

**Course Structure and Syllabi of
M.Sc. in Disaster Management**
Effective from 2022-23



**DEPARTMENT OF COASTAL DISASTER MANAGEMENT
SCHOOL OF PHYSICAL, CHEMICAL & APPLIED SCIENCES
PONDICHERRY UNIVERSITY
PORT BLAIR CAMPUS**

Department of Coastal Disaster Management

PONDICHERRY UNIVERSITY, PORT BLAIR CAMPUS

Revised Syllabus of M.Sc. (Disaster Management)

Effective from 2022-23 onwards

Eligibility for Two years M.Sc. (Disaster Management) course:

Bachelor's degree in any discipline in Science/ B.C.A./B.A. Geography/ B.E. Civil Engineering / Electrical and Electronics Engineering with a minimum of 55% of marks.

Department of Coastal Disaster Management
PONDICHERY UNIVERSITY, PORT BLAIR CAMPUS
Revised Syllabus of M.Sc (Disaster Management)
Effective from 2022-23 onwards

Code	Subject	Credits
First Semester		
DMPB411	Introduction to Hazards and Disasters	3
DMPB412	Principles of Remote Sensing	3
DMPB413	Earth systems dynamics and rock types	3
DMPB414	Structure and Tectonics	3
DMPB415	Geomorphology (Soft Core)	3
DMPB416	Practical I (412,413)	3
DMPB417	Practical II (414,415)	3
Second Semester		
DMPB511	Geographic Information Systems	3
DMPB512	Geophysical Exploration	3
DMPB513	Earthquakes, Volcanism, Landslides and Desertification	3
DMPB514	Floods, Tsunami and Cyclones and Other Coastal Problems	3
DMPB515	Biological and Technological Disasters (Soft Core)	3
DMPB516	Practical III (511, 514)	3
DMPB517	Practical IV (512,513)	3
Third Semester		
DMPB611	Climate Change and Environmental Disasters	3
DMPB612	Disasters and Environmental Strategic Assessment (ESA)	3
DMPB613	Disaster Response: Approaches and Strategies	3
DMPB614	Disaster Risk Reduction	3
DMPB615	Natural and manmade Disasters effects on buildings (Soft Core)	3
DMPB616	Practical V (611,612)	3
DMPB617	Practical VI (614, 615)	3
Fourth Semester		
DMPB711	Research Methods for the Preparation of Project = Credit 1 Collection of relevant Literature to M.Sc. Project = Credit 1 Project Report = Credit 4 Viva = Credit 3	9
	Total	72

DMPB-411 INTRODUCTION TO HAZARDS AND DISASTERS

Unit 1

12 Hours

Understanding of key concepts in Disasters Management: Hazards, Disasters, Vulnerability, Resilience, Disaster Management, Disaster Cycle, risk, prevention, mitigation, relief and response, recovery and rehabilitation etc – Brief history of disaster management in India and world- The emerging field of disaster management- Role of social sciences and natural sciences and multidisciplinary nature of disaster management as applied disciplines

Unit II

10 Hours

Different typologies and classification of disasters, cataclysmic – slow-onset, natural- manmade etc- Critique of different classifications, what magnitude constitutes a “disaster” for the government. Effects of hazards: Primary, secondary and tertiary.

Unit III

8 Hours

Consequences and impact of disasters; Flood, cyclones, tsunamis, earthquakes, landslides, volcanic eruption, desertification, drought, salinity ingress – Overview through case studies

Unit IV

8 Hours

Climate change, environmental stress, Biological and Technological disasters – Overview through case studies

Unit V

10 Hours

Nature of challenges in disaster management for people and environment, Lessons (overview of the field of study and nature of functions required of different professionals learnt, Role of disaster management in contemporary times).

Text Books:

1. Edward A Keller and Robert H Blodgett. 2008. Natural hazards. Pearson Prentice Hall, 488p.
2. Donald Hyndman and David Hyndman. 2009. Natural hazards and disasters. Brooks/Cole. 555p.

References

1. Bankoff, G., Frerks, G. and Hilhorst, D. 2004. (eds.) Mapping Vulnerability: Disasters, Development, and People, Earthscan, London.
2. Birkmann, J. 2007. “Risk and vulnerability Indicators at Different Scales: Applicability, Usefulness and Policy Implications”, Environmental Hazards, 7 (1): 20-31.
3. Burton, I., Kates, R.W. And White, G.F. 1968. “The Human Ecology of Extreme GeoPhysical Events”, Natural Hazard Research, Working Paper#1 Karuson, K. and

4. MacManus, S.A. 2011. "Gauging Disaster Vulnerabilities at the Local Level: Divergence and Convergence in an all Hazard System", *Administration and Society*, XXX:1-26
5. Quarantelli, E. L. 1998 (eds) *What is a Disaster? Perspectives on the Question*, Routledge, London.
6. Wisner, B., Blaikie, P., Cannon, T. and Davis, I. 2004. *At Risk: Natural Hazards, People's Vulnerability and Disasters*, Second Edition, Routledge, London.
7. Birkmann J (2006): *Measuring Vulnerability to promote disaster resilient societies: Conceptual frameworks and definitions*, United Nations University Press, Pg. 9-54.
- Coburn, Spence & Pomonis (1991): *Actions to reduce risk in Disaster Mitigation*, UNDP-UNDRO Manual, Pg. 15 – 27.
8. Bryant Edwards, 2005. *Natural hazard*. Cambridge University press, UK. Coburn, Spence & Pomonis (1991): *Mitigation Strategies*, UNDP-UNDRO Manual, Pg. 29 – 34.
9. Jeannette Sutton and Kathleen Tierney (2006) *Disaster Preparedness: Concepts, Guidance, and Research*, Natural Hazards Center, Institute of Behavioral Science, University of Colorado, Accessible at McEntire D A (2005): *Why Vulnerability Matters: Exploring the merit of an inclusive disaster reduction concept*, *Disaster Prevention and Management*, 14 (2), Pg. 206- 222.
10. Morrow B H (1999): *Identifying and Mapping Community Vulnerability*, *Disasters*, 23 (1): 1-18.
11. Rautela P and RK Pande (2005): *Implications of ignoring the old disaster management plans: Lessons from the Amparav tragedy of 23 September 2004 in the Nainital district of Uttaranchal (India)*, *Disaster Prevention and Management*, 14 (2), Pg. 388-394.
12. Weichselgartner F (2001): *Disaster Mitigation: The concept of Vulnerability Revisited*, *Disaster Prevention and Management*, 10 (2), Pg. 85- 94.
13. Wisner B (2004): *Assessment of Capability and Vulnerability in Bankoff G, Frerks G and Hilhorst D eds. 'Mapping Vulnerability: Disasters, Development & People'*, Earthscan, Pg. 183- 193.
14. Wisner B et al (2005): *At Risk: Natural Hazards, People's Vulnerability and Disasters*, London and New York, Routledge, Pg. 319 – 376.
15. Wisner B et al (2005): *At Risk: Natural Hazards, People's Vulnerability and Disasters*, London and New York, Routledge, Pg. 49-87.

