UNIVERSITY OF CALGARY
SCHOOL OF ARCHITECTURE, PLANNING AND LANDSCAPE

Winter 2024

Course Number	LAND 606	**Classroom**	PF TBD
Course Name	Site Technology I: Grading & Landform		
Pre/Co-Requisites	LAND 604		
Instructor	Kris Fox	Office Hours / Location	PF 3181, by appointment
	Email: mk.fox1@ucalgary.ca	Phone: 403-220-7428	
Class Dates	Tuesdays & Thursdays & Fridays, 10:00 – 12:00, January 9 – April 12, 2024 Please refer to course schedule for all meeting dates / times.		
Instructor Email Policy	All course communications must occur through your @ucalgary email		

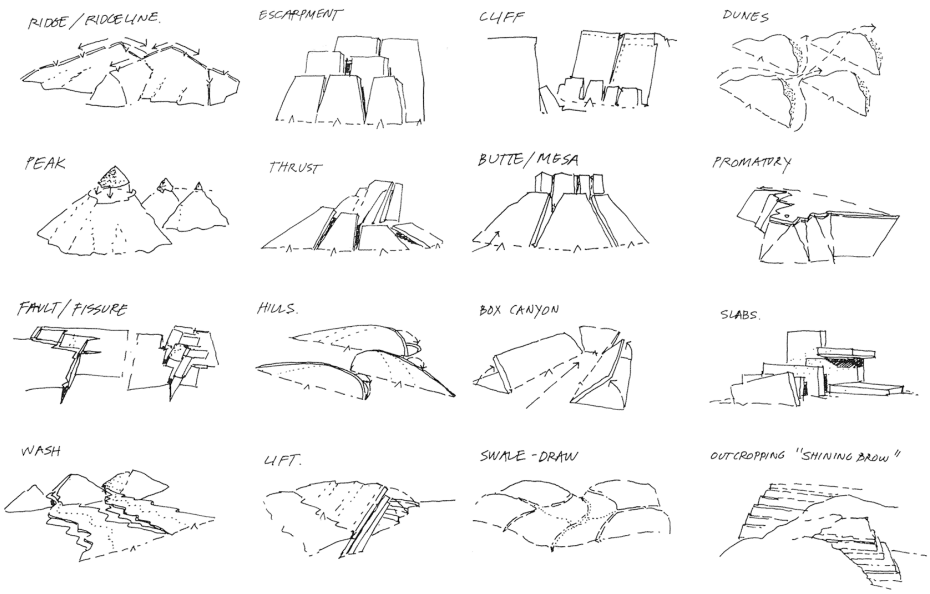

Image from *Civilizing Terrains: Mountains, Mounds and Mesa*s by William Moorish

"Landform is perhaps the most fundamental element in landscape architectural design. Natural and artificial topography can be manipulated, modified, or conserved to fully or partially enclose space. Learning to do this with subtlety, sensitivity and originality is an essential design skill."

Quote from *Form and Fabric in Landscape Architecture* by Catherine Dee

Course Description:

This course provides a working knowledge of grading, landform and storm water management systems and techniques. Covers fundamentals and advanced technologies including GPS grading and landform manipulation. Through this course, we will explore different ways to visualize, manipulate, design, and form the surface of the earth to achieve functional, aesthetic and ecological design solutions through the mastery of the principles and techniques of grading and drainage.

We will work at developing sound expertise in grading elements in the landscape such as pedestrian walks, ramps, steps, roads, walls, berms, flat areas, slopes, drainage swales and stormwater management elements. The approach for each assignment will emphasize an experiential design process approach (aka "learning by doing") with a balance of in-class tutorials, individual take home assignments and a couple of short field trips on campus and in the northwest of Calgary.

Grading and landform (aka site engineering) will be presented as the technical art of molding and shaping the earth emphasizing that this is one of the most powerful design tools available to the landscape architect. Technical and expressive grading distinguishes landscape architecture from its allied professions, is one of the principal components of form-giving to a site and is a critical component of spatial design. A well-executed site design creates spatial dialogs between all its components that starts with the ground plane and continues with all the components layered upon it: planting, built landscape elements and structures.

This course is the first in a series that will address the technical aspects of design and its changing role as our profession continues to mature; specifically, how to blend an increasing awareness of sustainable building practices with traditional design approaches. In contemporary site design stormwater management, green infrastructure and their catalog of built elements are now a critical component that drives design concepts, form-giving, the site engineering process and materials selection. This dialog of selecting and crafting materials and built elements will start in this course and continue next semester in Site Technology II: Construction and Materials.

