Centre for Disaster Management & Research (CDMR)

IIT Guwahati, Assam, India

Course Details

SEMESTER-I

Course No.	Course Name	L	T	P	C
DM 501	Core Course -1 (Fundamentals of disaster management)	3	0	0	6
DM 502	Core Course -2 (Socio-economic and policy aspects of disaster risk reduction)	3	0	0	6
DM xxx	Elective-1 (from the common basket)	3	0	0	6
DM xxx	Elective – 2 (from the common basket)	3	0	0	6
Total credits					**24**

SEMESTER-II

Course No.	Course Name	L	T	P	C
DM 503	Core Course -3 (Hazards monitoring and prediction)	3	0	0	6
DM 504	Core Course -4 (Research methodology and field visit)	2	0	2	6
DM XXX	Elective – 3 (from the common basket)	3	0	0	6
DM XXX	Elective – 4 (from the common basket)	3	0	0	6
DM 691	Project (Phase 1)	0	0	4	4
Total credits					**28**

SEMESTER-III

Course No.	Course Name	L	T	P	C
DM-692	Project (Phase 2)	0	0	30	30
Total credits					**30**

SEMESTER-IV

Course No.	Course Name	L	T	P	C
DM-693	Project (Phase 3)	0	0	30	30
Total credits					**30**

Credits grand total = 112

List of Elective Courses (Semester-I, II, III and IV)

DMxxx:	Disaster Governance	(3 0 0 6)
DMxxx:	Financing for Disaster Risk Reduction (DRR)	(3 0 0 6)
DMxxx:	Ergonomics in Product and Facility Design	(2 0 2 6)
DMxxx:	Rehabilitation and Retrofitting of RC Structures	(3 0 0 6)
DMxxx:	Application of Artificial Intelligence for Disaster Management	(3-0-0-6)
CE 647:	Environmental Geotechnology	(3 0 0 6)
CE 541:	Infrastructure Planning	(3 0 0 6)
CE 559:	Watershed Management and Remote Sensing Applications	(3 0 0 6)
CE 606:	Earthquake Engineering	(3 0 0 6)
CE 611:	Dynamics of Bridges	(3 0 0 6)
CE 594:	Geohazard Science and Engineering	(3 0 0 6)
CE 660:	Landslide Engineering	(3 0 0 6)
CE 648:	Applied Soil Mechanics	(3 0 0 6)
CE 641:	Reinforced Soil Structures	(3 0 0 6)
CE 646:	Rock Mechanics	(3 0 0 6)
CE 593:	Advanced Remote Sensing	(3 0 2 8)
CE 657:	Engineering Seismology	(3 0 0 6)
CE 659:	Climate Change: Causes, Effects and Mitigation	(3 0 0 6)
CE 652:	Precision Remote Sensing	(3 0 0 6)
CE 570:	River Engineering	(3 0 0 6)
CE 567:	Sediment Dynamics in Fluvial Systems	(3 0 0 6)
CE 555:	Principles of Water Quality and EIA	(3 0 0 6)
CE 583:	Pavement Analysis and Design	(3 0 0 6)
CE 584:	Traffic Engineering	(3 0 2 8)
CE 581:	Urban Transportations Systems Planning	(3 0 0 6)
CE 623:	Pavement Evaluation, Rehabilitation and Maintenance	(3 0 0 6)
CE 625:	Transportation Systems Management	(3 0 0 6)
CE 629:	Public Transportation Systems Planning	(3 0 0 6)
CE 525:	Solids and Hazardous Waste Management	(3 0 0 6)
CE 643	Earthquake Geotechnical Engineering	(3 0 0 6)
DD 509	Interaction Design	(2-1-0-6)
DD 521	System Design for Sustainability	(2-0-2-6)
RT 515:	Natural Resources Management	(3-0-0-6)
RT 523:	Rural Technology and Development	(3 0 0-6)
CS 578:	Internet of Things	(3 0 0 6)
CS 666:	Mobile Robotics	(2 0 2 6)
CS 549:	Computer and Network Security	(3 0 0 6)

Contents of theory core courses

DM 501 Fundamentals of disaster management (3-0-0-6)

Disaster and risk and their relationship; Approaches to understand disaster phenomena, disaster risk and its associated parameters; Classification, characteristics, causes, and damage potentials of different natural hazards; Dimensions of vulnerability and examples of hazard specific vulnerability factors (structural and non-structural). Disaster trends (Global, national and regional).; Methods of hazard, vulnerability and capacity assessment (HVCA); Scopes and criteria for disaster risk mitigation measures (prevention, mitigation and preparedness); Capacity building for disaster risk mitigation (structural and non-structural measures); Alternative adjustment processes for damage mitigation; Community based disaster risk reduction mechanism.

