

2006-2008 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.

Time: 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 231-7268, Dean.Steele@ndsu.edu.

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

Class Numbers: ABEN 464: 10045. ABEN 664: 10047.

Text: Schwab, G.O., D.D. Fangmeier, W.J. Elliott, and R.K. Frevert. 1993. *Soil and Water Conservation Engineering*, 4th Ed. New York: John Wiley & Sons, Inc. ISBN 0-471-57490-2.

Materials: Internet access and an E-mail account, data storage devices, and a calculator.

Prerequisites:

1. CE 309, Fluid Mechanics.

Topics: (Refer to the tentative schedule for details.)

Computer Usage:

Students will use computers for some homework and/or lab assignments.

Laboratory Projects:

Laboratory sessions may 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 field trips.

Miscellaneous:

Any students with disabilities or other special needs, who need accommodations in this course are invited to share these concerns or requests with the instructor as soon as possible.

All work in this course must be completed in a manner consistent with NDSU University Senate Policy, Section 355: Code of Academic Responsibility and Conduct, available at <http://www.ndsu.nodak.edu/policy/335.htm>.

Objectives: After completing this course, students should be able to:

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

ABEN Department Educational Objectives and Program Outcomes for ABET:

Educational Objective 1: Provide students with technical knowledge, design, and problem solving skills that are foundational to their engineering careers by ensuring that graduates have ability to:

- a. Apply knowledge of mathematics, science, and engineering.
- b. Design and conduct experiments, as well as to analyze and interpret data.
- c. 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.
- e. Identify, formulate, and solve engineering problems.
- k. Use techniques, skills, and modern engineering tools necessary for engineering practice.

Educational Objective 2: Provide learning experiences that build interpersonal and collaborative skills and the capacity for productive careers by ensuring that graduates have:

- d. An ability to function on multi-disciplinary teams.
- f. An understanding of professional and ethical responsibility.
- g. An ability to communicate effectively.

Educational Objective 3: Provide students with specialized (discipline-specific) knowledge, educational depth, and breadth to meet the challenges of changing careers and opportunities in agricultural and closely related biological industries by ensuring that graduates have competencies in one or more of the following areas:

- 1(iii) Apply engineering skills to environmental systems.

Grading:

Undergraduate students will have the following four categories of work in the course: homework assignments, lab reports or problem sets, tests, and a comprehensive final examination. The relative weighting of these work categories is shown in the table below. Each student's final grade in the course will be determined by a grade percentage ranging from 0 to 100%. The weighted grade percentage will be computed as follows: 1) divide the total points earned in each work category by the total points possible for that work category, 2) multiply the numbers from step (1) by the weight percentages for each respective work category, and 3) add the results. The weighted grade percentage will be converted to a letter grade using the following straight grading scale: $90 \leq A \leq 100\%$, $80 \leq B < 90\%$, $70 \leq C < 80\%$, $60 \leq D < 70\%$, and $0\% \leq F < 60\%$. The scale may be lower, but will not be higher.

Work Category	Weighted Percentage of Total Grade	
	Undergraduate Students	Graduate Students
Homework	25%	15%
Lab Reports and Problem Sets	25%	15%
Tests	30%	30%
Final Exam (comprehensive)	20%	20%
Project & Oral Presentation	0%	20%
Total	100%	100%

Due dates for homework and laboratory reports or problem sets will be given with the assignments. Late work will be accepted with a 10% penalty per NDSU class day. Work must be submitted before 5 p.m. to be credited to the day it is received.

Missed tests will receive zero points unless missed for an acceptable reason, such as medical or family emergencies or co-curricular activities. If possible, let the instructor know in advance of any absences which will affect your attendance at exams and quizzes. Extracurricular activities, vacations, hunting and fishing trips, work, etc. are not acceptable reasons for missing the scheduled dates and times for tests. If you miss class, handouts will be provided upon your return if requested; you are responsible for obtaining notes from a classmate. Attendance will be taken at laboratory sessions and factored into that portion of the grade.

Graduate students will be required to complete a project and make an oral presentation to the class, in addition to the regular requirements of the course. The project will consist of an engineering design or a term paper on a topic related to the class. Each project will be subject to approval from the instructor to ensure appropriate scope and content. The project and presentation will count for 20% of the grade for graduate students. The weight percentages for each work category are listed in the table above and the grade computation will follow the same procedure as that for undergraduate students.