

Summary of Courses for Postgraduate and Postgraduate Diploma Program

Degree	Type	Course Divisions	Credits	Total Credits
M.Sc. Eng./ M.Sc./MDM	Full Time	Theory + Thesis	18 + 18	36
	Part Time	Theory + Project	27 + 9	
PGD	Full Time/	Theory Courses	21	24
	Part Time	Project	3	

N.B.: A student of Postgraduate Degree of any branches of IDM has to complete any of the Thesis or Project and a student of Postgraduate Diploma Degree of any branches of IDM has to complete the Project.

COURSES FOR POSTGRADUATE AND POSTGRADUATE DIPLOMA DEGREES

S/N	Course Code	Course Title	Credit Hour
1.	DM 6000	Thesis (Postgraduate)	18.00
2.	DM 6000	Project (Postgraduate)	9.00
3.	DM 6000	Project (Postgraduate Diploma)	3.00
Basic Courses for Disaster Management			
4.	DM 6101	Introduction to Environment, Hazard, Vulnerability and Disaster	3.00
5.	DM 6103	Disaster Management Practices in Bangladesh	3.00
6.	DM 6105	Disaster Preparedness, Response, Recovery and Emergency Management	3.00
7.	DM 6107	Research Methodology	3.00
8.	DM 6109	Data Management and Statistical Analysis	3.00
9.	DM 6111	Introduction to GIS and Remote Sensing for Disaster Management	3.00
Advance Courses for Disaster Management			
10.	DM 6201	Disaster Forecast and Early Warning System	3.00
11.	DM 6203	Emergency Response and Humanitarian Assistance	3.00
12.	DM 6205	Public-Private-Partnership in Disaster Management	3.00
13.	DM 6207	Disaster Management in Agriculture	3.00
14.	DM 6209	Disaster and Ecosystem Service	3.00
15.	DM 6211	Refugees Management	3.00
16.	DM 6213	Hydrological Hazards and Disaster Management	3.00
17.	DM 6215	Landslide Management	3.00
18.	DM 6217	Meteorological Hazards and Management	3.00
19.	DM 6219	Fire Hazards Management and Civil Defense	3.00
20.	DM 6221	Public Health and Disaster	3.00
21.	DM 6223	Human Induced Disasters	3.00
22.	DM 6225	Strategic Planning and Leadership in Disaster Management	3.00
23.	DM 6227	Disaster Risk Reduction and Sustainable Development	3.00
24.	DM 6229	Community Based Approaches to Disaster Risk Management	3.00
25.	DM 6231	Legal Aspects of Disaster Management	3.00
26.	DM 6235	Occupational Hazards and Risks Management	3.00
27.	DM 6233	Research and Analytical Methods in Disaster Management	3.00
Courses Related to Engineering Field of Disaster Management			
28.	DM 6301	Built Environment in Disaster Prone Areas	3.00
29.	DM 6303	Utility Services Management in Disaster Prone Areas	3.00

30.	DM 6305	Earthquake Engineering and Management	3.00
31.	DM 6307	Design of Structures for Disaster Prone Areas	3.00
32.	DM 6309	Media, Communication and Transportation System during Disaster	3.00
33.	DM 6311	Choice of Water Management Technologies in Disaster Prone Areas	3.00
Courses Related to Environment			
34.	DM 6401	Epidemiology	3.00
35.	DM 6403	Physical Environment	3.00
36.	DM 6405	Environmental Planning and Management	3.00
37.	DM 6407	Ecological Impact of Disaster	3.00
38.	DM 6409	Coastal Zone Management	3.00
39.	DM 6411	Environmental Impact Assessment	3.00
40.	DM 6413	Climate Change Adaptation and Mitigation	3.00
41.	DM 6415	Climate Change Modeling	3.00
Courses Related to GIS/RS			
42.	DM 6501	Tools and Techniques in Disaster Risk Management	3.00
43.	DM 6503	Geospatial Applications in Disaster Risk Reduction	3.00
44.	DM 6504	Geospatial Applications in Disaster Management Sessional**	1.50
45.	DM 6505	Urban and Rural Planning and Hazard Mapping	3.00
46.	DM 6506	Hazard and Vulnerability Mapping Sessional**	1.50
Courses Related to Social Science			
47.	DM 6601	Socio-economic Analysis of Disaster	3.00
48.	DM 6603	Training and Public Awareness in Disaster Management	3.00
49.	DM 6605	Gender Issue in Disaster	3.00
50.	DM 6607	Disaster Psychology	3.00
51.	DM 6609	Economics of Disaster	3.00

**Offered only for PGD Program

Details of Courses of Postgraduate and Postgraduate Diploma Programs

Basic Courses for Disaster Management

DM 6101 Introduction to Environment, Hazard, Vulnerability and Disaster 3 Credits

Concept of Time, Space, Scale, Matter, Energy, Form and Geomorphic Processes, Definition and Components of Environment, Eco-Systems, Food Chain and Energy Chain, Vulnerability, Natural hazards, Human-induced hazards, Industrial hazards, Distinction between hazard and disaster, Resilience, Risk, Conceptual framework of disaster risk management, Multi-hazard risk management, Basic concepts of risk reduction and resilience building, Geo Hazards, Complex and Biological Hazards, Disaster Risk Reduction and Disaster Risk Transfer.

