geology.
13. Ramsay, J.G. Structural Analysis of Metamorphic Tectonites.

Paper 5: Dynamics of Earth and Plate Tectonics. (SC) 60 (15 hrs each unit) Hrs

Unit 1: The basic concept of Continental Drift Plate Tectonics – Divergent or Constructive Margins – Ocean Floor spreading Magnetic Anomalies, the shape of spreading ridge. Conservative Margins. Destructive Margins: – i) Ocean – Ocean Convergent Margins ii) Subduction Zones – Ocean – Continent Convergent Margins. iii) Continent – Continent Convergent Margins.

Unit 2: Geometry of Plate Tectonics – Poles of rotation – Triple junctions and plate evolution. The globe according to the plate tectonics. Continental Positions in the past, crust formations at ridges. Forces on Plates – The hot-spot frame of reference, Plate Velocities - Plate tectonics and Mantle convection.

Unit 3: Physical properties of earth material: Electrical resistivity, Induced polarization, Spontaneous Polarization; Dialectic constant, Seismic wave velocity, Effect of moisture on Seismic velocity; Variation of density, Magnetic susceptibility, Thermal conductivity, Natural radioactivity. Interrelationship of geophysical parameter and water saturation.Description of Seismic Imaging System with 24 channel and field procedure and seismic method to detect fault in the tectonically distributed zones. Description of Proton Procession Magnetometer, principle and field procedure, for identification and interpretation of intrusive rocks, cavity, subsidence and fractures/faults.

Unit 4: Application of resistivity and resistivity imaging for the identification structures (Folds, Faults and fractures), lithology and Water bearing aquifers. Application of GPR in the delineation of subsurface structural geometry, lithology, water, subsidence and buried objects. Seismic imaging for structures and rock types. Proton precession magnetometer for structures/minerals/dyke rocks.

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4. Gubbins, D. 1990. Seismology and plate tectonics. Cambridge UniversityPress.
5. Bolt, B. A. 1999. Earthquakes, 4th. Freeman, New York. BP statistical review of world energy. 1997. Group Media and Publications, BP Co.,plc.
6. H. Robert Burger, Introduction to Applied Geophysics: Exploring the Shallow Subsurface;W. W. Norton & Company (July 6,2006).
7. Griffiths, D. H., and King, R. F. 1981. Applied geophysics for geologists and engineers, 2nd. Pergamon, Oxford, UK.
8. Hailwood, E. A. 1989. Magnetostratigraphy. Blackwell scientific, Oxford,UK.
9. Kasahara, K. 1981. Earthquakes mechanisms. Cambridge University Press, Cambridge,UK.
10. Parasnis, D. S. 1997. Principles of applied geophysics, 4th. Chapman andHall,
11. C. Chet Miller, Karin Svedberg Helgesson, and Robert P. Gephart, Jr. 2018 The Routledge Companion to Risk, Crisis and Emergency Management. United Kingdom: Taylor & Francis.
12. Gordy, M. (n.d.). Disaster Risk Reduction and the Global System: Ruminations on a Way.
13.Germany: Springer International Publishing.

Paper - 6: Disaster Management Plans. (SC) 60 (15 hrs each unit) Hrs

(All 4 Units Practicals)

Unit 1: Vision, methodologies, Objectives and salient features of the plan.

Unit 2: National and State Disaster Management plan Disaster Management plan

Unit 3: District and Taluk Disaster Management plan.

Unit 4: Urban and Village Disaster Management plan and also natural and artificial disaster management plans are also included. Using different Soft wares and Data sets.

II SEMESTER

Paper 7: Planning-Modeling-Sensitivity and Preventions of Disasters. (HC) 60 (15 hrs. each unit) Hrs.

Unit 1: Planning, Disaster Prevention and Emergency Management Overhead Transparencies Plan, Definitions, Development of Planning, Strategic Planning, Preparedness Planning, The Preparedness Planning Process, Flow Chart, Contingency Planning, Operational Planning, Planning for Disaster Prevention and Emergency Management, Planning, Approaches, Plans Do Not Work, People Work. Stakeholder, Stakeholders Analysis. Planning Against Disasters. Plan of Action. Planning in a Logical Frame work.

Unit 2: Geospatial Modeling, Modeling, Schism, Flood Modeling, Modeling's on landslides, erosional features, geological, landforms, geomorphic features of the earth, geographic features of the earth and physical, chemical and environmental processes. Earth System Modeling.

