DISASTER RISK REDUCTION AND DEVELOPMENT PLANNING DM17304DCE

Course Outcome: This course covers important features of disaster risk reduction and development planning. The learners are expected get understanding of how a planned development can minimize the losses associated with disasters.

Credit - I

1. Concept and Objectives of DRR
2. Developmental Strategies for DRR
3. DRR Initiatives at International and National Level
4. International Mobilization of Risk Reduction
5. Sustainable Development and DRR

Credit - II

1. Concept of Developmental Planning
2. Disaster-Development Relationship
3. Developmental Planning in Context of DRR
4. Developmental Planning in Relation to Capacity and Vulnerability.
5. Application of IT and RS in DRR
6. DRR through IEC (Information, Education and Communication)

Suggested Readings

- Andrew E. Colins, 2009, Disaster and Development, Routledge.
- Jack Pinkowski, 2008, Disaster Management Handbook.
- Mark Pelling, 2003, Natural Disaster and Development in a Global World, Routledge.
- Misanya Doreau, 2011, Disaster and Development, VDM Variag Publishers.
- Nancy Rushford and Kerry Thomas, 2015, Disaster and Development: An Occupational Perspective, Churchill Livingstone.
- Pardeep Sahni, 2003, Disaster Risk Reduction in South Asia, Prentice Hall of India, New Delhi.
- Rajdeep Dasgupta, 2007, Disaster Management and Rehabilitation.
- Rajib Shaw, 2012, Community Based Disaster Risk Reduction.

ENVIRONMENTAL IMPACT ASSESSMENT AND ENVIRONMENTAL MANAGEMENT PROGRAMME DM17406DCE

Course Outcome: The EIA is very important and has to be undertaken during early development stage of proposed projects, plans and programmes and must be completed before a decision to proceed is made. Thus in this course students will be given information about the concept, approaches and legal provisions of EIA/EMP and the various methodologies adopted for EIA.

Credit-I

1. EIA: Concept, Objectives and Approaches
2. Baseline Data Generation and Strategic Environmental Assessment
3. EIA Guidelines 2006 and Legal Provisions
4. Protocol for Environment Impact Statements
4. Public Participation in Environmental Decision Making
5. National Policy for Resettlement and Rehabilitation (NPRR)

Credit-II

2. Methodologies of EIA: Quantification of Environmental Impact
3. Concept of Disaster-Environment Matrix
4. Matrices, Networks, Cost-benefit Analysis, Overlay Maps
5. EIA Report and its Contents
6. EIA Case Studies: Hydel Projects, Industrial Estates Highways
7. Ecological Assessment
8. Social Impact Assessment

Suggested Readings

- Alan Giplin, 1995, Environmental Impact Assessment.
- Charles H. Eccleston, 2011,Environmental Impact Assessment.
- John Glasson, Riki Therivel, and Andrew Chadwick, 2013, Introduction to Environmental Impact Assessment.
- Neil Craik, 2010, The International Law of Environmental Impact Assessment.

DISASTER SENSITIVE LAND USE PLANNING DM17307DCE

Course Outcome: Human practices have increased the risk and vulnerability towards disasters by many folds. Improper land use planning is the primary factors influencing exposure and vulnerability of communities. The course covers the important characteristics of land use planning and factors governing the land use change. Besides in this course students will get familiar with different legal provisions of India with regard to land use regulations.

Credit-I

1. Land Use Planning in Relation to Disasters - Concept and Objectives
2. Land Use Planning Techniques and Methods
3. Basic Principles of Land Use Planning
4. Land Use Planning in India and Legal Provisions

Credit-II

1. Concept of Land and Land Use
2. Factors Governing Land Utilization
3. Drivers of Land Use Changes
4. Land Use Zoning, Land Suitability and Land Sensitivity
5. Rural and Urban Land Use Planning

Suggested Readings

- Edward S. Kaiser and F. Stuart Chapin, 1957, Urban Land Use Planning, 4th Edition.
- Hok-Lin Leung, 2003, Land Use Planning Made Plain, University of Toronto Press.
- Jane Silberstein, M.A., and Chris Maser, 2013, Land-Use Planning for Sustainable Development, Second Edition, CRC Press.
- John Randolph, 2004, Environmental Land Use Planning and Management.
- Julian Conrad Juergensmeyer and Thomas E Roberts, 2003, Land Use Planning and Development Regulation Law, Thomas West.
- Philip R. Berke, David R Godschalk, 2006, Urban Land Use Planning, 5th Ed., University of Illinois Press.
- T. William Patterson, 1979, Land Use Planning, Techniques of Implementation, Van Nostrand Reinhold Company.