DM 6103 Disaster Management Practices in Bangladesh 3 Credits

Introduction to Natural Hazards and Disasters, Physiography of Bangladesh, Climate of Bangladesh, Ecological Regions of Bangladesh, Seismic Hazards Zone of Bangladesh, Major Natural Hazards of Bangladesh: Floods, Earthquakes, Tsunami, Landslides, Desertification, Drought, Cyclone, Snow Avalanches, Glacial Hazards, Salinization, Heat and Cold Waves, Sea Water Intrusion; Management Practice of the common disasters in Bangladesh, Case studies, Disasters Management Policies in Bangladesh, Future Disaster Trends in Bangladesh.

DM 6105 Disaster Preparedness, Response, Recovery and Emergency Management 3 Credits

Disaster preparedness planning, Risk insurance, Emergency rescue and relief needs, Long-term recovery, rehabilitation and reconstruction, Post-disaster trauma management, Special needs for women, children and disabled. Disasters and Emergency Situation, The nature of Emergency Situation, Phases of Emergency, Management (Mitigation, Preparedness, Response and Recovery), Emergency Mitigation (Risk Assessment, Precautionary Measures, Minimizing the Risk), Preparedness for Response (Training, Planning, Plan, and Institutions), Response: Early Warning System, Evacuation, Rapid Need Assessment and Preliminary Damages Assessment, Search and Rescue, Triage, Medical First Aid, Fire Fighting, Hospital, Security, Relief, Camp Management, Emergency Response Organizations (Federal, Provisional, District, Community, Individual, NGOs), Emergency Operation Centre.

DM 6107 Research Methodology 3 Credits

Introduction to Research: Meaning, Importance, Scope and limitation of research; Classification of research; Fundamental vs. Applied, Exploratory and Explanatory, Longitudinal vs. Cross-section, Time Series vs. Panel Research, Characteristics of Scientific inquiry; Relevance of creativity, innovation, originality and advancement of knowledge in research; Conceptualization of research problems; epistemologies and the application of knowledge; choosing theories and methods; Identifying research questions; Research Design: Meaning, Importance, Types of Design, Method vs. Methodology.; Literature Review: Meaning, Importance, Methods and Techniques of literature Review; Sample and Research Protocols: Sample, Population, Sample Frame, Parametric and Non-parametric Sampling, Other Classification of Sampling, Questionnaire Types and Preparation of good Questionnaire; Other method of Data Collection: PRA, FGD, Case Study, Experimental Design; correction & regressions; Standard Deviation and error; Statistical Data analysis; Presenting research finding and writing scientific papers and reports; Research Proposal: Meaning, Purpose, Structure, Content, Steps in preparation; Referencing and Bibliography: Meaning, Importance, MLA, Harvard, Chicago University style of Referencing. Developing a research proposal. Ethics in research: research conduct, authorship and intellectual property, consent and confidentiality, animal research, commercializing research, copyright, research integrity, plagiarism.

DM 6109 Data Management and Statistical Analysis 3 Credits

Introduction - definition, scope and importance of statistical evaluation in disaster management: Some basic concept - variables and constants, population and sample, parameters and statistics, accuracy and precision, random variable, expectation and variance of random variables, tabulation and frequency distribution, survey and experiments: Measure of central tendency - variation, types, measure of moment, skewness and kurtosis: Probability and probability distributions - elementary theory and laws of probability; binomial, poisson and normal distributions, properties and their applications. Data requirement for water resources development; Types and sources of data; Time series data; Database management; Exploratory data analysis; Homogeneity and stationarity of data; Descriptive statistics; Statistical interval, inference and hypothesis testing; Statistical sampling; Analysis of variance; Correlation and regression; Frequency analysis; Statistical software, Lab work.

