GUJARAT TECHNOLOGICAL UNIVERSITY

M.E Semester: I

Environmental Management

Subject Name : Water and Wastewater Treatment Technologies

Sr.No	Course content
1.	Introduction: Characteristics of water & Wastewater basis of permissible limits, interpretation of analysis report of water, wastewater, sludge and soil.
2.	Quantities of water and waste water flows, water requirements for domestic and industrial purposes, wastewater formation, spectrum of particle size distribution, variation in flows and particle sizes.
3.	Theory of discrete particle settling stock's law applied to fluids , design settling tanks, efficiency of sedimentation units, types of sedimentation tanks.
4.	Coagulation – flocculation, colloids and their stability, mechanisms of destabilization, limitations, mechanical & hydraulic flocculation, coagulation agents and their recycling.
5.	Flow through process media, mechanisms of filtration dominant mechanisms for a particular size, hydraulics of filtration, filter clogging , filter washing , types of filter and their flow directions break through.
6.	Physico – chemical removal of dissolved, organics, sorption mechanisms and isotherms, estimation of sorbent requirements.
7.	Biological parameters : Biological method of analysis, parameters affecting BOD, BOD equations , methods of estimating BOD,COD procedures
8.	Treatment kinetics: Zero, first, second fractional and executive order reactions in biologic treatment, time and temperature effects.
9.	Reactor Design: Kinetics of oxic treatment CSTR and plug flow reactors , mathematical models for fixed film and suspended growth reactors, evaluation of treatment systems.
10.	Microbiology of anoxic process: Optimal anoxic environment, kinetic constants, stuck reactors, problems, high rate and multistage anoxic digesters, Concept and use of UASB , UAF and hybrid filters.

Term work:

1. Term work will comprise of assignments on the questions related to sketches and description on water and wastewater treatment, numericals on coagulation and flocculation, numericals on rapid sand filters, numericals on sedimentation, aerobic treatments of water and wastewater and its numerical, anaerobic treatment of water and waste water, numericals on quantity of sludge generation.

Reference Books:

1. Wastewater treatment, disposal and reuse: By Metcalf & Eddy
2. Introduction to Environmental Engineering: By Mackenzie
3. Environmental Engineering: By Sincero and Sincero
4. Environmental Engineering: By Peavy, Rowe and Tchobanoglous
5. Water Quality and Treatment (A handbook of community water supplies 5th edition): Published by American Water Works Association.