

# University of Science & Technology Meghalaya

Department of Earth Science

**M.SC. ENVIRONMENTAL SCIENCE**

**POs , PSOs, COs**

SCHOOL OF APPLIED SCIENCES



➤ **Programme Outcomes of M.Sc. Environmental Science:**

1. To generate resourceful degree holders enabled with professional and research oriented knowledge and skills so as to explore and implement in diverse fields of applicability and employability that significantly helps in the process of planning, evaluation, decision making and management of sustainable environment, sound societal development and overall nation building.
2. To prepare students to become a role player/transformer/leader/entrepreneur in multiple aspects to address the challenges of environmental problems and finding solutions to meet the sustainable dimensions at local, national, regional and global context.
3. To transfer the contemporary skilful knowledge to students to address the real life issues with strong sense of ethical values, scientific intellectuality, social responsibility and national integrity.

➤ **Programme Specific Outcomes of M.Sc. Environmental Science:**

1. Students will be able to critically investigate, evaluate and synthesize complex information on various problems of environmental and allied disciplines.
2. Students can conduct assessment and periodic monitoring of different ecosystems of the region and its complex interactions with the local communities, thereby can address the threats and can develop conservation strategies.
3. Students can investigate and analyse the wildlife and biodiversity of the region and its complex interactions with the community.
4. Students can use sophisticated tools like Geoinformatics/Geospatial Technologies for monitoring, modeling and analysis to address local environmental pollutions and natural resource management.
5. Students will be able to disseminate environmental knowledge and awareness among local mass.
6. Students will be able to pursue higher studies (M.Phil and Ph.D.) and can appear in various competitive examinations like CSIR-NET, UGC-NET, ICAR-NET, GATE, etc. through which they can join different scientific projects to build a promising career in the field of scientific research.

➤ **Course Outcomes of M.Sc. Environmental Science:**

<b>Semester I</b>		
<b>Course Code</b>	<b>Course Name</b>	<b>Course Outcomes</b>
MEV 101	Fundamentals of Ecology	<ol style="list-style-type: none"> <li>1. One objective is to give concept and understanding of ecology and environmental biology.</li> <li>2. Students will understand functions of different ecosystems.</li> <li>3. Students will be able to gain knowledge about components &amp; structure of the earth.</li> <li>4. Students will understand topics of population ecology.</li> <li>5. Students will have knowledge on origin and evolution of life.</li> </ol>
MEV 102	Environmental Chemistry	<ol style="list-style-type: none"> <li>1. This course focuses to provide theoretical and conceptual knowledge on fundamentals of environmental chemistry.</li> <li>2. Students will be able to understand the chemical composition and important reactions of air.</li> <li>3. Students will understand water chemistry.</li> <li>4. Students will know physical and chemical properties of soil.</li> <li>5. Students will know different analytical methods.</li> </ol>
MEV 103	Environmental Pollution	<ol style="list-style-type: none"> <li>1. This course will enable students to learn and understand different environmental problems at local, national and global level.</li> <li>2. Students will learn types, sources, effects, control measures and treatment processes of water, air and soil pollution</li> <li>3. Students will know emerging water pollutants.</li> <li>4. Students will know causes and impacts of radioactive pollution</li> <li>5. One objective is to impart knowledge on noise control and abatement measures.</li> </ol>
MEV 104	Statistical Techniques and Computer Applications	<ol style="list-style-type: none"> <li>1. Students will learn basic concepts of statistics</li> <li>2. Students will know different methods of statistical analysis and testing</li> <li>3. Students will know how to use statistical tools.</li> <li>4. Introduction to computer system will be easy.</li> <li>5. Students will know data communication and networking.</li> </ol>
MEV 105	Laboratory I	<ol style="list-style-type: none"> <li>1. Students will be able to do basic practicals in Ecology.</li> <li>2. Identification and population estimation in a pond ecosystem</li> <li>3. Students will be able to estimate different water</li> </ol>