DM 6111 Introduction to GIS and Remote Sensing for Disaster Management 3 Credits

Importance of Spatial Data in Disaster Management, Basic concepts of Remote Sensing technology; Scope and Application Areas of Remote Sensing in Disaster Management; Elements of Remote Sensing; Importance of different types of resolutions for Image Interpretation; Visual Interpretation of Aerial Photographs and Satellite Imagery for landuse, land pattern analysis, geological and structural analysis etc.; Basics of Photogrammetry; Scope and Application Areas of Photogrammetry in Disaster Management; Basics of Aerial Photos and Flight Plan; Overview, History and Concepts of GIS; Scope and Application Areas of GIS in Disaster Management; Mapping Concept, Map Projection and Spatial Referencing System; Data Types, Data Structure and Data Format; Introduction to Symbology and Cartography; Data Acquisition, Manipulation and Analysis; Concept of Hazard Mapping, Vulnerability mapping and Risk Mapping; Watershed Analysis;

Advanced Courses for Disaster Management

DM 6201 Disaster Forecast and Early Warning System 3 Credits

Introduction to the forecasting of hydro-meteorological hazards, Meteorology, Vertical and horizontal distribution of temperature and pressure, Types of clouds and precipitation, Measuring instruments, Weather phenomenon, Weather forecast and tools, Physiography Meteorology and Hydrology, Types of hydro-meteorological hazards, Basic elements of hydro-meteorological hazards (Intensity, density, exposed population and property), Measuring and presentation of the hydro-meteorological hazards (Scale, level and end user), Use of modern technology, Major stakeholders (Government, public and international institutions), Forecasting of hydro-meteorological hazards, Early warning system for different hazards.

DM 6203 Emergency Response and Humanitarian Assistance 3 Credits

Need assessment, tools and techniques of need assessment, assessment report preparation, response planning (human resources, storage of relief goods, selection of beneficiaries), distribution of relief goods, accountability and quality in humanitarian response, principles of humanitarian assistance, standards. Understanding humanitarianism: why the world has responsibility to help, Poor competing against poor to become projects: how humanitarian organizations choose where to work and where not to work; who gets international aid and how much Challenges of humanitarian organizations working in conflict areas: how to be perceived as neutral to stay safe and undertake development, How to ensure human security, vulnerability reduction and sustainability in humanitarian crises, The role of mediation in managing international crises, Best practices in humanitarian crises management Practicing humanitarianism: difference between rhetoric and reality, Responding to an

international call for humanitarian crises as a disaster response manager, Studying World Health Organization practice as a case in point.

DM 6205 Public-Private-Partnership in Disaster Management 3 Credits

Introduction to the Public Private Partnerships, Public Private Partnership for Disaster Risk Reduction, Private sector involvement in DRR, The business case for corporate sector involvement in DRR, The role of the private sector in DRR, Case studies of private sector involvement in DRR activities, Current legislative and institutional framework for PPPs for DRR, Recommendations for strengthening partnerships, Way forward/Evolving Concepts in PPP for DRR with special reference to Bangladesh.

DM 6207 Disaster Management in Agriculture 3 Credits

Disaster Management – Definition; Components of DM; Crisis Management; Risk Management; Disaster Management Cycle; Environmental regulations – Divisional, state, and local, and how they impact agriculture; Best management practices (BMPs); Execution of a qualitative and quantitative risk and vulnerability assessment; Agricultural Risk Management Tools; Determining the probable disaster loss; Disaster Risk Mitigation; Government interventions and Institutional mechanism for Disaster Management; Good practices identified during field survey.

DM 6209 Disaster and Ecosystem Service 3 Credits

Disasters and Ecosystems: Resilience in a Changing Climate - why take this course?; Introduction to Disasters, Risk Reduction and Climate Change; Links between Disasters, Disaster Risk Reduction, adaptation and Key International Actors; Principles and Challenges of Ecosystem-based Disaster Risk Reduction (Eco-DRR) and Adaptation (EbA); Ecosystem Management Contributions Pre- and Post-Disasters; Linking Ecosystems and Humans to Disasters; Principles of Systems thinking and using Natural Systems for Disaster Risk Reduction; Incorporating ecosystems in risk assessments; Ecosystems and spatial tools for Risk Reduction; Principles of spatial planning and community-based tools for Eco-DRR; Ecological Engineering for Disaster Risk Reduction and Climate Change adaptation; Principles of Mainstreaming Ecosystem based Disaster Risk Reduction into National Policies, Strategies, Plans and Projects.

DM 6211 Refugee Management 3 Credits

Introduction to Population Studies, Sources of demographic data and census statistic, Demographic Analysis of the Society: Population Growth, Fertility, Mortality, Migration, Age and Sex Structure, Ethnicity, Urbanization, Family Structure, Education, Employment, Changing nature of Canadian population, Demographic applications in research and planning, Refugees and Humanitarian Emergencies: Research Seminar, Humanitarian Assistance and Project Management, Immigration Law and Policy, Migration and Development, International Trafficking of Women and Children, Conflict Management and International Security, International Mediation, War Crimes and Prosecution, International Criminal Law, Human Rights and Conflict, Human Rights in International Relations, Human Rights in the Arab World and Africa, International Human Rights Law.

