ABE 456: Land & Water Resources Engineering - Fall 2025

Schedule: Mondays and Wednesdays, 1:00 – 2:50 PM
Location: 242 Agricultural Engineering Sciences Building (AESB)

Instructor: Luciano Alves de Oliveira
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Phone: (217) 333-1078
Office Hours: Scheduled through email

Course Description:
ABE 456 equips students with the skills to analyze and design hydrologic systems that support sustainable land and water management. The course integrates scientific principles with engineering applications, preparing students to address challenges such as water movement, soil conservation, and resource protection through data-driven evaluation and design.

Prerequisite:
Credit or concurrent registration in TAM 335

Course Objective:
Students will be able to understand, design, analyze, and interpret hydrologic applications for land and water resources engineering and environmental management. Students will be able to perform complex hydrologic and water resources data analysis. They will be able to interpret and synthesize processes leading to natural resource degradation, formulate solutions, and design structures for land and water resources utilization, conservation, and management. Students should be able to evaluate their designs and conduct engineering analysis to justify the use of such structures to protect our valuable natural resources.

Textbook: Hydrology and the Management of Watersheds (Brooks et al., 4th Edition, 2012)

References:
SWC ASABE - Soil and Water Conservation Engineering (Huffman et al., 7th Edition, 2013 OR Huffman et al., 6th Edition, 2011)
Design Hydrology and Sedimentology for Small Catchments (C.T. Hann, B.J. Barfield, and J.C. Hayes)
NSCS Urban Hydrology for Small Watersheds, TR-55.
NRCS National Engineering Handbook, Part 630 - Hydrology.
NRCS National Engineering Handbook, Part 650 – Engineering Field Handbook.
“Estimating Your Soil Erosion Losses with the Universal Soil Loss Equation” by R.D. Walker, U of I Cooperative Extension Service.
“Design for a Grassed Waterway” by Stall et al., U of I Cooperative Extension Service.

I expect regular class attendance of all students, and I will record it. You should not have more than two unexcused absences during the semester. Please, notify me of any known conflict as soon as possible, but no later than one week before the date of a quiz, examination, or assignment. You should notify me in advance of missing any class or as soon as possible after that. If you cannot contact me due to hospitalization or other emergencies, you may contact the Student Assistance Center in the Office of the Dean of Students during business hours to request that an email notification be sent. For an absence to be excused and make-up work to be accepted, you must provide me with an explanation and supply supporting evidence, which may include an absence letter, when the absence meets the criteria outlined on the campus attendance policy. The complete campus attendance policy is available here: https://studentcode.illinois.edu/article1/part5/1-501/.

Course Requirements and Assessment Overview:
This 3/4-credit hour course will require approximately 6-8 hours per week. This includes two 110 min (220 min total) in-person classes per week and approximately 2-4 hours of extra activities dedicated to the course. Actual time commitments will vary depending on your personal needs and study habits.

Classes and Participation
Weekly, you are expected to attend two 110 min classes for a total of 27 encounters for regular classes, one encounter for the exam, and two encounters for project presentation. You will receive participation points based on engagement in discussions during class, up to 10 points per week. The two lowest participation points will be dropped for a maximum participation grade of 120 points. Note that if you miss a class, you will not receive any points for that week.

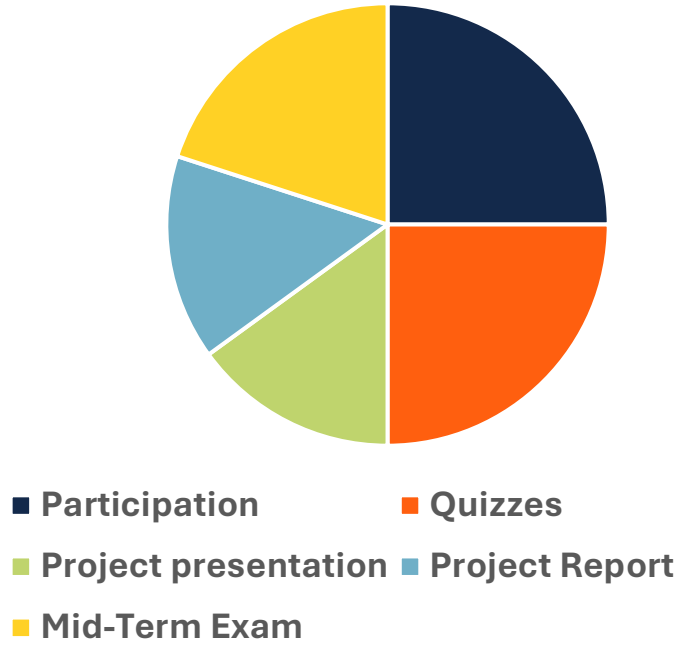
Quizzes
Each week, there will be one 20-minute quiz. If you are late for class, that will impact the number of minutes you have – if more than 20 minutes late, you will not be allowed to take the quiz. Each quiz is worth up to 10 points, and the lowest two grades will be dropped for a maximum quiz grade of 120 points. Each week the quizzes will cover material from the previous weeks and consist of 5 short answer questions. If at least 50% of the students get a question wrong, this question may be repeated in future quizzes. If you miss a class, make sure to get up to date on the material to perform well on the next quiz. After the quiz, the previous quiz's solution will be discussed. Make sure to correct the questions you got wrong because they may appear again on future quizzes/exams.

