

Maulana Abul Kalam Azad University of Technology, West Bengal
(Formerly West Bengal University of Technology)
Syllabus for B. Tech in Computer Science & Engineering
 (Applicable from the academic session 2018-2019)

Environmental Sciences

Code: MC-401

Contacts: 1L

Name of the Course:	Environmental Sciences		
Course Code: MC-401	Semester: IV		
Duration:6 months	Maximum Marks:100		
Teaching Scheme		Examination Scheme	
Theory:1hrs./week		Mid Semester exam: 15	
Tutorial: NIL		Assignment and Quiz : 10 marks	
		Attendance : 5 marks	
Practical: NIL		End Semester Exam :70 Marks	
Credit Points:	1		
Objective:			
1	Be able to understand the natural environment and its relationships with human activities.		
2	Be able to apply the fundamental knowledge of science and engineering to assess environmental and health risk.		
3	Be able to understand environmental laws and regulations to develop guidelines and procedures for health and safety issues.		
4	Be able to solve scientific problem-solving related to air, water, noise & land pollution		
Pre-Requisite:			
1	Basic knowledge of Environmental science		

Unit	Content	Hrs/Unit	Marks/Unit
1	<p>Basic ideas of environment, basic concepts, man, society & environment, their interrelationship (1L)</p> <p>Mathematics of population growth and associated problems, Importance of population study in environmental engineering, definition of resource, types of resource, renewable, non-renewable, potentially renewable, effect of excessive use vis-à-vis population growth, Sustainable Development. (2L)</p> <p>Materials balance: Steady state conservation system, steady state system with non-conservative pollutants, step function. (1L)</p> <p>Environmental degradation: Natural environmental Hazards like Flood, earthquake, Landslide-causes, effects and control/management; Anthropogenic</p>	6	

	degradation like Acid rain-cause, effects and control. Nature and scope of Environmental Science and Engineering. (2L)		
2	<p>Elements of ecology: System, open system, closed system, definition of ecology, species, population, community, definition of ecosystem- components types and function. (1L)</p> <p>Structure and function of the following ecosystem: Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems, Mangrove ecosystem (special reference to Sundar ban); Food chain [definition and one example of each food chain], Food web.(2L)</p> <p>Biogeochemical Cycle- definition, significance, flow chart of different cycles with only elementary reaction [Oxygen, carbon, Nitrogen, Phosphate, Sulphur]. (1L)</p> <p>Biodiversity- types, importance, Endemic species, Biodiversity Hot-spot, Threats to biodiversity, Conservation of biodiversity.(2L)</p>	6	
3	<p>Atmospheric Composition: Troposphere, Stratosphere, Mesosphere, Thermosphere, Tropopause and Mesopause. (1L)</p> <p>Energy balance: Conductive and Convective heat transfer, radiation heat transfer, simple global temperature model [Earth as a black body, earth as albedo], Problems.(1L)</p> <p>Green house effects: Definition, impact of greenhouse gases on the global climate and consequently on sea water level, agriculture and marine food. Global warming and its consequence, Control of Global warming, Earth's heat budget.(1L)</p> <p>Lapse rate: Ambient lapse rate Adiabatic lapse rate, atmospheric stability, temperature inversion (radiation inversion).(2L)</p> <p>Atmospheric dispersion: Maximum mixing depth, ventilation coefficient, effective stack height, smokestack plumes and Gaussian plume model.(2L)</p> <p>Definition of pollutants and contaminants, Primary and secondary pollutants: emission standard, criteria</p>	11	

	<p>pollutant. Sources and effect of different air pollutants- Suspended particulate matter, oxides of carbon, oxides of nitrogen, oxides of sulphur, particulate, PAN. (2L)</p> <p>Smog, Photochemical smog and London smog. Depletion Ozone layer: CFC, destruction of ozone layer by CFC, impact of other green-house gases, effect of ozone modification. (1L)</p> <p>Standards and control measures: Industrial, commercial and residential air quality standard, control measure (ESP, cyclone separator, bag house, catalytic converter, scrubber (ventury), Statement with brief reference). (1L)</p>		
4.	<p>Hydrosphere, Hydrological cycle and Natural water. Pollutants of water, their origin and effects: Oxygen demanding wastes, pathogens, nutrients, Salts, thermal application, heavy metals, pesticides, volatile organic compounds. (2L)</p> <p>River/Lake/ground water pollution: River: DO, 5-day BOD test, Seeded BOD test, BOD reaction rate constants, Effect of oxygen demanding wastes on river [deoxygenation, reaeration], COD, Oil, Greases, pH. (2L)</p> <p>Lake: Eutrophication [Definition, source and effect]. (1L)</p> <p>Ground water: Aquifers, hydraulic gradient, ground water flow (Definition only)(1L)</p> <p>Standard and control: Waste water standard [BOD, COD, Oil, Grease],</p> <p>Water Treatment system [coagulation and flocculation, sedimentation and filtration, disinfection, hardness and alkalinity, softening] Waste water treatment system, primary and secondary treatments [Trickling filters, rotating biological contractor, Activated sludge, sludge treatment, oxidation ponds] tertiary treatment definition. (2L)</p> <p>Water pollution due to the toxic elements and their biochemical effects: Lead, Mercury, Cadmium, and Arsenic (1L)</p>	9	
5	Lithosphere; Internal structure of earth, rock and soil (1L)	3	

	Solid Waste: Municipal, industrial, commercial, agricultural, domestic, pathological and hazardous solid wastes; Recovery and disposal method- Open dumping, Land filling, incineration, composting, recycling. Solid waste management and control (hazardous and biomedical waste).(2L)		
6	Definition of noise, effect of noise pollution, noise classification [Transport noise, occupational noise, neighbourhood noise] (1L) Definition of noise frequency, noise pressure, noise intensity, noise threshold limit value, equivalent noise level, L_{10} (18hr Index) , $n L_d$. Noise pollution control. (1L)	3	
7	Environmental impact assessment, Environmental Audit, Environmental laws and protection act of India, Different international environmental treaty/ agreement/ protocol. (2L)	2	

Text books/ reference books:

1. M.P. Poonia & S.C. Sharma, Environmental Studies, Khanna Publishing House (AICTE Recommended Textbook – 2018)
2. Masters, G. M., “Introduction to Environmental Engineering and Science”, Prentice-Hall of India Pvt. Ltd., 1991.
3. De, A. K., “Environmental Chemistry”, New Age International

Course Outcomes:

On completion of the course students will be able to

MC-401.1 To understand the natural environment and its relationships with human activities.

MC-401.2 To apply the fundamental knowledge of science and engineering to assess environmental and health risk.

MC-401.3 To develop guidelines and procedures for health and safety issues obeying the environmental laws and regulations.

MC-401.4 Acquire skills for scientific problem-solving related to air, water, noise & land pollution.