

CEE 3420 HYDRAULICS

Required Course

Catalog Description:

CEE 3420 - Hydraulics (Lec. 3. Credit 3.)

Prerequisite: ME 3720. Fundamental principles and design of water and wastewater supply, stormwater and sanitary sewer systems and their components, including pipes, pumps, storage facilities, detention basins, open-channels, and culverts.

Math & Basic Sciences:	0 Credits	Course Coordinator:	Alfred J. Kalyanapu
Engineering Topics:	3 Credits	Contains Significant Design:	Yes
General Education:	0 Credits	Updated:	09/12/2013
Other:	0 Credits	Specify Type if Other:	

Text Book(s) and Supplemental Material(s):

Chin, A. D. (2013). *Water Resources Engineering*. Third Edition. Pearson Prentice Hall™., Upper Saddle River, New Jersey, ISBN: 9780132833219

Young, D.F., Munson, B. R., and Okiishi, T. H. *A Brief Introduction to Fluid Mechanics*. Third Edition, John Wiley & Sons, Inc., Hoboken, NJ. ISBN: 0471457574

Course Goal(s):

The goal of this course is to introduce students to the fundamental principles of hydraulics and to provide you with the basic knowledge and tools necessary to accurately analyze and design civil engineering hydraulic systems (e.g., water distribution, wastewater/stormwater collection, and pumping applications).

Instructional Outcomes for the Course:

Students will be expected to:

1. Analyze and design closed-conduit hydraulic systems including pipes, valves, fittings, and pumps.
2. Analyze open channel hydraulic systems operating under uniform and varied flow conditions.
3. Design culverts.
4. Design stormwater detention basins.
5. Design storm and sanitary sewer systems.
6. Interpret hydraulic design requirements, consider alternative designs, justify design choices, and critique hydraulic designs.

Criterion 3 Student Outcomes addressed by this Course:

- a) An ability to apply knowledge of mathematics, science, and engineering (Level 3)
- c) An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability (Level 4)
- e) An ability to identify, formulate, and solve engineering problems (Level 3)
- k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice (Level 3)

Program Criteria addressed by this Course:

- Apply knowledge of mathematics through differential equations, calculus-based physics, chemistry, and at least one additional area of basic science, consistent with the program educational objectives (Level 3)
- Conduct civil engineering experiments and analyze and interpret the resulting data (Level 3)
- Design a system, component, or process in more than one civil engineering context (Level 4)

Course Topics:

1. Introduction and Fluid Mechanics Review (2%)
2. Continuity Equation (2%)
3. Bernoulli Equation and General Energy Equation (10%)
4. Linear Momentum (6%)
5. Viscous Flows and Losses in Pipes (8%)
6. Pipeline Systems (11%)
7. Computer Modeling (11%)
8. Pumps, Selection and Operation (18%)
9. Open Channel Flow - Introduction and Flow Classification (14%)
10. Culverts (10%)
11. Stormwater System Design (8%)

Additional Topics/Assignments for dual-level (4000/5000) courses:

N/A