***MS in Environmental Science and Management (MESM)***

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| **Foundation Courses (6 credits)** |
| **Course Code** | **Title** | **Credits** |
| ENV 501 | Fundamentals of Environmental Science and Management | 3 |
| ENV 502 | Economics for Environmental Management | 3 |
| **Total** |  | **6** |
| **Core Courses (18 credits)** |
| **Course Code** | **Title** | **Credits** |
| ENV 602 | Resource and Ecological Economics | 3 |
| ENV 606 | Environmental and Social Impact Assessment | 3 |
| ENV 609 | Integrated Resource Management | 3 |
| ENV 627 | Pollution Control  | 3 |
| ENV 649 | Climate Change | 3 |
| ENV 652 | Geographical Information System | 3 |
| **Total**  |  | **18** |
| **Elective Courses (12 credits)-*Take any 4 courses; Thesis can substitute 2 courses*** |
| **Course Code** | **Title** | **Credits** |
| ENV 605 | Geography and Natural Disaster | 3 |
| ENV 615 | Research Methodology | 3 |
| ENV 624 | Ecological Systems and Biodiversity | 3 |
| ENV 626 | Integrated Water Resources Planning and Management  | 3 |
| ENV 629 | Waste Management | 3 |
| ENV 630 | Urban Environmental Management | 3 |
| ENV 635 | Project Development, Monitoring and Evaluation | 3 |
| ENV 685 | Water Supply and Sanitation | 3 |
| ENV 697 | Thesis | 6 |
| **Total** |  | **12** |
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| **In Total: 6+18+12** | **36** |

***Course Description***

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| **Foundation Courses (6 credits)** |
| **ENV 501** | **Fundamentals of Environmental Science and Management:** Major components of the environment, population dynamics, environmental management system, biogeochemical cycles, biosphere, lithosphere, atmosphere and hydrosphere, characteristics of ecosystems, management of forests, ranks of biodiversity, renewable and nonrenewable energy sources, concepts of waste management. 3 credits |
| **ENV 502** | **Environmental Economics:** Free market system and public policy, economic toolkits for environmental management, economic rationale for environmental regulation, economics of rural-urban relations and environmental implications, economists’ articulation of environmental problems, economic development and environmental degradation, environmental management measures, valuation of environmental damages and amenities. 3 credits |
| **Core Courses (18 credits)** |
| **ENV 602** | **Resource and Ecological Economics:** Economic and environmental resources, abiotic and biotic resources, resource availability and limits to growth, ecological economic principles, concepts of market failure and externality, theory of optimal extraction and use of nonrenewable and renewable resources, economic valuation of ecological goods and services, intertemporal equilibrium and ecological economic models in water, fisheries and forestry sectors, globalization, international trade and environmental sustainability, pollution control policies and their implications for growth, efficiency and equity. 3 credits |
| **ENV 606** | **Environmental and Social Impact Assessment:** Environmental movement, emergence and evolution of environmental impact assessment (EIA); principles of EIA, EIA process for different development projects; EIA methodologies/tools; public participation, EIA regulations in Bangladesh, social impact assessment (SIA), integration of EIA and SIA; tools and methods of SIA, strategic environmental assessment (SEA), integrated environmental assessment (IEA); writing and reviewing EIA report; case studies. 3 credits |
| **ENV 609** | **Integrated Resource Management:** Concept & Dynamics of INRM; History, evolution, and characteristics of INRM; Challenges and Issues of INRM in practice; Elements of an Integrated Resource Management Approach; Social, political, cultural, institutional, economic, and ecological dimensions of IRM; Linkages between natural and social systems: resilience, sustainability and other perspectives; Indigenous Knowledge (IK) in IRM; Significance and processes of community involvement in IRM; Developing participatory and local level planning for IRM options; Understanding research & learning in the context of IRM Process, tools and strategies; Case studies on sectoral integration: Integrated Watershed Management; Government plan and guidelines; Review of Selected NRM Policies in Bangladesh.. 3 credits |
| **ENV 627** | Pollution Control: Overview of pollution control: scientific, regulatory, fiscal and other instruments, causes and effects of water, air, soil and noise pollution, air quality standards, gaseous and particulate matter pollution control techniques, noise measurement and control, water quality standards, effluent treatment plant, solid waste management, hazardous waste management and risk analysis, case studies of pollution control strategies and regulations at national to global context. 3 credits |
| **ENV 649** | **Climate Change:** Historical perspective, science of climate change, three regimes of climate change – mitigation, impact and adaptation; impacts of climate change across sectors, regions, countries and communities; vulnerability, adaptive capacity and adaptation needs; IPCC and other perspectives, UNFCCC and Kyoto protocol, CDM, climate change policy, justice and negotiation, financing climate change. 3 credits |
| **ENV 652** | **Geographical Information Systems:** History, Concepts and Application of GIS; Introduction to Arc Catalog and Arc Map; Tabular Data and Basic Queries; Image Projection and Geo-referencing; GIS Data Entry and Management; Cartographic Representation and Map Preparation; Field Work on data acquisition, processing, manipulation, analysis and product generation using vector based GIS software; Participatory GIS and Spatial analysis; Network analysis; Remote Sensing; Image interpretation, processing and analysis; GPS and its use in GIS and remote sensing and individual GIS-RS data project. 3 credits |
| **Elective Courses (12 credits)-*Take any 4 course; Thesis can substitute 2 courses*** |
| **ENV 605** | **Geography and Natural Disaster:**  Introduction to geography, geology and physiography, natural resources and their geographic distribution, environment  and associated problems, dynamic relationships between geological, atmospheric and hydrological processes, causes and geographical distribution of natural disasters, disaster management cycle; hazard, risk, and vulnerability, coping and adaptation mechanisms, analysis of physical characteristics of natural disasters, prediction of their impact on human population; disaster risk reduction strategy; disaster, environment and development. 3 credits |
| **ENV 615** | **Research Methodology:** Research paradigm, qualitative research methods, data collection, processing analysis and interpretation, statistical tools and SPSS, social research methods – survey, interview, ethical issues in social research, quantitative environmental research: field- and/or laboratory based research, safety issues in environmental research design, modeling and simulation, techniques for disseminating research outcome: thesis, articles and presentation, writing research proposals. 3 credits |
| **ENV 624** | **Ecological System and Biodiversity:** Basics of ecology and ecosystem, energy and nutrient cycling, population regulation, community structure, ecological succession, terrestrial and aquatic biomes, human impacts on ecosystem and biodiversity, biodiversity conservation at genetic, species and ecosystem levels, roles of protected area, ecological critical area and community conserved areas, national and global conventions and protocols for biodiversity conservation and bio-safety, context of economic development, case studies of biodiversity conservation. 3 credits |

