VIDYASAGARUNIVERSITY

Midnapore, West Bengal

PROPOSED CURRICULUM&SYLLABUS (DRAFT) OF

BACHELOR OF SCIENCE WITH DISASTER MANAGEMENT

(MULTIDISCIPLINARY STUDIES)

3-YEAR UNDERGRADUATE PROGRAMME

(w.e.f. Academic Year 2023-2024)

Based on

Curriculum & Credit Framework for Undergraduate Programmes

(CCFUP), 2023& NEP, 2020

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VIDYASAGAR UNIVERSITY

BACHELOR OF SCIENCE IN PHYSICAL SCIENCE with DISASTER MANAGEMENT

(*Under CCFUP, 2023*)

Level	YR.	SEM	Course Type	Course Code	Course Title	Credit	L-T-P	Marks		
								CA	ESE	TOTAL
B.Sc. in Physical Science with Disaster Manage-ment	3rd	V	**SEMESTER-V**							
			Major-A4	DSMPMJ04	T: ICT for Disaster Management; P: Practical *(To be studied by students taken Disaster Mgt. as Discipline- A)*	4	3-0-1	15	60	75
			Major-A5	DSMPMJ05	T: Disasters and Health Management; P: Practical *(To be studied by students taken Disaster Mgt. as Discipline- A)*	4	3-0-1	15	60	75
			Major-A6	DSMPMJ06	T: Disaster Risk Management in India; P: Practical *(To be studied by students taken Disaster Mgt. as Discipline- A)*	4	3-0-1	15	60	75
			Major (Elective) -2	DSMMJE02	Disaster, Human Society, Population and Environmental Conservation OR Finance and Insurance in Disaster Management *(To be studied by students taken Disaster Mgt. as Discipline- A)*	4	3-1-0	15	60	75
			Minor-5 (Disc.-C5)	DSMMIN05	T: Disasters and Health Management; P: Practical *(To be studied by students taken Disaster Mgt. as Discipline- C)*	4	3-0-1	15	60	75
			Semester-V Total			**20**				**375**
		VI	**SEMESTER-VI**							
			Major-B4		*To be decided (Same as Major–A4 for Disaster Mgt. taken as Discipline-B)*	4	3-0-1	15	60	75
			Major-B5		*To be decided (Same as Major–A5 for Disaster Mgt. taken as Discipline-B)*	4	3-0-1	15	60	75
			Major-B6		*To be decided (Same as Major–A6 for Disaster Mgt. taken as Discipline-B)*	4	3-0-1	15	60	75
			Major (Elective) -3	DSMMJE03	Institutional Disaster Management Structure OR Disaster Governance, Law and Implementation *(To be studied by students taken Disaster Mgt. as Discipline- A)*	4	3-1-0	15	60	75
			Minor -6 (Disc.-C6)	DSMMIN06	T: Disaster Risk Management in India; P: Practical *(To be studied by students taken Disaster Mgt. as Discipline- C)*	4	3-0-1	15	60	75
			Semester-VI Total			**20**				**375**
			TOTAL of YEAR-3			**40**	**-**	**-**	**-**	**700**
			Eligible to be awarded Bachelor of Science in Multidisciplinary Studies with Disaster Management *on Exit*			**126**	**Marks (Year: I+II+III)**			**2325**

MJP = Major Programme (Multidisciplinary), MI = Minor, A/B = Choice of Major Discipline; C= Choice of Minor Discipline; CA= Continuous Assessment, ESE= End Semester Examination, T = Theory, P= Practical, L-T-P = Lecture-Tutorial-Practical

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MAJOR (MJ)

Major A4/B4: Information Communication Technology (ICT) for Disaster Management

Credits 04 (Full Marks: 75)

Major A4/B4T: Information Communication Technology (ICT) for Disaster Management

Credits 03 (Lectures: 45)

Course contents:

Unit- 1: Information Communication Technology (ICT)

Concept and Relevance of ICT; Data Communications and Computer Networks- Elements of Communication Systems, Data transmission modes, speed, media; Switching techniques, Routing Techniques, Network topologies, Network Types, Communication protocols, wireless networks, Internet, multimedia

Unit -2: Information Processing

Relevance of Information to Decision Making, Source and Types of Information, Quality of Information, Value of information, Data Collection methods, Management Information Systems, Decision-Making Concept - Models of Decision Making.