CONFLICTS AND GEO-POLITICAL ISSUES IN DISASTER MANAGEMENT DM17404DCE

Course Outcome: This course is aimed at providing comprehensive knowledge about the conflicts and geo-political issues that are related to disaster management e.g. the trans-boundary disasters and their management. Besides the refugee crisis and the role and mandate of various global and regional organizations in Geo-political conflicts will also be dealt in the course.

Credit-I

1. Trans-Boundary Disasters and their Management
2. Concept of Uni-Polar and Bi-Polar World
3. Buffer Zones: Evolution and Dynamics
4. Boundary Disputes in South Asia and West Asia

Credit-II

1. Conflicts and their Implications on People and their Economy: Case Studies of
   a. Vietnam
   b. Afghanistan
   c. Gulf

Credit-III

2. Refugee Crisis and their Implication; Case Studies of:
   a. South Asia
   b. West Africa
   c. Central Africa

Credit-IV

1. Role and Mandate of UNHCR, UNICEF, ICRC in Geo-political Conflicts
2. Post-Independence Conflict between India-Pakistan
3. Economic and Life losses from the India-Pakistan conflict
4. India-Pakistan conflict and Development Constraints for SAARC Countries

Suggested Readings

- Colin Flint, 2012, Introduction to Geopolitics.
- Amos N. Guiora, 2013, Modern Geopolitics and Security: Strategies for Unwinnable.
- Michael Don Ward, 1992. The New Geopolitics.

EMERGENCY MEDICINE DM17405DCE

Course Outcome: The course has been developed to make students aware about the application of medical and health disciplines for prevention, preparedness, response and recovery of health problems arising out of disasters. Besides the meaning and significance of disaster medicine, disaster site management, casualty area management, community health management, and application of ICT in health management of disasters will also be covered.

Credit-I

1. Understanding Emergency Medicine
2. Disaster Site Management
3. Mass Casualty Management
4. Triage- Concept and Use

Credit-II

1. Medical and Health Response to Different Disasters
2. Community Health Management During Disasters
3. Education and Training in Health Management During Disasters
4. Role of Information, Communication and Technology in Health Response

Suggested Readings

- Gregory R. Ciottone, 2006, Disaster Medicine,
- Singleton. R.A. Jr, and Straits B. C., 1999, Approaches to Social Research. Oxford University Press, New York.
- Vohra N.D., 2003, Quantitative Techniques in Management Tata McGraw Hill.

FUNDAMENTALS OF DISASTER MANAGEMENT DM17104DCE

Course Outcome: The course has been designed to deliver on basic concepts, principles, and significance of disaster management. The course would also cover best practices, changes, and new aspects of disaster management. The learners would get knowledge of frameworks adopted for disaster risk reduction over the period of time that has come up in the backdrop of various world disaster conferences. Moreover, the course covers disaster management policies as case studies from under developed, developing and developed nations.

Credit-I

1. Disaster Management- Concept
2. Disaster Management Cycle
3. Disaster Management Policy: Principles and Significance
4. Essential Components of Disaster Management Policy: Formulation & Execution.

