

2018-2019 Catalog Data:

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

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

Office hours:

11:00 a.m. to 12:00 p.m. on Mondays and Fridays or by appointment. Variations in this schedule will be announced in class, via Blackboard, and/or via e-mail. You may also check with a staff member in ABEN 100 for variations in this schedule.

Class Numbers:

ABEN 464: 17639
ABEN 664: 17640

Text:

Huffman, R.L., D.D. Fangmeier, W.J. Elliot, and S.R. Workman. 2013. *Soil and Water Conservation Engineering*, 7th Ed. St. Joseph, Michigan: ASABE. ISBN 1-892769-86-7.

Required Student Resources:

In addition to the textbook, students will need note-taking resources, Internet access, an e-mail account, data storage devices, folders or notebooks for handouts and homework, and a scientific or engineering calculator.

Prerequisites:

CE 309, Fluid Mechanics.

Topics:

Chapter titles from the text are: 1) conservation and the environment, 2) water quality, 3) precipitation, 4) evaporation and evapotranspiration, 5) infiltration and runoff, 6) open channel flow, 7) soil erosion by water, 8) terraces and vegetated waterways, 9) water and sediment control structures, 10) channel stabilization and restoration, 11) water supply, 12) wetlands, 13) drainage principles and surface drainage, 14) water table management, 15) irrigation principles, 16) surface irrigation, 17) sprinkler irrigation, 18) microirrigation, 19) pumps and pumping, and 20) soil erosion by wind. Refer to the attached schedule for more details. We will likely not

cover chapters 10-12.

Course Schedule:

A tentative course schedule will be published in a separate document. Changes are likely because of variations in the availability of lab space, tour hosts, guest speakers, etc.

Objectives:

After completing this course, students should be able to:

1. Apply knowledge of mathematics, science, and engineering [PEO# 1, SO a (see below)];
2. Identify, formulate, and solve engineering problems (PEO # 1, SO e); and
3. Complete and present an extra project during the semester (graduate students only). Details are described later in the syllabus.

The Accreditation Board for Engineering and Technology (ABET) requires that accredited engineering programs publish their program educational objectives (PEOs) and student outcomes (SOs). Table 1 shows the ABEN PEOs and SOs. A goal of this course is to meet ABET requirements.

Table 1. Agricultural and Biosystems Engineering program educational objectives and supporting student outcomes.*

Graduates are expected to have established themselves as practicing engineers who, within a few years of graduation:

- 1 Successfully address emerging engineering challenges in the design or evaluation of machine systems, processing systems, and natural resources and environmental systems affecting the production of food, feed, and other biobased products;

Technical learning outcomes include student outcomes (a), (b), (c), (e), and (k);

- a) Ability to apply mathematics, science and engineering principles.
- b) Ability to design and conduct experiments, analyze and interpret data.
- c) Ability to design a system, component, or process to meet desired needs.
- e) Ability to identify, formulate and solve engineering problems.
- k) Ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

- 2 Effectively use professional communication, critical thinking, and interpersonal skills as team leaders and team members;

Communicational learning outcomes include student outcomes (d) and (g);

- d) Ability to function on multidisciplinary teams.
- g) Ability to communicate effectively.

- 3 Responsibly serve the public and their employers by participating in professional development and by maintaining the highest standard of professional ethics.

Contextual learning outcomes include student outcomes (f), (h), (i), and (j):

- f) Understanding of professional and ethical responsibility.
- h) The broad education necessary to understand the impact of engineering solutions in a global and societal context.
- i) Recognition of the need for and an ability to engage in life-long learning.
- j) Knowledge of contemporary issues.

* See <https://www.ndsu.edu/aben/about/abet-accredited/> for more information.

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 safe lab/shop use and for field trips. If these forms are not signed, credit will not be given for the course. See the Course Information area of Blackboard for more information. NDSU policies require the use of seat belts in NDSU vehicles.

Students with Special Requirements:

Any students with disabilities or other special needs, who need special accommodations in this course, are invited to share these concerns or requests with the instructor and contact the Disability Services Office (www.ndsu.edu/disabilityservices) as soon as possible. The instructor may ask for verification, which along with other assistance, can be requested from Disability Services in Lower Level of Main Library, Suite 17, 701-231-8463.

