Code and Name: CE 445 – Water Resources Management
Credit Hours: 3 (Lecture: 3, Tutorial: 1)

Textbook:
- Water Resources Engineering: Chin, D.A., 3rd Edition, Pearson, 2013.
Other References:
- *Water Resource Systems Planning and Management: An Introduction to Methods, Models and Applications. Loucks, D. P. and M. van Beek., UNESCO, 2005.*
- *Water Resources System Analysis, - Karamouz, M., Szidarovszky, F. and Zahraie, B., CRC Press 2003.*
- *Course handouts: distributed on a regular basis to provide more information on the topic.*

Course Description:
The aim of the course is to study how to properly manage the available limited water resources. The course sheds light on: Reservoirs, dams, and reservoir basins. Hydro- power generation. Flood estimation, routing and control. Engineering economy in water resources planning. Introduction to system engineering in water resources. Topics in arid and semi-arid region water resources. Desertification water conservation techniques, reuse of water, remote sensing and arid water resources. Linear/nonlinear and dynamic programming and its applications in water resources.

Pre-requisites: CE340 Water Resources Engineering
Co-requisites: None

Course Learning Outcomes:
With relation to ABET Student Outcomes (From Fall 2019-SOs: 1-7)
1. Apply economic theory and environmental constraints to analyze issues of water resource management (4);
2. Design and optimize a water resources system using linear programming graphically and via Excel (2);
3. Conduct model-based analysis of integrated water resource systems (1);
4. Using HecResSim package to carryout reservoir operation (1);
5. Apply remote sensing techniques in different problems related to water resources applications (1);
6. Build water resources models that simulate river basin processes (1);
7. Develop and analyze models for catchment-river-reservoir systems (2);

Topics to be covered:
- Introduction to Water Resources and the Integrated Water Resources Management.
- Introduction to System Engineering in Water Resources and Linear Programming and its Applications in Water Resources.
- Introduction to the Reservoir System Simulation.
- Introduction to hydropower and reservoir operation.
- Water laws and engineering economy in water resources planning.
- Introduction to Remote Sensing in Water Resources.
- Special topics for arid and semi-arid environs: Flood, Drought and Desertification Control
- Best management practices and various methods to mitigate adverse hydrological impacts of urbanizations,
- Introduction to software packages: HEC-ResSim, QGIS(+SCP plugin), Lingo and Excel solver.

Grading Policy:
The grading for the course is: 60% coursework and 40% Final Exam. The course work consists of two Midterm Exams, where each midterm exam is worth 20%. It also includes 2 to 3 quizzes for the remaining 20% that is modified by the course instructor.