DM 6213 Hydrological Hazards and Disaster Management 3 Credits

Coastal Hazards; Causes, locations, Modes of occurrence of various coastal hazards like Tsunamis, Storm Surges and Erosion, Their origins and mitigation measures. Historical records of tsunamis. Hydrodynamics of tsunamis and storm surges, Tsunami Early Warning Systems, Construction of tsunami walls, levees etc. Mitigation of their effects, Marine Pollution, Coastal Salinities, Oil slicks, Impact of sea level rise, Water pollution, water quality, classes of water pollutants, pollutant trace elements in water, Arsenic, Cadmium, lead, mercury and other inorganic chemicals in water, acidity, alkalinity, salinity, sewage and water pollution – Ground water rise, causes of rising ground water. Historical perspective coastal hazards and disaster management in Bangladesh; vulnerability assessment in coastal disaster management, island risk management pertaining to cyclone and sea level rise and trends of coastal disaster management. Coastal early warning system, community based disaster management system. Hazards from floods, causes of flooding, Flood diversion

analysis, risk analysis. Methods for Industrial hazard risk assessment. 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. Remote sensing and GIS in industrial hazard risk assessment - Industrial hazard risk assessment and legislation – policies and guidelines – National policy.

DM 6225 Strategic Planning and Leadership in Disaster Management 3 Credits

Leadership qualities, capacity and decision making skills, problem solving skills, executive management to meet the needs of police, law enforcement and public safety organisations; Analysis of policing and public safety from a strategic leadership perspective, and the impact of economic, social and technological issues; understanding of the strengths and weaknesses of leadership styles.

DM 6227 Disaster Risk Reduction and Sustainable Development 3 Credits

Forging the links between disasters and development, The dilemma of sustainability, The Concept & Historical Perspective of Sustainable Development, Medium Term Development Framework, The Conceptual Relationship between Disasters and Development, Disasters – A challenge for developing countries and development cooperation, The Millennium Development Goals, Disaster Risk Reduction; An Instrument for Achieving Millennium Development Goals, Disaster and National Development, Assessing the trade-offs in investing in vulnerability reduction, National Developmental Plans/ Legislation of Bangladesh.

DM 6229 Community Based Approaches to Disaster Risk Management 3 Credits

Introduction to CBDRM, Definition, types and essential elements of community, Sociological criteria of a good community, The character of resilient communities, Importance of community based disaster risk management, Recognition of the need for community involvement, ownership and participation, Key points on the CBDRM approach, Community based disaster risk management process, Community based risk, needs and damage assessment, Participatory methods and tools of risk assessment, Guidelines for good practice in community based disaster risk management, Participatory disaster risk management planning, Community managed implementation of risk reduction measures, Major considerations in undertaking in CBDRM, Household risk mapping, community risk assessment, community based disaster management, Community mobilization, Empowerment, Indigenous knowledge, Facilitating self-help initiatives, Sustaining long-term community based disaster risk management.

DM 6231 Legal Aspects of Disaster Management 3 Credits

Role of the government/NGOs/international funding agencies/ private sector/ armed forces (may be taught in 'case-study' format), Cluster approach and interagency coordination, Humanitarian accountability practices, Code of conduct, Standing Orders, Government Existing Rules and Regulations, Policy formulation, Program and project implementation. Disaster Risk Management Phases (Recovery, Development, Prevention and Mitigation): Disaster Risk: The Global Problem, Understanding the nature of risk, Emerging trends in hazards, vulnerability patterns and the impact of disasters, Risk and Community: Perception, Determination and Adjustment, Building of Resilient Community, Risk Assessment, Strategies for Risk Management, Key Techniques Used in Disaster Risk Assessment, Gender Sensitive Risk Assessment, Risk Treatment and Management.

DM 6233 Occupational Hazards and Risks Management 3 Credits

Introduction to Health and Safety, Personal Health and Safety, Accidents & Their Effect, Physical Hazards Controls, WHMIS Workplace Hazardous Material Information System, Workers Compensation, Roles of Health and Safety Personnel, Stress and Safety, Mechanical Hazards and Safeguarding, Heat and Temperature Hazards, Introduction to Fire Science, Fire Hazards, Noise and

Vibration Hazards, Preparing for Emergencies, Promoting Safety, Construction Industry and Safety Regulations, Legal Aspects and Environmental Regulations, Introduction to Hazardous Materials and Waste, Health and Safety training, Safety Program Training Presentation Techniques, Principles of Industrial Hygiene, Ergonomics and Human Factors in Safety, Safety Program Management, Job Safety Analysis, Emergency Response Procedure and Responsibility, Multi-employer Worksite Issues, Prevention of Occupational Risks, Risk Management, Risk Analysis, Risk Assessment, Risk Control, Risk Management Tools.