DMPB-412 PRINCIPLES OF REMOTE SENSING

Unit -I

8 Hours

Aerial Photography: History - Types of Photographs-classifications - Films and filters, FCC, Characteristic features of aerial photographs – scale, overlap, sidelap, vertical exaggeration **Photo Mosaics:** Photo mosaic (uncontrolled, semi controlled & Controlled mosaics) – Flight planning – Aerial triangulation.

Unit -II

10 Hours

Photo Interpretation Keys & Elements: Photo Interpretation Keys (Definition, its parts, Key sets, Types of Study) - Photo Interpretation Elements (Photo elements - Tone, Texture, Color, Shadow) - Geotechnical / Geomorphic elements (Landforms, Drainage, Erosional pattern, vegetative cover, Landuse, Shape & size of objects).

Unit -III

10 Hours

Principles of Remote Sensing: Definition, History & Concepts of remote sensing – Electromagnetic Radiation (Source, Mode of Energy transfer, Radiation Principles, Black body radiation). **Electro Magnetic Radiation (EMR):** EMR Spectrum - EMR Interaction with Atmosphere(Absorption, Scattering & Atmospheric windows) - EMR Interaction with Earth surface (Absorption & reflection) - Spectral Response pattern of terrestrial objects - Energy budgeting in Remote Sensing. **Sensors and Platforms:** Resolutions (Spectral, Spatial, Temporal, Radiometric) - Platforms - Sensors - Scanning & Orbiting Mechanisms of Satellites and Data Acquisition. Optical Remote Sensing: Basic concepts – Optical sensors and scanners.

Unit -IV

10 Hours

Thermal & Microwave Remote Sensing: Thermal Remote Sensing: Basic concepts - Thermal sensors & scanners - Thermal Inertia. Microwave Remote Sensing: Basic concepts - Microwave sensors and Radiometers - Geometric characters - Radargrammetry (SLAR / SAR) - LIDAR – Hyper spectral Remote Sensing: basic concepts.

Unit -V

10 Hours

Global remote sensing Satellites (LANDSAT Series - IRS Series - IRS-P series – Cartosat - Spot Series - ASTER, MODIS – IKONOS – QUICKBIRD - ORBVIEW – ERS-OTHER SATELLITES) - ALTM – LIDAR – SRTM, Cartosat. Meteorological Satellites – Shuttle Missions – Developments of Remote Sensing in India - Future Remote Sensing Missions.

References:

1. Wolf, P.R. Elements of Photogrammetry McGraw Hill Book Co., Tokyo. 1974.

2. Moffit H.F. And Edward, M.M, Photogrammetry, 3rd Edition, Harper and Row Publishers, New York. 1980.
3. Bhatt. A.B., Aerial Photography & Remote Sensing (An Introduction), Bishen Singh& Mahendra Pal Singh Pub., 1994.
4. Rampal, Handbook of Aerial Photography and Interpretation, Concept publishing. 1999.
5. Lillesand, T.M. And P.W.Kiefer, Remote Sensing and Image Interpretation, John Wiley & Sons, New York. Third Edition, 2007.
6. Curran, P. Principles of Remote Sensing, Longman, London. 1985.
7. Sabins, F.F.Jr., Remote Sensing Principles and Interpretation, Freeman, Sanfrancisco. 1978.
8. American Society of Photogrammetry, Manual of Remote Sensing (II Edition), ASP, Falls Church, Virginia. 1983.
9. Burnside, C.D., Mapping From Aerial Photographs, Collins Publishers. 1985.
10. John, T.Smith Jr, Manual of Colour Aerial Photography (I Edition) American Society of Photogrammetry, ASP Falls Church, Virginia, 1968.
11. Colwell, Robert, Manual of Photographic Interpretation, American Society Of Photogrammetry, ASP Falls Church, Virginia. 1960.
12. David Paine. Aerial Photography and Image Interpretation for Resource Management, John Wiley & Sons, New York. 2003.
13. George Joseph, Fundamentals of Remote Sensing, Cambridge University Press, 2nd Edition.
14. Shiv N. Pandey, Principles and Applications of Photogeology, Wiley Eastern Limited, India.1987.
15. Michel Kasser and Yves Egels, Digital Photogrammetry, Taylor & Francis Inc., 2002.
16. Sabins, F.F.Jr., Remote Sensing Principles and Interpretation, Freeman, Sanfrancisco. 1978.
17. American Society of Photogrammetry, Manual of Remote Sensing (II Edition), ASP, Falls Church, Virginia. 1983.
18. Burnside, C.D., Mapping From Aerial Photographs, Collins Publishers. 1985.
19. John, T.Smith Jr, Manual of Colour Aerial Photography (I Edition) American Society of Photogrammetry, ASP Falls Church, Virginia, 1968.
20. Colwell, Robert, Manual of Photographic Interpretation, American Society Of Photogrammetry, ASP Falls Church, Virginia. 1960.
21. David Paine. Aerial Photography and Image Interpretation for Resource Management, John Wiley & Sons, New York. 2003.
22. George Joseph, Fundamentals of Remote Sensing, Cambridge University Press, 2nd Edition.
23. Shiv N. Pandey, Principles and Applications of Photogeology, Wiley Eastern Limited, India.1987.
24. Michel Kasser and Yves Egels, Digital Photogrammetry, Taylor & Francis Inc., 2002.

DMPB – 413 EARTH SYSTEM DYNAMICS AND ROCK TYPES

Unit I

10 Hours

Earth system: solar system- origin of the earth- Age of the earth (different hypothesis)- interior of the earth-lithosphere - asthenosphere. Three classes of rocks – Igneous rocks - Sedimentary and Metamorphic rocks, Rocks distribution in the earth. Earth structure and petro – tectonic Assemblages, Moho, Thermal gradient.

Unit II

10 Hours

Igneous rock: Volcanic rock- Basaltic lava, Pyroclastic rocks Intrusive rocks- Granite, Granodiorides and related rocks, and carbonotites. Sedimentary Rocks: Terrigenous, Chemical and bio chemical rocks- Structure and texture of the sedimentary rocks: Grain size, shape, Mineralogy and chemistry of sedimentary rocks- Classification of sedimentary rocks: Conglomerate rocks, Breccias, sandstone, Arkoses, Greywacke, Mud rock, Shale, Siltstone, Carbonate rock, Evaporates. Lithification and Diagenesis, Oxidation and Reduction.

Unit III

10 Hours

Sedimentary Environment- Fluvial, Desert, Glacial, Lacustrine, swamp Transitional. Coastal, Deltaic, Estuarine, Lagoon, Littoral, Beaches- Marine Shelf- Shallow Sea, reef, Submarine Canyon, Slope, Rise and Pelagic Trench Ocean Sediments, Origin and size of sediment particles- Biogeneous Sediments, Lithogeneous sediments, Hydrogenous sediments – sediments Transport, Atmospheric transport.

Unit IV

10 Hours

Metamorphic Rocks: Definition of metamorphism- Agents and types of Metamorphism (Pressure, stress, Temperature, Chemical Activities of fluids)- Local Metamorphism and Continental Metamorphism- Dynamo Thermal Metamorphism- important Metamorphic rocks, Gneiss, Schist, Slate, Quartzite, migmatites, Eclogite, Mylonite and serpentinite. Ophiolite suite: Structure and Composition of Ophiolite, Origin of Ophiolite Tectonics of Andaman region.

