

**2008-2010 Catalog Data:**

ABEN 464/664. Resource Conservation and Irrigation Engineering. 4 cr. Engineering principles and design of systems for soil and water resource management and environmental protection. 3 lectures, 1 three-hour laboratory. Prereq: CE 309. S.

**Times and Days:**

10:00 to 10:50 a.m. on Mondays, Wednesdays, and Fridays.  
2:00 to 4:50 p.m. on Wednesdays.

**Place:**

ABEN 208.

**Instructor:**

Dr. Dean Steele  
113 ABEN Building  
Phone 701-231-7268  
[Dean.Steele@ndsu.edu](mailto:Dean.Steele@ndsu.edu)

**Office hours:**

11:00 a.m. to 12:00 p.m. on Mondays and Fridays or by appointment.

**Text:**

Fangmeier, D.D., W.J. Elliott, S.R. Workman, R. L. Huffman, and G.O. Schwab. 2006. *Soil and Water Conservation Engineering*, 5<sup>th</sup> Ed. Boston: CENGAGE Delmar Learning. ISBN 1-4108-9749-5.  
[http://www.delmarlearning.com/Browse\\_CatalogDetail\\_Print.aspx?xxID=19083&isbn=1401897495](http://www.delmarlearning.com/Browse_CatalogDetail_Print.aspx?xxID=19083&isbn=1401897495)

**Materials:**

Internet access and an E-mail account, data storage devices, folders or notebooks for handouts, and a calculator.

**Prerequisites:**

CE 309, Fluid Mechanics.

**Topics:**

Chapter titles from the text are: conservation and the environment, water quality, precipitation, evaporation and evapotranspiration, infiltration and runoff, open channel flow, soil erosion by water, terraces and vegetated waterways, water and sediment control structures, channel stabilization and restoration, water supply, wetlands, drainage principles and surface drainage, water table management, irrigation principles, surface irrigation, sprinkler irrigation, microirrigation, pumps and pumping, and soil erosion by wind. Refer to the attached schedule for more details.

See also the tentative schedule.

**Objectives:**

After completing this course, students should be able to:

1. Understand principles of hydrology; soil, water, and plant relationships; erosion control; and irrigation [Educational Objective 3 (see below)].
2. Design structures and systems for water conveyance and control, natural resource management, and irrigation [Educational Objective 1; Outcomes c, e, and k].
3. Apply knowledge of mathematics, science, and engineering; analyze and interpret data; use computer software and other engineering tools, develop clear and concise documentation of engineering work; function in teams; and understand professional and ethical responsibility [Educational Objective 1; Outcomes a, b, d, f, and g].

**ABEN Department Educational Objectives for ABET:**

Educational Objective 1: Graduates will become engineers with the ability to use their technical knowledge, design, and problem solving skills throughout their careers.

Educational Objective 2: Graduates will become engineers who have interpersonal and collaborative skills and the capacity for productive careers.

Educational Objective 3: Graduates will become engineers who can use their disciplinary knowledge, educational depth, and breadth to deal with changing career opportunities in agricultural and closely related biological industries.

**ABEN Department Program Outcomes for ABET:**

- a. An ability to apply knowledge of mathematics, science, and engineering.
- b. An ability to design and conduct experiments, as well as to analyze and interpret data.
- 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.
- d. An ability to function on multidisciplinary teams.
- e. An ability to identify, formulate, and solve engineering problems.
- f. An understanding of professional and ethical responsibility.
- g. An ability to communicate effectively.
- h. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
- i. A recognition of the need for, and an ability to engage in life-long learning.
- j. A knowledge of contemporary issues.
- k. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

**Computer Usage:**

Students will be required to use computers for some reading, homework, and/or lab assignments. Blackboard will be used in the course.

**Laboratory Projects:**

Laboratory sessions will involve field trips, work in on-campus laboratories, work in computer clusters, and/or work in the classroom. Plan to meet in ABEN 208 unless other notice is given. Students must sign and submit a release form for lab/shop use and for field trips or credit will not be given for the course. See the Course Information area of Blackboard for more information.

Last update: 9/28/2009.