Unit 3: Sensitivity: The degree to which a system, asset, or species may be affected, either adversely or beneficially, when exposed to climate variability or change or geophysical hazards. Disaster Prevention - Mitigation Overhead Transparencies Mitigation, Principal Objectives of Mitigation, Menu of Emergency Management Action, Physical Planning Measures, Economic Measure, Management and Institutional Measures, Societal Measures, Engineering and Construction Measures

Practical: Case studies- Floods, Earth quakes, Fires, Mining Disasters, Tsunami, Cyclones, Drought, Soil Disaster, Atmosphere, Man made Disasters, In National and States. State Disaster Management policy and plan. SDMA Structure, SDRF and its Role in Disaster management, Role of NGO'S.

References:

1. Anil K Gupta, 2016, Resource Book on Chemical (Industrial) Disaster Management.
2. Forest Fire Disaster Management, www.nidm.gov.in
3. NIDM Publications, www.nidm.gov.in
4. Satyendra, A. And D. Kaushik, 2014, Forest Fire Disaster Management.
5. A. N. Raina, 1981, Geography of Jammu and Kashmir,
6. Disaster Management Policy of Jammu and Kashmir-Document-2012
7. Majid Husain, 1998, Geography of Jammu andKashmir.
8. Qazi, S.A. 2005, Systematic Geography of Jammu and Kashmir.

Paper 8: Geospatial tools in Disaster Management . (HC) 60 (15 hrs each unit) Hrs

Unit 1: Aerial photography, advantages, limitations, geometric characters – film, spectral sensitivity of Black and White films, color film, color infra-red film - filter – Aerial film cameras, single lens frame camera, panoramic cameras, film resolution, electronic imaging, aerial videography, multi band imaging,. Elements of aerial photo interpretation, Preparation of photogeological map. Remote sensing, Principles of remote sensing, Energy sources and radiation principles, Energy interactions in the atmosphere, Energy interactions with earth surface features, Black body radiation, Data acquisition and interpretation active and passive sensing, Characteristics of Images, Satellites orbit, Geostationary, Sounders and swath, resolution of satellites.

Unit 2: Geographical information system – definition, components of GIS, data sources, data structures- point features, line features and polygon features, raster and vector, data capturing-primary and secondary data capture, pre-processing, spatial querying and analysis, overlay function, neighborhood function and connectivity function, spatial data presentation .File management, data base management systems in GIS- data base, query, SQL statement - data manipulations and product generation, Environmental GIS, Data acquisition system using GPS, component of GPS, DGPS, Kinematic GPS, factors that affect GPS, GPS application.

Unit 3: Spatial data-field, object, computer representation of geographic information, raster representation, vector representation, point, line and polygon representation, topology, scale and resolution, sources of error and data quality, database design, convention, mapping concepts and coordinate systems- Overview of GIS software, introduction about ARCGIS, Arc map, Arc

catalog, Arc toolbox, 3D analyst, ARCGIS environment, ARCGIS extension, Arc IMS, Arc SDE, Arc GIS server, Developer GIS, ArcGIS engine – Mobile GIS. Query based information retrieval. Web GIS, online GIS and its applications. Development of GIS based decision support for disaster risk reduction. Open source. GIS for natural disaster management. Guidelines for geospatial preparedness.

Practicals: Methods of spatial interpolations in GIS – Visualizations in GIS, quantitative and qualitative data, time series, map cosmetics, map dissemination. Linking terrain, and climate to target the vulnerability due to natural disasters using GIS and Remote Sensing. Visual interpretation of aerial photos and satellite images, preparation of drainage maps, lineament maps, landslides, flood related maps, land use, land cover maps, earthquake related maps, Digital image processing and interpretation of satellite imageries, different types of disasters, droughts, and hazard zonation maps.

Reference

1. P.A. Burrough, 2007, Principles of Geographical Information System for Land Resource Assessment, Oxford University Press, p.345.
2. Tor Bernhardsen, 2009, Geographic information system an introduction, 3rd edition, Wiley student edition, p.428
3. P.A. Longley, M.F. Goodchild, D.J. Manguire, D.W. Rhino, Geographical Information System, Volume I: Principal and Technical Issues, Volume II: Management Issues and Applications, John Wiley &Sons, p432.
4. Ian Heywood, 2006, An introduction to GIS, Prentice Hall,464p.
5. Paul A. Longley, 2010, Geographic Information Systems and Sciences, John Wiley and Sons Ltd, 536p.
6. Michael f. Goodchild, 2005, Geographical Information Systems, principles, techniques, management and applications, John Wiley & Sons Inc.,404p
7. Andrew Skidmore,2008, Environmental modeling with GIS and remote sensing, Taylor & Francis
8. George B Korte, 2007, The GIS Book On Word Press, Thomson Learning, Inc.