Unit V

8 Hours

Rock types its relation continental oceanic crust Major rock types (Andaman Flysch, Mithakhari and Ophiolite) of Andaman & Nicobar region. Origin of Andaman & Nicobar Islands.

References:

1. Dexter Perkins, minerals in thin section; Prentice Hall, 2nd edition 2003.
2. Petrology: The study of Igneous, sedimentary and metamorphic rocks, Second Edition by Loren a. Raymond, Weavel and Pr.Inc; 2nd Edition, 2007.
3. Sam Boggs Jr. Principle of sedimentology and Stratigraphy (4th Edition) Prentice Hall; 4th edition (July 10,2005)

DMPB-414 STRUCTURE AND TECTONICS

Unit I

10 Hours

Crustal deformation- Stress: Folds and stress- Normal and shearing stress- Principal axis of stress-hydrostatic. lithostatic and deviatoric stresses- Stress field and stress trajectories. **Strain:** Nature of strain- Measurement of strain- Strain ellipsoids- Simple strain- Homogenous strain- Progressive deformation and Finite strain. **Stress and strain in materials:** Elastic, Elasto-viscous, visco-elastic, and viscous strain- plastic, brittle and ductile deformation- Effect of hydrostatic pressure, confining pressure, temperature, time and pore fluid pressure.

Unit II

8 Hours

Folds: Definition- Types and classification of folds- Geometry of the folds- Description of the folds –Expression of the folds in field and remote sensing data

Unit III

10 Hours

Faults: Definition, Geometry and the classification of faults- Rocks produced by faults- Fault plain features-extension - strike slip faults- thrust faults and their significance- Recognition of faults in the field and expression of faults in remote sensing data – Lineaments and lineament analysis (lineament density, lineament intersection density, length of lineaments), Major Faults of Andaman and Nicobar islands.

Unit IV

10 Hours

Geotectonic and Plate Tectonics: Major topographic features of the earth- Active tectonics- plate tectonics, Geometry of plate motion, lithospheric plates, plate boundaries- Plate margins and boundaries;- Convergent and Divergent plate margins, Active and Inactive plate boundaries- Island Arc- Structure of the subduction zones- collision zones –interplate and intraplate boundaries and seismicity - Ocean floor spreading and Mid-oceanic ridges

Unit V

10 Hours

Structure and tectonics and its relation to natural disasters: Faults and Seismicities- Faults and Landslides- Tectonic subsidence and continental flooding and coastal flooding- Tectonic upliftment, sheet joints and soil erosion

Reference Books

1. Hobbs, B.E, Means, W.D and Williams, P.F. (1986). An outline of structural Geology, 2nd Edn, Wiley, New York.
2. Fleuty, M.J. (1964). The description of folds.75, 461-489.
3. Park, R.G. Foundations of structural Geology, Routledge, London, 195 p.
4. Billings, (2004). Structural Geology. Prentice Hall, 606p.

5. Davis, G.H and Stephen J Reynolds (1996). Structural Geology of rocks and regions. John Wiley & Sons. 776p.

DMPB 415-GEOMORPHOLOGY (SOFT CORE)

Unit I

6 Hours

Principles of geomorphology: Basic principles of geomorphology and laws- processes and evolution of the surface of the Earth- Development of distinct morphology and constraint materials with specific characteristic properties

Unit II

12 Hours

Denudational and Tectonic Geomorphology Process of weathering:- physical, chemical and biological weathering ; Classification of denudational geomorphic features:- **Summit features** – denudational hills, inselbergs, Bornhorte, dissected denudational hills, tors, torcliffs, erosional plateaus, dissected erosional plateaus, gullied erosional plateaus. **Slope zone features:** concave slope, convex slope, plain slope, deep moderate and shallow slope, debris slopes, dissected slopes, gullied slopes, dip slope, upsequent slope, slope with complex folding, active and passive slopes, vertical slopes. **Foot hill features:** Talus cone, talus fan, debris cone, debris fan, debris avalanche, debris creek, solifluction. **Plains zone features:** pediments, dissected and dissected pediments, gullied pediments, Its expression in the field and in satellite data. **Valley features:** intermontanne valleys, barren valley and filled valley. anticlinal valleys, synclinal valleys, faultline valleys, fracture valleys. **Tectonic geomorphology:** Fault scarp, pressure and shutter ridge, sag ponds, plateaus, undissected plateaus, Marginally dipping plateaus, boat shaped plateaus, rolling plateaus, Escarpments: Retreating escarpment, rectilinear escarpments, faultline escarpments. queta, Butte, mesa, hogback ridges

Unit III

10 Hours

Fluvial and Coastal geomorphology; Fluvial geomorphology: source of drainages. types of drainages: permanent, semi permanent, ephemeral, intermittent, purely temporary drainages, dendritic, semidentric, trellis, radial, rectilinear, avulted, hide, deflected drainages, ponded streams, submerged, anomalous compressed meanders etc., **Life history of river:** youthful, mature and old stages – **Destructional and Constructional landforms of the youthful stage - Destructional landforms:** V shaped gullies, hanging valleys, waterfalls and rapids, pot holes, step like drainages. **Constructional landforms:** valley fills, colluvial fills, alluvial cone, alluvial fan, debris wash plain, piedmont zone. **Destructional landform of the mature stage:** Incised meanders, entrenched meander, river cut terraces. **Constructional landform of the mature stage:** flood plains (asymmetrical flood plain, symmetrical food plain, multilevel flood plain, meander scars, levees, backwaters, oxbow lakes and braided drainages) **Old stage landforms:** Apex of the delta, lobate delta, awkward delta, cusbate delta, digitate delta, protruding delta, symmetrical delta, asymmetrical delta, birdfoot delta. **Migratory pattern of drainages:** river migration, palaeo channel mapping, significance of river migration, reasons for river migration, dating of palaeo channels, prediction of future changes and migration and other significance of river migration. **Rejuvenated stage of river:** floodplain in youthful stage, incise meanders in youthful stage, extensive erosion and gully in old stage. **Coastal geomorphology; Definition**

of the coast – classification of coast, straight shoreline, oscillating shore line, embayed coast, emergence coast, subsiding coast, neutral coast, compound coast. **Land forms of emerging coast:** different types of delta, spits, etched shore line, eroded coast, offshore islands, beach ridges and swale complex including delta. **Landform of subsiding coast:** backwaters, lagoons, estuaries, tidal flats, creeks, shoals.