Credit-II

1. Paradigm Shift in Disaster Management
2. Disaster and Development Planning
3. Community Based Disaster Management (CBDM).
4. Human and Legal Aspects of Disaster Management

Credit -III

1. International Decade for Natural Disaster Reduction (IDNDR) (1990's)
2. Yokohama Declaration (1994)
3. Hyogo Framework for Action (HFA, 2005-2015)
4. Sendai Framework for Disaster Risk Reduction (2015-2030)

Credit -IV

1. Case Studies of:
   i) Disaster Management Policy of United States of America
   ii) Disaster Management Policy of Bangladesh
   iii) Disaster Management Policy of India

Suggested Readings

- A Manual on Disaster Management. Parag Diwan (2010), Pentagon Earth.
- 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.
- Handbook of Disaster Risk Reduction & Management. Christian N Madu and Chu-HuaKuei (2017).World Scientific.
- Handbook of Hazards and Disaster Risk Reduction. Ben Wisner, J.C. Gaillard, Ilan Kelman(2012) Routledge.
- H.K. Gupta., Disaster Management, 2003.
- Patrick L. Abbott., Natural Disasters, McGraw-Hill Higher Education, 2004.
- Systems Approach to Management of Disasters: Methods and Applications, Slobodan P. Simonovic (2011). Wiley.
- http://www.unisdr.org/
- http://www.ndma.gov.in/en/
- http://nidm.gov.in/default.asp
- https://www.fema.gov/

UNDERSTANDING GEOPHYSICAL ENVIRONMENT DM17105DCE

Course Outcome: This course aims to provide understanding of geomorphology, hydrosphere, atmosphere and cryosphere. Their dynamics, role and impact on geophysical environment; and importance for understanding disaster profile of a region would also be covered.

Credit-I

1. Role of Geomorphology in understanding Disaster Profile of a Region
2. Concept of Landform Evolution and Earth Movements
3. Geomorphic Agents and Processes
4. Configuration of Oceans and Continents

Credit-II

1. Hydrosphere
2. Coastal Geomorphology, Ocean Currents and their Importance
3. Role of Oceans in Shaping the Geo-Ecology of Surrounding Land-Masses
4. El Nino, Southern Oscillations and La-Nina Phenomena, Sea Waves and Storm Surges

Credit- III

1. Atmosphere- Composition and Structure
2. Insolation, Heat-Balance of the Earth
3. Extreme Weather Events- Cyclones, Thunder Storms, Lightning, Hail Storms, Windstorms and Cloudbursts
4. Green House Effect and Global Climate Change

Credit- IV

1. Cryosphere-principal processes controlling glaciers, ice sheets and snow cover
2. General patterns in Greenland, Antarctica, Patagonia, Iceland, and Himalaya
3. Glacial Dynamics (Mass Balance, Glacial and Snowmelt Runoff)
4. Cryosphere and Global Water Security

Suggested Readings

- Alam Clowes and Comfort, Processes and Landforms.
- Bloom, A.L., Geomorphology-A systematic Analysis of Late Cenozoic Landforms.
- Wilfried Brutsaert, 2005,Hydrology**:** An Introduction.
- Steers, J.A., Unstable Earth.
- Strahler, A.H. &Strahler, A.H., Elements of Physical Geography.
- Thornbury, W.D., Principles of Geomorphology.

DISASTER MITIGATION AND PREPAREDNESS DM17106DCE

Course Outcome: With emphasis on mitigation and preparedness, the course covers various aspects of Disaster Management at different levels. Significance of planning and preparedness involving different stakeholders at different levels are also part of the course. The students are anticipated to understand the importance and means of disaster preparedness and mitigation.

Credit-I

1. Disaster Preparedness: Concept and Significance
2. Disaster Preparedness Measures and Plan
3. Institutional Mechanism for Disaster Preparedness

Credit-II

1. Disaster Preparedness for People with Special Needs and Vulnerable group (Women, Children, Especially Abled, Elderly)
2. Preparedness with Reference to Housing and Infrastructure.
3. Community Based Disaster Preparedness-Need and Significance

Credit-III

1. Structural and Non-structural Mitigation
2. Societal Perspectives on enhancing Preparedness
3. Resilience, Social Capital, Adaptation and Socio- Political Transformation
4. Adoption and enforcement of Land use and Zoning Practices

Credit-IV

1. Role of IEC (Information, Education and Communication) and Training
2. Role of International Agencies
3. Role of NGO's

Suggested Readings

- Collins Larry R. and Schneid Thomas D. 2000, Disaster Management and Preparedness, Taylor and Francis.
- Managing Disaster Risk in Emerging Econom(eds.)
- Sahni, Pardeep et.al. (eds.), 2002, Disaster Mitigation Experiences and Reflections, Prentice Hall of India, New Delhi.
- White, G.F, 1974, Natural Hazards: Local, National, Global, Oxford University Press, New York.
- White, Gilbert F. and J. Eugene Hass, 1975, Assessment of Research on Natural Hazards, Cambridge, MIT Press.

