

Sewage and Wastewater Treatment System - sewage characteristics, primary, secondary and tertiary treatments, efficiency measurements, and environmental pollution control. Biofilms-wastewater treatment, development and Kinetics, aerobic biofilms.

Industrial Wastewater Treatment - primary, secondary, advanced, physical, chemical and biological unit processes, aerobic, anaerobic attached and suspended growth processes, sources of heavy metal pollution. Advanced wastewater treatment - carbon adsorption, ion exchange, membrane processes and pollution control in selected process industries – tannery, textile, paper, sugar and distillery units.

Bioremediation - *in situ* and *ex situ* bioremediation, constraints, priorities and evaluating bioremediation, bioremediation of VOCs, biodegradation, factors affecting process of biodegradation - methods in determining ,contaminant availability for biodegradation, microbial interactions with inorganic pollutants, microbial metal resistance, microbial transformation, accumulation and concentration of metals, and heavy metal pollution.

TEXT BOOKS / REFERENCES:

1. Raina M. Maier, Ian L.Pepper and Charles P. Gerba, “Environmental Microbiology”, Academic Press, 2000.
2. Martin Alexander, “Biodegradation and Bioremediation”, Second Edition, Academic Press, 1999.
3. Gabriel Bitton, “Wastewater Microbiology”, Second Edition, Wiley- Liss, 1999.
 1. S. P. Mahajan, “Pollution Control in Process Industries”, Tata McGraw Hill, 2001.