DM 6235 Research and Analytical Methods in Disaster Management 3 Credits

Research typologies, Basic statistical and sampling techniques, Survey techniques, Qualitative and quantitative research, Data analysis, PRA methods, Literature Review, Dissertation writing. Introduction Research Techniques in Disaster Management, Types of Research, Basic Elements of Scientific Research Methodology, Research in the Field of Disaster Management, Research Process Theory and Hypothesis, Methods/Techniques of Data Collection and Analysis, Questionnaire Design, Field Survey, Analysis, Interpretation, Data Classification and Tabulation, Sample and Sampling, Measures of Central Tendency, Measures of Dispersion, Comparisons, Computer Based Statistics (SPSS16/MS Excel etc.), Writing a Research Proposal.

Courses Related to Engineering Field of Disaster Management

DM 6301 Built Environment in Disaster-Prone Areas 3 Credits

Building-for-safety, Retrofitting, Disaster shelters, Emergency housing, Building codes, Indigenous structure in Disaster prone areas, Nature of disaster and sustainable structures, case studies.

DM 6303 Utility Services Management in Disaster Prone Areas 3 Credits

Introduction to basic engineering fields and their role (Agricultural, Chemical, Civil, Electrical, Mechanical and Mining), Water supply system in disaster prone area, Gas supply system in disaster prone area, Typical process of engineering project output (concept, feasibility, design, approval, execution, handover, management, maintenance, end of design life disposal), Basic concept of Planning Commissioning proformas (PC-I to PC-V), Introduction of concept of codes, guidelines, specifications in various engineering fields with few case studies (Building Code of Bangladesh – Seismic Provisions; Bangladesh Electric Safety Code; other international examples), History of various disasters in world with summary of engineering challenges, History of various disasters in Bangladesh with engineering challenges.

DM 6305 Earthquake Engineering and Management 3 Credits

Introduction to earthquake engineering, Plate tectonics, Various types of earthquakes and faulting, Ground motion parameters, Fundamentals of waves propagation, Dynamic properties of soils, Laboratory tests for dynamic characterization of soils, In situ tests for dynamic characterization of soils, Characteristics of seismometers and microtremor instruments; Characteristics of magnitude and intensity scales; Earthquake time histories; Fourier and response spectra; Historical seismicity and earthquake catalogues: data acquisition, sources, magnitude rescaling, Site characterization: amplification and responses; Experimental simulation and shaking tables; Introduction to lifeline engineering: electricity, water, natural gas, telecommunication and transportation systems; Post earthquake damage survey; Mitigation strategies; Case studies of major earthquakes. Methods to estimate site effects, Assessment of seismic hazard using deterministic hazard approach (DSHA) and probabilistic seismic hazard approach (PSHA).

DM 6307 Design of Structures for Disaster Prone Areas 3 Credits
Effect of wind forces on buildings and other structures, Assessment of wind pressure, Requirements for structural adequacy, Use of design codes for wind resistant design of masonry, steel and timber structures, Improve resistance to cyclones and high winds; foundations, walls, frames and roofs.

DM 6309 Media, Communication and Transportation System during 3 Credits
Disaster
Disasters and the media in a global age, The geopolitics of disaster coverage, Making disasters mean and politically matter, The making of a newsroom and news editing, Disaster citizenship and assumption of state responsibility, Accountability of disaster news: ethics of disaster reporting, Social media and disaster, Essentials of successful disaster communication, Learning the application of communication principles in different phases of disasters, Understanding disaster communications audience, Managing media relations as a disaster manager, Building an effective plan, strategy and skill for disaster communication in a changing media world, Terrorism communication challenges. Alternative transportation options, quick action for road clearing and construction, Materials of Construction.

DM 6311 Choice of Water Management Technologies in Disaster 3 Credits
Prone Areas
Role of technology in water management; Technology imperatives: society, culture and indigenous knowledge; Technology management: assessment, appropriateness, transfer, forecasting, risk, innovation & diffusion; Development strategies; Choice of technology for water resources management: flow control, irrigation, water supply, pumps, flood management, drainage, river training, hydropower, navigation, dredging, land reclamation, wetland conservation; Case studies.

