

EnvE. 434- Environmental Geotechnics

COURSE SYLLABUS

Winter (Second) Term 2026

Lectures Tues-Thurs 9:30 – 10:50

Instructor: David Barsi
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Hours: TBA
Phone: TBA
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TA: Abigail Paul

Marks:	Assignments	=	25 %
	Term Papers	=	25 %
	Midterm Exam	=	20 %
	Final Exam.	=	30 %

Grading Policy: The standard distribution for a fourth year course will be used as a general guide. The high and low range of the mark distribution will be based on both absolute and relative standards of performance.

Prerequisites: CIV E 381.

Exam schedule: Midterm: Tuesday, February 24, 2025

Final: TBA

Course Objectives: To provide an introduction to geoenvironmental engineering for the design, analysis, monitoring and evaluation of waste repositories and subsurface geologic strata. Specific objectives and topics include:

- Learn the fundamental principles and theory of geomechanics for waste repository design,
- Be able to perform basic stability analyses for waste containment systems,
- Learn the fundamental theory of groundwater seepage and transport for waste repositories,
- Be able to perform basic seepage analysis and contaminant transport modelling for waste repositories,
- Be able to design, model and monitor waste management systems including tailings and waste impoundments,
- Have a basic understanding of geoenvironmental issues in mining including oil sands tailings as well as base and precious metals and acid rock drainage.

Notes and assignments: will be posted on ENV E 434 2025 e-class site in advance of scheduled lectures.

Assignments: Five assignments/tutorials plus two term papers will be given over the course of the term. Assignment due dates will be established in class when the problems and tutorials are assigned. These dates will be determined depending on progress through the course material, and considering students' other workload.

Tentative Lecture Schedule

Week	Day	Date (2026)	Topic	Approximate Due Date
1	Tues	06-Jan	Intro to Mine Waste	
	Thurs	08-Jan	Intro to Mine Waste	
2	Tues	13-Jan	Surface Tailings Disposal	
	Thurs	15-Jan	Bearing Capacity	Assign #1 Due
3	Tues	20-Jan	End Pit Lakes	
	Thurs	22-Jan	End Pit Lakes	
4	Tues	27-Jan	Stability of Slopes	Assign #2 Due
	Thurs	29-Jan	Stability of Slopes	
5	Tues	03-Feb	Stability of Slopes	
	Thurs	05-Feb	Stability of Slopes	Assign #3 Due
6	Tues	10-Feb	Tailings Dam Stability	
	Thurs	12-Feb	Stability of Slopes (Slope/W)	
7	Tues	17-Feb	Reading week	
	Thurs	19-Feb	Reading week	
8	Tues	24-Feb	Mid-Term Exam	
	Thurs	26-Feb	Case Studies of Dam Failures	1 st Paper 1 Due
9	Tues	03-Mar	Introduction to Seepage	
	Thurs	05-Mar	Seepage/Contaminant Hydrology (Seep/w)	
10	Tues	10-Mar	Seepage Hydrology	Assign #4 Due
	Thurs	12-Mar	Seepage Hydrology	
11	Tues	17-Mar	Cover Systems	
	Thurs	19-Mar	Acid Rock Drainage	
12	Tues	24-Mar	Acid Rock Drainage	
	Thurs	26-Mar	Special Topics	Assign #5 Due
13	Tues	31-Mar	Special Topics	
	Thurs	02-Apr	Special Topics	
14	Tues	07-Apr	Review	2 nd Paper Due

References: Blight, G.E. 2010. Geotechnical Engineering for Mine Waste Storage Facilities. CRC Press.
 Reddi, L.N., and Inyang, H.I. 2000. Geoenvironmental Engineering, Principles and Applications. Marcel Dekker Inc.

Class participation: Attendance at all lectures is expected.

Cheating and Plagiarism: The U of A policy on cheating and plagiarism is contained in CODE OF STUDENT BEHAVIOUR

University and faculty policies



Respect and professionalism



The Faculty of Engineering is committed to fostering and protecting an equitable, inclusive, and respectful work and study environment in line with University of Alberta policies and professional engineering industry standards.

The faculty prepares students to uphold industry standards to become a Professional Engineer (P.Eng). Therefore, respect, professionalism, and accountability must be upheld within the Faculty of Engineering and the University of Alberta.

Academic integrity and student conduct

The University of Alberta is committed to the highest standards of academic integrity and honesty, as well as maintaining a learning environment that fosters the safety, security, and the inherent dignity of each member of the community, ensuring students conduct themselves accordingly. Students are expected to be familiar with the standards of academic honesty and appropriate student conduct, and to uphold the policies of the University in this respect.

Students are particularly urged to familiarize themselves with the provisions of the Student Academic Integrity Policy and the Student Conduct Policy, and avoid any behaviour that could misrepresentation of facts, participation in an offence) and non-academic misconduct (e.g., discrimination, harassment, physical assault). Academic and non-academic misconduct are taken very seriously and can result in suspension or expulsion from the University.