Calendar Description:
https://www.ucalgary.ca/pubs/calendar/grad/current/landscape-architecture-land.html#45308

Course Hours: 3 units; (2-2)

Course Learning Outcomes:

Upon successful completion of the course, you should have developed an understanding of the knowledge, skills, and technologies involved in the following:

1. Illustrate that site engineering is an integral part of the design process that addresses both environmental and aesthetic concerns.
2. Interpolate from spot elevation data to produce topographic contour plans.
3. Perform the calculations necessary to manipulate and determine slopes, slope angles, and percentages.
4. Develop grading concepts that respond to specific design goals while maintaining technical site engineering requirements (including earthwork volumes and soil characteristics).
5. Compute storm water runoff volumes and drainage techniques.
6. Demonstrate an understanding of 2D and 3D representation techniques in the context of grading, landform and drainage applications, utilizing both hand and digital graphics (CAD, Adobe CS, digifab).

Learning Resources:

Readings will be assigned to complement the lectures. Students will be required to complete these readings prior to the related lecture. You may be questioned in class regarding these readings -- come prepared.

Required readings, textbooks and learning materials:

The following text is required for the course:

- Strom, Steven, Kurt Nathan and Jake Woland. 2013. Site Engineering for Landscape Architects, 6th Edition. New York: John Wiley & Sons, Inc. http://site.ebrary.com.ezproxy.lib.ucalgary.ca/lib/ucalgary/detail.action?docID=10650019

The following text is recommended but not required:

- Woland, Jake. 2013. Site Engineering for Landscape Architects: Workbook, 2nd Edition. New York: John Wiley & Sons, Inc. http://site.ebrary.com.ezproxy.lib.ucalgary.ca/lib/ucalgary/detail.action?docID=10648912

Course Bibliography:

- Alberta Barrier-Free Design Guide (2008). PDF available online.
- 2010 ADA Standards for Accessible Design. PDF available online.
- British Columbia Building Access Handbook (2014). PDF available online.
- Calkins, Meg. (2008) Materials for Sustainable Sites: A Complete Guide to the Evaluation, Selection and Use of Sustainable Construction Materials.
- Calkins, Meg. (2012) The Sustainable Sites Handbook: A Complete Guide to the Principles, Strategies, and Best Practices for Sustainable Landscapes
- Harris, Charles W. & Dines, Nicholas T. (1997) Time-Saver Standards for Landscape Architecture.
- Hopper, Leonard J. (2007) Landscape Architectural Graphic Standards, Student Edition. (Note: you should seek out the regular edition of this book and other titles by Hopper for unabridged technical reference material.)
- Marsh, Willam. (2010) Landscape Planning: Environmental Applications, 5th Ed.
- Petschek, Peter. (2014) Grading: LandscapingSMART, 3D-Machine Control Systems, Stormwater Management (2nd Ed.)
- Petschek, Peter. (2008) Grading for Landscape Architects and Architects. (1st Ed.)
- Sharky, Bruce. (2014) Landscape Site Grading Principles: Grading with Design in Mind.
- Thompson, William J. & Sorvig, Kim. (2007) Sustainable Landscape Construction — 2nd Edition.
- University of Arkansas Community Design Center. (2010) Low Impact Development: A Design Manual for Urban Areas.

Equipment Needed

In addition to the required texts, you will need the drafting and model building tools and supplies from the list below. Please have those materials on hand and available at all times during class studio hours. The final deliverables for Assignment 7 will utilize the following software: CAD, graphic layout, 3D modelling and file preparation to use the laser cutters in the SAPL Workshop (full shop access is mandatory for this course).

Drafting supplies

- A calculator with trig functions
- Metric scales (scales ranging from 1:25 to 1:1000 will be used)
- Rolling ruler with rubber, no-slip wheels (a personal favorite!)

- Mechanical pencils (.3, .5, .7 and .9 recommended). Lead holders also work if kept sharpened.
- Erasers – white plastic best and Erasing Shield – cheap and very helpful for precision erasing
- Drafting brush – optional, but helpful
- Drafting (or painters) tape or dots, (tape is more flexible and can be used for model building)
- Tracing paper and/or vellum: tracing paper for practice, vellum for final assignment drafts (comes in 11x17 pads)
- Triangles: 45/45/90 degree and 30/60/90 degree (with inking edges) - optional
- Circle Templates – Large and small (with inking 'bumps')
- Colored pencils / markers (Prismacolor or equivalent)