Paper 9: Field Training For Disaster Management. (HC) (Minor Project)

Unit 1: Preparation of field visit plan, Application of spatial tools. Validation and Interpretation of satellite data in the field. GPS field data collection and mapping. Identification and Interpretation of geological structures and major geomorphic features in the field. Interpretation of Landslide surface morphology. Visit to flood prone areas and Inundation assessment. Field evaluation of Environmental factors responsible for Earthquakes, Volcanoes, Tsunami, Drought and drought questionnaire designing, Participatory Disaster Risk Assessment (PDRA), Village Disaster Management Plan (VDMP) preparation, Disaster drills, collection of Socio-economic data in the field. Collection of data pertaining to vulnerability and hazards. Preparation of Disaster management plan. etc.

Unit 2: One month internship can be given to students. They can choice the place for work for e.g. NIDM, NGRI, IMD, and ISRO etc.

Reference

- DavidLambert, 2007, The Field Guide to Geology,
- Enrico L. Quarantelli, and Russell Dynes, 2007, Handbook of Disaster Research, Havidan Rodriguez,
- Robert A. Stallings, 2003, Methods of Disaster Research.
- March, A. and Kornakova, M. (2017). Urban Planning for Disaster Recovery. Butterworth-Heinemann
- Marcus, O. (2005), "A Conceptual Framework for Risk Reduction". World Conference of Disaster Reduction, Kobe, Japan, 18-22 January 2005.
- Mayers, K. N. (1993), Total Contingency Planning for Disasters: Managing Risk, Minimizing Loss, Ensuring Business Continuity. John Wiley and Sons, New York.

Paper 10: Geo-Political Issues In Disaster Management. (SC) 60 (15 hrs each unit) Hrs

Unit 1: Trans-Boundary Disasters and their Management. Concept of Uni-Polar and Bi-Polar World. Buffer Zones: Evolution and Dynamics. Boundary Disputes in South Asia and West Asia. Conflicts and their Implications on People and their Economy: Case Studies of Vietnam, Afghanistan, Gulf.

Unit 2: Refugee Crisis and their Implication; Case Studies of: South Asia, West Africa, Central Africa. Role and Mandate of UNHCR, UNICEF, ICRC in Geo-political Conflicts.

Unit 3: Post-Independence Conflict between India-Pakistan. Economic and Life losses from the India-Pakistan conflict. India-Pakistan conflict and Development Constraints for SAARC Countries.

Unit 4: Disaster Profile of India – Mega Disasters of India and Lessons Learnt Disaster Management Act 2005 – Institutional and Financial Mechanism National Policy on Disaster Management, National Guidelines and Plans on Disaster Management; Role of Government (local, state and national), Non-Government and Inter Governmental Agencies. Study of Recent Disasters (at local, state and national level) And Preparation of Disaster Risk Management Plan of an Area or Sector Role of Engineers in Disaster Management.

Reference

1. Colin Flint, 2012, Introduction to Geopolitics.
2. Amos N. Guiora, 2013, Modern Geopolitics and Security: Strategies for Unwinnable.
3. Michael Don Ward, 1992. The New Geopolitics.
4. Kaushik, R. (2012). Geopolitics of Disaster Relief and Role of Diplomacy. Germany: Lap Lambert Academic Publishing GmbH KG.
5. Schlegelmilch, J. (2020). Rethinking Readiness: A Brief Guide to Twenty-First-Century Megadisasters. Germany: Columbia University Press.

Paper 11: Statistical Techniques for Disaster Management. (SC) 60 (15 hrs. each unit) Hrs.

Unit 1: Evolution, Organizational Structure, Powers and Functions of the Following International Organizations for Disaster Management. United Nations Development Programme (UNDP). World Health Organization (WHO), United Nations International Strategy for Disaster Risk Reduction (UNDP).

Unit 2: International Federation for Red Cross Societies (IFRCS). Global Facility for Disaster Risk Reduction (GFDRR). Asian Disaster Reduction Centre (ADRC). Asian Disaster Preparedness Centre (ADPC). SAARC Disaster Management Centre. National Disaster Management Authority. National Institute of Disaster Management. NITI Ayog.

Unit 3: National Civil Defense Organization. National Platform for Disaster Risk Reduction. J&K Disaster Management, Relief Rehabilitation and Reconstruction Department. State Disaster Management Authority. (NDMA), National Executive Committee (NEC), National Disaster Response Force (NDRF), State Executive Committee. State Disaster Response Force. District Disaster Management Authority.