INSTITUTIONAL STRUCTURE FOR DISASTER MANAGEMENT DM17204DCE

Course Outcome: In this course the learners would get an understanding of the evolution, organizational structure, powers, and functions of the different international, national and local organizations for Disaster Management.

Credit-I

1. United Nations Development Programme (UNDP)
2. United Nations International Strategy for Disaster Risk Reduction (UNDP)
3. International Federation for Red Cross Societies (IFRCS)
4. Global Facility for Disaster Risk Reduction (GFDRR)
5. World Health Organization(WHO)

Credit-II

1. Asian Disaster Reduction Centre (ADRC)
2. Asian Disaster Preparedness Centre (ADPC).
3. SAARC Disaster Management Centre

Credit-III

1. National Disaster Management Authority
2. National Institute of Disaster Management
3. NITI Ayog
4. National Civil Defence Organization
5. National Platform for Disaster Risk Reduction

Credit-IV

1. J&K Disaster Management, Relief Rehabilitation and Reconstruction Department
2. State Disaster Management Authority
3. State Executive Committee
4. State Disaster Response Force
5. District Disaster Management Authority

Suggested Readings

- www.adpc.net
- www.gfdrr.org
- www.ifrc.org
- www.npc.gov.np
- www.ndma.gov.in
- www.nidm.gov.in
- www.in.undp.org
- www.who.int
- D.B.N. Murthy, 2007, Disaster Management: Text and Case Studies
- J&K Disaster Management, Relief Rehabilitation and Reconstruction Department jkadworld.com and http://jklaw.nic.in/pdf.
- Jack Pinkowski, 2008, Disaster Management Handbook
- National Platform for Disaster Risk Reduction nidm.gov.in/npdrr
- www.ndrfandcd.gov.in
- www.niti.gov.in
- Rajdeep Dasgupta, 2007, Disaster Management and Rehabilitation.
- www.unisdr.org

STATISTICAL TECHNIQUES FOR DISASTER MANAGEMENT DM17205DCE

Course Outcome: This course will introduce the students to statistical studies useful for analysis, understanding behavior and trends of hazards and disasters based on related statistics (historical data, statics on frequency, damage, loss, spatio-temporal patterns, etc.). Statistical analysis of data collected from the field through direct observations or from respondents (using designed questionnaires) regarding, vulnerability, hazards, disaster, and scenarios in any phase of disaster management are also contents of this course. This course will also familiarize the students about how to collect the data and how to identify factors impacting individuals and communities risk status.

Credit –I

1. Statistical Analysis in Disaster Management
2. Measures of Central Tendency
3. Measures of Dispersion
4. Measures of Skewness and Kurtosis
5. Quartile Deviation and Coefficient of Variation

Credit-II

1. Correlation: Types of Correlation
2. Karl Person's Coefficient of Correlation
3. Rank Correlation
4. Method of Concurrent Deviation

Credit-III

1. Regression Analysis, Coefficient of Regression
2. Linear Regression Equation, Least Square Method
3. Composite Index

Credit-IV

1. Sampling and its Types
2. Surveying for Damage Assessment

Suggested Readings

- B. L. Agarwal, 2006, Basic Statistics
- David Howell, 2010, Fundamental Statistics for the Behavioural Sciences
- M. G. Bulmer, 1979, Principles of Statistics
- Sheldon M. Ross, 2010, Introductory Statistics

DISASTER MANAGEMENT IN INDIA DM17206DCE

Course Outcome: The approach towards managing disasters has undergone a radical change over the last few decades. This course highlights the overall development of institutions dealing with disaster management in India. The course acquaints students about the roles, responsibility, and institutional structure of disaster management in India.