Unit - 3: Advanced Information Communication Technology

Tsunami and Cyclone Early Warning System, Forest Resource Information System, GIS, Remote Sensing, Digital Image Processing, emergency communication System, Bluetooth and Wireless communication, Satellite Phones and Radio.

Unit - 4: Disaster Management Information Sources

Forecasting & Warning- Indian meteorological department, tsunami warning Centre, pacific disaster Centre, central water commission, INCOES; Resources: UNISDR, USAID, SAHANA, Red Cross, Indian disaster resource network

Major A4/B4P: Information Communication Technology (ICT) for Disaster Management

Credits 01 (30 Hrs)

1. **Field training:** Training on Remote Sensing & GIS for Disaster Management
2. **Case studies**: Case studies on any ICT based Disaster Management system
3. **Case Presentation –** presentation on case study
4. **Laboratory note book and Viva Voce:** Students will be required to maintain records of all works done in connection with the topic taught in this paper

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Suggested Books/ Reading

- Jain, Raj K. (2000). Fundamentals of Programming. New Delhi: S. Chand & Company Ltd.
- Navathe, Elmasri and, Addison-Wesley (2019). Fundamentals of Data base Systems. New Delhi: S. Chand & Company LTD.
- Nayak, Shailesh and Sisi Zlatanova (2008). Remote Sensing and GIS Technologies for Monitoring and Prediction of Disasters. New York: Springer.
- Rao, Peddada Jagadeeswara, Kakani Nageswara Rao and Sumiko Kubo, P. K. Sinha (2019).
- Dekker, Sidney (2019). Foundations of Safety Science: A Century of Understanding Accidents and Disasters. New York: Routledge

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Major A5/B5:Disasters and Health Management **Credits 04(Full Marks: 75)**

Major A5/B5T: Disasters and Health Management **Credits 03 (Lectures: 45)**

Course Contents:

Unit-I: Introduction to Disaster Health Management

- Public Health issues during Disasters.
- Various definitions in Disaster Health Management (DHM).
- Planning for Disaster health management throughout the Cycle.
- Decision making and Participation.
- Access to Medical resources and supplies.
- Identification and Training of Disaster Health Volunteers.
- Disaster Health System in India- PHC, CHC, NHM.

Unit-II: Phases of Disaster Health Response

- Notification, Search and Rescue, Triage, Medical Care of Disaster Victims, Disaster Communications, Record keeping, Transportation and Evacuation.
- Recovery, Rapid Assessment of emergency Health Care needs.
- Medical Care of Mass Gatherings. Medical surge, Surge capacity.
- Risk Assessment. Self-protection contaminated area and decontaminated area.
- Medical Equipment and Supplies during Disasters.

Unit-III: Disaster Hospital Planning

- Preparing the Hospital emergency Plan- Disaster Management Committee. Centre command structure.
- Plan activation of different areas of the hospital. Disaster beds/ how to increase bed capacity in emergencies.
- Planning of public information and liaison. Planning for security.
- Logistic planning
    ii. Communications planning
    iii. Transportation planning
    iv. Store planning.
    v. Personnel planning
    vi. Financial planning

Unit-IV: Disaster Medical Teams (DMT)

- Members of the team: Advanced clinicians (nurse practitioners/physician assistants), medical officers, registered nurses, respiratory therapists, paramedics, pharmacists, pharmacy technicians, emergency medical technicians, safety specialists, logistical specialists, information technologists, communication and administrative specialists, Medical Social Workers, Hospital workers, Healthcare workers, Humanitarian aid workers, Public health workers, Health profession students, Volunteers. Role of different Team members.

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Major A5/B5 P: Disasters and Health Management (Practical) **Credits 01 (30hrs.)**

List of Practical

1. **Field training:** Training on Disaster Medical Management
2. **Visits**: Visit to model Disaster Health System - PHC, CHC, NHM
3. **Project Presentation**: Disaster Hospital Planning – case presentation.
4. **Laboratory note book and Viva Voce:** Students will be required to maintain records of all works done in connection with the topic taught in this paper

Suggested Readings:

1. Ministry of Home Affairs. (n.d.) Guidelines for hospital emergency preparedness planning: Ground DRM Programme (2002–2008). New Delhi: Ministry of Home Affairs, Government of India.
2. Nelson C, Lurie N, Wasserman J, Zakowski S. Conceptualizing and defining public health emergency preparedness. Am J Public Health. 2007; 97 Suppl 1: S9-11. DOI: AJPH.2007.114496 [pii].
3. Pathak, S. H. (1961). Medical Social Work in India. India: Delhi School of Social Work.
4. Reilly, M. J., & Markenson, D. S. (2011). Health care emergency management: Principles and practice. Jones & Bartlett Publishers.
5. Shoaf KI, Rottman SJ. Public health impact of disasters. Australian Journal of Emergency Management. 2000; 15(3): 58-63.
6. Spitzer, W. J., Allen, D. K. M. (2015). Social Work Practice in Healthcare: Advanced Approaches and Emerging Trends. United States: SAGE Publications.