Unit IV

10 Hours

Aeolian, Glacial and Volcanic geomorphology; Destructional landform: exfoliation domes, windcarved features, rocky desert, desert pavement, hard fans, playa lakes, desert oasis, bornhorste. **Constructional landforms:** longitudinal dunes, barchan dunes, transverse dunes, combed dunes, star dunes, dune complexes, sand sheets, dust storms, loess. Buried channels **Volcanic features:** flow plateau, stepped escarpments in flows, volcanic cone, volcanic neck, volcanic crater, volcanic calderas, flope pediments, flope line. **Glacial landforms**

Unit V

10 Hours

Geomorphology and Natural disasters; Denudational landforms and landslides, seismicity and landslide, fluvial geomorphology and seismotectonic, fluvial geomorphology and flooding, Deltas as indicators of shoreline process, Fluvial geomorphology and Aeolian geomorphology as indicators of coastal hazards. Glacial geomorphology as indicators of global warming etc.,

Reference books

1. Thornbury. Principles of geomorphology.
2. Mateo Gutierrez (2013).. Geomorphology. CRC press, 1017p.
3. Dunn, A.J. and Beckinsale, R.P. (1964) The History of the Study of Landforms, Vol. 1, London:
4. Fairbridge, R.W. (ed.) (1968). Encyclopedia of Geomorphology, New York: Reinhold.
5. Walker, H.J. and Grabau, W.E. (1993) The Evolution of Geomorphology. A Nation-by-Nation Summary of Development, Chichester: Wiley.
6. Eric Bird. Coastal Geomorphology. John Wiley, 436p.
7. Andrews S Goudie. Encyclopedia of Geomorphology. Routledge (Taylor & Francis), 1202p.

DMPB-416 PRACTICAL I

12 hours

(Practical for Remote sensing (412) and Earth systems dynamics and rock types (413))

1. Study of Pocket stereoscope, Mirror stereo scope, 3D view
2. Study of land use, drainage pattern, structural and lithological features
3. Data browsing in internet
4. Usage of topindex and identification of path and row of satellite
5. Exploring image processing software
6. Data downloading, georeferencing the data
7. Digitization in image processing software
8. Digital image processing: Image enhancement, image manipulation
9. Image classification supervised and unsupervised classification
10. Hazard identification and vulnerable area estimation
11. Megascopic identification of rock samples

DMPB 417 PRACTICAL II

24 hours

(Practical for Structure and Tectonics (DMPB 414) and Geomorphology (DMPB 415))

1. Structural interpretation using satellite imagery,
2. Stress and strain analysis
3. Geomorphic mapping using satellite imagery,
4. Morphometric (Indices) analysis,
5. Paleochannel mapping using satellite imagery,
6. Drainage analysis
7. Risk assessment of Hazard and
8. Vulnerability mapping
9. Field report

DMPB 511 GEOGRAPHICAL INFORMATION SYSTEMS

Unit I

8 Hours

Definition - Usefulness of GIS - Components of GIS - Computer Hardware- Software Modules and Organizational Context of GIS. Data Structure in GIS - Data Base Structures Raster Data Structures and Vector data Structures

Unit II

10 Hours

Data Conversion, (Vector to Raster and Raster to Vector). Data input, Data editing, detecting and correcting errors, data reduction and generalization, edge matching and rubber sheeting. Data quality: introduction, data stream, data input methods; keyboard entry, manual digitizing, scanning and automatic digitizing, topology, data source for GIS, sources of error in GIS,.

Unit III

10 Hours

GIS data management: Database management system: functions of DBMS, components of DBMS, GIS data file management, Simple list, ordered sequential files, indexed files, building GIS world. Relational database models, standard query language (SQL), storage of GIS data.

Unit IV

10 Hours

Spatial Interpolation: Basic Principles of Interpolation – Methods of Interpolation Digital Elevation Modeling: Products of DTM (Contour Maps, Shaded Relief Map, Maps Related To Slopes, Line of Sight Maps, Drainage Analysis, Volume Estimation, etc.) - Usefulness of DEM/DTM.

Unit V

10 Hours

Simple data retrieval spatial query, attribute query and vector based spatial data analysis, raster based spatial data analysis, buffer analysis–Map Overlaying and Data analysis and modeling in GIS – types of GIS Modeling, - Overlay analysis– Net work analysis – web GIS & Open source GIS.

REFERENCES:

1. Burrough, P.A Principles of Geographical Information Systems for Land Resources Assessment, Clarandone Press, Oxford, 1986.
2. Kang - Tsung Chang, Introduction to Geographic Information System, MC Graw Hill, Boston. 2002.
3. Campbell, J, Introductory Cartography, Printers Hall Englewood Cliffs, N.J, 1984.
4. Dent B.D, Principles of Thematic Map Design, Addition - Wesley, Reading, Mass. 1985.
5. Freeman, H and Pieroni, GG. Map Data Processing, Academic Press, New York. 1980.
6. Monmonier, M.A, Computer Assisted Cartography - Principles and Prospects, Prentice Hall, Englewood Cliffs, NJ, 1982.
7. Tomlinson, R.F Calkins, H.S and. Marble, D.F, Computer Handling of Geographic Data, UNESCO, Geneva. 1976.
8. Graeme F. & Bonham Carter, Geographic Information Systems for Geoscientists, Modelling with GIS, Pergamon Publications, 1994.
9. Anji Reddy, M. 2004, Geoinformatics for environmental management B.S. Publications

10. Chang T.K. 2002: Topographic Information Systems, Tata MC Graw Hill
11. Heywood I. Cornelius S. CrverSteve. 2003: An Introduction to Geographical Information Systems. Pearson Education/
12. Ram Mohan Rao. 2002. Geographical Information System. Rawat Publication

DMPB – 512 GEOPHYSICAL EXPLORATION

Unit I

12 Hours

Physical property of earth material: Electrical resistivity of rocks; Induced Polarization in rocks; Spontaneous Polarization; Dielectric constant of rocks; seismic waves velocity of rocks; Effect of moisture on seismic Velocity; Variation of density in Rocks; Magnetic Susceptibility of rocks; Thermal conductivity of rocks; Natural radioactivity of rocks; interrelationship of geophysical parameters and water saturation of rock.

Unit II

8 Hours

Description of seismic Imaging system with 2 channel and field procedure and seismic method to detect fault in the tectonically distributed zone. Time distance diagram to measure seismic velocities in rocks, Descriptions of proton precession magnetometer, principle and field procedure, for identification and interpretation of intrusive rocks, cavity, subsidence and fracture/fault.

Unit III

10 Hours

Electrical Resistivity techniques: Principle; controlling factors of resistivity, concept of depth penetration, Wenner- Schlumberger electrode configuration – apparent Resistivity. Resistivity profiling – Vertical Electrical sounding- Field procedure, interpretation. Electrical resistivity imaging for mapping of bed rocks and Delineation of fault structure.

Unit IV

8 Hours

Ground penetrating radar (GPR) Instrument Description and principle and field procedure, method to study landslide, subsurface cavity, subsidence, and fault interpretation, Field survey using Total station and GPS.

Unit V

10 Hours

Transient electromagnetic (TEM) Principle, description of the equipment, types of loop TERRA TEM, concept of frequency domain such as high, intermediate and low frequency duration for the estimation of the geological formation with depth and to demined quality of water (salt Water intrusion) and identification of subsurface due to pollution- application and interpretation.