Credit-I

1. HPC 1999, Disaster Management Act 2005
2. Constitutional Power and Functions of Central Ministries (MHA, MoEF)
3. National Disaster Management Authority (NDMA), Central Ministries
4. National Disaster Response Force (NDRF) and National Crisis Management Committee (NCMC)
5. National Executive Committee (NEC) and Indian Meteorological Department (IMD)
6. National Institute of Disaster Management (NIDM)

Credit - II

1. National Agencies for Forecasting and Early Warning:
    i. IMD
    ii. ISRO
    iii. NRSC
    iv. WIRS
    v. GSI

Suggested Readings

- Govt. of India, 2004, Disaster Management in India, A Status Report. National Disaster Management Division, Ministry of Home Affairs,.
- GSI www.gsi.gov.in
- IMDwww.imd.gov.in
- ISRO www.isro.gov.in
- Mathur, G.C. 1986, Housing in Disaster prone areas, National Building Organization and U.N. Regional Centre. ESCAP, New Delhi.
- Mishra, P.K. 2004, Transforming Adversity into Opportunity: Experiences from Gujarat Earthquake Reconstruction Program World Congress on Natural disaster mitigation proceedings
- National Disaster Response Plan, NCDM, New Delhi, 2001.
- NRSC, www.nrsc.gov.in
- Sharma, Vinod K. 1994, Disaster Management, NCDM, IIPA, New Delhi.
- Taori, K , 2005, Disaster Management through Panchayati Raj, Concept Publishing Company, New Delhi
- WIRS,www.lr.org
- World Institution Building Programme Centre, 2004, Contemporary Natural and Manmade Disaster. Master of Disaster Mitigation.

RESEARCH METHODS IN DISASTER MANAGEMENT DM17308DCE

Course Outcome: Considering the broad scope for research in disaster management and its importance as a means of disaster mitigation and preparedness, this course covers different input data sets and methods for disaster research. This course will enhance the skills of the students to tackle the research works as well.

Credit-I

1. The Research Process –Broad Problem Area, Preliminary Data Collection, Problem Selection
2. Theoretical Framework– Research Questions, Hypothesis Development, Elements of Research Design.
3. Experimental Design –Laboratory Experiment, Variables, Validity, Types of Experimental Designs

Credit-II

1. Sampling Methods
2. Data Collection –Sources and Methods
3. Data Processing and Analysis
4. Hypothesis Testing, Sampling Designs

Suggested Readings

- Robert A. Stallings, 2003, Methods of Disaster Research.

WASTE AND DEBRIS MANAGEMENT DM17207DCE

Course Outcome: The objective of this course is to provide students knowledge about the generation, removal, and disposal of debris and waste following a major disaster. At the end of course, students should be able to know how to handle and dispose the hazardous and non-hazardous debris and waste.

Credit -I

1. Hazard Debris: Sources and Types
2. Debris and Waste Management – Need and Significance
3. Factors Affecting Debris Management
4. Disaster Debris Management Strategies/Disaster Debris Management Cycle
5. Disaster Debris Prevention Strategies

Credit -II

1. EPA's Guidelines for Disaster Waste Management Plan
2. Temporary Debris Management Areas (TDMA's)
3. Identifying Debris Management Sites (Ownership, Size, Location, Environmental and Historic Preservation Concerns)
4. Connecticut's Concept of Operations Plan (ConOps) for Disaster Debris Management.
5. Future Challenges of Debris management

Suggested Readings

- Bandara, and Hettiaratchi, 2010, Environmental impacts with waste disposal practices in a suburban municipality in Sri Lanka, Inderscience Publishers.
- Biomedical Waste (Management and Handling) Rules, 1998.
- D. Bhide and B.B. Sundaresan, 2001, "Solid Waste Management – Collection, Processing and disposal" Mudrashilpa Offset Printers, Nagpur.
- Hanrahan, D., S. Srivastava, and A. Ramakrishna, 2005, Municipal Solid Waste in India — Overview and Challenges, World Bank Environment Unit South Asia Region.
- J. Glynn Henry and Gary. W. Heinke, 2004, "Environmental Science and Engineering", Prentice Hall of India.
- UN-Habitat, Solid Waste Management in the World's Cities, 2009.

