

M. Tech. Syllabus (Environmental Engineering) for Entrance Exam

Water quality, detection and measurement of water pollution, standards, criteria, objective and goal of water quality for different uses, water quality management, modelling approaches to water quality, mathematical Models for water quality, management of water pollution, disposal of wastewater, critical water quality parameters, water quality guidelines and standards for various water uses, principles and design of aeration systems, principles of sedimentation – types of settling and settling equations, Filtration - theory of granular media filtration; Classification of filters; dual and multimedia filtration, adsorption process, disinfection. water softening, Fluoridation and Defluoridation – Principles and design. Ion Exchange-processes, Application Membrane Processes, Reverse osmosis, Ultrafiltration, Electrodialysis. corrosion and corrosion control, Physico-chemical Treatment Systems: flocculation, sedimentation, floatation, filtration, chemical unit processes, Biological unit processes: Bio kinetics, treatment and disposal of sludge. Emerging technologies for wastewater treatment and their design, Darcy's law, General hydro-dynamic equations, flow nets in isotropic and anisotropic medium, ground water recharge and run off, Sources of air pollution, air pollution measurement, effects of air pollution. air quality standards, air pollution meteorology, air pollution control equipment, noise standards, health effects of noise, basic knowledge about noise models, noise control methods, Green-House Effect, Green House Gases and their Emission Sources, Indicators of global warming, Global Warming Potential, Modelling Climate change, Ozone layer depletion and its control, Impacts of climate change – Global and India, Kyoto Protocol – Importance, Significance and its role in Climate Change, Carbon Trading - Mechanisms , Clean Development Mechanisms, Carbon Sequestration – Conventional and non-conventional techniques, Role of Countries and Citizens in Global Warming, introduction to air pollution models, application of air pollution models, stability classification, plume behaviour, dispersion parameters, emission factor, factors affecting vehicular emissions, theory of Gaussian plume model and its application, Environment and Sustainable Development - carrying capacity, relationship with quality of life, carrying capacity and resource utilization, Environmental Audit – methods, procedure, reporting and case studies, Total Quality Management in environmental management and protection – ISO 9000, 14000 and 18000 series of standards. Sources of solid waste, types of solid waste, methods of disposal of solid waste, recycle and reuse, problems in the management under Indian conditions, Ultimate disposal of solid wastes, Environmental Impact Assessment, Environmental Management Plan, Chemistry of pollution due to detergents, pesticides, polymers, trace organics, metals, mining, petroleum and radioactive compounds, basic principles of microbial transformation of organic matter. Microbial biochemistry, biodegradation, acclimatization of wastes and microbial inhibition mechanisms, Role of microbes in water and wastewater Engineering, Microbiology applied to bio scrubbers and bio filters, bioremediation.