

CE 512: Water Quality and Environment (3-0-0:3)

Course objectives: To comprehend basic concepts for planning and design of water resources systems and to understand different types of optimization approaches in different aspects of water resources engineering

Introduction

The composition and characteristics of natural waters. Effect of Temperature, Equilibria in water systems.

Water Quality Characteristics

Physical, Chemical and Biological Characteristics of Water. Standard methods of determination of important physical and chemical parameters of water quality, eg. pH, turbidity, electrical conductivity, total Solids, alkalinity, hardness etc., Units of measurements and expression of results, Bacteriological Indicators, and determination of Coliforms

Concepts in Organic and Biochemical Methods

Biochemical cycles of C, N, P and S, Trace Organics, Detergents, Pesticides, Fertilisers, etc.

Water Quality Representation and Standards

Water Quality Criteria, Guidelines, and Standards for Various uses.

Water Pollution

Natural factors affecting water quality and pollution from various wastes, mechanisms of surface water pollution, point and Non-point sources, Effect of Geological formations on Water quality.

Water Quality in Receiving Water Bodies

Lakes and Impoundments, Stratification and Eutrophication, Water Quality in Rivers, self purification and Reaeration, Dissolved Oxygen Balance in Rivers, Thermal Pollutions.

Ground Water Quality

Sources and Mechanisms of Groundwater Pollution. Groundwater Pollution from Landfills and Waste Dumps.

Text Books and References:

1. Canter, L. W., "*Environmental Impact Assessment*", McGraw-Hill
2. Peavy, H. S., Rowe, D.R. and Tchobanoglous, G., "*Environmental Engineering*", McGraw-Hill
3. Tchobanoglous, G. and Schroeder, E. D., "*Water Quality: Characteristics, Modeling and Modification*", Addison-Wesley Reading, MA
4. Sawyer, C.N. and McCarty, P. L., "*Chemistry for Environmental Engineers*", McGraw-Hill.
5. Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WPCF, Washington, D.C.

Expected outcome: The student shall get an understanding of the engineering of water resource systems in general and also obtain skills for mathematical modelling of both natural and engineered water resource systems that are used to analyze system components.