Project
There will be a project worth 100 points, split into 50 points for the written report, and 50 points for presentation. This project will consist of a study case in which a problem from a real farm will be presented, and you will be asked to develop a solution. The written portion should contain detailed information on the solution created. A template for the written portion will be provided.

Exam

There will be one exam (mid-term) worth 100 points. The exam will consist of a combination of fill-in-the-blank, multiple-choice, true/false, matching, and/or short-answer questions. Part of the exam' problems will consist of questions covered on the quizzes, so if you study for the quizzes, you should be able to perform well on the exams.

Course Evaluation:
Midterm: 20%
Quizzes: 25%
Group/Individual Project: 30% (*Report: 15%, Presentation 15%*)
Attendance/Participation: 25%



Percentage	Grade
97.5-100.0	A+
92.5-97.4	A
90.0-92.4	A-
87.5-89.9	B+
82.5-87.4	B
80.0-82.4	B-
77.5-79.9	C+
72.5-77.4	C
70.0-72.4	C-
67.5-69.9	D+
62.5-67.4	D
60.0-62.4	D-
<60.0	F

Course website: The course uses Canvas to disseminate course materials, assign and grade homework, labs and project work.

Course Schedule:

	Date	Topic	Reference
week 1	25-Aug 27-Aug	Introduction Water Cycle and Watersheds	 Ch. 2, Class Notes
week 2	**1-Sep** 3-Sep	**Labor Day** Water Cycle and Watersheds	 Ch. 2, Class Notes
week 3	8-Sep 10-Sep	Precipitation Precipitation	Ch. 3, class notes Ch. 3, class notes
week 4	15-Sep 17-Sep	Infiltration - measurement and prediction Infiltration – measurement and prediction	Ch. 5, class notes Ch. 5 class notes
week 5	22-Sep 24-Sep	Evaporative Processes Evaporative Processes	Ch. 4, class notes Ch. 4 class notes

week 6	29-Sep 1-Oct	Runoff Runoff	Ch. 5, class notes Ch. 5, class notes
week 7	6-Oct 8-Oct	Streamflow Streamflow	Ch. 6, class notes Ch. 6, class notes
week 8	**13-Oct** 15-Oct	**Midterm Exam** Soil Physical Properties	 Class notes
week 9	20-Oct 22-Oct	Soil Erosion Soil Loss	Ch. 8, class notes Ch. 8, class notes
week 10	27-Oct 29-Oct	Extreme Events Analysis Extreme Events Analysis	Class notes Class notes
week 11	3-Nov 5-Nov	Open Channel Channel Design	SWC ASABE Ch. 6, class notes SWC ASABE Ch. 6, class notes
week 12	**10-Nov** 12-Nov	**Luciano's Travel** Design of Vegetative Waterway	 SWC ASABE Ch. 8, class notes
week 13	17-Nov 19-Nov	Design of terraces Water and Sediments Control Structures	SWC ASABE Ch. 8, class notes SWC ASABE Ch. 9, class notes
	24-Nov **26-Nov**	**Thanksgiving - Fall Break** **Thanksgiving - Fall Break**	
week 14	1-Dec 3-Dec	Reservoirs Reservoirs	Class notes Class notes
week 15	8-Dec 10-Dec **11-Dec**	Interaction Soil x Water x Atmosphere x Plant Interaction Soil x Water x Atmosphere x Plant **Reading Day**	Class notes Class notes
week 16	**15-Dec** **17-Dec**	**Project Presentation – Report Due** **Project Presentation**	

Academic Integrity Statement

The University of Illinois at Urbana-Champaign Student Code should also be considered as a part of this syllabus. Students should pay particular attention to Article 1, Part 4: Academic Integrity. Read the Code at the following URL: http://studentcode.illinois.edu/

Academic dishonesty may result in a failing grade. Every student is expected to review and abide by the Academic Integrity Policy: http://studentcode.illinois.edu/. Ignorance is not an excuse for any academic dishonesty. It is your responsibility to read this policy to avoid any misunderstanding. Do not hesitate to ask the instructor(s) if you are ever in doubt about what constitutes plagiarism, cheating, or any other breach of academic integrity.