CLIMATOLOGY DM17408GE

Course Outcome: The course is designed to provide learners an understanding of fundamental characteristics of weather and climate. Moreover, the course would cover other atmospheric phenomenon as well such as the impact of monsoon and western disturbances on the climate of India.

Credit-I

1. Meteorology and its Relation with Climatology
2. Evolution of Earth's Atmosphere- Structure and its Role
3. Heat Budget and Latitudinal Heat Balance
4. Pressure Belts - Global Circulation System
5. Climatic Classification, Koppen

Credit- II

1. Climatic Change and Climatic Variability – Evidences and Indicators
2. Climate of India & Its Controls
3. Western Disturbances - Nature and Significance
4. Classical Theory of Indian Monsoon
5. Modern Theory of Indian Monsoon

Suggested Readings

- Aguada, Edward & Brat, J. E., 2016, Understanding Weather and Climate, Pearson International.
- Barua, A.K., 2005, Climatology, Dominant Publishers and Distributors.
- Critchfield, H.,1975, General Climatology, Prentice Hall, NewYork.
- Grald, S., 1980, General Oceanography-An Introduction, John Wiley & Sons, New York.
- Houghton, J.T., 2015, Global Warming a Complete Briefing (5th Ed.), Cambridge University Press.
- Lutgen, Fedrick K., 2006, The Atmosphere: An introduction to Meteorology, Princeton Hall.
- Paneersalvam, S.K., 2012, Global warming and Climate Change, AHP Publishing Co.
- Stringer, E.T., 1982, Foundation of Climatology, Surjeet Publication, Delhi.
- Vega, Anthony J. and Rohil, Robert V., 2008, Climatology.

GEOMORPHOLOGY DM17309GE

Course Outcome: The course has been designed to provide learners an understanding of fundamental principles in geomorphology. The course includes looking at evolution and dynamics of landforms in relation to various exogenic and endogenic processes.

Credit-I

1. Fundamental Concepts in Geomorphology
2. Concept of Landform Evolution
3. Principles of Uniformitarianism
4. Cycles of Erosion - Concepts of Davis and Penck

Credit-II

1. Exogenic Processes- Weathering and Erosion
2. Fluvial Process and Resultant Landforms
3. Glacial Process and Resultant Landforms
4. Dynamics of Aeolian Process and Resultant Landforms

Suggested Readings

- Alan Clowes and Comfort, 1987, Processes and Landforms.
- Bloom, A.L., 2003, Geomorphology-A systematic Analysis of Late Cenozoic Landforms.
- Steers, J.A., 1983, Unstable Earth: Some recent views in Geomorphology.
- Strahler, A.H. &Strahler, A.H., 199, Elements of Physical Geography.
- Thornbury, W.D., 2004, Principles of Geomorphology, Second Edition.

REGIONAL HAZARD AND DISASTER MANAGEMENT SCENARIO DM17107DCE

Course Outcome: The course is intended to acquaint students about the hazard, exposure, and vulnerability scenario of Jammu and Kashmir. Besides, the course would deal with the recent and historical perspective of disasters in Jammu and Kashmir. The course would cover the disaster management structure of Jammu and Kashmir and the role of different organization in disaster management as well.

Credit-I

1. Historical Disaster Scenario of Jammu and Kashmir
2. J&K: A Multi-Hazard Zone
3. Case Study/Examples from Recent Disasters - 2014 Flood, 2010 Leh Flash Flood , 2005 Earthquake, 2005Waltengo Snow Avalanche

Credit-II

1. Seismic Sensitivity of Kashmir Himalaya
2. Weather and Climate Variability in Jammu and Kashmir: Causes, Effects and Adaptation Strategies
3. Hydrological and Drainage characteristics of Jammu and Kashmir
4. Geomorphic Configuration and Flood Inundation Scenario of Kashmir valley

Credit-III

1. Water resource availability; distribution pattern and recent variability
2. Land Use and Land Cover Change: Drivers and Effects
3. Social, economic, and demographic Construction of Risk: Regional Situation
4. Regional Disaster and Development Status

Credit-IV

1. State Disaster Management Policy and Plan
2. SDMA Structure
3. SDRF and its Role in Disaster Management
4. Role of NGO's

Suggested Readings

- A. N. Raina, 1981, Geography of Jammu and Kashmir,
- Disaster Management Policy of Jammu and Kashmir-Document -2012
- Majid Husain, 1998, Geography of Jammu and Kashmir.
- Qazi, S.A. 2005, Systematic Geography of Jammu and Kashmir.