		<p>quality parameters</p> <p>4. Knowledge on identification and management options of solid waste.</p> <p>5. Students will know hands on practicals on basic computer tools.</p>
<b>Semester II</b>		
<b>Course Code</b>	<b>Course Name</b>	<b>Course Outcomes</b>
MEV 201	Natural Resources and Biodiversity	<ol style="list-style-type: none"> <li>1. Students will understand different natural resources, their utilization and management strategies</li> <li>2. Students Will know conventional and non-conventional energy resources</li> <li>3. This course will provide concept and information on understanding of biodiversity, its importance, threats and conservation strategies.</li> <li>4. One objective is to make students familiar with different types of natural resources, their utilization and conservation.</li> <li>5. Students will know different conventions and policies of Biodiversity.</li> </ol>
MEV 202	Soil and Freshwater Ecology	<ol style="list-style-type: none"> <li>1. This course will provide concept and information on soil ecology. This includes knowledge about soil sciences, soil flora and fauna; and important soil processes.</li> <li>2. Students will understand soil ecosystems.</li> <li>3. Students will understand agroecosystems in India with reference to North East India</li> <li>4. Topics of freshwater ecology will be understood.</li> <li>5. The course will allow students to understand freshwater communities and ecosystems with knowledge of major river systems of the country.</li> </ol>
MEV 203	Environmental Biotechnology	<ol style="list-style-type: none"> <li>1. This course will help students to understand the development of biotechnological applications in the field of environmental science.</li> <li>2. Students will know microbial waste treatment processes.</li> <li>3. Students will understand concept, role and methods of Bioremediation.</li> <li>4. Students will know sources, half life and decay of radioactive wastes.</li> <li>5. Concept and applications of Biofuels and Environmental genomics will be understood.</li> </ol>
MEV 204	Environment and Society	<ol style="list-style-type: none"> <li>1. This course will make students able to understand</li> </ol>

		<p>the complex relationship between environment, society and economy.</p> <ol style="list-style-type: none"> <li>Students will understand role of traditional ecological knowledge in environmental conservation.</li> <li>This course provides the knowledge about the importance of environmental studies in education system</li> <li>Students will know about different environmental awareness programmes, movements, treaties and conventions.</li> <li>Students will understand environmental economics.</li> </ol>
MEV 205	Laboratory II	<ol style="list-style-type: none"> <li>This course allows students to enhance practical knowledge on Biodiversity in baseline study.</li> <li>Study of plant diversity and determination of dominant plant species in a forest ecosystem will be easy.</li> <li>Students will be able to determine different physic-chemical properties of soil.</li> <li>Study of zones of India from agroecological map and study of soil types in India will be easy.</li> <li>Students will learn practicals of environmental biotechnology.</li> </ol>
<b>Semester III</b>		
<b>Course Code</b>	<b>Course Name</b>	<b>Course Outcomes</b>
MEV 301	Research Methodology	<ol style="list-style-type: none"> <li>This course will allow students to create a basic knowledge and awareness about the nature of research process and inquiry.</li> <li>It also provides student an exposure to the methodological problems encountered and ways to deal in interdisciplinary research.</li> <li>This course will provide knowledge and foundation on different types of research options</li> <li>Students will learn sampling, data collection and data processing.</li> <li>The course will help students to know research process.</li> </ol>
MEV 302	Climate Change and Environmental Management	<ol style="list-style-type: none"> <li>This course will make students understand the phenomena of climate change</li> <li>Students will understand climate change mitigation and global responses.</li> <li>The course also provides basic concepts on understanding the process of Environmental management.</li> <li>Concept of sustainable development will be understood.</li> </ol>

