

K L UNIVERSITY
INDUSTRIAL WASTE WATER ENGINEERING (11 - CE 432)

Pre – requisite: 11 - CE 207

SYLLABUS

Overview of Industrial Wastewater Treatment , Typical pollutants and their significance.

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Main design factors; Measurement of flow rate and key pollutants; Relevant tests; Maximum quality attainable from wastewater treatment processes. **Preliminary, Primary and secondary treatment unit processes**: Equalization; Neutralization; Flotation, Sedimentation; Coagulation and flocculation, Reverse osmosis and Ion exchange. **Biological treatment processes**: Main aerobic and anaerobic reactions; Activated sludge microorganisms; Bacterial growth curve; Biological reactors; Activated sludge reactor; Sludge growth kinetics; Sludge bulking; Sludge foaming; Trickling filters. Nitrogen and phosphorous removal. Rotating biological contractors, Anaerobic wastewater treatments and its mechanism. Upflow anaerobic sludge blanket reactor and its design principle. Adsorption: Mechanism of adsorption, Break through curve, Adsorption isotherms. **Wastewater characteristics and its effect on environments from textile**: wool, rayon, nylon, polyester and synthetic fibers industries. Pulp and paper mill waste: Manufacturing process and sources and Characteristics and treatment methodology. Corn starch waste and its treatment process. Petroleum refinery industries and various treatment methodologies. Fertilization and pesticides industries: Manufacturing process of Ammonia, Urea, Phosphoric acids, Ammonium sulphate, Pesticides, various treatment methodology associated with it. Characteristic and treatment methodology of pharmaceutical plant. Acid mine drainage conversion of coal into coke, Treatment of coke oven waste water, Blastfurnace, Cooling mills.

TEXTBOOKS:

1. Wastewater Engineering (Environmental Engineering -2) by B.C.Punmia, Ashok Kumar Jain, Arun Kumar Jain; Laxmi publications (P) LTD, Delhi.
2. Industrial Wastewater Treatment (third edition) , by A. D. Patwardhan, Published by Asoke K.Ghosh, PHI Learning private limited, New Delhi.

REFERENCE BOOKS:

1. Environmental Engineering by Howard S. Peavy, Donald R. Rowe, George Tchobanoglous McGRAW-Hill International Editions
2. Wastewater treatment (third edition) by M.N. Rao, A.K. Datta Oxford & IBH Publishing Co.PVT. LTD, New Delhi
3. Wastewater Engineering, (4th edition) byMetcalf Eddy, Tata McGRAW-Hill Publication.