Model building supplies

- Cutting mat – 12" x 18" minimum (do not cut on / damage the new studio desks).
- Metal straight edge(s) – with non-slip backing.
- Cutting instruments: scissors, heavier duty and precision utility knives (Olfa, Xacto etc) with refill blades (#11 blades or "snap-off" blades)
- Variety of glues (Elmer's, wood, Weldbond, glue stick, Superglue, epoxy etc.)
- Modelling clay (soft plastilina / oil-based clay works best:

Technology requirements (D2L etc.):

To successfully engage with this technical course, students should have access to the following:

- Materials from the Equipment Lists (above)
- A computer with a supported operating system, as well as the latest security, and malware updates
- A current and updated web browser
- Webcam (built-in or external)
- Microphone and speaker (built-in or external), or headset with microphone
- Current antivirus and/or firewall software enabled
- Broadband internet connection

Workshop Safety Training Requirement

If a course requires the use of the SAPL workshop, students must complete all online University of Calgary safety courses, the online Trajectory safety training course, as well as in-person workshop training and a grade of pass on the final evaluation project, to be granted access to the SAPL workshop. This training is offered once a year, around the start of the Fall term and has a completion deadline.

SAPL Workshop access is mandatory for this course.

Additional Classroom Conduct and Related Information

This course will be taught in person. Students are expected to be in attendance for the entirety of all lectures, in-class workshops, and reviews which will be scheduled during class time. (Refer to Attendance and Participation Expectations section below)

Guidelines for Zoom Sessions in Online Classes

Students are expected to participate actively in all Zoom sessions and to turn on their webcam. Please join our class in a quiet space that will allow you to be fully present and engaged in the Zoom sessions. Students must behave in a professional manner during the session. Students, employees, and academic staff are also expected to demonstrate behaviour in class that promotes and maintains a positive and productive learning environment

Assessment Components:
Assignments 1 – 6 are "solution-based" and have fixed outcomes, while the Comprehensive Grading Design Project integrates the skills acquired in Assignments 1 – 6 with the design of a specified site. The result is a technically focused design that combines design critique with technical evaluation.
Learning outcomes 1 – 6 apply to all assignments issued in this course.

Assignment	Title	Value
1	Topography, Landform and Interpolation	10%
2	Developing Grading Plans for Roadways	8%
3	Developing Grading Plans for Terraces and Pads on Slopes	10%
4	Developing a Grading Plan for a Roadway and Parking Lot	10%
5	Developing a Grading Plan for a House with a Swale	15%
6	Developing Grading Plans for Stairs, Ramps and Walls	15%
7	Comprehensive Grading Design Project – 100 Points Total	32%
	Phase 1: Clay & Cardboard Landform Model	25/100
	Phase 2: Draft Grading Plan	35/100
	Phase 3: Final Grading Plan and Laser-Cut Contour Model	40/100
Total		100%

Assessment and Evaluation Information

Attendance and Participation Expectations:
Students are expected to be in attendance for the entirety of all lectures, workshop days, and project reviews that are scheduled during class time.

Teaching Approach
Through lectures, working through exercises in class, site specific field demonstrations and assignments, we will explore different ways to develop understanding of the relation between design thinking, grading plans and built form. Landscape Architects must be able to generate design ideas in the context of a landscape setting. Understanding grading, landforms, and drainage are critical components in this process.

In-Class Exercises will be used systematically to introduce new concepts, techniques and methodologies. Worksheets will be distributed to students.

Take Home Assignments (1 - 7) will apply the knowledge gained from lectures and in-class exercises to specific site contexts. Take home assignments will be discussed in class. Printed hardcopies of Assignments 1 – 6 will be distributed to all students.

Guidelines for Submitting Assignments:
Take home assignments (Assignments 1 – 6 and the Comprehensive Grading Design Project) will be discussed in class and are due at the beginning of class time, 10:00am. All assignments are to be handed in **as both a hardcopy and a scanned PDF file** (hardcopies will be collected and/or pin-up, digital files are all to be uploaded to D2L). **A scanned PDF file of your marked assignment is due within 48 hours of being handed back.** All assignments are to be uploaded to the appropriate folder in the course D2L site.

Final Examinations:
This course will not have a final exam.

Expectations for Writing

Please refer to the University of Calgary Calendar (https://www.ucalgary.ca/pubs/calendar/current/e-2.html):

Late Assignments:

Unless agreed to by the Instructor on compassionate grounds, illness, or for reasons of academic accommodation (see note 2 below), assigned work that is handed in late will be penalized 10% of the total available grade per calendar day late (this includes weekends and holidays). Assignments more than two calendar days late will not be accepted and no credit will be given for them. Assignments must be handed in or presented during scheduled class hours. Please refer to the Academic Accommodation selection below for any clarifications.