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Major A6/B6: Disaster Risk Management in India **Credits 04(FM: 75)**

Major A6/B6T: Disaster Risk Management in India **Credits 03 (45Hrs.)**

Course Contents:

Unit-I: Geographical Setup of India and Regional Hazard Risks

a) Regional Physiography, Geology, Climate, of India and Natural Hazards Risk Prone Areas
b) Hazard Risk, Vulnerability and Disaster: Concepts and Relationships
c) Measuring Hazard Risks, Vulnerability and Disasters

Unit-II: Disaster Extremes in India, their impact

a) Regional extreme events in India: Earthquakes, Floods, Droughts, Cyclones, Tsunami, Landslides, Avalanches, Snow, Rain and Wind storms.
b) Disaster Magnitude and impact: Case Study / Examples from recent disasters.

Unit-III: Regional Patterns of Disaster Vulnerability in India

a) Earthquake Disaster Vulnerability Assessment - Case Study of Metropolitan and other Major Cities
b) Flood Disaster Zonation and Vulnerability Assessment - Case Study of Brahmaputra and Ganga river systems
c) Landslide and Avalanche Disaster Zonation and Mapping - Case Study of Himalayas and North-East Region
d) Drought Disasters Zonation and Mapping
e) Multi-Hazard Risk Assessment

Unit-IV: Disaster Management in India

a) Disaster Management Act 2005
b) Institutional and Financial Mechanism National Policy on Disaster Management,
c) National Guidelines and Plans on Disaster Management

Major A6/B6P: Disaster Risk Management in India (Practical) **Credits 01 (30Hrs.)**

List of Activities

1. **Identification of Sites:** Map Disaster prone areas, vulnerable sites, vulnerability of people (specific groups) and resources in India.

2. **Plan of Disaster Management:** Preparing plant for addressing these vulnerabilities, preparing plans in consultation with local administration.

3. **Project Presentation**: Disaster Risk Management in Indian context – case presentation.

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Suggested Readings:

1. Disaster Management in India – A Status Report. National Disaster Management Division, Ministry of Home Affairs, Govt. of India, 2004
2. Sharma, Vinod K. Disaster management, NCDM, IIPA, New Delhi, 1994
3. National Disaster Response Plan, NCDM, New Delhi, 2001.
4. Mathur, G.C. Housing in Disaster prone areas, National Building Organization and U.N. Regional Centre. ESCAP, New Delhi, 1986
5. Mishra, P.K. Transforming adversity into opportunity: experiences from Gujarat earthquake reconstruction program World congress on Natural disaster mitigation proceedings, February 2004
6. Taori, K (2005) Disaster Management through Panchayati Raj, Concept, Publishing Company, New Delhi
7. Dave, R.K. (2018) , Disaster Management in India : Challenges and Strategies
8. Joshi, S.R., (2008) "Natural Disasters in North-East Region and its Management: An Essay", Centre for Science Education,, North Eastern Hill University, Meghalaya
9. United Nations Development Programme (UNDP), Disaster Management- Preparedness Methodology in Assam. http://data.undp.org.in/dmweb/Article
10. Vulnerability Atlas of India, Building Materials & Technology Promotion Council, Ministry of Housing & Urban Poverty Alleviation, Government of India, New Delhi

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MAJOR ELECTIVE

(To be studied by students taken Disaster Management as Discipline- A)

Major Elective (MJE)-02:

***(Disaster, Human Society, Population and Environmental Conservation* OR**

Finance and Insurance in Disaster Management)

MJE-02: Human Society, Population and Environmental Conservation in Disaster

Credits 04 (Full Marks: 75)

MJE-02T: Human Society, Population and Environmental Conservation in Disaster

Credits 04 (Lecture: 60 Hrs.)

Course contents:

Unit-I Disaster Perception, Disaster Management & Mitigation. Human Society:

Meaning, Definition, Structure, Groups, Community, Caste, Class, Family, Rural Society & Urban Society.