DISASTER PROFILE OF INDIA DM17209GE

Course Outcome: India's unique geo-climatic position makes India particularly exposed to many hazards and the socio-economic structure makes it vulnerable too; the combination often becomes a cause of disasters. The spatio-temporal variability of India with respect hazards, vulnerability, exposure, and risk would be covered in this course. The paper will also illustrate the causes and consequences of historical disasters in India.

Credit-I

1. Historical Overview of Earthquake in India
2. Earthquake: Distribution and Zonation
4. Landslides: Implications and Zonation in Northern India
5. Floods/ Flash Floods

Credit-II

1. Cloudburst- Causes and Consequences
2. Cyclone and Tsunami Vulnerability Scenario of India
3. Chemical Biological Radiological and Nuclear (CBRN) Disasters
4. Road Accidents and Building Collapses

Suggested Readings

- Barua, A.K, 2005, Climatology, Dominant Publishers and Distributors.
- Bryant Edwards, 2005. Natural Hazard, Cambridge University Press.
- Edward A. Keller and Robert .H. Blodgett, 2008, Natural Hazards, Pearson Prentice Hall.
- Edward Aguada and J. E. Brat., 2016, Understanding Weather and Climate, Pearson International.
- G. K. Gosh, Disaster Management, A.P.H Publishers, New Delhi
- H.K. Gupta. 2003, Disaster management, 2003.
- Houghton, J.T., 2015, Global Warming: A Complete Briefing (5th Ed.), Cambridge University Press, 2015. .
- NIDM, Geological Hazards, www.nidm.gov.in
- Paneersalvam, S.K., 2012, Global Warming and Climate Change, A.H.P Publishing Co.
- Rajesh K Yadav*et. al*. Encyclopaedia of Disaster and Hazards Management, Oxford Book Company,
- Singh, K.K., Lotfi, Aleya and Singh, V., Disaster Management of Manmade Disasters, Motilal Banarsidass Publishers Private Limited.

FIELD TRAINING FOR DISASTER MANAGEMENT DM17303CR

Course Outcome: Students will be taken to field and exposed to socio-economic and geo-physical environment of any region, so that they are able to evaluate the different dimensions of vulnerability, exposure, and risk. The students will also get familiar with the important aspects which shall be kept in mind while preparing disaster management plan of any region. Pertinently, in the field studies course each student shall have to prepare a brief field report according to the nature and purpose of the field.

Credit-I

1. **Activities**- Preparation of Field Visit Plan
2. Application of Spatial Tools
3. Validation and Interpretation of Satellite Data in the Field
4. GPS Field Data Collection and Mapping

Credit-II

1. **Activities**- Identification and Interpretation of Geological Structures and Major Geomorphic Features in the Field
2. Interpretation of Landslide Surface Morphology
3. Visit to Flood Prone Areas and Inundation Assessment
4. Field Evaluation of Environmental Factors Responsible for Snow Avalanche Occurrence

Credit-III

1. **Activities**- Questionnaire Designing
2. Collection of Socio-Economic Data in the Field
3. Collection of Data Pertaining to Vulnerability and Hazards.

Credit- IV

1. Preparation of Disaster Management Plan

Suggested Readings

- David Lambert, 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.

PROJECT WORK/DISSERTATION DM 17403CR

Course Outcome: This course involves components for preparation of dissertation by concerned students on any of the topics relevant to disaster management theme selected in consultation with the concerned supervisor (teacher).

Credits: 04

Credit-I carrying 25 percent marks would involve teaching (lectures) on components and preparation of dissertation by concerned teachers. Credit-II, III, and IV carrying 75 percent marks of the course would be for the preparation of dissertation on any of the topics relevant to disaster management, selected in consultation with the concerned Supervisor/Guide. The structure of the dissertation is highlighted in Credit-I.