		5. Environmental priorities in India for sustainable development and challenges will be understood.
MEV 303	Fundamentals of Geoinformatics	<ol style="list-style-type: none"> <li>1. This course focuses to make students learn the basic concepts of remote sensing.</li> <li>2. Students will understand Aerial Photographs and image interpretation.</li> <li>3. Students will learn principles of Geographical Information System.</li> <li>4. Principles and methodologies in Global Positioning System will be understood</li> <li>5. Students will learn Global Navigation Satellite System</li> </ol>
MEV 304 (A)	Wildlife Ecology: Wildlife Habitat and Population	<ol style="list-style-type: none"> <li>1. This course helps students to know the basic concept and information on wildlife habitat and population.</li> <li>2. It allows students to know about the wildlife of India with special reference to NE India.</li> <li>3. It will help draw the students more and more connected to the nature and wildlife and their importance in nature.</li> <li>4. Wildlife population and migration will be understood.</li> <li>5. Students will know wildlife census and conflict issues.</li> </ol>
MEV 304 (B)	Hazards and Disaster Management: Basic Concepts	<ol style="list-style-type: none"> <li>1. This course provides concepts related to hazard and disaster.</li> <li>2. Students will know disaster phenomena and events at global, national and regional levels.</li> <li>3. Students will know mechanism, causes and consequences of different geological hazards.</li> <li>4. Mechanism, causes and consequences of hydro-meteorological hazards will be understood.</li> <li>5. Students will know the contribution of human activities to the cause of various disasters.</li> </ol>
MEV 304 (C)	Geoinformatics: Principles and Techniques of Remote Sensing	<ol style="list-style-type: none"> <li>1. This course helps students to understand the principles and techniques of Remote Sensing.</li> <li>2. Students will know Digital Image Processing techniques.</li> <li>3. Students will know Digital Image classification techniques.</li> <li>4. Students will know post classification analysis.</li> <li>5. Students will know the various areas and application of remote sensing tools in solving environmental issues and crisis.</li> </ol>
MEV 304 (D)	Forest Ecology and Management: Basics of	<ol style="list-style-type: none"> <li>1. This course is aimed to provide basic concepts and principles of forest ecosystem</li> </ol>

	Forest Ecosystem	<ol style="list-style-type: none"> <li>Students will learn topics of Forest regeneration processes</li> <li>Students will know forest management.</li> <li>Students will understand forest productivity.</li> <li>Concepts, dimensions and measures of forest diversity will be understood.</li> </ol>
MEV 304 (E)	Environmental Monitoring and Management: Basic Concepts	<ol style="list-style-type: none"> <li>Students will know principles and methods of air quality monitoring.</li> <li>Water quality monitoring will be easy.</li> <li>Assessment of soil quality will be understood.</li> <li>Students will know topics of environmental toxicology.</li> <li>The course allows students to understand the hazardous and toxic substances affecting the environment and their health impacts.</li> </ol>
MEV 305	Laboratory III: Practical on Fundamentals of Geoinformatics (General)	<ol style="list-style-type: none"> <li>This course helps students to enhance capacity building in handling geoinformatics tools.</li> <li>This course makes students to understand and deal with geospatial data and identify their utility.</li> <li>Students will have knowledge on practical use of GIS tools</li> <li>Use of geoinformatics in different fields will be understood.</li> <li>Students will know use of GPS/ DGPS.</li> </ol>
MEV 306	Northeast India: Land, People and Culture	<ol style="list-style-type: none"> <li>This course intends to make students to understand the biogeography, climate, agriculture, ethnicity, linguistics, economy and politics of Northeast Region of India.</li> <li>Students will understand cultural diversity of Northeast Region of India.</li> <li>The course will also make students know the specialty and uniqueness of the NE region.</li> <li>Students will know industries and transportation of NE India</li> <li>Students will understand and have knowledge on the different environmental related problems prevailed in the region.</li> </ol>
<b>Semester IV</b>		
<b>Course Code</b>	<b>Course Name</b>	<b>Course Outcomes</b>
MEV 401	Environmental Geosciences and Meteorology	<ol style="list-style-type: none"> <li>This course is designed to make students know about concepts of geomorphology</li> <li>Students will learn concepts of geohydrology.</li> <li>Students will understand causes and mechanisms of different geological hazards.</li> <li>Students will know fundamentals of Meteorology.</li> <li>Students will understand basic topics of climatology</li> </ol>
MEV 402	Wildlife Ecology:	<ol style="list-style-type: none"> <li>To provide information on the rich wildlife</li> </ol>