References:

1. H. Robert Introduction to Applied Geophysics: Exploration the shallow Subsurface; W.W Norton & Company (july 6,2006)
2. Griffiths,D.H., and King, R.F.1981.applide geophysics for geologist and engineer ,2nd edition Pergamum, Oxford,UK
3. Hail wood, E.A.1989 Magnetostratigraphy, Blackwell scientific oxford .UK
4. Kasahara, K. 1981 Earthquake mechanisms. Cambridge university press, Cambridge, UK

5. Parasins, D.S 1997 .Principles of applied Geophysics, 4th edition Chapman and Hall.

DMPB 513 EARTH QUAKES, VOLCANISM, LANDSLIDES AND DESERTIFICATION

Unit 1

Hours 10

Earthquake: Description, Ground Shaking and Damage Potential, Ground Failures and Deformation, Seismic waves types, detecting of seismic waves, geophone, seismometer, ray path refraction, reflection Snell's law, Seismic feature of earth's interior core, mantle, seismic tomography .

Unit II

Hours 10

Locating Earthquake, rupture dimensions and displacement, measures of earthquake size, intensity, severity of earthquake and seismic movement, Magnitude of earthquake, prediction methods, Global earthquake catalogue, b-value calculation from earthquake data, seismicity in Andaman and Nicobar islands Mitigation and Management, Disaster Mitigation Programme in India, Earthquake events, Public awareness and Risk

Unit III

Hours 8

Landslides: Occurrences in India, causes of landslides, factors, slope, geology, water content, weathering, effect of vegetation, morphology of landslide and classification of landslides, falls, topples, slides, creep, spreads, earth flow, complex flow, Mitigation methods.

Unit IV

Hours 10

Volcanism: Description: Assessment and Mapping, Monitoring and Warning, Description of Volcanic hazards, Geographical and Geological analysis: Primary and Secondary, Event Modification, Role of volcanism in Geological Hazard Prediction and Mitigation, Risk Mitigation and Training. Volcanism in Andaman & Nicobar islands, **Drought** and Famine and stages. Impact and mitigation methods.

Unit V

Hours 10

Identification of human made and natural voids, mine shaft, naturally occurring caves in karst terrain depth, size and shape. Subsidence: tectonic causes, human made, ground water extraction, oil extraction, unequal settling at unconsolidated sediment bottom layer and impact of subsidence.

References:

1. Encyclopedia of Disaster Management, Volume 12-Prof.Priya Ranjan Trivedi.
2. Earthquake-A natural Disaster.Ashutosh Gautam,1944,Ashish,New Delhi
3. Disaster Management, Vinod Kumar, 1994, IIPA, New Delhi.

4. Looking into Earth : An Introduction to Geological Geophysics : Alan E. Musset and M.Aftab khan .Cambridge
5. Fowler , C.M.R.1990 : The solid Earth : An Introduction to global geophysics : Cambridge University Press

DMPB-514 FLOODS, TSUNAMI, CYCLONES AND OTHER COASTAL PROBLEMS

Unit I

Hours-12

TROPICAL CYCLONES: Conditions for formation of cyclone, Structure of Tropical Cyclone, Coriolis force Global cyclone basins, Different forms of cyclone and their classification, Cyclone Hazard Assessment and Mapping, Tropical Cyclone Warning Strategy in India, Disaster Management and Mitigation Measures, Cyclone in the Bay of Bengal and Arabian sea: Pattern and Incidence, Robust Foundation System for Cyclone Prone Areas, Cyclone Risk and Engineering,India:Impact of Cyclones, Assessment and Management of Impact. Cyclone best track data & e-atlas (IMD). Storm surge

Unit II

Hours-10

Types of flood – Coastal flood –Anthropogenic impact – Flood hazard assessment and management-Flood hazard mapping- Flood hazard map of India- flood warning system, Flood forecasting, mitigation, planning and management –Flood resistant houses. Emerging techniques in flood hazard mapping & mitigation

Unit III

Hours-10

Ground water rise: Causes – Impacts: Structures, roads, sewage plants, public health, salting, water logging- Ground water fall – Ground water drought- Overexploitation – sea water intrusion, modeling and preventive measures. Ocean processes- Waves, wave parameters, types of waves- tides and classification - current and their types- causes of coastal erosion- coastal protection – Types & strategies (hard and soft engineering, natural based solutions) - Coastal habitat destruction, coral reef bleaching.

Unit IV

Hours-10

Tsunami, causes, impacts, Tsunami warning system and forecasting, Sumatra-Andaman 2004 Tsunami - lessons learned & gaps identified, nodal agencies in tsunami monitoring, EL-NINO, LA-NINA, ENSO, Lightening; Description, Frost hazards: Definition, Frost bite, Frost hazards in Agriculture and Highways, Wildfire Hazards.

Unit V

Hours-6

Sources-urban effluents-oil spills and its effect- counter measures-remote sensing in oil spills-control techniques - international convention on marine pollution.

Text Books:

1. Natural hazard. 2005, Edward Bryant. ISBN 0521537436
2. Natural disasters. 1998. David Alexander. ISBN 1857280946
3. Environmental hazards: Assessing risk & reducing disaster, 2004, Keith Smith, Rutledge. ISBN 0415318041
4. Natural hazards & Environmental change. 2002. Bill McGuire, Ian Mason & Chris Kilburn, Arnold Press. ISBN 0340742208

Reference Books

1. Geological hazards, 1999. Fred Bell, Spon Press. ISBN 0419169709

2. Global tectonics. 1996. Philip Kearney & Fred Vine. Blackwell. ISBN 0865429243
3. The mathematics of natural catastrophes. 1999. Gordon Woo. Imperial College press. ISBN 1860941826
4. Dangerous earth: An introduction to geological hazards. 1996. Barbara Murck et al. Wiley Press. ISBN 0471135658

DMPB-515 BIOLOGICAL AND TECHNOLOGICAL DISASTERS (SOFT CORE)

Unit I

8 Hours

Definition – biohazards – classification, Biodiversity extinction – population extinction and saving biodiversity – species at risk – loss of biological diversity – population diversity and extinction rate – rate of population loss – pattern of impact on species.

Unit II

10 Hours

Increasing bacterial infection – ecological consequence assessment – Biodiversity and precaution principle. Deforestation and loss of biological diversity – loss in species –management of species diversity, deforestation, wetland drainage, loss of ecological services – deforestation by human action. Carbon sequestering implication – the effect of global climatic change – tropical deforestation and climatic change. Locust outbreaks and tier management, Brown plant hopper attacks in paddy, foreign animal and plant species invasion, monitoring / forecasting. Coconut mite and beetle attack. Out break of dengue and malaria epidemics, contagious disease e.g. AIDS, protection and awareness.

Unit III

8 Hours

Biotech and genetic manipulation – biotech and biodiversity – issue in biodiversity the emergency of biotechnology – public awareness of biotechnology. Dangerous trends in agricultural biotechnology – seeds breeding extinction – managing hazards of genetic engineering – Bio safety and CBD – regulation of bio safety. Bird's flu epidemics and protection and awareness measures. Foot and mouth / mad cow disease. Educating farmers

Unit IV

10 Hours

Definition – source and types of industrial hazards – toxic release – type of toxic effects toxic rate parameters. Industrial hazards risk assessment, Hazard identification, probability analysis, consequent analysis, risk analysis, methods for industrial hazard risk assessment.

