Department of Civil Engineering

Course Name:

Surface Water Quality Modeling

Course Number: 20026	**Credit:** 3
Program: Undergraduate	**Course Type:** Technical elective
Prerequisite: Numerical Analysis in Civil Engineering	**Corequisite:** Environmental Engineering

Course Description (Objectives):
The objective of this course is to understand the complex interactions of physical, chemical, and biological processes involved in water quality problems in different water bodies. The course will expose the students to a mix of field methods of data collection as well as theoretical and numerical modeling of environmental systems.

Course Content (outline):

- Review of numerical analysis using MATLAB
- Review of reaction Kinetics
- Mass balance in well-mixed systems
- Diffusion and mixing
- Water-quality modeling in natural waters: rivers and streams, estuaries, and lakes
- Sediments transport
- BOD and Oxygen modeling
- Biological modeling: Nutrients-Phytoplankton-Zooplankton models
- Eutrophication and stratification modeling
- Modeling pathogen dynamics

References:

- "Surface water quality modeling", S.C. Chapra, Waveland Press, Long Grove, IL (2008).