Practicals: Statistical Analysis in Disaster Management. Measures of Central Tendency. Measures of Dispersion. Measures of Skewness and Kurtosis. Quartile Deviation and Coefficient of Variation. Correlation: Types of Correlation. Karl Person's Coefficient of Correlation. Rank Correlation. Method of Concurrent Deviation. Regression Analysis, Coefficient of Regression. Linear Regression Equation, Least Square Method. Qualitative and quantitative research methods, Methods of data collection, Composite Index. Sampling and its Types. Surveying for Damage Assessment.

Reference

- www.adpc.net

1. www.gfdrr.org
2. www.ifrc.org
3. www.npc.gov.np
4. www.ndma.gov.in
5. www.nidm.gov.in
6. www.in.undp.org
7. www.who.int
8. D.B.N. Murthy, 2007, Disaster Management: Text and Case Studies
9. J&K Disaster Management, Relief Rehabilitation and Reconstruction- http://jklaw.nic.in/pdf.
10. Jack Pinkowski, 2008, Disaster Management Handbook
11. National Platform for Disaster Risk Reductionnidm.gov.in/npdrr
12. www.ndrfandcd.gov.in
13. www.niti.gov.in
14. Rajdeep Dasgupta, 2007, Disaster Management and Rehabilitation.
15. www.unisdr.org

16. B. L. Agarwal, 2006, Basic Statistics
17. David Howell, 2010, Fundamental Statistics for the Behavioral Sciences
18. M. G. Bulmer, 1979, Principles of Statistics
19. Sheldon M. Ross, 2010, Introductory Statistics

Paper 12: Earth and its Disasters. (Open Elective) 60 (15 hrs each unit) Hrs

Unit 1: Introduction to Earth Science, Features of the Earth, Origin of the Earth, Interior of the Earth, Geomorphic processes and cycles, Geological action of wind, water, glaciers, and Earth quakes, Morphology of oceans, Isostacy and uniformintatrinism, Topography of India, Orogeny of India.

Unit 2: Introduction to Disaster management, Basic principles of disasters management, Hazard, risk, vulnerability, disaster, concepts and fundamentals, classification of hazards, their strength and weaknesses, hazard characteristics, Categorization of Disasters. Introduction, Lithosphere, Atmosphere, Hydrosphere, Biosphere.

Unit 3: Definition of Climate and weather. Climatology, its meaning, aims and methods. Climatology as distinguished from meteorology. The Climatic elements. Order of treatment of climatic elements. Earth's Atmosphere-Structure and properties of Atmospheric layers. Solar Climate and Physical Climate. Continental and Marine Climate. Climatic factors *viz*., Temperature, Relative Humidity, Rainfall, wind, moisture and cloudness, Green house gasses. Temperature as a climatic element. Atmospheric Moisture, humidity, precipitation, and cloudiness. Types of clouds and Fogs. Major circulation of air as local winds.

Unit 4: Natural and Geological Disasters (earthquakes, landslides, tsunami, mining); Hydro-Meteorological Disasters (floods, cyclones, lightning, thunder-storms, hail storms, avalanches, droughts, cold and heat waves) Biological Disasters (epidemics, pest attacks, forest fire); Technological Disasters (chemical, industrial, radiological, nuclear) and Global Disaster Trends – Emerging Risks of Disasters.

References

1. Disaster Management Guidelines, GOI-UND Disaster Risk Program (2009-2012)
2. Damon, P. Copola, (2006) Introduction to International Disaster Management, Butterworth Heineman. 3. Gupta A.K., Niar S.S and Chatterjee S. (2013) Disaster management and Risk Reduction, Role of Environmental Knowledge, Narosa Publishing House, Delhi.
3. Murthy D.B.N. (2012) Disaster Management, Deep and Deep Publication Pvt. Ltd. New Delhi.
4. Modh S. (2010) Managing Natural Disasters, Mac Millan publishers India Ltd.
5. A Manual on Disaster Management. Parag Diwan (2010), Pentagon Earth.
6. Bryant Edwards., Natural Hazards, Cambridge University Press, U.K,2005.
7. Handbook of Disaster Risk Reduction & Management. Christian N Madu and Chu-HuaKuei (2017). World Scientific.

8. Handbook of Hazards and Disaster Risk Reduction. Ben Wisner, J.C. Gaillard, Ilan Kelman(2012) Routledge.
9. H.K. Gupta., Disaster Management, 2003.
10. Disaster Administration and Management, Text & Case studies- SL Goel-Deep and Deep Publications.
11. Disaster Management- G.K Ghosh-A.P.H. Publishing Corporation.
12. Disaster management – S.K.Singh, S.C. Kundu, Shobha Singh A – 119, William Publications, New Delhi.
13. Disaster Management – Vinod K Sharma- IIPA, New Delhi, 1995.
14. Encyclopedia of Disaster Management- Goel S.L. - Deep and Deep Publications, New Delhi, 2006.