Veterans and Active Duty Military Personnel:

The instructor thanks veterans and active duty military personnel for their service to the country and for their efforts to preserve the freedoms we enjoy. Veterans and student service members with special circumstances or who are activated are encouraged to notify the instructor as soon as possible and are encouraged to provide Activation Orders.

Dead Week Policy:

The NDSU Dead Week policy is available at <http://www.ndsu.edu/registrar/dates/deadweek/>.

Academic Honesty:

The following general statement of academic honesty was taken from NDSU Policy 331.1: Course Syllabus:

The academic community is operated on the basis of honesty, integrity, and fair play. [NDSU Policy 335: Code of Academic Responsibility and Conduct](#) applies to cases in which cheating, plagiarism, or other academic misconduct have occurred in an instructional context. Students found guilty of academic misconduct are subject to penalties, up to and possibly including suspension and/or expulsion. Student academic misconduct records are maintained by the [Office of Registration and Records](#). Informational resources about academic honesty for students and instructional staff members can be found at www.ndsu.edu/academichonesty.

All work in this course must be completed in a manner consistent with the Honor System of the College of Engineering (CoE) available at https://www.ndsu.edu/coe/current_students/honor_code/. You are expected to read and abide by NDSU and CoE policies, which are incorporated herein by reference. You should have signed a sheet indicating your agreement to abide by the CoE Honor Pledge early in your academic career in the College of Engineering; if not, please contact the ABEN Department main office to do so as soon as possible. The CoE Honor Code states the following about violations: "If, from the evidence presented, the commission determines that a violation has taken place, it will recommend disciplinary action. Disciplinary action may include: failure or a grade reduction in the course; failure or grade reduction on the examination, quiz, paper or project in question; or a recommendation for suspension or expulsion."

Practically speaking, these policies mean you may consult with a classmate on procedures for homework and laboratory assignments, but the final product must be your original work. Homework, laboratories, or other work that involves team work will be designated as such and sharing of the workload, lab time, calculations, reporting, etc. is acceptable and expected. Tests, quizzes (if applicable), and the final exam will require individual work with no help from anyone in any form or by any means. To help prevent the temptation of academic dishonesty due to inadvertent observation of a neighbor, intentional collaboration, etc., the instructor will require seating to be dispersed across the room during test sessions.

Additional details on graduate student projects—including writing or design projects and presentations—will be provided to graduate students. All projects and reports are expected to be original work from the student. Assignments or presentations showing evidence of plagiarism will incur penalties such as a point reduction, a zero score on the assignment or part of an assignment, or, for more severe cases,

referral to the CoE Honor System and/or other university channels. To avoid plagiarism, you must do or note at least the following:

1. Enclose in quotation marks (" ") any wording or narrative that is directly copied or quoted from any other source.
2. Limit direct quotations to a small fraction of your writing. In general, direct quotes should be used sparingly and for emphasis only.
3. When citing the work of others or compiling a review of literature, the generally accepted approach is to read the source document, close it or hide it from view, and attempt to convey in your own words what you think the author meant.
4. Equations and their variables can be cited directly without quotation marks because there is generally only one way to present an equation—as it is in the original. However, you should cite the source of the equation whenever possible.
5. The references cited in your narrative should have a one-to-one correspondence with those in the bibliography and vice-versa. The citations should include author (s), date of publication, title, and source or publisher. Please refer to the [ASABE Guide for Authors](#) for additional details.

Use of Cell Phones and Other Portable Electronic Devices:

As a courtesy to other students and the instructor, all cell phones and other portable electronic devices except handheld calculators should be turned off or placed in a vibrate-only mode during class and laboratory time. Initiating text messages and phone calls during class time is unacceptable unless there is a genuine emergency.

Use of cell phones or other portable electronic devices for verbal communication, text messaging, e-mail, web surfing, taking pictures, etc. during the administration of a test, quiz, or exam may be considered an incident of academic dishonesty. The only foreseeable exception to this policy is the use of handheld calculators for computational purposes.

All participants in this class are subject to NDSU University Senate Policy 158: Acceptable use of Electronic Communication Devices (<http://www.ndsu.edu/fileadmin/policy/158.pdf>).