The U of A policy on cheating and plagiarism is contained in CODE OF STUDENT BEHAVIOUR located at :

<http://www.governance.ualberta.ca/CodesofConductandResidenceCommunityStandards/CodeofStudentBehaviour/303OffencesUndertheCode/3032InappropriateAcademicBehav.aspx>

Following is an excerpt from that document

30.3.2 Inappropriate Academic Behaviour

30.3.2(1) Plagiarism

No Student shall submit the words, ideas, images or data of another person as the Students own in any academic writing, essay, thesis, project, assignment, presentation or poster in a course or program of study.

30.3.2(2) Cheating

30.3.2(2) a *No Student shall in the course of an examination or other similar activity, obtain or attempt to obtain information from another Student or other unauthorized source, give or attempt to give information to another Student, or use, attempt to use or possess for the purposes of use any unauthorized material.*

30.3.2(2) b *No Student shall represent or attempt to represent themselves as another nor shall a Student attempt to have themselves represented by another in the taking of an examination, preparation of a paper or other similar activity. See also misrepresentation in 30.3.6 (4).*

30.3.2(2)c *No student shall represent another's substantial editorial or compositional assistance on an assignment as the Student's own work.*

30.3.2(2) d *No Student shall submit in any course or program of study, without the written approval of the course Instructor, all or a substantial portion of any academic writing, essay, thesis, research report, project, assignment, presentation or poster for which credit has previously been obtained by the Student or which has been or is being submitted by the Student in another course or program of study in the University or elsewhere.*

30.3.2(2) e *No Student shall submit in any course or program of study any academic writing, essay, thesis, report, project, assignment, presentation or poster containing a statement of fact known by the Student to be false or a reference to a source the Student knows to contain fabricated claims (unless acknowledged by the Student), or a fabricated reference to a source.*

30.3.2(3) Misuse of Confidential Materials

No Student shall procure, distribute, or receive any confidential academic material such as pending examinations, laboratory results or the contents thereof from any source without prior and express consent of the Instructor.

30.3.2(4) Research and Scholarship Misconduct

30.3.2(4) a *30.3.2(4) a No Student shall violate the University of Alberta Research and Scholarship Integrity Policy, as set out in the Research and Scholarship Integrity Policy in UAPPOL or any other University regulation concerning academic matters. (CLRC 24 MAY 2012)*

30.3.2(4) b *Where a Student is charged with the academic offence of research and scholarship misconduct, the procedure to follow is that outlined below. (CLRC 24 MAY 2012) (EXEC 12 NOV 2014)*



All students are expected to consult the Academic Integrity website for clarification on the various academic offences. All forms of academic dishonesty are unacceptable at the University. Unfamiliarity of the rules, procrastination or personal pressures are not acceptable excuses for committing an offence. Listen to your instructor, be a good person, ask for help when you need it, and do your own work -- this will lead you toward a path to success. Any academic integrity concern in this course will be reported to the College of Natural and Applied Sciences. Suspected cases of non-academic misconduct will be reported to the Dean of Students. The College, the Faculty, and the Dean of Students are committed to student rights and responsibilities, and adhere to due process and administrative fairness, as outlined in the [Student Academic Integrity Policy](#) and the [Student Conduct Policy](#). Please refer to the policy websites for details on inappropriate behaviours and possible sanctions.

The College of Natural and Applied Sciences (CNAS) has created an [Academic Integrity for CNAS Students](#) eClass site. Students can self-enroll and review the various resources provided, including the importance of academic integrity, examples of academic misconduct & possible sanctions, and the academic misconduct & appeal process. Students can also complete assessments to test their knowledge and earn a completion certificate.

"Integrity is doing the right thing, even when no one is watching." -- C.S. Lewis

The Faculty of Engineering expects an environment free of harassment, discrimination, and bullying. We encourage you to talk to the [Office of Safe Disclosure and Human Rights](#) about experiences, questions, or concerns. Additional resources and support for students are attached below.

Engineering students studying in the province of Alberta must also follow the [Code of Ethics](#) set by the Association of Professional Engineers and Geoscientists of Alberta (APEGA).

Course outline policies, course requirements, evaluation and grading information can be found in the [University Calendar](#).



Safety during learning activities



In all Faculty of Engineering courses, labs, seminars or other learning activities, safety is of paramount importance. In some cases, laboratory work in a program requires high standards for risk management to keep potential hazards safely under control.

Anyone found to be unable to function safely in the class, lab, seminar or other learning activity may be asked to leave or be removed for their and the safety of other participants and instructors in alignment with the [Student Academic Integrity Policy](#) and [Student Conduct Policy](#). As members, or prospective members, of the engineering profession, it is your responsibility to identify and inform the proper authorities of unsafe work.

Audio and video recording



Audio or video recording, digital or otherwise, of lectures, labs, seminars or any other teaching environment by students is allowed only with the prior written consent of the instructor or as a part of an approved accommodation plan.

