GUJARAT TECHNOLOGICAL UNIVERSITY

Environmental Management

M.E. Semester: IV

Subject Code: 741801

Subject Name: **Anaerobic Biotechnologies**

Sr. No.	Course Content
1.	**Anaerobic Treatment :** Fundamental concept, Application • Applications, Advantages & disadvantages of Anaerobic Treatment. • Principles of Anaerobic Treatment, Methanogenic series Metabolism, COD equivalence of Methane. • Factors affecting Anaerobic Treatment • Evaluating the applicability of Anaerobic Treatment
2.	Microbiology and Biochemistry of Anaerobic Treatment processes. • Sources of Methane in Anaerobic Treatment • Role of Acid fermentation and Methane fermentation • Characteristics
3.	Anaerobic Reactor Configuration • Anaerobic Suspended growth processes • Anaerobic Attached growth processes • Anaerobic Sludge Blanket processes
4.	Treatment of raw sewage under Tropical condition
5.	Process operation parameter • Mixing and facilities • Heating facilities
6.	**Design of Anaerobic reactors :** Detailed design of any four reactors from following:- (A) Conventional treatment units including stabilization pond, Oxidation pond, anaerobic lagoons standard rate and high rate sludge digesters. (B) High rate : Upflow Anaerobic Sludge Blanket , Upflow Anaerobic Filters, Expanded Granule Sludge Blanket, Internal Circulation, migrating blanket, biphasic anaerobic reactors
7.	Treatability Protocol Assay techniques, Biochemical Methane Potential (BMP), Anaerobic toxicity assay, Treatability Parameters, plot plant Studies

Term work:

Term work will comprise of questions, numericals and design of high rate anaerobic reactors.

Reference Books:

(1) Anaerobic Biotechnology for Industrial Wastewater by Dr. R.E. Speece ARCHAE PRESS
(2) Wastewater Engineering Treatment and Reuse by Metcalf & Eddy
(3) Design of Anaerobic Process for the Treatment of Industrial and Municipal Wastes by J. F. Malina
(4) Biological Process Design for Wastewater Treatment by Larry D Benefield, Clifford W Randall