CIV E 695 Soil Structures

Winter 2025 - January 06 to April 09

Class time: Wednesday 8:00-10:50 Location: NRE 2-080

Instructor:

F. Albert Liu, PhD
780-492-0379
fa6@ualberta.ca
6-209
Office Hours: By appointment

Course Description:

*4 (fi) (second term, 3-1S-1) Stresses in slopes. Limit equilibrium methods of analysis. Landslides in soil. Design of earth dams and embankments. Case histories of earth and rockfill dams. Dam foundations. Soft ground tunnelling

Course synchronous and asynchronous content delivery schedule:

Land Acknowledgment:

The University of Alberta respectfully acknowledges that we are situated on Treaty 6 territory, traditional lands of First Nations and Métis people.

Lab Sections:

Section	Day	Time	Location
LAB H01		01:00 - 01:00	

Seminar Sections:

Section	Day	Time	Location
SEM J01		01:00 - 01:00	

Course Objectives & General Content:

Topic 1
1.1 Limit Equilibrium Approach (LEA)
1.2 Factor of Safety (FoS)
1.3 Methods of LEA / 2D & 3D
1.4 Shear Strength Reduction (SSR)

Topic 2

2.1 Settings for stability analyses
2.2 End of Construction (EoC) analyses
2.3 Special ground conditions

Topic 3
3.1 Tailings dams
3.2 TSF failure analyses
3.3 Earth dams / design / behaviours
3.4 Earth dams / Rapid drawdown

Learning Outcomes:

By the end of this course, students should be able to:

Marking Scheme:

Activity	(A)Synchronous	Due/Scheduled	Weight
Assignment			30%
Term Project			40%
Final Exam			30%

The Faculty recommended grade point average for a 600 level course is 3.3.Instructors have the leeway to deviate from this average and can assign grades based on their own scheme. All grades are approved by the department chair (or delegate). The office of the Dean has final oversight on all grades.

Term Work

All term work solutions will be posted no later than the last day of classes. All term work will be returned to students by the final day of classes, with the exception of major term work due in the last week of classes. The latter will be returned by the day of the final examination or the last day of the examination period if there is no final examination in the course as per university policy; instructors will make accommodations to return these term work. It is the responsibility of the student to pick up all their term work at the specified time and place. Any unreturned term work, shall be retained and then shredded six months after the deadline for reappraisal and grade appeals. Final examinations will be kept for one year as required by university guidelines and the Government of Alberta's Freedom of Information and Protection of Privacy Act.

Text and References (Mandatory):

Duncan, Wright & Brandon. Soil strength and slope stability. 2ed, John Wiley & Sons, 2014. (https://www.library.ualberta.ca/catalog/7295348)

Text and References (Recommended):

Cornforth, D. H. 2005. Landslides in Practice – Investigation, analysis and remedial/preventative options in soils. John Wiley & Sons Canada Ltd.

Fell R., P. Macgregor, D. Stapledon, G. Bell, M. Foster 2015. Geotechnical Engineering of Dams. 2nd Edition Taylor & Francis

Simons, Noel, Bruce Menzies, and Marcus Matthews 2001. A short course in: Soil and Rock Slope Engineering. Thomas Telford Limited.

Website:

eClass

Previous Examples of Evaluative Materials:

Past exam questions are migrated into assignments and tutorials.

Did you know that the University of Alberta has various low-to-no-cost services to help students succeed? Visit http://www.deanofstudents.ualberta.ca/ for information about the academic, wellness, and various other support services available to U of A students. It's never too early or too late to seek help!

CIV E 695
Soil Structures
Winter 2025

Instructor

F. Albert Liu, PhD
Email: fa6@ualberta.ca
Office: DICE 6-209
Office Hours: By appointment

Teaching Assistant

Prabin Acharya
Email: pachary2@ualberta.ca
Office Hours: prefer contact via email or by appointment

Course

Lecture: Wednesday 8:00-10:50 AM (NRE 2-080)

Grading

Assignments	30%
Term Project	30% (Report) + 10% (Presentation)
Final Exam	30% (8:30 AM on Tuesday, April 15)

Tentative Topics

Topic 1	Limit Equilibrium Approach (LEA) / Factor of Safety (FoS)
	Methods of LEA / 2D & 3D / Shear Strength Reduction (SSR)
Topic 2	Settings for stability analyses
	End of Construction (EoC) analyses
	Special ground conditions
Topic 3	Tailings dams / TSF failure analyses
	Hydraulic dams / design / behaviours
	Hydraulic dams / Rapid drawdown

Reference and Recommended Reading

Lecture notes (in PDF format) will be posted on eClass.

- Duncan, Wright & Brandon. Soil strength and slope stability. 2ed, John Wiley & Sons, 2014. (https://www.library.ualberta.ca/catalog/7295348)
- Cornforth, D. H. 2005. Landslides in Practice – Investigation, analysis and remedial/preventative options in soils. John Wiley & Sons Canada Ltd.
- Fell R., P. Macgregor, D. Stapledon, G. Bell, M. Foster 2015. Geotechnical Engineering of Dams. 2nd Edition Taylor & Francis
- Simons, Noel, Bruce Menzies, and Marcus Matthews 2001. A short course in: Soil and Rock Slope Engineering. Thomas Telford Limited.

Laboratory

Laboratories for this course were included within CIV E 680 during the last term.