Course Related to Environment

DM 6401 Epidemiology 3 Credits
Public health and biological hazards; Outbreak of dengue and malaria epidemics, contagious diseases e.g. AIDS, protection and awareness. Ground water contamination; water-borne diseases affecting bowels /kidney. Introduction to Health Issues in Disaster Management, Basic Elements of Public Health, The Consequences of Disasters and Its Impacts on Public Health, Public Health and Phases of Disaster Response: Acute Phase (Surgical, Rapid response, Ambulances etc.), Non-Surgical, Chronic Phase; Short Term Programs: Mobile Clinic, Tele Health, Training, Restoration of Public Health Facilities, Safe Community, Rehabilitation Medicines, Drugs and Vaccines, Liaison with other Stakeholders of DM etc. Long Term Programs: Medical Support, Rapid Response Unit, Field Hospital and Mobile Clinic, Management of Health Issues in Disasters (Coordination, Logistics, Manpower etc.)

DM 6403 Physical Environment 3 Credits
Introduction to physical environment – definition, the components, the significance of physical environment as life support system: The earth; structure and origin - The uniqueness of the earth, dimensions of earth, a model of the earth's interior, principles of seismic methods, major divisions of the earth's interior, earth's magnetic field: The solar system - formation of the planets, origin of the earth, earth in comparison with other planets in the solar system. Surface features of the earth; The major surface features of the earth – continental crust, the transition zone, and the ocean basins, The

theory of plate tectonics and its evolution - plate tectonics, forerunners of modern tectonic thought, the theory of continental drift, sea-floor spreading, the plate tectonics synthesis, mechanisms of the plate movement: Crustal deformation; Vertical and lateral movement of crust - faults, folds, their major classification, mechanism of rock deformation, mountain building, Concept and evolution of geological time scale; Interpreting the sedimentary rock records - the laws involved, development of a geological time scale, measuring geological time, the geologic concept of time, Field Work.

DM 6405 Environmental Planning and Management 3 Credits

Introduction – significance of environmental planning and design in sustainable environment: Planning processes and methodologies – content and function, the plan as a process, social and historical considerations, elements of planning and team work: Concept of planning in the developed and developing countries: Protection and restoration of natural system: Design plan – implementation process, comprehensive plan, zoning plan, industrial performance, historical preservation, flexible zoning, specific plan. Environmental design fundamentals: Geo-climatic factors in environmental design: Social and aesthetic factors: Site evaluation: Land-use regulations: Modern development and their effects in the physical environment: Energy efficient buildings and settlements: Design and planning guideline for environmental design: Sociological, Psychological and Geoclimatic factors of low-rise and high-rise development.

DM 6407 Ecological Impacts of Disaster 3 Credits

Definition of ecosystem; freshwater ecosystems- river, wetlands, floodplains; Coastal ecosystems- mangrove, inter-tidal, estuarine; Ecosystem functions and services; Ecosystem valuation; Ecosystem and IWRM; Eco-hydrology and Eco-hydraulics-concepts, principals and application; Assessment of environmental flow; Eco-friendly water structures; Ecosystem approach to water management, Environmental Impact Assessment, Impact analysis of a disaster on ecosystem.

DM 6409 Coastal Zone Management 3 Credits

Definitions and fundamental concepts of integrated coastal zone management (ICZM) and other relevant terminology, the need for integrated coastal and ocean management; Evaluation of international prescriptions of ICZM: UN conference on the law of the sea, UN conference on the Human Environment, UNCED; Practical guide to ICZM: setting the stage and developing the political will, public participation and consensus building, options for leadership; Inter-governmental, institutional and financial consideration of ICZM; Informing the ICZM process: Building the science and environmental information systems. Formulation and approval of an ICZM program; Implementation, operation and evaluation of ICZM programs: methods and approaches; Participatory coastal resource assessment: Principles and theories; Analysis of project contributing to the ICZM processes; Coastal management in Asian countries: Case study from Bangladesh; processes, strategies, planning, and policies of ICZM; Sustainability of ICZM and its assessment processes: Integrated agro-aquaculture system and estimation of its survival function; Adaptation of Coastal and Marine Ecosystems with Issues of Global Climate Change.

DM 6411 Environmental Impact Assessment 3 Credits

Introduction; ECA; Scoping and Baseline Environmental Studies; Impact Prediction and Assessment; EIA Methodologies (checklists, EES, interaction matrices, network); Mitigation Measures, Environmental Management Plan; Environmental Monitoring; Environmental Audit; Public Participation in EIA Process and Decision Making; Preparation of EIA Document; Impacts on Water and Air Environment; Impacts on Ecological and Socio-economic Environment; Impacts on Aesthetic, Heritage and Cultural Environment.