Homework, File Management, and Backups:

Most of the homework in this course will consist of handwritten solutions to problems from the textbook. Refer to the documents in the "Problem-Solving Formats" item in the "Course Information" area of Blackboard for more information on the format required for homework. Laboratory report formats may vary and will be specified as needed. Handwritten work must be legible to receive full credit. Illegible work may be returned for revision, rewriting, typing, etc. with a possible loss of credit. Typing of your homework is optional—it is acceptable but not required.

Some homework and/or laboratory activities may require the

use of a spreadsheet, word processor, or other software. Computer printouts should exhibit reasonable effort at organization, documentation, and clarity. Students are responsible for backing up their data and ensuring that electronic file submissions, if required, are received by the instructor. Please do not restrict yourself to only one location for data storage. Students often want to save time by storing documents, spreadsheets, and drawings on only one flash drive. I encourage you to use multiple tools for backing up your documents, such as two or more of the following:

1. Flash drives,
2. The "Files" tab on Blackboard,
3. An online data storage service,
4. A folder on your e-mail account (you can send yourself an e-mail with an attached file to store important documents), or
5. An external hard disk drive.

Evaluation Procedures and Grading Criteria:

Undergraduate students will have the following four categories of work in the course: homework, lab-based reports or problem sets, tests, and a comprehensive final examination. The relative weighting of these work categories is shown in Table 2. Each student's final grade in the course will be determined by a weighted grade percentage ranging from 0 to 100% which 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.

Table 2. Grade weighting for undergraduate and graduate students in ABEN 464 and 664.

Work Category	Weighted Percentage of Total Grade	
	Undergraduate Students	Graduate Students
Homework	25%	15%
Labs (including attendance)	25%	15%
Tests	30%	30%
Final Exam (comprehensive)	20%	20%
Project & Oral Presentations	0%	20%
Totals	100%	100%

Due dates for homework and laboratory reports or problem sets will be given with the assignments. Work must be submitted before 5 p.m. to be credited to the day it is received. Late work will be accepted with a 10% penalty per NDSU class day, but will not be accepted after solutions have been posted, handed out, or discussed (unless advance arrangements

have been made). Homework submitted after the last day of class will not receive credit. Your scores on homework or laboratory work involving teams may be increased or decreased based on your participation in your team's efforts.

According to NDSU Policy 333 (www.ndsu.edu/fileadmin/policy/333.pdf), attendance in classes is expected. Attendance is not required for lecture sessions but you are responsible for all materials, discussion, and other items presented in class as well as all scheduling changes discussed in class. If you miss class, the instructor will provide handouts upon your return if asked; you are responsible for obtaining notes from a classmate and checking Blackboard and your e-mail for additional material, notices, etc.

Missed tests, exams, and quizzes will receive zero points unless missed for an acceptable reason and with advance notification where possible. This policy is intended to improve exam security and to improve the fairness of the course for all students. Acceptable reasons for missing tests, exams, and quizzes include a medical or family emergency; university-sanctioned events (see NDSU Policy 333), or a co-curricular activity (such as an unusually-scheduled field trip for another class, a one-time requirement for a major, or another similar event with advance notice to and approval by the instructor). Unacceptable reasons for missing tests, exams, and quizzes include non-curricular activities such as sports, family and personal vacations, hunting or fishing trips, work schedules, farming operations, routine medical and dental appointments made after the semester begins, etc. If you are sick on the day of a quiz or test (or on the due date for a homework assignment), please call or e-mail the instructor before class so arrangements can be made for a make-up session, replacement work, or an adjusted due date.

Attendance will be taken at laboratory sessions and will be factored into that portion of the grade. You may miss one laboratory session during the semester and there will be no make-up laboratory sessions. The reason for this policy is that time, travel, personnel, material, and other constraints associated with laboratory sessions often make it difficult to provide repeated (make-up) material or laboratory sessions. For your one allowed missed laboratory session, the number of points possible for that lab will not be included in the computations for the laboratory component of the grade. It will be to your advantage to attend all laboratory sessions because: a) all information discussed in the laboratory sessions is subject to inclusion in test and/or final exam questions, and b) the points possible for laboratory sessions varies from one session to another and point values will not be announced in advance.

If you enroll in the course after its start date and miss one or more labs, the first missed lab will be dropped from the laboratory portion of your weighted grade total. Subsequent missed laboratory sessions will receive zero points with no

make-up sessions.