Criteria that must be met to pass:

LAND 606 is a graded course. Incomplete (INC) and deferred term (DT) grades will be issued only for documented circumstances for which the student is clearly not able to complete the work due to significant illness, injury, etc. (please refer to Note #2 below). The course evaluation will be based on the assignments completed during the term. The basis for evaluation of each assignment issued will be present on the project brief. A passing grade is required for Assignment 7 (cumulative grade for all three phases of the project) in order to pass the course.

Grading Scale:

Grade	Grade Point Value	4-Point Range	Percent	Description
A+	4.00	4.00	95-100	Outstanding - evaluated by instructor
A	4.00	3.85-4.00	90-94.99	Excellent - superior performance showing comprehensive understanding of the subject matter
A-	3.70	3.50-3.84	85-89.99	Very good performance
B+	3.30	3.15-3.49	80-84.99	Good performance
B	3.00	2.85-3.14	75-79.99	Satisfactory performance
B-	2.70	2.50-2.84	70-74.99	Minimum pass for students in the Faculty of Graduate Studies
C+	2.30	2.15-2.49	65-69.99	All final grades below B- are indicative of failure at the graduate level and cannot be counted toward Faculty of Graduate Studies course requirements.
C	2.00	1.85-2.14	60-64.99	
C-	1.70	1.50-1.84	55-59.99	
D+	1.30	1.15-1.49	50-54.99	
D	1.00	0.50-1.14	45-49.99	
F	0.00	0-0.49	0-44.99	

A student who receives a "C+" or lower in any one course will be required to withdraw regardless of their grade point average (GPA) unless the program recommends otherwise. If the program permits the student to retake a failed course, the second grade will replace the initial grade in the calculation of the GPA, and both grades will appear on the transcript.

The School of Architecture, Planning and Landscape will not permit the Flexible Grade Option (CG Grade) for any course offered by the School. https://www.ucalgary.ca/pubs/calendar/current/f-1-3.html

Topic Areas & Detailed Class Schedule

Date	In-Class / Lecture	Reading	Assignment / Deadlines
Jan 9	Course overview Intro to Contours & Landforms	Text, CH 3	Assignment 1 – issued
Jan 11	Contours, Landforms & Watersheds Technical Drawings and Conventions	Text, CH 3 Review CH 15	WB, CH 4 in-class
Jan 16	Interpolation and Slope Formula Intro	Review CH 4	WB, CH 3 in-class
Jan 18	Slope Formula, Grading of Roadways WB, CH 5 in-class	Text, CH 5 Pg 77-89	Assignment 1 – DUE Assignment 2 – issued
Jan 23	Slope Formula, Terrace Grading & Swales WB, CH 5 in-class, Work Day	Text, CH 5, Pg 90-99	Assignment 3 – issued
Jan 25	Drainage and Swales Cont., Work Day		Assignment 2 – DUE
Jan 30	Grading of Parking Lots, Parking Dimensions, Work Day	BS, Pg 218-222	Assignment 4 – issued
Feb 1	Review of Assignments; In-Class Exercise		Assignment 3 – DUE
Feb 6	Grading Process; Drainage and Buildings, Assignment 4 Work Day	Text, CH 6	Assignment 5 – issued
Feb 8	Assignment 5 Work Day		Assignment 4 – DUE
	Feb 12-16 – SAPL Block Week *Feb 18-24 – Mid-Term Break*		
Feb 27	Stairs, Ramps and Walls Accessibility Guides (AB, BC, ADA, LARE),	Review Guides	Assignment 5 – DUE Assignment 6 – issued
Feb 29	Assignment 6 Work Day		
Mar 5	Comprehensive Grading Design Project Intro Mini field trip (on campus)		Assignment 6 – DUE
Mar 7	Storm Water Management Design Principles	Text, CH 9 & 10 LID Manual	In-class exercise
Mar 12	Storm Water Built Elements and Sizing		
Mar 14	Assignment 7 P1 model presentations		Assignment 7 P1 – pin-up
Mar 19	Assignment 7 P2 work day with Guest		KFox @ CELA Conf
Mar 21	Assignment 7 P2 work day with Guest		KFox @ CELA Conf
Mar 26	Assignment 7 draft grading plan presentations		Assignment 7 P2 – pin-up
Mar 28	Soils for Landscape Construction and Erosion / Sedimentation Control	Text, CH 7 & 8 Ch 11	
Apr 2	Cut / Fill Calculations, Work Day		In-class exercise
Apr 4	Storm Water Management Case Studies		
Apr 9	Assignment 7 final presentations		Assignment 7 P3 – pin-up

Final / Assignment 7 Documentation Due:

- Friday April 12 before the SAPL main office closes.
- All hardcopies to be turned in to SAPL main office.
- All digital files to be uploaded to D2L by 4:30pm.