DM 6413 Climate Change Adaptation and Mitigation 3 Credits

Introduction to Climate Change and Natural Hazards, Weather and Climate, Global Climatic Regions, Introduction to Climate Change Adaptation, Climate change and climate variability, Risk of Disasters

and Climate Change, Major impacts of climate change: Agriculture, Water resources, Forestry, Biodiversity, human health and hydro-meteorological disasters, Climate Change and Extreme Hydro-meteorological Events, Climate Change and Vulnerabilities, Assessing the impacts and vulnerabilities to climate change and adaptation ,Climate Change Mitigation, Climate Change Adaptations, Local coping strategies, indigenous knowledge in climate change adaptation, Climate Change adaptation needs in *Bangladesh*-agriculture, water, forestry, biodiversity, health etc., Role of Oceans: Surface Current, Carbon sink, El-Nino and La-nina Effect; Hydro-Meteorological System, Causes of Climate Change (Natural and Anthropogenic), Impacts of Climate Change, Global Warming, Extreme Weather Events, Hydro-meteorological Hazards and Disasters, Global Distribution of Hydro-meteorological Disasters.

DM 6415 Climate Change Simulation and Basics of Cyclone, Flood and Earthquake Modeling 3 Credits

Overview of Climate Variability and the Science of Climate Dynamics, El Niño; Basics of Global Climate; Physical Processes in the Climate System, El Niño remote impacts: tele-connections, Other inter-annual climate phenomena and prospects for seasonal-to- inter-annual climate prediction, Hurricane season forecasts, Sahel drought, North Atlantic oscillation and annular modes; Climate Models: Constructing a Climate Model, An Atmospheric model, Treatment of sub-grid scale processes, Resolution and computational cost, An ocean model and ocean-atmosphere coupling, Land surface, snow, ice and vegetation, Summary of principal climate model equations, Climate system modeling, Sea ice and snow, Climate simulations and climate drift, Evaluation of climate model simulations for present day climate, Atmospheric model climatology from specified SST, Climate model simulation of climatology, Simulation of ENSO response; The Greenhouse Effect and Climate Feedbacks: The greenhouse effect in Earth's current climate, Global energy balance, A global-average energy balance model with a one-layer atmosphere, Infrared emissions from a layer, The greenhouse effect, Global warming, Climate Model Scenarios for Global Warming: Greenhouse gases, aerosols and other climate forcings, Scenarios, forcings and feedbacks, Forcing by sulfate aerosols, Commonly used scenarios, Global-average response to greenhouse warming scenarios, Spatial patterns of warming for time-dependent scenarios, Comparing projections of different climate models, Multi-model ensemble averages, Poleward amplification of warming, Summary of spatial patterns of the response, Climate response time in transient climate change, Transient climate change versus equilibrium response experiments, A doubled-CO₂ equilibrium response experiment, The role of the oceans in slowing warming, Climate sensitivity in transient climate change, Ice, sea level, extreme events, Sea ice and snow, Land ice, Extreme events.

Courses Related to GIS/RS

DM 6501 Tools and Techniques in Disaster Risk Management 3 Credits

GIS - Constituents of vector and raster models, Data analysis, Spatial information assembling for disaster risk management, Utilization for decision-making, Remote Sensing Techniques, Geo- and hydro-informatics, MIS, Social and environmental impact assessment, Damage assessment.

DM 6503 Geospatial Applications in Disaster Risk Reduction 3 Credits

Major Technological Tools for DM, Acquisition of GIS and Remote Sensing data for disaster management, Data collection techniques, Web Map Services; Web Feature Services; Constituents of Vector and Raster Models, Concept of Spatial Database; Process Modeling; Surface Creation Analysis and Interpolation Techniques; Hazard Mapping, Physical Vulnerability Mapping, Social

Vulnerability Mapping and Risk Mapping, GIS based Risk Assessment techniques, GIS based Impact Assessment techniques, Role of GIS and RS in Mitigation and Preparedness, Role of GIS and RS in Disaster Response and Recovery, Role of GIS and RS in Disaster Risk Assessment, Preparation of different Thematic Maps; Exercises on creating maps for different disasters. Image Classification techniques, Change Detection techniques, Introduction to GPS and Basic Concepts.

DM 6504 Geospatial Applications in Disaster Management 1.5 Credits
Sessional

Introduction to GPS and basic concepts. Integration of RS, GIS techniques and thematic map data and interpretation. Importance of spatial data in disaster management, Acquisition of GIS and Remote Sensing data for disaster management, Data collection techniques, Application of GIS and Remote Sensing data for disaster management, Role of GIS and RS in Mitigation and Preparedness, Role of GIS and RS in Disaster Response and Recovery, Role of GIS and RS in Disaster Risk Assessment, Preparation of different thematic maps; exercises on creating maps for different disasters.