Unit V

10 Hours

Rapid ranking, qualitative, quantitative, semi-quantitative methods. Effect model – protection against contamination of the environment from radioactive fallout. Effluent contamination and acid rain – environment and ground water pollution and management – solid waste management – monitoring and protective measures – safe toxic waste disposal technologies. Reducing the impact of industrial disaster - Remote sensing and GIS in industrial hazard risk assessment – industrial hazard risk assessment and legislation – policies and guidelines – national policy

Text Books:

1. King R.W and Magid, J. 2009, Industrial hazards and safety handbook, 825p
2. Sanjoy Banerjee, 2002, Industrial hazards and plant safety. Taylor and Francis groups UK 475p.
3. Bryant Edwards 2005, Natural hazard, Cambridge university press UK, 312p.
4. Peter H. Wald and Gregg M. Stage, 2002, Physical and Biological Hazards. 680p.
5. Encyclopaedia of Disaster management by Prof. Priya Ranjan trivedi, Jnanoda prakeshan, New Delhi*

Rerefence Books:

1. Braj Kishore and Prasad Sing, 2008, Industrial Disaster management, Navyung publishers, New Delhi, 288p.
2. Disaster prevention and mitigation 1984, UNDRO publication, Geneva.
3. Hohenemser, C, R.W. Kates, et all 1983. The nature of technological hazards, 378-384p
4. Alexander D 1993, Natural disaster, UCL press ltd., London
5. World Disaster Report 1993, International Federation of Red Cross
6. Smith, K. 2001, Environmental hazards, Rutledge
7. Reena Mohanka, Chowdhary, Singh.M.P2010. Environmental resources and biological hazards A.P.H.publication 384.p.
8. Shaw, Disaster Management, Orient Longman, New Delhi
9. Alexander, D. 1993, Natural disaster , UCLpress Ltd, London
10. Bryant Edwards 2005, natural hazard, Cambridge university press UK
11. Gaur, Disaster management, Authors press, New Delhi
12. Ghost, G.K. Disaster management, Macmillan, New Delhi
13. Sathis Modh, Introduction to disaster management, Macmillan, New Delhi
14. Singh, Disaster management, future challenges, IK international, New Delhi
15. Sundar, Disaster management, Sarup & Sons, New Delhi

DMPB516 PRACTICAL III

12 hours

(Practical for Geographic Information System (DMPB511) and Flood, tsunami and cyclones and other coastal process (DMPB 514)

1. Onscreen digitizing (point, line and polygon)
2. Data base design
3. Layout preparation
4. Querying database
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. Landuse map
 - e. Vulnerability map
9. Leica Photogrammetric suite

PRACTICAL IV (DMPB517)

24 Hours

(Practical for Geophysical Exploration (DMPB 512) and Courses of Earth quake, tsunami and landslides (DMPB 513)

1. Measuring of Earthquake magnitude, location, time from seismogram , Evaluation of stress from earthquake data , fault plane solution related to stress , Time –Distance method to measure velocities
2. Analysis of Characteristic features of cyclones of Indian Ocean from data collected from IMD e-atlas and best track data
3. Geophysical survey in Delineating the position and nature of faults and fracture zones
4. Pollution studies, Beach profiling using Total station,
5. Sea Water Intrusion,
6. Ground Water,
7. Landslides study using, Electrical Tomographic Imaging, GPR, Resistivity meter etc.

DMPB 611: CLIMATE CHANGE AND ENVIRONMENTAL DISASTER

Unit I

8 Hours

Weather and climate, climate, albedo, Early Earth Climate- a Runway Greenhouse, Greenhouse effect on Earth Today, Climate History: Time scale in Millions of Years.

Unit II

6 Hours

Glacial Advances and Retreat : Time Scale In thousands of years , Climate variations :Time scale in thousands of years , Shorter- term climate change in multiyear- El Nino, La Nina Volcanism and climate effects, Sea level changes.

Unit III

8 Hours

Relationship between climate change- increase of Co₂ and- increase of global temperature- ocean acidification, understanding of carbonate and acidity, time series of atmospheric Co₂ and surface pH and Co₂ in the Ocean Surface, Ocean acidification differ in different ocean- causes, prediction of severity of ocean acidification

Unit IV

8 Hours

Ocean Acidification impacts on Southern ocean chemistry, ocean acidification – effect of on reef organisms, Ecological impact, Species interaction and ecosystem shifts, most vulnerable communities.

Unit V

6 Hours

Science- Policies issue- mitigation measure- adaptation strategies and action plans, Economic Implication of ocean acidification; A hidden risk for sustainable development, Role of United Nations and International community, Policy options, International Action on Mitigation and strategies , technology impact, information Generation and Dissemination.

References:

1. Grant Bigg. The ocean and climate (2nd ED). Cambridge university press, ISBN: 0-521-01634-7
2. Martin Beniston. From turbulence to climate. Springer ISBN:3-540-63495-9
3. Yoshiaki Toba: ocean – Atmosphere Interactions. Terra scientific publishing company, Tokyo and Kluwer academic publisher, Dordrecht, London, Boston, ISBN: 1-4020-1171-7
4. John Houghton. Global warming complete briefing (third Edition). Cambridge University Press, ISBN:0-521-52874-7
5. Trujulo, Thurman. Essentials of Oceanography (ten edition) (page 468-495). Prentice hall, ISBN:13-987-0-321-66812-7
6. Andrew A. Dessler , Edward Parson. The science and politics of global climate change- A guide to debate. Cambridge press. ISBN:0-521-53941-2
7. Peter Jassen. The interaction of ocean waves and winds. Cambridge University Press, ISBN:0-521-46540-0

DMPB 612 DISASTERS AND ENVIRONMENTAL STRATEGIC ASSESMENT (ESA)

Unit I

5 Hours

EIA; Definition- Objective-Types-Brief history-Steps in conducting EIA, regulation in India, Disaster and their impact- social and environment- Risk assessment vs EIA and limitation of EIA; Definition-Importance of ESA- comparison EIA and ESA—arrangement and procedures-ESA aims, procedure and approach-ESA methodology- signification and aspects of social impact assessment.

Unit II

10 Hours

Impact assessment procedure- Application of Matrices, Network and overlay maps, data collection, Environmental evolution system-impact prediction-evaluation and mitigation-assessment of impact on physical, biological and socio-economical environment.

Unit III

10 Hours

Monitoring the Environment and Environmental auditing, Environment Management and Disaster management plans, cost benefit analysis, public participation.EIA report: Content and non technical summary.

Unit IV

10 Hours

Environmental Management Plan and Policies; Key features of National Environmental Policy and Act, Conceptual linkages between approach-environmental impact studies and Disasters, Plan and management of environment from the perspective of Disaster vulnerability and post disaster impacts. Integrating EIA & SIA in analyzing disaster then impact and Post-Disaster recovery and reconstruction.