Student or instructor content, digital or otherwise, created and/or used within the context of the course is to be used solely for personal study and is not to be used or distributed for any other purpose without prior written consent from the content author(s).

Only those items specifically authorized by the instructor may be brought into the exam facility. Students must not bring any unauthorized electronic device into an examination room, including cell phones or other devices.



Student services and support

Health & Wellness Support

Counselling and Clinical Services

Free, short-term, appointment-based counselling and psychiatric services. Also offers drop-in workshops. Book an initial consultation. Visit uab.ca/CCS to learn more.

Wellness Supports Social Workers

Free one-on-one support for students in the areas of housing, finances, academics, personal wellness, life skill development, family dynamics, system navigation, and any area of life where there is a desire to invite change. Visit uab.ca/wellness to learn more.

Sexual Assault Centre

Free, anonymous, and confidential drop-in counselling. Visit uab.ca/UASAC to learn more.

The Office of Safe Disclosure & Human Rights (OSDHR)

The OSDHR advises confidentially on sensitive issues you may not feel comfortable solving on your own.

Contact

the OSDHR if you want to get help or to make a report while keeping your privacy.

Visit uab.ca/OSDHR to learn more.

HIAR (Helping Individuals at Risk)

If you're worried about someone, contact

HIAR, who can help assess risk and connect

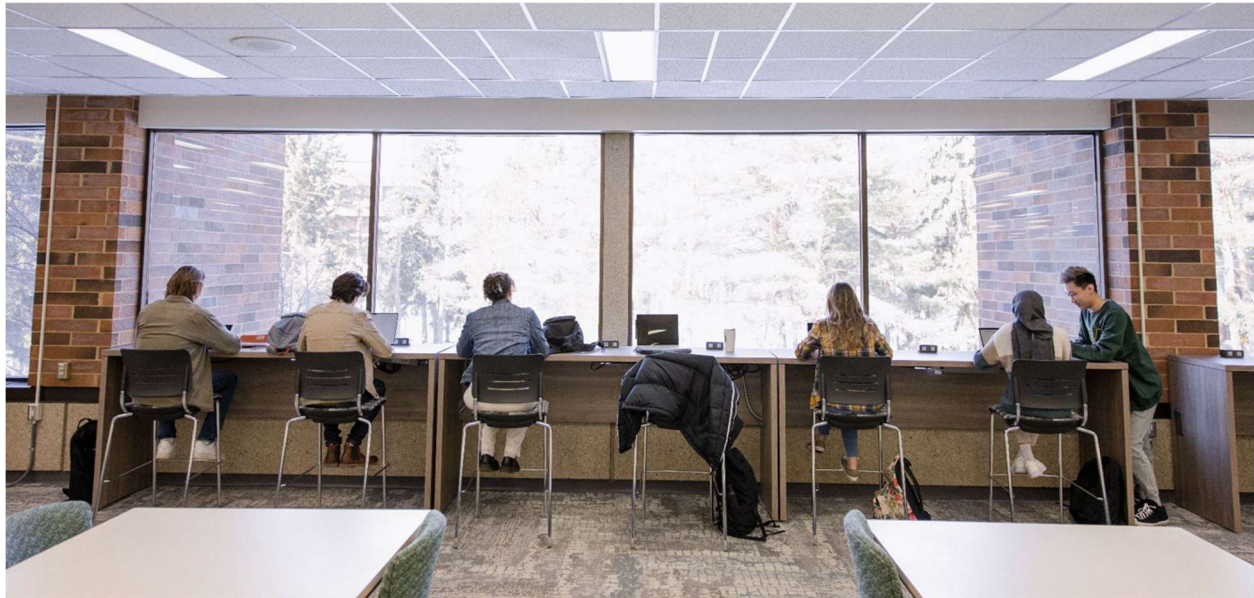
individuals to support. Learn more at uab.ca/HIAR.

Immediate External Supports

Health Link Alberta: 811

Suicide Crisis Helpline: 988

CIV



Academic support



Academic Success Centre

Access to a variety of services to maximize your academic success. Learn more at uab.ca/ASC.



Accessibility Resources

Connects students with disabilities to accommodations. Learn more at uab.ca/Access under accommodations + accessibility.



Decima Robinson Support Centre

Academic support for 100- or 200-level introductory calculus, linear algebra and statistics courses. Visit uab.ca/DSC to learn more.



Engineering Student Success Centre

The Faculty of Engineering provides drop-in tutoring for first-year courses. Visit uab.ca/ESSC to learn more.



Office of the Student Ombuds

Call for complex problems and conflict mediation. Learn more at uab.ca/ombuds.



Financial support



Student Service Centre

For awards and other funding support. Learn more at uab.ca/ask.



Campus Food Bank

The Campus Food Bank Society is an independent charity supporting University of Alberta students, faculty, staff, and alumni for up to five years. For additional information visit their website at campusfoodbank.com.