Text/ References

1. Porter, M., Jakob, M., Savigny, K.W., 2015. Geohazard Risk Management for Linear Facilities, 310p, Springer
2. Abbott, P.L., 2013. Natural Disasters, 9th Edition, McGraw Hill Education, 512p.
3. Nicholas, C., 1994. Geohazards: Natural and Human, Prentice Hall.

DM 502 Socio-economic and policy aspects of disaster risk reduction (3-0-0-6)

Impact of disaster on socio-economic aspects of a place; disaster and development; role of governance in disaster management; five year plans and disaster management; direct and indirect costs, output and welfare losses, benefits of disaster risk reduction, challenges of making economic assessments, Gender and disaster; Community-hazard profiles in India; Different phases of Disaster Management; Relief mechanism.; Roles of NDMA, SDMA; Objectives, provisions and recommendations of DM Act 2005 and NPDM 2009.

Text/ References:

1. Asia-Pacific Disaster Report 2015: Disasters without borders - Regional resilience for sustainable development, Economic and Social Commission for Asia and the Pacific (ESCAP) - ESCAP, 2015.
2. Sendai Framework for Disaster Risk Reduction 2015-2030, United Nations Office for Disaster Risk Reduction (UNISDR) - UN/ISDR, 2015.
3. Environmental Change and Sustainability, Etd. Steven Silvern and Stephen Young, IntechOpen, ISBN: 978-953-51-1094-1. 2013.

DM 503 Hazards monitoring and prediction (3—0-0-6)

Monitoring of various hazards, early warning systems; Flood monitoring, rain distribution, hydrological forecasting, flood mapping, basin studies, case studies of floods; Seismic hazard assessment, seismotectonic modelling, probabilistic distributions, few case earthquake case studies, micro and macro zonation; monitoring of landslides, application of GIS, Remote sensing in landslide monitoring and evaluation, landslide hazard zonation.

Text/ References

1. Keller, E.A., Environmental geology, Prentice Hall, 2000.
2. D. Hyndman and D. Hyndman, Natural hazards and disasters, Brooks/Cole, 2006.
3. Reiter, L., Earthquake hazard analysis: Issues and insights, Columbia University Press, 2000.
4. Fred G. Bell, Geological Hazards: Their assessment, avoidance and mitigation, E&FN Spon, 1999.
5. Wyss and Schroeder, Earthquake hazards, risks and disasters, Elsevier, 2014.
6. Glade, Anderson and Crozier, Landslide hazard and risk, John Wiley and Sons, 2005.
7. Oka, Murakami and Kimoto, Prediction and simulation methods for geohazard mitigation, CRC Press, 2009
8. Kolathayar and Sitharam, Earthquake hazard assessment: India and adjacent regions, CRC Press, 2018.
9. Durrani, Wang and Forbes, Geological disaster monitoring based on sensor networks, Springer, 2019.
10. Dunnicliff and Green, Geotechnical instrumentation for monitoring field performance, John Wiley and Sons, 1998.
11. Ansal, Atilla, Recent advances in earthquake geotechnical engineering and microzonation, Springer, 2004.
12. Villaverde, R. Fundamental concepts of earthquake engineering, CRC Press, 2009

DM 504 Research Methodology and Field Visit (2-0-2-6)

Philosophy of doing research and scientific ethics; Sources of information; Review of literature; Approaches for high quality research; Importance of reasoning in research; Planning research and fine tuning the research problem; Development of experimental and theoretical research frameworks; Formulation of research problem, hypothesis, various methods of conducting on field Research: data gathering, sampling techniques,

Customization of research to infrastructural and intellectual capabilities; Generation, analysis, interpretation and presentation of results. Planning and preparation for writing; Scientific writing structures for conference and journal articles, M. Tech and Ph.D. theses; Art of effective writing through sectioned approach – introduction, literature review, novelty, objectives, materials and methods, results and discussion, conclusions, future work, bibliography, appendix, nomenclature, abstract, and synopsis; Refinement approaches for the enhancement of article quality – order of words, structure of sentences and paragraphs, concise writing, removal of redundancy, ambiguity and vagueness, hedging and criticism, functional English, complexity of hypothesis, and level of reasoning; Methods to avoid plagiarism; Intellectual property rights and permissions.

Text/ References :

1. C. G. Thomas, Research Methodology and Scientific Writing, Ane Books, Delhi, 2015.
2. A. Wallwork, English for Writing Research Papers, Springer, New York, 2011.
3. J. D. Lester and J. D. Lester (Jr.), Writing Research Papers: A Complete Guide, Longman, London, 2014.
4. R. A. Day and B. Gastel, How to Write & Publish a Scientific Paper, Greenwood Press, Connecticut, 2011.
5. H. Glasman-Deal, Science Research Writing for Non-Native Speakers of English, Imperial College Press, London, 2009.