(A)	Conservation and Management	<p>biodiversity in India with special reference to N.E. India.</p> <ol style="list-style-type: none"> <li>It will give detailed information and knowledge about various migratory behaviors and routes of migration of Indian wildlife.</li> <li>Knowledge on various census techniques of the wildlife in India.</li> <li>Students will know in-situ and ex-situ conservation of wild life</li> <li>Basic concept and information on wildlife threats, conservation and management strategies adopted locally, nationally and globally.</li> </ol>
MEV 402 (B)	Hazards and Disaster Management: Preparedness and Mitigation	<ol style="list-style-type: none"> <li>This course provides in-depth knowledge on various type natural and human induced disasters.</li> <li>Students can understand different tools and techniques for disaster preparedness and mitigation.</li> <li>Role of government and NGOs will be understood</li> <li>Technologies for disaster management will be known</li> <li>Information on various governmental and non-governmental organisations working on disaster management field.</li> </ol>
MEV 402 (C)	Geoinformatics: Principles and Techniques of GIS and GPS	<ol style="list-style-type: none"> <li>To teach the students the various principles of GIS and GPS technology.</li> <li>Students will learn fundamentals of Geodesy.</li> <li>Data management in Geoinformatics will be understood</li> <li>Students can understand the benefits of geoinformatics tools in environmental studies.</li> <li>Students will be provided direction to take up research on thrust areas.</li> </ol>
MEV 402 (D)	Forest Ecology and Management: Agroforestry and Forest Hydrology	<ol style="list-style-type: none"> <li>Students will understand concepts of Agroforestry system</li> <li>Students will know fundamentals of forest management</li> <li>Topics of forest hydrology will be known by students.</li> <li>Students will understand relationships between agroforestry and forest hydrology</li> <li>Students will understand hydrological processes affected by forest lands.</li> </ol>
MEV 402 (E)	Environmental Monitoring and Management: Principles	<ol style="list-style-type: none"> <li>Students will know water purification Processes in Natural Systems</li> <li>Students will understand meteorology and Natural Purification Processes</li> <li>Students will get knowledge on biological</li> </ol>



		<p>indicators in terrestrial and aquatic systems</p> <p>4. Students will know recent developments in environmental management.</p>
MEV 403 (A)	Wildlife Ecology: Wildlife Health and Wealth	<ol style="list-style-type: none"> <li>1. This course helps students to learn about wildlife behavior.</li> <li>2. Offers information on various health issues faced by Indian wildlife.</li> <li>3. Disease control mechanisms will be known</li> <li>4. To understand, in details, wildlife economy and trade related and associated with wildlife in India.</li> <li>5. To aware the students on various laws related to wildlife in India.</li> </ol>
MEV 403 (B)	Hazards and Disaster Management: Issues and Policies	<ol style="list-style-type: none"> <li>1. Students will be taught various issues related to natural hazards</li> <li>2. Students will learn man-made hazards and disaster in India.</li> <li>3. Students will learn different policies framed for disaster management.</li> <li>4. Students will learn various strategies adopted for disaster management.</li> <li>5. Students will get knowledge of different disasters occurred locally and globally.</li> </ol>
MEV 403 (C)	Geoinformatics: Applications in Major Areas	<ol style="list-style-type: none"> <li>1. This course will help students to gain knowledge on use of geoinformatics for natural resources monitoring and management</li> <li>2. Students will be able to apply geoinformatics in hazards and disaster management</li> <li>3. Students will know use of geoinformatics in planning and development</li> <li>4. Application of geoinformatics in drainage basin</li> <li>5. Application in hydrological analysis will be understood.</li> </ol>
MEV 403 (D)	Forest Ecology and Management: Economics and Regulations	<ol style="list-style-type: none"> <li>1. Students will know objectives and relationship of Silviculture with other branches of forestry</li> <li>2. Students will understand Forest Mensuration and Management</li> <li>3. Topics related to forest economics will be understood.</li> <li>4. Students will know different Forest Policies</li> <li>5. Forest Laws in India will be known</li> </ol>
MEV 403 (E)	Environmental Monitoring and Management: Analytical Methods	<ol style="list-style-type: none"> <li>1. Student will get knowledge on quantitative analysis</li> <li>2. Qualitative analysis will be understood</li> <li>3. Principles of wet-chemical and chromatographic methods of analysis will be known.</li> <li>4. Principles, Instrumentation and Applications of Spectrophotometry will be understood by students.</li> <li>5. Students will learn concepts and terminology of</li> </ol>

