

Course	CE 41800 – Hydraulics Engineering
Type of Course	Required for Civil Engineering Program
Catalog Description	Sources and distribution of water in urban environment, including surface reservoir requirements, utilization of groundwater, and distribution systems. Analysis of sewer systems and drainage courses for the disposal of both wastewater and storm water. Pumps and lift stations. Urban planning and storm drainage practice.
Credits	3
Contact Hours	3
Prerequisite Courses	CE 31800 – Fluid Mechanics
Corequisite Courses	None
Prerequisites by Topics	None
Textbook and Other Supplemental Materials	Larry Mays, <i>Water Resources Engineering</i> , John Wiley Publishing Company, 2010.
Course Objectives	Students will understand and be able to apply fundamental concepts and techniques of hydraulics and hydrology in the analysis, design, and operation of water resources systems.
Course Outcomes	Students who successfully complete this course will be able to: <ol style="list-style-type: none">1. Become familiar with different water resources terminology like hydrology, ground water, hydraulics of pipelines and open channel. [1]2. Understand and be able to use the energy and momentum equations. [1]3. Analyze flow in closed pipes, and design and selection of pipes including sizes. [1,2]4. Understand pumps classification and be able to develop a system curve used in pump selection. [1,2]5. Design and select pumps (single or multiple) for different hydraulic applications. [1,2]

[Type here]

6. Become familiar with open channel cross sections, hydrostatic pressure distribution and Manning's law. [1]
7. Determine water surface profiles for gradually varied flow in open channels. [1]
8. Familiar with drainage systems and wastewater sources and flow rates. [1]
9. Analyze and design a sanitary sewer system using modern engineering software. [1,2]
10. Understand precipitation processes, spatial and temporal distribution of rainfall, and conduct data analysis. [1,6]
11. Understand factors affecting runoff, rational method, SCS Curve Number Method, and hydrographs. [1]
12. Familiar with storm water storage facilities and able to compute storage volumes. [1,2]
13. Understand routing process and conduct reservoir routing by Puls method. [1,2]
14. Identify and use modern computer software to analyze and design different water and wastewater systems. [2,7]
15. Familiar with contemporary issues related to water resources. [4,7]

Lecture Topics

1. Introduction of Hydraulics and Water Resources
2. Hydraulic Processes: Flow and Hydrostatic Forces
3. Pressurized Pipe Flow
4. Pumping System
5. Open Channel Flow (I)
6. Open Channel Flow (II)
7. Storm Water and Flood Control
8. Hydrologic Processes (I)
9. Hydrologic Processes (II)
10. Ground Water Flow
11. Selected Contemporary Water Resource Issues

Computer Usage

High

Laboratory Experience

None

Design Experience

High

Coordinator

Dong Chen, Ph.D., P.E.

Date

16 July 2018