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| **ENV 626** | **Integrated Water Resources Planning and Management:** Global water availability, scope and major sub-systems of IWRM, overview of hydrology, fluid mechanics and river morphology, water resources system of Bangladesh – rainfall, rivers, wetlands and catchment’s characteristics, urban hydrology and drainage issues, water related disaster management, national policy and plans for water resources, integrated planning and management, transboundary water sharing issues and international water law, climate change and water resources. 3 credits |
| **ENV 629** | **Waste Management:** Basic principles of waste management, classification of wastes, waste production, collection, disposal and treatment design: 3Rs, thermal and biological treatment processes, engineered sanitary land filling, community based waste management: Bangladesh perspective, economics of waste management, waste to energy, context of sustainable development and protection of natural resources. 3 credits |
| **ENV 630** | Urban Environmental Management: Urban environmental management (UEM) paradigm in planning education; urbanization, urban development, and sustainable cities, meanings of urbanization and urban growth components, urbanization and economic development, demographic and economic settings of urbanization, water safety, sanitation, waste, air pollution, transportation; urban infrastructure financing and cost recovery, decentralized urban system, urban poverty and the informal sector, gender issues, environmental policy for UEM, climate change and cities. 3 credits |
| **ENV 635** | **Project Development, Monitoring and Assessment:** Knowledge areas, tools and solutions to support the planning, controlling and monitoring, resource allocation, performance measurement, project management cycle, leadership and management skills, methods for identifying the risks to cause cost overruns, delayed schedules, and failure to meet performance standards, techniques to acquire goods and services, project evaluation, understanding of national planning documents and project management challenges in Bangladesh. 3 credits |
| **ENV 685** | **Water Supply and Sanitation:** Importance of safe drinking water and improved sanitation, water safety plan, planning and design considerations for water supply and sanitation, pressure-velocity-head relationships, ground water hydrology, water demand and peak factor design flow, water treatment processes, disposal, treatment and management of human waste and wastewater, appropriate sanitation technologies for disaster prone areas, urban and rural sanitation: country situation and international test case scenarios. 3 credits |
| **ENV 697** | **Thesis.** 6 credits |