

1. CEE 3420 - Hydraulics
2. Course credit hours: 3  
Contact hours per week: 3  
Credit category: Engineering Topics (Significant Design)
3. Course coordinator: Alfred J. Kalyanapu
4. Textbook: Chin, A. D. (2013). Water Resources Engineering. Third Edition. Pearson Prentice Hall™, Upper Saddle River, New Jersey, ISBN: 9780132833219

Supplemental materials: 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

5. Course information:

2020 Catalog description	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.
Prerequisite(s)	ME 3720
Course type	Required

6. Course instructional outcomes:

Course Outcome No.	Course Outcome (CO)	ABET Student Outcome
CO1	Analyze and design closed-conduit hydraulic systems including pipes, valves, fittings, and pumps	1, 2
CO2	Analyze open channel hydraulic systems operating under uniform and varied flow conditions	1, 2
CO3	Design culverts	1, 2
CO4	Design stormwater detention basins	1, 2
CO5	Design storm and sanitary sewer systems	1, 2
CO6	Interpret hydraulic design requirements, consider alternative designs, justify design choices, and critique hydraulic designs	1, 2

ABET criterion 3 Student Outcomes addressed by this course:

SO No.	Student Outcome (SO)
3.1	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science and mathematics
3.2	An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, well as global, cultural, social, environmental, and economic factors

7. 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%)

Program criteria (curriculum) addressed by this course:

1. Apply knowledge of mathematics through differential equations, calculus-based physics, chemistry, and at least one additional area of basic science
  2. Conduct experiments in at least two technical areas of civil engineering and analyze and interpret the resulting data
  3. Design a system, component, or process in at least two civil engineering contexts
8. Additional topics, assignments, or requirements for dual-level (4000/5000) course:  
N/A
  9. Date: 01/14/2020