1. CEE 4440 (5440) – Water Resources Engineering

2. Course credit hours: 3
   Contact hours per week: 3
   Credit category: Engineering Topics (Significant Design)

3. Course coordinator: Julia B. Avera

4. Textbook: Chin, David A.; Water-Resources Engineering, Second Edition, Pearson Prentice Hall, Upper Saddle River, New Jersey (2006).

5. Course information:

2020 Catalog description	Problems related to the planning and design of systems to manage water resources for flood-damage reduction, hydropower and river navigation.
Prerequisite(s)	CEE 3420 or consent of instructor
Course type	Selected Elective

6. Course instructional outcomes:

Course Outcome No.	Course Outcome (CO)	ABET Student Outcome
CO1	Illustrate floodplain management through land use controls and reclamation of wetlands	1, 4
CO2	Apply the U.S. Army Corps of Engineers Hydraulic Engineering Center's River Analysis System (HEC-RAS) software	1
CO3	Analyze aquifers as feasible sustainable water supply sources	1
CO4	Design water supply wells and relate the design to the construction of water supply wells	2, 4
CO5	Analyze streams/rivers and lakes/reservoirs as feasible sustainable water supply sources	1
CO6	Illustrate proper management of streams/rivers as sustainable sources of water supply and recreation	1, 4
CO7	Illustrate proper management of lakes/reservoirs as sustainable sources of water supply, recreation and for the purpose of flood control	1, 4
CO8	Demonstrate the proper design of water supply intakes on streams/rivers and lakes/reservoirs	1
CO9	Relate projected potential effects of climate modification on water resources	4

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, as well as global, cultural, social, environmental, and economic factors
3.4	An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgements, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts

7. Course topics:
   1. General introduction (1 class)
   2. Floodplain management (2 classes)
   3. Use of HEC-RAS software (3 classes)
   4. Evaluation of aquifers as sustainable water supplies (3 classes)
   5. Design, construction and testing of water supply wells (3 classes)
   6. Evaluation of steams/rivers as sustainable water supplies (3 classes)
   7. Management of streams/rivers (2 class)
   8. Evaluation of lakes/reservoirs as sustainable water supplies (3 classes)
   9. Management of lakes/reservoirs (2 classes)
   10. Integrated management of water resources (1 class)
   11. Design of water supply intakes (2 class)
   12. Projected potential effects of climate modification on water resources (2 classes)
   13. Testing and assessment (3 classes)

   Program criteria (curriculum) addressed by this course:
   1. Apply knowledge of mathematics through differential equations, calculus-based physics, chemistry and at least additional area of basic science
   2. Analyze and solve problems in at least four technical areas appropriate to civil engineering
   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:
   Graduate students will prepare and give a 45 minute presentation over a given topic related to water resources engineering.

9. Date: 01/24/2020