DM 6505 Urban and Rural Planning and Hazard Mapping 3 Credits

Introduction; Urban Area Interpretation, Various classification systems; Residential area classification; Principles of sub-division; Unit of sub-division; Urban sprawl; Environment of residential area; Process of built form; Suitability analysis, Rural land use and settlement patterns, Settlement patterns associated with major agriculture types - Space Use, Space use classification system; NIMROV space use classification making of inventories; Case study, Land use Planning, Issues in land use planning; Classification of Land Use; Introduction to planning, Historical development of planning, general development plans, Information for planning, Zoning, Land subdivision regulations, Strategic Planning, Environmental land use planning, Economic development, Land use change monitoring urban sprawl mapping, Aerial Photo & Census Operation, Population estimation through remote sensing-Basic principles, Updating of population data, case studies, Traffic and parking survey, Traffic surveys; Traffic volume; Parking surveys; Role of RS & GIS in Transportation Planning. Integration of hazard loss considerations in urban infrastructure planning, Facilities location and planning, Hazard mapping and zoning, Building regulations, Building codes, Performance standards, Shelters, Evacuation route planning.

DM 6506 Hazard and Vulnerability Mapping Sessional 1.5 Credits

Land use change monitoring urban sprawl mapping, Aerial Photo & Census Operation, Population estimation through remote sensing-Basic principles, Updating of population data, case studies.

Courses Related to Social Science

DM 6601 Socio-economic Analysis of Disaster 3 Credits

Purpose of social survey; Social indices; Social methods; Sampling techniques; Questionnaire development; Data analysis and interpretation; Basic economic principles; Market economy; Benefit-cost analysis; Financial analysis; Public goods models; Social welfare functions and Pareto optimality. Sociology and the Study of Disaster, Social System Ecological Networks and Disaster, Sociological Perspective on Disaster, Role of Faith, Belief and Religion in Disasters, Myths, Realities and Cultural Representation of Disaster, Behavioural Response to Disaster, Community Impact of Disaster, Social Capital and Disaster, Social Vulnerability and Theories of Social Vulnerability, Disaster, Race and Social Class, Gender and Disaster, Children and Disaster, Elderly and Disaster, Consequences of

Post disaster relocation and prospects for recovery, Disaster, language barrier and disabilities, Disaster and social change.

DM 6603 Training and Public Awareness in Disaster Management 3 Credits

Mode of Communication, Communication and Dissemination Techniques, Challenges of Communication, Public Awareness Campaigns, Training Programs, Methods of Public Awareness, Role of Media, Internet and Telecommunications.

DM 6705 Gender Issue in Disaster 3 Credits

Gender and gender relations in disasters, Women in society, Perspective of gender: A missing element in disaster, Gender inequality, vulnerability and disaster, Gender Specific Needs and Issues, Differential impact of disaster on women in different life cycle stages, Role of women in disaster management, Women involvement in reconstruction and development phase following an emergency and/or disaster, Psychosocial considerations: prevention, mitigation and preparedness, Community mobilization through women, Case studies of women responding to disaster.

DM 6707 Disaster Psychology 3 Credits

Introduction to Psychological Impacts of Disasters, Disaster Impacts, Psychological Trauma, Trauma response: Normal response, Basic principle, Bio psychosocial model, cultural influences; Classification of Psychological Disorders: Depression, Anxiety, Post- traumatic stress disorder; Children in Disasters: Development tasks, risk factors, and childhood traumatic grief; Psychological and social support: Psychological first aid, coping strategies, and resiliency models. Community Mental health program.

DM 6709 Economics of Disaster 3 Credits

Modeling Environmental Problems; the role of economics in environmental management, Understanding the economic and financial impacts of disasters, Economic Impacts of Disasters in Bangladesh, Nature of Economic Aid after Disasters, Insurance Against Disaster Losses, Financial and economic tools, Effects of Disasters on Capital Accumulation, Economic Resilience to Disasters, Public Finance and Disasters, Economic cost of Disasters, Financing the Cost of Future Disasters, Significance of Insurance in risk reduction across developing countries, Making Disaster Risk, Reduction and Insurance Work Together. Significance of Disaster Risk Financing, Inter-regional disaster risk financing mechanisms, Fiscal disaster risk financing mechanisms at the country level, The role of public-private partnerships in disaster insurance, Cost – Benefit Analysis of Disaster Risk Financing, Risk Transfer and Finance, Risk Financing Instruments, Micro Credit in DRR, The role of private disaster insurance in disaster risk financing, Financial Arrangement for Disaster Management in Bangladesh: Prime Minister's Disaster Relief Fund, Risk Mitigation Fund, Drought Emergency Relief Assistance.