Unit V

5 Hours

Environmental impact statement and environmental management plan ISO 1400-EIA guideline 1994 and their relevance for climate change and environmental impact of disasters-

References:

1. Betty Bowers Marriot,(1997), Environmental Impact Assessment: A Practical Guide, McGraw Hill
2. Center L.W, (1997), Environmental Impact Assessment, McGraw Hill
3. Clark B.C Biseet and Tomlinson P, (1985), Perspective on Environmental Impact Assessment, Allied Publisher.
4. Biswas, A and Agarwal, S.B.C (1992) Environmental Impact Assessment for developing countries. Oxford: Butterworth-Heinemann Ltd.
5. UNEP (2002) Environmental Impact assessment Training Resource Manual. Second addition, Geneva:UNEP
6. Peter Morris & Riki Therivel,(2001) Methods of Environmental Impact Assessment, Rutledge.
7. Rau and Wooten, (1981), Environmental Impact Assessment Handbook, McGraw Hill.
8. Lee, N and George, C.(2000) Environmental Impact Assessment in developing and transition countries .John & Willey Sons Ltd.

DMPB 613 DISASTER RESPONSES: APPROACHES AND STRATEGIES

Unit I

6 Hours

Nature and type of immediate response. Factors shaping public – making processes, cultural contexts, past experiences. Policies, Legal Framework. Key Response functions. Post Disaster Need Assessment, Food, water, Health, Shelter etc. Organized Response- Government, Non-government, and Community based Organization, role of private sector, role of media.

Unit II

8 Hours

Concept of Relief- policy, Relief delivery and management. Standards and Best Practices in Relief operations –SPHERE standards. **Early Warning systems and public evacuation, search and rescue, Sanitation, Dead body disposal, Debris Management, Restoration of key infrastructure. Public health-** Impact on public health and mental health, Planning and managing public health care during a disaster preparedness and response plan. Ethics and standards in public health care delivery.

Unit III

8 Hours

Response Management: Planning – Information management, Resource management, Contingency planning, Business Continuity Plans, Safety of response personnel. Logistics and supply chain management: Distribution, Transport and warehousing, Store management. Coordination among various agencies: Communication. Approaches to integrated response-Incident management system (IMS), Incident Response system (IRS), Community based Response .

Unit IV

8 Hours

Concept of Recovery, Rehabilitation and Reconstruction. Impact of disaster on development. Eg: displacement; livelihood; infrastructural; public health; environmental; changes; political and organizational changes; changes in business environment. Implication of Damage and under uncertainty. Preparedness, safety, Early warning systems, mock drills.

Unit V

6 Hours

Phases of Recovery. Elements of recovery plan. Mitigating disaster risk during recovery- land use. Financing of recovery projects, Recovery management approaches – centralized versus decentralized. Community participation in planning process. Role of planning experts, NGOs community leaders and other, interest groups – in recovery process towards long term development.

References

1. The Disaster Management Act, Government of India, 2005 (www.ndma.gov.in)
2. UNDP, Local Government In Tsunami Recovery: Lessons Learned And Emerging Principles, UNDP Banagkok,2006
3. Vatsa, K.S and Joseph: 'Disaster management plan for the state of Maharashtra, India: Evolutionary process, Natural Hazard Rev, 4(4), 2003, pp.06-212
4. Bryant Edward (2005). Natural Hazard. Cambridge University Press, UK Alexander (1993). Natural Disaster, UCL Press Ltd, London

DMPB 614: DISASTER RISK REDUCTION

Unit I

Hours 3

Hazard and Disasters: Disaster planning and vulnerability reduction, understanding Vulnerability, Nature of Vulnerability, Disaster Mitigation Policies and planning.

Unit II

Hours 8

Mitigation Planning and Policy Strategies: Local, State and Central level, Disaster Management Act 2005, Institutions of governance NDMA, SDMA ,NIDM , National and state Disaster Management Plans, Mapping Vulnerability,(Social , Economic and Political vulnerabilities) Approaches to Preparedness and Planning.

Unit III

Hours 6

Hazard and Risk Reduction Strategies -: Mainstreaming DRR, Objectives of Disaster Risk Reduction, Understanding Resilience, Hyogo and Sendai framework for action and its History (Yokohama Strategy), Resilience linking vulnerability, Disaster Risk Reduction and Disaster Recovery Community and National Level.

Unit IV

Hours 8

Planning for Emergency Management, Communication and risk Management (Policies & Planning), Disaster Response: Planning for Response- Emergency Planning, supporting Emergency Response, Operations using Geo-Spatial Technologies, collaboration & coordination in Emergency Response Planning & Management with various institutions- local, communities, NCC, NDRF, Armed Forces, Government Departments, NGOs- case studies.

Unit V

Hours 6

Disaster Recovery, Rebuilding & Rehabilitation, Recovery Time- frames and differential recovery rates, long-term Recovery, Post disaster Recovery Planning & Reconstruction, Post Disaster Housing & Habitat Planning, and Rights- based approach to disaster rehabilitation.

References

1. Birkland, Thomas.2006.Lessons of Disaster: Policy change after Catastrophic Events, Washington, D.C.: Georgetown University Press.
2. Burby, Raymond (Ed.).1998. Cooperating with Nature: Confronting natural hazards with land –use planning for sustainable communities, Joseph Henry Press.
3. Drabek, Thomas.2010.The Human side of Disaster. Taylor and Francies.
4. Florida Department of Community Affairs.2010. Post – Disaster Redevelopment Planning: Guide for Florida Communities.

5. Disaster Administration and Management, Text & Case studies- SL, Goel-Deep and Deep Publications
6. Disaster Management- G.K Ghosh-A.P.H. Publishing Corporation
7. Disaster management – S.K.Singh, S.C. Kundu, Shobha Singh A – 119, William Publications, New Delhi.
8. Disaster Management – Vinod K Sharma- NIDM, New Delhi
9. Disaster Risk Reduction in South Asia- by Pradeep Sahni - Prentice – Hall of India
10. Disaster Mitigation and Management Post – Tsunami Perspectives P, Jagadish Gandhi
11. Disaster Mitigation – Experiences and reflections – By Pradeep sahani - Prentice – Hall of India
12. Alexander David, Introduction in 'Confronting Catastrophe', Oxford University Press, 2000
13. Andharia J. Vulnerability in Disaster Discourse, JTCDM, Tata Institute of Social Sciences Working Paper no. 8, 2008
14. Blaikie, P, Cannon T, Davis I, Wisner B 1997. At Risk Natural Hazards, Peoples' Vulnerability and Disasters, Rutledge.
15. Coppola P Damon, 2007. Introduction to International Disaster Management, Carter, Nick 1991. Disaster Management: A Disaster Manager's Handbook. Asian Development Bank, Manila Philippines.
16. Cluny, F. 1983. Development and Disasters, Oxford University Press.
17. Document on World Summit on Sustainable Development 2002.
18. Govt. of India: Disaster Management Act 2005, Government of India, New Delhi.
19. Government of India, 2009. National Disaster Management Policy,
20. Gupta Anil K, Sreeja S. Nair. 2011 Environmental Knowledge for Disaster Risk Management, NIDM, New Delhi
21. Indian Journal of Social Work 2002. Special Issue on Psychosocial Aspects of Disasters, Volume 63, Issue 2, April.
22. Kapur, Anu & others, 2005: Disasters in India Studies of grim reality, Rawat Publishers, Jaipur
23. Kapur Anu 2010: Vulnerable India: A Geographical Study of Disasters, IIAS and Sage Publishers, New Delhi.
24. Parasuraman S, Acharya Niru 2000. Analyzing forms of vulnerability in a disaster, The Indian Journal of Social Work, vol 61, issue 4, October.
25. Pelting Mark, 2003 The Vulnerability of Cities: Natural Disaster and Social Resilience Earthscap publishers, London
26. Reducing risk of disasters in our communities, Disaster theory, Tear fund, 2006.
27. UNISDR, Natural Disasters and Sustainable Development: Understanding the links between Development, Environment and Natural Disasters, Background Paper No. 5. 2002.
28. IFRC, 2005. World Disaster Report: Focus on Information in Disaster, pp.182-225.

