EVPC3003 WASTE WATER ENGINEERING (3-0-0)

Course Objectives:

- To learn about the methods used for the treatment of wastewater biologically.
- To make the students understand modeling and design aspects of biological techniques available.

Module-I: (08 hours)

Objectives of wastewater treatment: flow variations, characteristics, analysis of BOD, COD, solids and volatile solids & their significance, BOD progression & its formulation, types of reactors and reactors analysis. Wastewater Treatment, Flow Diagrams and Hydraulic Profile. Theoretical principles and design - screens, equalization basin, grit chamber, primary and secondary settling tanks.

Module-II: (06 hours)

Kinetics of biological treatment systems: bio-kinetic constants and their determination, batch and continuous systems.

Module-III: (08 hours)

Theoretical principles and design: Suspended growth system - conventional activated sludge process and its modifications. Theoretical principles and design – attached growth system – trickling filter, bio-towers and rotating biological contactors. Principles and design of stabilization ponds

Module-IV: (08 hours)

Sludge Processing: Separation, sludge thickeners, volume reduction, conditioning and digestion – aerobic and anaerobic. Advanced Wastewater Treatment – Need and technologies used. Nitrification and Denitrification Processes, Phosphorous removal. Wastewater disinfection.

Course Outcomes:

Upon successful completion of this course, students will be able to

- The concept of a unit operation and a unit process.
- The fundamental scientific processes underlying the design and operation of wastewater treatment plant.
- The management of residuals from water and wastewater treatment.
- The methods that are used for the design of a water and wastewater treatment plant.

Books:

- Peavy, H.S., Rowe and Tchobonoglous,G., (1985), “Environmental Engineering”, McGraw Hill
- Metcalf and Eddy Inc., (2003), “Wastewater Engineering - Treatment and Reuse”, 4th Edition, Tata McGraw Hill Publishing Co. Ltd., New Delhi.
- R.J. Ranjit Daniels, J. Krishnaswamy, Environmental Studies, Wiley India publications.
- Benefield R.D., and Randal C.W., (1980), “Biological Process Design for Wastewater Treatment”, Prentice Hall, Englewood Chiffs, New Jersey.
- Karia G.L., and Christian R.A., (2001), “Wastewater Treatment Concepts and Design Approach”, Prentice Hall of India Pvt. Ltd., New Delhi.
- ` Lee C.C., and Lin S.D., (1999), “Handbook of Environmental Engineering Calculations”, McGraw Hill, New York.