Credit-I

1. Statement of the Problem
2. Conceptual Framework
3. Objectives
4. Hypothesis/ Research Questions
5. Literature Survey
6. Methodology
7. Data Sources (Based on Primary Sources, Secondary Sources and Laboratory Work)
8. Results and Discussion
9. Conclusion
10. References

Credit-II, III, and IV

Dissertation

REHABILITATION, RECONSTRUCTION AND RECOVERY DM17202CR

Course Outcome: This course aims to make students recognize important elements and distinguish the rehabilitation, reconstruction and recovery phase of disaster management. The students are expected to gain in–depth knowledge of physical, social and economic rehabilitation components and more importantly the learners will be able to know how rehabilitation, reconstruction and recovery phase can be made efficient. Besides they will be familiar about one of the important aspects i.e. build-back-better approach.

Credit-I

1. Rehabilitation, Reconstruction and Recovery
2. Introduction to Short and Long Term Recovery Aspects
3. Community Participation in RRR (Rehabilitation, Reconstruction and Recovery)
4. Priorities in Recovery

Credit -II

1. Rehabilitation: Physical and Social Infrastructure
2. Relocation and Reconstruction of Housing
3. Public Buildings, Roads, Bridges, Dams
4. Archives and Monuments

Credit -III

1. Essential Services
2. Waste Management
3. Communication
4. Capacity Building for Self-Help Construction

Credit -IV

1. Social and Economic Rehabilitation
2. Capacity Building for Reconstruction under BBB (Build Back Better) Approach
3. Skill Enhancement for Livelihood Development
4. Training and Awareness Programs
5. Medical Aid Therapy and Counselling- Psycho-Social Issues

Suggested Readings

- F.Y. Cheng and Y.Y. Wang, 1996, Post-Earthquake Rehabilitation and Reconstruction
- Rajdeep Dasgupta, 2007, Disaster Management and Rehabilitation.
- David A. McEntire, 2014, Disaster Response and Recovery: Strategies and Tactics for Resilience, Wiley Publications.

REMOTE SENSING, GIS AND GPS-I DM17102CR

Course Outcome: The course aims to make students understand basic theoretical concepts of Remote Sensing, Geographic Information System (GIS) and Global Positioning System (GPS). The students would gain understanding of electromagnetic spectrum, Image Interpretation, and image processing. In addition to that this course would include study of the GIS components, data models, GPS segments and applications.

Credit-I

1. Fundamentals of Remote Sensing
2. Electromagnetic Spectrum (EMS)
3. Energy Interactions with Earth Surface Features and Atmosphere
4. Image Interpretation
5. Digital Image Processing

Credit-II

1. Remote Sensing Systems
2. E-O-Space Programmes
3. Platforms – Space borne / Airborne
4. Sensors-Active/ Passive. Multispectral and Hyperspectral Systems
5. RADAR and LIDAR Systems

Credit-III

1. Introduction to Geographic Information System
2. Components of GIS
3. Spatial and Non-spatial Data
4. Data Models- Raster and Vector, Processing and Analysis/Modelling
5. Data Dissemination

Credit-IV

1. Introduction to Global Positioning System (GPS)
2. GPS Segments
3. Fundamentals of GPS Positioning
4. Sources of Errors and Limitations
5. Applications

Suggested Readings

- Andrew Skidmore, 2003, Environmental Modelling with GIS and Remote Sensing,
- Floyd F. Sabins Jr. 1987, Remote Sensing, Principles and interpretation. W.H. Freemanes & Co., New York, 2nd Edition.
- Integration of GIS and Remote Sensing Victor Mesev–2008
- James B. Campbell, Randolph H. Wynne, Introduction to Remote Sensing, Fifth Edition.
- N. Peterson,2009, GIS Cartography: A Guide to Effective Map Design, Gretchen
- Sam J. Purkis and Victor V. Klemas, 2011, Remote Sensing and Global Environmental Change.
- Stan Marany, 1999, GIS Solutions in Natural Resource Management, Onward Press, USA.
- Thomas Martin Lillesand, Ralph W. Kiefer and Jonathan W. Chipman, 2004,Remote Sensing and Image Interpretation, Remote Sensing and GIS in Ecosystem Management.