

Tennessee Technological University
Department of Civil & Environmental Engineering
CEE 4440(5440) Water Resources Engineering
Elective
Spring Semester 2008

2007 Catalog Data: CEE 4440(5440): Water Resources Engineering. Lecture 3. Credit 3. Problems related to the planning and design of systems to manage water resources for flood-damage reduction, hydropower and river navigation.. Prerequisite: CEE 3420 or consent of instructor.

Textbook: Linsley et al., Water-Resources Engineering, McGraw-Hill, Inc., New York, 4th edition, 1992.

Reference: None

Coordinator: V. S. Neary, Associate Professor of Civil & Environmental Engineering

Goals: Students will learn aspects of planning and design of systems to manage water resources such as flood-damage reduction, hydropower, and river navigation (water systems not covered in CEE 3420). It treats important aspects involved in planning these systems (probability concepts, water law, engineering economy and simulation modeling).

Course Learning Objectives:

Students will be expected to:

1. develop a working knowledge of hydrology and hydraulics methods for technical analysis of structural and non-structural components of a river-reservoir systems;
2. develop a working knowledge of economic analyses applied to water resource engineering problems;
3. develop a working knowledge of water law;
4. develop a working knowledge of water resources planning; and
5. develop a working knowledge of simulation modeling

Course Measurable Outcomes:

Students will be expected to:

1. develop a working knowledge of hydrology and hydraulics methods for technical analysis of structural and non-structural components of a river-reservoir systems;
2. develop a working knowledge of economic analyses applied to water resource engineering problems;
3. develop a working knowledge of water law;
4. develop a working knowledge of water resources planning; and
5. develop a working knowledge of simulation modeling.

Topics covered: (Three lecture classes per week, 55 minutes each)

1. Planning for Water Resources Development (3 classes)
2. Probability Concepts in WRE Planning (3 classes)
3. Water Law (3 classes)
4. Engineering Economy in WRE Planning (3 classes)
5. Simulation Modeling of River-Reservoir Systems (5 classes)
6. Reservoirs (7 classes)
7. Hydroelectric Power (5 classes)
8. River Navigation (5 classes)
9. Flood-Damage Mitigation (5 classes)
10. Tests (3 classes)

Contribution of the course to meeting professional component:

This course is a part of the engineering topics component of the curriculum to include one hour of engineering design (45%).

ABET category content as estimated by faculty member who prepared this course description:

Engineering science: 1 credits or 33%

Engineering design: 2 credits or 67%

Relation of course to program outcomes:

- Outcome 1: The graduates will have a broad understanding of the relevant principles of mathematics, science, and engineering.
- Outcome 2: The graduates will have a general comprehension of four technical areas appropriate to civil engineering.
- Outcome 4: The graduates will be capable of design activities and have the ability to identify, formulate, and solve civil engineering problems.
- Outcome 8: The graduates will have the ability to use techniques, skills, and modern engineering tools needed for engineering practice.
- Outcome 11: The graduates will have an understanding of the importance of fundamental and applied research in the advancement of engineering knowledge.

Relation of course to ABET Criteria:

General Criteria

Bloom's Level of Achievement

- | | |
|--|---|
| (3a) Knowledge of math, science, engineering | 3 |
| (3c) Design a system, component, process | 4 |
| (3e) Identify, formulate, and solve engineering problems | 3 |
| (3k) Techniques, skills, modern tools for engineering practice | 3 |

Program Criteria

Bloom's Level of Achievement

- | | |
|--|---|
| 1. Apply knowledge of math and sciences | 3 |
| 2. Apply knowledge of four technical areas appropriate to civil engineering | 3 |
| 3. Design a system, component, or process in more than one civil engineering context | 4 |

Computer usage: Homework assignments will require use of Microsoft Excel

Laboratory projects: None

Prepared by: V. S. Neary

Date: September 27, 2007