Unit-II Population:

Meaning, Historical Background, Composition, Literacy; Status and Impact. Migration and Urbanization: Meaning, Causes and Consequences. Population as a Problem: Population Growth, Causes of Rapid Growth in India.

Unit-III Environment and Resource:

Meaning, Definition, Natural Resources, Human Resource, Financial Resource, Impact of Population Growth on Natural Resources. Sustainable Development: Concept, Meaning, Definitions, Needs, Areas and Strategies. Development and Disaster: Disaster Centric Development.

Unit-IV: Legislative Provision for Environmental Conservation:

Environment (Protection) Act, Air Prevention and Control of Pollution Act, Water (Prevention and Control) Act, Wild Protection Act, Forest Conservation Act, Environment Impact Assessment (EIA), Disaster Management Act, 2005.

OR

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MJE-02: Finance and Insurance in Disaster Management **Credits 04 (Full Marks: 75)**

MJE-02T: Finance and Insurance in Disaster Management **Credits 04 (Lecture: 60 Hrs.)**

Course Contents:

Unit-I: Introduction to Banking & Finance:

Concept of Banking, Types of banks, Functions of banks; Tax administration; Public budgeting and finance systems; State and local finances.

Unit-II: Central Bank / Reserve Bank:

Role and function of central bank, RBI and Monetary Policy

Unit-III: Introduction to Insurance:

Evolution and Features of Insurance, Classification of Insurance, Conditions relating to risk, selection or Risk

Unit-IV: Life Insurance & General Insurance:

Principles of LIC, Privatization of Life Insurance Business, Role and performance of LIC, Nonlife insurance – Fire, Automobile, Marine, Health, Rural, Social and miscellaneous insurances.

Unit-V: Insurance Policies for Disaster Management:

Evaluation of risk funding and risk transfer policies; Catastrophe insurance pool; Reserve funds and contingent credit policies; Role of Government and market participants; Insurance policy design; Fiscal cost of relief and reconstruction; Grants and low interest loan for reconstruction.

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Major Elective (MJE)-03:

(Institutional Disaster Management Structure OR

Disaster Governance, Law and Implementation)

MJE-03: Institutional Disaster Management Structure **Credits 04 (Full Marks: 75)**

MJE-03T: Institutional Disaster Management Structure **Credits 04 (Lecture: 60 Hrs.)**

Course contents:

Unit -1: International Institutions of Disaster Management and their Roles in DM

a) United Nations System and its specialized agencies like UNDP, UNISDR, WHO, The World Bank, IPCC
b) Other International Organizations like; International Federation of Red Cross and Red Crescent Societies (IFRC), Global Facility for Disaster Risk Reduction (GFDRR)

Unit -2: National and State Institutions of Disaster Management and their Roles in DM

a) National Agencies: Disaster Management Division (Ministry of Home Affairs, Govt. of India)
b) National Disaster Management Authority (NDMA) and National Executive Committee (NEC)
c) National Institute of Disaster Management (NIDM)
d) National Disaster Response Force (NDRF)
e) NPDRR
f) Indian Red Cross Society
g) Armed Forces, Central Para Military Forces, State Police Forces and Fire Service
h) National Civil Defence Organization and Home Guards and National Cadet Corps , National Service Schemes and Nehru Yuva Kendra Sangathan (NYKS)
i) State Disaster Management Authority (SDMA)
j) District Disaster Management Authority (DDMA)
k) Local Authorities at Panchayat Level

Unit- 3: Other Institutions of Disaster Management and their Roles in DM

a) Academic Institutions
b) Civil Society Organizations and Non-Governmental Organizations
c) Print, Television and Mass Media
d) Local Community

Suggested Books/ Reading:

1. NDMA, 2010, National Disaster Management Guidelines , Role of NGOs in Disaster Management
2. Dave, R.K. (2018) , Disaster Management in India : Challenges and Strategies
3. Disaster Management Handbook, Jack Pinkowski – 2008
4. Disaster Management and Rehabilitation, Rajdeep Dasgupta, 2007
5. Disaster Management: Text and Case Studies, D.B.N. Murthy - 2007
6. Managing Disaster Risk in Emerging Economies". Arnold, Margaret and Kreimer, Alcira (eds.)

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7. Disaster Management and Preparedness, Collins Larry R. and Schneid Thomas D., Taylor and Francis 2000
8. Disaster Management in India – A Status Report. National Disaster Management
9. Division, Ministry of Home Affairs, Govt. of India, 2004
10. Sharma, Vinod K. Disaster management, NCDM, IIPA, New Delhi, 1994
11. National Disaster Response Plan, NCDM, New Delhi, 2001.