		error estimation in environmental sampling and analysis.
MEV 404 (A)	Laboratory IV: Practical on Wildlife Ecology	<ol style="list-style-type: none"> <li>1. This course will make students familiar with practical aspects of wildlife ecology.</li> <li>2. This course will enhance student's ability to work in field and collection of field data.</li> <li>3. Detailed information on how to process data and derive results will be known by students.</li> <li>4. Students will learn different techniques of wildlife census</li> <li>5. Students will know animal behavior, activity budgeting, nesting pattern of birds, etc.</li> </ol>
MEV 404 (B)	Laboratory IV: Practical on Hazards and Disaster Management	<ol style="list-style-type: none"> <li>1. This course will make students familiar with practical analysis and techniques of hazard and disaster management.</li> <li>2. Students will get knowledge on mapping of major crustal plates, earthquake zones</li> <li>3. Mapping of flood and landslide hazard zones will be known</li> <li>4. Understanding of risk mapping will be easy.</li> <li>5. Students will know what to do in emergency situation through mock-drill.</li> </ol>
MEV 404 (C)	Laboratory IV: Practical on Geoinformatics	<ol style="list-style-type: none"> <li>1. This course will enhance student's capacity in handling geo-informatics tools.</li> <li>2. This will help in learning on how to collect data using GIS technology</li> <li>3. This will provide knowledge on how to process data using GIS technology.</li> <li>4. Students will learn geoinformatics tools and can utilize in their project work.</li> <li>5. Practicals using GPS will be known</li> </ol>
MEV 404 (D)	Laboratory IV: Practical on Forest Ecology and Management	<ol style="list-style-type: none"> <li>1. This course will make students familiar with practical aspects of forest ecology</li> <li>2. The course will enhance student's ability to work in field</li> <li>3. Collection of forest data will be understood</li> <li>4. Students will be able to do practicals like measurement of girth increment of forest trees, reparation of herbarium, estimation of forest productivity etc.</li> <li>5. Students will know time series analysis of rainfall data.</li> </ol>
MEV 404 (E)	Laboratory IV: Practical on Environmental Monitoring and Management	<ol style="list-style-type: none"> <li>1. This course will enhance student's capacity in handling different analytical instruments</li> <li>2. This course will make students capable of particulate analysis of air samples.</li> <li>3. Physico-chemical analysis of water samples will be known.</li> <li>4. Students will be able to estimate basic soil</li> </ol>

		<p>physical properties.</p> <p>5. Estimation of soil chemical properties will be known</p>
MEV 405	Project work	<ol style="list-style-type: none"> <li>1. The course will help to think environmental aspects of any issue.</li> <li>2. This course will allow students to identify and design a research problem related to wildlife ecology / Forestry</li> <li>3. Topics related to Environmental monitoring can be identified</li> <li>4. Topics related to Hazards and disaster management will be taken for study</li> <li>5. It will help students to apply theoretical and practical knowledge to carry out a research work on local or regional topic with environmental significance.</li> <li>6. This course will allow students to utilize various tools and techniques to analyse the research problem.</li> <li>7. The course will impart training to students on how to present their research work and findings via presentation</li> <li>8. Students will learn presentation through dissertation and research papers.</li> </ol>