Graduate students will be required to complete a written report on a project and make two oral presentations to the class in addition to the regular requirements of the course. The project will consist of an engineering design, a literature review, or a scientific experiment on a topic related to the class. Each project will be subject to approval from the instructor to ensure appropriate scope and content. The oral reports will consist of a short project description during the first half of the semester and a longer final presentation near the end of the semester. The project and presentations will count for 20% of the grade for graduate students. The weight percentages for each work category are listed in Table 2 and the grade computation will follow the same procedure as that for undergraduate students. Additional details and requirements will be provided separately to graduate students enrolled in the course.

Important Dates for Spring Semester 2019:

<https://www.ndsu.edu/registrar/dates/2019/#c511015>

Date		Day	Description
Jan	1	Tue	HOLIDAY — New Year's Day Observed (<i>offices closed</i>)
Jan	7	Mon	Classes begin at 4:00 p.m.
Jan	8	Tue	First full day of classes
Jan	16	Wed	Last day for Campus Connection Wait Lists to run
Jan	17	Thu	Last day to Add classes via Campus Connection* Permit needed after this date.
Jan	17	Thu	Last day for no-record Drop of classes @ 100% refund* (<i>full semester classes only</i>)
Jan	17	Thu	Last day to Withdraw to Zero Credits @ 100% refund* (<i>full semester classes only</i>)
Jan	17	Thu	Attempted credits calculated for financial aid SAP (11:59 p.m.)**
Jan	17	Thu	Eligible Pell/TEACH/ND Grants/Scholarships based on enrollment at 11:59 p.m.
Jan	21	Mon	HOLIDAY — Martin Luther King, Jr. Day (<i>no classes, offices closed</i>)
Jan	22	Tue	Financial aid applied to NDSU account balances
Jan	23	Wed	Payments due for NDSU account balances*
Jan	28	Mon	Last day to submit requests to Audit, Pass/Fail
Feb	1	Fri	Undergraduate/Professional Spring and Summer Degree Applications due
Feb	1	Fri	Graduate student Spring/Summer Intent to Graduate forms due
Feb	4	Mon	Last day to Add full semester classes. Permit & Appeal needed after this date.
Feb	18	Mon	HOLIDAY — Presidents' Day (<i>no classes, offices closed</i>)
Feb	18	Mon	Last day to Withdraw to Zero Credits @ 75% refund* (<i>full semester classes only</i>)
Mar	First	Week	Summer/Fall schedule available
Mar	1	Fri	Grades of 'Incomplete' convert to 'F'
Mar	4	Mon	2nd half (8-week session) of Spring

Date		Day	Description
			semester begins
Mar	11-15	Mon-Fri	Spring Break Week (<i>no classes, offices open</i>)
Mar	15	Fri	Late fee applied to unpaid account balances (11:59 p.m.)
Mar	21	Thu	Last day to Withdraw to Zero Credits @ 50% refund* (<i>full semester classes only</i>) No refunds issued for withdraw to zero credits after this date.
Apr	1-21	Mon	Summer/Fall registration begins online based on total credits completed
Apr	19-22	Fri-Mon	HOLIDAY -- Spring Recess (<i>no classes, offices closed Friday, offices open Monday</i>)
Apr	5	Fri	Last day to Drop classes with 'W' record*
Apr	5	Fri	Last day to Withdraw to Zero Credits for Spring
Apr	12	Fri	Graduate student Initial Disquisition submission for May graduation
Apr	15	Mon	Late fees applied to unpaid account balances (11:59 p.m.)
Apr	22	Mon	Open registration for summer/fall
Apr	26	Fri	Spring Commencement Participation deadline
Apr-May	29-3	Mon-Fri	Dead Week
Apr	30	Tue	Grade entry begins
May	3	Fri	Last day of Spring classes
May	6-10	Mon-Fri	Final Examinations
May	10	Fri	Graduate student Final Disquisition copy due for May graduation
May	11	Sat	Commencement ceremonies (10:00 & 2:00 in Fargodome)
May	14	Tue	Grades due (12:00 p.m.)
May	14	Tue	Spring grade access begins online (late evening)
May	15	Wed	Late fees applied to unpaid account balances (11:59 p.m.)

Last update: 01/08/2019.