OR

MJE-03: Disaster Governance, Law and Implementation **Credits 04 (Full Marks: 75)**

MJE-03T: Disaster Governance, Law and Implementation **Credits 04 (Lecture: 60 Hrs.)**

Course Contents:

Unit- 1: Institutional framework and federal structure of governance; the constitutional and legal framework within which decisions are taken in disaster management.

Unit -2: The Disaster Management Act 2005 and the institutional structures it has brought up in states and districts. Federal imperatives and allocation of responsibilities. Role and relationships of SDMA's, DDMA's to NDMA and their state government.

Unit - 3: Comparative Disaster Management laws and structures with some selected states in the neighbourhood and the world.A brief survey of how these institutions function, interpret and take decisions in emergency and non-emergency situations. Role of leadership and technology forecasting institutions.

Unit - 4: Role of the State as a public trustee: Administrative Accountability and Local Governance: The role of panchayats and customary community based institutions has a role in community resilience building and this differs from location to location. This diversity of institutional response mechanism and participatory governance strategies would be explored for fragile regions.

Suggested Books/ Reading

1. Contemporary Natural and Manmade Disaster. Master of Disaster Mitigation. World Institution Building Programme Centre, 2004
2. Disaster Management in India – A Status Report. National Disaster Management Division, Ministry of Home Affairs, Govt. of India, 2004
3. Sharma, Vinod K. Disaster management, NCDM, IIPA, New Delhi, 1994
4. National Disaster Response Plan, NCDM, New Delhi, 2001.
5. Mathur, G.C. Housing in Disaster prone areas, National Building Organization and U.N. Regional Centre. ESCAP, New Delhi, 1986
6. Mishra, P.K. Transforming adversity into opportunity: experiences from Gujarat earthquake reconstruction program World congress on Natural disaster mitigation proceedings, February 2004

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7. Taori, K (2005) Disaster Management through Panchayati Raj, Concept, Publishing Company, New Delhi
8. Disaster Management Handbook, Jack Pinkowski – 2008
9. Disaster Management and Rehabilitation, Rajdeep Dasgupta, 2007
10. Disaster Management: Text and Case Studies, D.B.N. Murthy - 2007

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MINOR (MI)

(To be studied by students taken Disaster Management as Discipline- C)

MI-5/C5: Disasters and Health Management **Credits 04(Full Marks: 75)**

MI-5/C5T: Disasters and Health Management **Credits 03 (Lectures: 45)**

Course Contents:

Unit-I: Introduction to Disaster Health Management

- Public Health issues during Disasters.
- Various definitions in Disaster Health Management (DHM).
- Planning for Disaster health management throughout the Cycle.
- Decision making and Participation.
- Access to Medical resources and supplies.
- Identification and Training of Disaster Health Volunteers.
- Disaster Health System in India- PHC, CHC, NHM.

Unit-II: Phases of Disaster Health Response

- Notification, Search and Rescue, Triage, Medical Care of Disaster Victims, Disaster Communications, Record keeping, Transportation and Evacuation.
- Recovery, Rapid Assessment of emergency Health Care needs.
- Medical Care of Mass Gatherings. Medical surge, Surge capacity.
- Risk Assessment. Self-protection contaminated area and decontaminated area.
- Medical Equipment and Supplies during Disasters.

Unit-III: Disaster Hospital Planning

- Preparing the Hospital emergency Plan- Disaster Management Committee. Centre command structure.
- Plan activation of different areas of the hospital. Disaster beds/ how to increase bed capacity in emergencies.
- Planning of public information and liaison. Planning for security.
- Logistic planning
    i. Communications planning
    ii. Transportation planning
    iii. Store planning.
    iv. Personnel planning
    v. Financial planning

Unit-IV: Disaster Medical Teams (DMT)

- Members of the team: Advanced clinicians (nurse practitioners/physician assistants), medical officers, registered nurses, respiratory therapists, paramedics, pharmacists, pharmacy technicians, emergency medical technicians, safety specialists, logistical specialists,

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information technologists, communication and administrative specialists, Medical Social Workers, Hospital workers, Healthcare workers, Humanitarian aid workers, Public health workers, Health profession students, Volunteers. Role of different Team members.