Accommodations Statement

To obtain disability-related academic adjustments and/or auxiliary aids, students with disabilities must contact the course instructor and the Disability Resources and Educational Services (DRES) as soon as possible. To contact DRES, you may visit 1207 S. Oak St., Champaign, call 333-4603, e-mail disability@illinois.edu or go to the DRES website.

Emergency Response Statement
Emergency response recommendations can be found at the following website: http://police.illinois.edu/emergencypreparedness/. I encourage you to review this website and the campus building floor plans website within the first 10 days of class. http://police.illinois.edu/emergency-preparedness/buildingemergency-action-plans/.

Family Educational Rights and Privacy Act (FERPA) Statement
Any student who has suppressed their directory information pursuant to Family Educational Rights and Privacy Act (FERPA) should self-identify to the instructor to ensure protection of the privacy of their attendance in this course.

See https://registrar.illinois.edu/academic-records/ferpa/ for more information on FERPA.

Sexual Misconduct Policy and Reporting Statement
The University of Illinois is committed to combating sexual misconduct. Faculty and staff members are required to report any instances of sexual misconduct to the University's Title IX and Disability Office. In turn, an individual with the Title IX and Disability Office will provide information about rights and options, including accommodations, support services, the campus disciplinary process, and law enforcement options. A list of the designated University employees who, as counselors, confidential advisors, and medical professionals, do not have this reporting responsibility and can maintain confidentiality, can be found here:
https://wecare.illinois.edu/resources/students/#confidential

Other information about resources and reporting is available here: wecare.illinois.edu.
University Police Department, Emergency, 9,-911; Non-emergency, 217.333.8911
Counseling Center, 110 Student Services Bldg., 610 E. John St., 217.333.3704
McKinley Health Center, General Information, 217.333-2701
McKinley Mental Health Center, 1109 S. Lincoln, 217.333.2705
Dean of Students, 300 Turner Students Services Bldg., 610 E. John St., 217.333.0050
Local Sexual Assault Center, RACES, 217.384.4444
Women's Resources Center, 703 South Wright Street, 2nd Floor, 217-333-3137

For campus assistance and support: The Office of Diversity, Equity and Access (ODEA) http://diversity.illinois.edu

Inclusivity Statement
The effectiveness of this course is dependent upon the creation of an encouraging and safe classroom environment. Exclusionary, offensive or harmful speech (such as racism, sexism, homophobia, transphobia, etc.) will not be tolerated and in some cases subject to University harassment procedures. We are all responsible for creating a positive and safe environment that allows all students equal respect and comfort. I expect each of you to help establish and maintain and environment where you and your peers can contribute without fear of ridicule or intolerant or offensive language.

Netiquette Statement

In any social interaction, certain rules of etiquette are expected and contribute to more enjoyable and productive communication. The following are tips for interacting online via e-mail or discussion board messages, adapted from guidelines originally compiled by Chuq Von Rospach and Gene Spafford (1995):

- Remember that the person receiving your message is someone like you, deserving and appreciating courtesy and respect
- Avoid typing whole sentences or phrases in Caps Lock
- Be brief; succinct, thoughtful messages have the greatest effect
- Your messages reflect on you personally; take time to make sure that you are proud of their form and content
- Use descriptive subject headings in your e-mails
- Think about your audience and the relevance of your messages
- Be careful when you use humor and sarcasm; absent the voice inflections and body language that aid face-toface communication, Internet messages are easy to misinterpret
- When making follow-up comments, summarize the parts of the message to which you are responding
- Avoid repeating what has already been said; needless repetition is ineffective communication
- Cite appropriate references whenever using someone else's ideas, thoughts, or words

Students may use generative-AI tools (e.g., ChatGPT) for homework only if they clearly disclose such use in an AI-use appendix that lists the exact prompts, step-by-step interactions (including intermediate outputs/edits), and a brief explanation of how those outputs informed their own work; students remain fully responsible for accuracy, sources, and academic integrity.