Web sites and Web Resources:

1. NIDM Publications at <http://nidm.gov.in>- Official Website of National Institute of Disaster Management (NIDM), Ministry of Home Affairs,
2. Government of India <http://cwc.gov.in>, <http://ekdrm.net>, <http://www.emdat.be>, <http://www.nws.noaa.gov>, <http://pubs.usgs.gov>, <http://nidm.gov.in>, <http://www.imd.gov.in>

**DMPB 615 NATURAL AND MANMADE DISASTERS EFFECTS ON BUILDINGS
(SOFT CORE)**

Unit I

8 Hours

Earthquakes, seismic waves, lateral force resisting systems – Seismic effects on structures – Earthquake response in Architectural Features of buildings during Earthquakes- Buildings twist during Earthquakes - Seismic Design Philosophy for Buildings - flexibility of Buildings affects their Earthquake Response - Brick Masonry Houses behave during Earthquakes - simple Structural Configuration of Masonry Buildings - Indian Seismic Codes

Unit II

10 Hours

Appropriate technology in indigenous buildings Masonry Buildings - Earthquakes affect on Reinforced Concrete Buildings and its appropriate technology – resistance of beams in RC Buildings for Earthquakes - Columns in RC Buildings resist Earthquake - Open-Ground Storey Buildings vulnerable in Earthquakes – more damages of Short Columns during Earthquakes - Mitigation, Earthquake damage to structures: structural damage, Damage as a result of problem soils, structural problems - Secondary causes of structural damage. Earthquake resistance design, seismic isolation, passive energy dissipation, active control. The structure anti-earthquake anti-breeze design theories and structure vibrate a control. Seismic design of bridges: earthquake damages to bridges, seismic conceptual design, and seismic performance criteria. The large civil engineering structure - hang cord structure, pellicle structure, shell structure etc.

Unit III

8 Hours

Solid remediation procedures, (gravel drains, deep mixing method, sand compaction pile method, improving slope stability and preventing landslides), Soil structure interaction to improve earthquake response, structural elements that prevent damage and improve dynamic response). Buildings with Shear Walls preferred in Seismic Regions - reduce Earthquake Effects on Buildings. The disaster prevention function, design, method and norm standard of engineering structure. The large and complicated structure's safety assessment

Unit IV

10 Hours

Volcanoes- Effects of volcanic eruptions, Flooding -Effects of floods, Elements of design, Individual properties, General approach, Case study, Weather conditions – Storm, Wind effects on buildings, Hurricane and tornado, Lightning, Effects of lightning on buildings, Case study, Extreme temperatures, General design features, Effect of extreme temperatures on buildings, Case study, Center roof repair, New materials, Mass movement -Types of mass movement and slope failure, Case study

Unit V

10 Hours

.Man-made Disasters – Conflict, Effect of conflict and terrorist attack on buildings, Case studies, Fire -Types fire, Fire disasters affecting wildland and forests, Fire disasters affecting humans, Monitoring and prevention strategy, Case study, Disasters resulting from human activities - Historic buildings destruction. Basics for assessment of existing structures:. Good building design and construction:- Code of minimum standards for house construction, House building checklist.

Rereference Books:

1. Williams, Martin, 1999, Structures: Theory and analysis. Palgrave Macmillan, 448p.
2. Chopra, Anil.K, 2000. Dynamics of structures: Theory and applications to earthquake engineering. Pearson Higher Education, 844p.
3. Coull. Alex. Stafford Smith and Bryan, 1991. Structural analysis and design of high rise building. Jhon Wiley and Sons. Ltd. 558p.
4. Priestely, M.J.N. and Paulay. Tom, 1992. Reinforced concrete and masonry buildings. John Wiley and Sons Ltd., 768p.
5. Berqado, D.T., Balasubramanian, A.S. and Alfaro, M.C. 1994. Improvement techniques of soft ground in subsiding and lowland environment. Swets & Zeitkinger Publishers, 232p.
6. Chen. W.F.,Lui. E.M., 2006 Earthquake engineering for structural design, Taylor & Francis, 235.
7. Schlie, T. W. (2000) Appropriate Technology: Some Concepts, Some Ideas, and Some Recent
8. Experiences in Africa Journal of Development, Vol. 7, Nos. 1- 2, 77- 108.
9. Drabek, Thomas. 2010. The Human Side of Disaster. Taylor and Francis
10. Introduction to Natural and Man-made Disasters and their Effects on Buildings, Roxanna McDonald, British Library Cataloguing in Publication Data

Additional reference:

1. Guidelines for repair, restoration and retrofitting of masonry buildings in Kachchh Earthquake affected areas of Gujarat, Gujarat state Disaster Management Authority, Government of Gujarat – March 2002
2. Basics for assessment of existing structures, Milan Holicky, Vladislava Navarova, Roman Gottfried, Michal Kronika, Jama Markova, Miroslav sykora, karel jung- lifelong learning programme, Published by Klokner Institute, Czech Technical University in Prague, Solinova 7, 166 08 Prague 6, Czech Republic ISBN:978-80-01-05420-8
3. Handbook on good building design and construction- International strategy for disaster reduction (ISDR), The Secretariat of the international strategy for disaster reduction, Switzerland.

DMPB 616 PRACTICAL V

24 Hours

(Practical for Climate change and environmental disasters (DMPB 611) and Disaster and strategic environmental assessment (612))

Field Study:

1. Terrain and Topography
2. Climate and Meteorology
3. Soil quality
4. Geology formation underneath the site
5. Hydrogeology and water quality
6. Ecology of the site
7. Noise
8. Ambient air quality
9. Public consultation
10. Assessment of the potential environmental impact
11. Analysis and evaluation of risk mitigation and field report should be submitted
12. Laboratory: Data analysis of meteorological soil, water quality

DMPB 617 PRACTICAL VI

12 Hours

(Practical for Disaster response: Approaches and strategies (DMBP 614) and 615)

1. Building strength using GPR
2. Concrete thickness measurement
3. Strength of concrete pillar by GPR
4. Basement of building strength by Geophysical studies
5. Weakness of the building structure by Geophysical techniques
6. Preparation of Hazard Zonation maps
7. Geospatial technology in DRR
8. Geophysical techniques in DRR

DMPB 711 PROJECT AND VIVA

46 hours

- Research Methods for the Preparation of Project = Credit 1
- Collection of Relevant Literature to M.Sc. Project = Credit 1
- Project Report = Credit 4
- Viva = Credit 3