MI-5/C5P: Disasters and Health Management (Practical) **Credits 01 (30hrs.)**

List of Practical

1. **Field training:** Training on Disaster Medical Management
2. **Visits**: Visit to model Disaster Health System - PHC, CHC, NHM
3. **Project Presentation**: Disaster Hospital Planning – case presentation.
4. **Laboratory note book and Viva Voce:** Students will be required to maintain records of all works done in connection with the topic taught in this paper

Suggested Readings:

1. Ministry of Home Affairs. (n.d.) Guidelines for hospital emergency preparedness planning: Ground DRM Programme (2002–2008). New Delhi: Ministry of Home Affairs, Government of India.
2. Nelson C, Lurie N, Wasserman J, Zakowski S. Conceptualizing and defining public health emergency preparedness. Am J Public Health. 2007; 97 Suppl 1: S9-11. DOI: AJPH.2007.114496 [pii].
3. Pathak, S. H. (1961). Medical Social Work in India. India: Delhi School of Social Work.
4. Reilly, M. J., & Markenson, D. S. (2011). Health care emergency management: Principles and practice. Jones & Bartlett Publishers.
5. Shoaf KI, Rottman SJ. Public health impact of disasters. Australian Journal of Emergency Management. 2000; 15(3): 58-63.
6. Spitzer, W. J., Allen, D. K. M. (2015). Social Work Practice in Healthcare: Advanced Approaches and Emerging Trends. United States: SAGE Publications.

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MI-6/C6: Disaster Risk Management in India **Credits 04(FM: 75)**

MI-6/C6T: Disaster Risk Management in India **Credits 03 (45Hrs.)**

Course Contents:

Unit-I: Geographical Setup of India and Regional Hazard Risks

a) Regional Physiography, Geology, Climate, of India and Natural Hazards Risk Prone Areas
b) Hazard Risk, Vulnerability and Disaster: Concepts and Relationships
c) Measuring Hazard Risks, Vulnerability and Disasters

Unit-II: Disaster Extremes in India, their impact

a) Regional extreme events in India: Earthquakes, Floods, Droughts, Cyclones, Tsunami, Landslides, Avalanches, Snow, Rain and Wind storms.
b) Disaster Magnitude and impact: Case Study / Examples from recent disasters.

Unit-III: Regional Patterns of Disaster Vulnerability in India

a) Earthquake Disaster Vulnerability Assessment - Case Study of Metropolitan and other Major Cities
b) Flood Disaster Zonation and Vulnerability Assessment - Case Study of Brahmaputra and Ganga river systems
c) Landslide and Avalanche Disaster Zonation and Mapping - Case Study of Himalayas and North-East Region
d) Drought Disasters Zonation and Mapping
e) Multi-Hazard Risk Assessment

Unit-IV: Disaster Management in India

a) Disaster Management Act 2005
b) Institutional and Financial Mechanism National Policy on Disaster Management,
c) National Guidelines and Plans on Disaster Management

MI-6/C6P: Disaster Risk Management in India (Practical) **Credits 01 (30Hrs.)**

List of Activities

1. **Identification of Sites:** Map Disaster prone areas, vulnerable sites, vulnerability of people (specific groups) and resources in India.

2. **Plan of Disaster Management:** Preparing plant for addressing these vulnerabilities, preparing plans in consultation with local administration.

3. **Project Presentation**: Disaster Risk Management in Indian context – case presentation.

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Suggested Readings:

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2. Sharma, Vinod K. Disaster management, NCDM, IIPA, New Delhi, 1994
3. National Disaster Response Plan, NCDM, New Delhi, 2001.
4. Mathur, G.C. Housing in Disaster prone areas, National Building Organization and U.N. Regional Centre. ESCAP, New Delhi, 1986
5. Mishra, P.K. Transforming adversity into opportunity: experiences from Gujarat earthquake reconstruction program World congress on Natural disaster mitigation proceedings, February 2004
6. Taori, K (2005) Disaster Management through Panchayati Raj, Concept, Publishing Company, New Delhi
7. Dave, R.K. (2018) , Disaster Management in India : Challenges and Strategies
8. Joshi, S.R., (2008) "Natural Disasters in North-East Region and its Management: An Essay", Centre for Science Education,, North Eastern Hill University, Meghalaya
9. United Nations Development Programme (UNDP), Disaster Management- Preparedness Methodology in Assam. http://data.undp.org.in/dmweb/Article
10. Vulnerability Atlas of India, Building Materials & Technology Promotion Council, Ministry of Housing & Urban Poverty Alleviation, Government of India, New Delhi

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