

## **457.560 Advanced Environmental Hydraulics**

### **I. River Mixing Theory**

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#### **Description:**

This course deals with the analysis and prediction of the mixing and transport phenomena of various pollutants introduced into water environmental system. In the course, fundamental theory and analytical methods for the diffusion and dispersion of the substance are discussed. In the latter part of the course, mixing characteristics and practical problems in real streams and estuaries are covered. Numerical modeling techniques of hydrodynamics and solute transport in rivers and estuaries are also treated.

#### **Text:**

1. Fischer, et al., 1979, Mixing in Inland and Coastal Waters, Academic Press, New York, N.Y.

#### **Reference:**

1. Crank, J., 1975, The Mathematics of Diffusion, 2nd Ed., Oxford Science.
2. Fischer, H.B. ed., 1979, Transport Models for Inland and Coastal Waters, Academic Press, New York, N.Y.
3. Thomann, R.V. and Mueller, J.A., 1987, Principles of Surface Water Quality Modeling & Control, Harper & Row.
4. Rutherford, J.C., 1994, River Mixing, John Wiley & Sons.

#### **Prerequisites:**

Hydraulics and Lab., Fluid Dynamics

#### **Contents:**

1. Introduction to Environmental Hydraulics
2. Diffusion Process and Solutions
3. Turbulent Transport

4. Dispersion Process
5. Mixing in Rivers
6. Dispersion of Decaying Substances
7. Mixing in Estuaries
8. Numerical Modeling

**Grade:**

Homework Assignments	30%
Final Exam.	40%
Term Project	30%