

# CE 3030 Water Resources Engineering

Credit: 3 1 0 4

August – November 2018

## Instructor:

Dr. Subhasis Mitra.  
Email: smitra@iitpkd.ac.in

## Course Outline:

Introduction: Hydrologic Cycle, Precipitation: forms, classification, variability, measurement, data analysis.

Evapotranspiration: Penman-Monteith and other methods.

Infiltration: factors affecting, estimation by NRCS, Green-Ampt methods.

Runoff: drainage basin characteristics, hydrograph; concepts, assumptions and limitations of unit hydrograph, derivation of unit hydrograph, flow duration curve, rainfall-runoff modeling.

Hydrologic Analysis and Design: design flood estimation, frequency analysis, flood routing, storm drainage design

Dams: types, forces, failure types and causes; design of gravity dams.

Reservoirs: safe yield, capacity design, reliability, design of overflow spillway,

Role of economics in water resources planning, multipurpose projects, issues in water resources planning and development, systems techniques, risk analysis.

Hydroelectric Power: low, medium and high head plants, powerhouse components, micro-hydel

Flood management: flood mitigation, flood damage analysis

Irrigation: Irrigation water requirement computation, diversion structures, cross drainage structures, regulation structures, field irrigation methods.

Groundwater: occurrence, hydraulics of wells, yield, artificial recharge.

## Text Book:

Mays, L. W. (2004). Water Resources Engineering. John Wiley & Sons, Inc., Kundli.

## Reference:

1. Chow, V. T., Maidment, D. R., and Mays L. W. (1988). Applied Hydrology. McGraw-Hill Inc., New York.
2. James, L. D., and Lee, R. R. (1971). Economics of water resources planning. McGraw-Hill Book Inc., New York.
3. Garg, S. K. (1991). Irrigation Engineering and Hydraulic Structures. Khanna Publishers, Delhi.

**Learning outcomes:**

In this course the students will:

1. Learn to describe the fundamental concepts of hydrology
2. Understand various methods of hydrologic analysis
3. Apply various hydrologic analysis methods to design storm water drains, dams, irrigation and diversion structures

**Grading Policy:**

The final grade for this course will be weighted based on the pattern given below:

Quiz-I	15%
Quiz-II	20%
Tutorials and Projects	15%
Final Exam	50%

**Attendance:** As per institute norms 100% attendance in the course is expected. Due to the unlikely event of minor illness and/or participation in other activities a minimum attendance of 85% would be strictly enforced. Unless otherwise due to a prolonged illness and/or hospitalisation, students with less than 85% attendance would be assigned 'W' grade in the subject. A minimum score of 40% overall would be required for a pass in the course.

Best Wishes to all of you for a wonderful semester!!