* - Note: dates, lectures and guest speakers subject to change.

University of Calgary Policies and Supports

ACADEMIC ACCOMMODATION

It is the student's responsibility to request academic accommodations according to the University policies and procedures listed below. The student accommodation policy can be found at: https://www.ucalgary.ca/legal-services/university-policies-procedures/student-accommodation-policy

Students needing an accommodation because of a disability or medical condition should communicate this need to Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities:https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Accommodation-for-Students-with-Disabilities-Procedure.pdf. Students needing an accommodation in relation to their coursework or to fulfil requirements for a graduate degree, based on a Protected Ground other than Disability, should communicate this need, preferably in writing, to their instructor (contact information on first page above).

SAS will process the request and issue letters of accommodation to instructors. For additional information on support services and accommodations for students with disabilities, visit www.ucalgary.ca/access/ .

ACADEMIC MISCONDUCT

Academic Misconduct refers to student behavior which compromises proper assessment of a student's academic activities and includes: cheating; fabrication; falsification; plagiarism; unauthorized assistance; failure to comply with an instructor's expectations regarding conduct required of students completing academic assessments in their courses; and failure to comply with exam regulations applied by the Registrar.

For information on the Student Academic Misconduct Policy and Procedure please visit: https://www.ucalgary.ca/legal-services/university-policies-procedures/student-academic-misconduct-policy Additional information is available on the Academic Integrity Website at https://ucalgary.ca/student-services/student-success/learning/academic-integrity.

COPYRIGHT LEGISLATION:

All students are required to read the University of Calgary policy on Acceptable Use of Material Protected by Copyright (https://www.ucalgary.ca/legal-services/university-policies-procedures/acceptable-use-material-protected-copyright-policy) and requirements of the copyright act (https://laws-lois.justice.gc.ca/eng/acts/C-42/index.html) to ensure they are aware of the consequences of unauthorised sharing of course materials (including instructor notes, electronic versions of textbooks etc.). Students who use material protected by copyright in violation of this policy may be disciplined under the Non-Academic Misconduct Policy (https://www.ucalgary.ca/pubs/calendar/current/k.html).

INSTRUCTOR INTELLECTUAL PROPERTY

Course materials created by instructors (including presentations and posted notes, labs, case studies, assignments and exams) remain the intellectual property of the instructor. These materials may NOT be reproduced, redistributed or copied without the explicit consent of the instructor. The posting of course materials to third party websites such as note-sharing sites without permission is prohibited. Sharing of extracts of these course materials with other students enrolled in the course at the same time may be allowed under fair dealing.

FREEDOM OF INFORMATION AND PROTECTION OF PRIVACY

Student information will be collected in accordance with typical (or usual) classroom practice. Students' assignments will be accessible only by the authorized course faculty. Private information related to the individual student is treated with the utmost regard by the faculty at the University of Calgary.

SEXUAL AND GENDER-BASED VIOLENCE POLICY

The University recognizes that all members of the University Community should be able to learn, work, teach and live in an environment where they are free from harassment, discrimination, and violence. The University of Calgary's sexual violence policy guides us in how we respond to incidents of sexual violence, including supports available to those who have experienced or witnessed sexual violence, or those who are alleged to have committed sexual violence. It provides clear response procedures and timelines, defines complex concepts, and addresses incidents that occur off-campus in certain circumstances. Please see the policy available at https://www.ucalgary.ca/legal-services/university-policies-procedures/sexual-and-gender-based-violence-policy .

UNIVERSITY STUDENT APPEALS OFFICE

If a student has a concern about a grade that they have received, they should refer to Section I of the Undergraduate Calendar (https://www.ucalgary.ca/pubs/calendar/current/i-3.html) which describes how to have a grade reappraised. In addition, the student should refer to the SAPL's Procedure for reappraisal of grades

OTHER IMPORTANT INFORMATION

Please visit the Registrar's website at: https://www.ucalgary.ca/registrar/registration/course-outlines for additional important information on the following:

- Wellness and Mental Health Resources
- Student Success
- Student Ombuds Office
- Student Union (SU) Information
- Graduate Students' Association (GSA) Information
- Emergency Evacuation/Assembly Points
- Safewalk