



Course Name:

Water Quality Management

Course Number: 20-646	Credit: 3
Program: Graduate	Course Type: Technical Selective
Prerequisite: Hydrology, Fluid Mechanics, Environmental Engineering	Corequisite: -

Course Description (Objectives):

This course generally focuses on topics related to the quality management of surface water resources and water quality analysis. It covers areas such as understanding analytical frameworks like TMDL, setting water quality standards and criteria, examining pollutant dispersion and their impacts on water resources, presenting basic models for reactive and non-reactive pollutants, analyzing water quality indicators in dams and lakes, and assessing the quality of surface water resources on a watershed scale.

Course Content (outline):

- Chapter 1: Understanding the concept of water quality management, quality indicators, and beneficial uses of water resources
- Chapter 2: Reactions, reaction rates, and hydraulic performance of reactors
- Chapter 3: Salinity routing, the relationship between quality and quantity
- Chapter 4: Pollutant dispersion in aquatic and natural environments
- Chapter 5: Changes in dissolved oxygen in rivers
- Chapter 6: Simulating temperature changes in rivers
- Chapter 7: Simulating water quality changes in estuaries
- Chapter 8: Simulating thermal stratification in reservoirs and lakes
- Chapter 9: Changes in dissolved oxygen in reservoirs and lakes
- Chapter 10: Eutrophication and its management in reservoirs and lakes
- Chapter 11: Application of quality models at the watershed scale to simulate the movement and transfer of major pollutants such as nitrogen, phosphorus, bacteria, and sediment (in rivers and reservoirs)
- Chapter 12: Determining the environmental requirements of rivers and wetlands
- Chapter 13: Application of satellite images in the assessment and quality of water resources
- Chapter 14: Agricultural water quality management, salinity, and salt balance



References:

- Krenkel, P.A. and V. Novotny (1980). Water Quality Management. Academic Press.
- Orlob, G.T. (1983). Mathematical Modeling of Water Quality: Streams, Lakes, and Reservoirs. John Wiley & Son.
- Chapman, D. editor (1992). Water Quality Assessments. ITP Publishing Co.
- Chapra, H (1998). Surface Water Quality Modelling. McGraw-Hill Book Co. N.Y.
- Wetzel, R.G. (2001). Limnology. Lake and River Ecosystems, 3rd. edition, Academic Press
- Biswas, A.A., "Models for Water Quality Management", McGraw-Hill Book, 1981.
- James, A., "An Introduction to Water Quality Modelling", A Wiley Interscience, 1984.