



Course Title: **Site Technology I: Grading & Landform**  
Course Number: **LAND 606**

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Class Dates: Fall 2020, Tuesdays & Thursdays  
Class Times: 9:50 – 11:50 AM

Class Location: Online

### **Course Description:**

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 of 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.

### **Course Learning Objectives**

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.

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 on line.
- 2010 ADA Standards for Accessible Design. PDF available on line.
- British Columbia Building Access Handbook (2014). PDF available on line.
- 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 (quality does matter here / my 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

**(OPTIONAL with online delivery, digital models will be accepted as alternatives):**

- 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 (plastilina / oil-based works best: Roma Plastilina "soft-med" is highly recommended)

## Assessment and Evaluation Information

EVDL 603 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 in order to pass the course. There will be no final examination.

## 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.

### **Guidelines for Submitting Assignments**

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

Take Home Assignments will apply the knowledge gained from lectures and in-class exercises to specific site contexts. Take home assignments will be discussed in class and are due at the beginning of class time, as both a hardcopy and a scanned PDF file (10:00am collection and/or pin-up). 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 course D2L site.

### **Timely Completion of Projects**

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.

### **Preliminary Course Assignment List & Values**

<b>Assignment</b>	<b>Title</b>	<b>Value</b>
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 a House with a Swale	15%
6	Developing Grading Plans for Stairs, Ramps and Walls	15%
7	Comprehensive Grading Design Project	32%
		<b>Total 100%</b>

## Grading Scale

Final grades will be reported as letter grades, with the final grade calculated according to the 4-point range. Assignments will be evaluated by percentage grades, with their letter grade equivalents as shown.

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	

### Notes:

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.

## Course Schedule\*

Date	Lecture Topic	Readings	Assignments
Sept 8	Course overview Introduction: Contours, Landforms	Text, CH 4	Assignment 1 – issued
Sept 10	Interpolation and Slope Formula Intro Technical Drawings and Conventions	Text, CH 3 Review CH 15	Assignment 1 – issued WB, CH 4 in-class
Sept 15	Contours, Landforms & Watersheds	Review CH 1-2	WB, CH 3 in-class
Sept 17	Slope Formula, Grading of Roadways	Text, CH 5 Pg 77-89	<b>Assignment 1 – DUE</b> Assignment 2 – issued WB, CH 5 in-class
Sept 22	Slope Formula, Terrace Grading & Swales Work Day	Text, CH 5, Pg 90-99	Assignment 3 – issued WB, CH 5 in-class
Sept 24	Drainage and Swales – Reprised Work Day		<b>Assignment 2 – DUE</b>
Sept 29	Grading of Parking Lots, Parking Dimensions Work Day	BS, Pg 218-222	Assignment 4 – issued
Oct 1	Review of Assignments; In-Class Exercise		<b>Assignment 3 – DUE</b>
<b>October 5-9 – SAPL BLOCK WEEK – NO CLASSES</b>			
Oct 13	Grading Process; Drainage and Buildings Parking Lot (A – 4) Work Day	Text, CH 6	Assignment 5 – issued
Oct 15	Comprehensive Grading Design Project Intro Mini field trip (on campus)		Assignment 7 – issued <b>Assignment 4 – DUE</b>
Oct 20	Assignments 5 & 7 Work Day		
Oct 22	Stairs, Ramps and Walls Accessibility Guides (AB, BC, ADA, LARE)	Review Guides	<b>Assignment 5 – DUE</b> Assignment 6 – issued
Oct 27	Assignment 7 clay & cardboard model Presentations		<b>Assignment 7 P1 – DUE</b>
Oct 29	Stairs / Ramps (A – 6) Work Day		
Nov 3	Storm Water Management Design Principles, Built Elements and Sizing In-class exercise	Text, CH 9-10 LID Manual	<b>Assignment 6 – DUE</b>
Nov 5	Storm Water Management Design -continued with In-class exercise		
<b>Nov 9-13 – READING WEEK – NO CLASSES</b>			

Nov 17	Assignment 7 draft grading plan presentations	<b>Assignment 7 P2 – DUE</b>
Nov 19	Soils for Landscape Construction and Erosion / Sedimentation Control	Text, CH 7-8 Ch 11
Nov 24	Cut / Fill Calculations – Work Day	
Nov 26	Storm Water Management Case Studies Guest Lecture TBD	
Dec 1	Planting Plans and Planting Details	
Dec 3	Work Day	
Dec 8	Assignment 7 final presentations	<b>Assignment 7 P3 – DUE</b>
Dec 11	<i>No Class</i> <b>Final / Assignment 7 Documentation Due:</b> • All digital files to be uploaded to D2L by 4:30pm.	<b>Final Assignment DUE by 4:30 PM</b>

\* **Note:** Dates, lectures and guest speakers subject to change.

## Media and Recording in Learning Environments

### Part 1

University Calendar: <https://www.ucalgary.ca/pubs/calendar/current/e-6.html>

Recording of lectures (other than audio recordings that are pre-arranged as part of an authorized accommodation) is not permitted.

Students may not record any portion of a lecture, class discussion or course-related learning activity without the prior and explicit written permission of the course instructor or authorization from Student Accessibility Services. For any other use, whether by duplication, transcription, publication, sale or transfer of recordings, written approval must be obtained from the instructor for the specific use proposed. Any use other than that described above constitutes academic misconduct and may result in suspension or expulsion.

### Part 2

The instructor may use media recordings to capture the delivery of a lecture. The instructor will notify all students and guests in the class that the event is being recorded. If a student or guest wants to take steps to protect privacy, and does not want to be recorded, the instructor will provide the individual (s) with an alternative means of participating and asking questions (e.g., passing written notes with questions). Students cannot be penalized for choosing not to be recorded in situations where participation is part of the course. Students must be offered other ways of earning participation credit that do not involve recording.

Any video-recording would be intended to only capture the instructor and the front of the classroom. Students/other participants would not necessarily be visible on video recordings.

## **University of Calgary Policies and Supports**

### **ACADEMIC ACCOMMODATION**

Students seeking an accommodation based on disability or medical concerns should contact Student Accessibility Services; 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/](http://www.ucalgary.ca/access/). Students who require an accommodation in relation to their coursework based on a protected ground other than disability should communicate this need in writing to their Instructor. The full policy on Student Accommodations is available at <http://www.ucalgary.ca/policies/files/policies/student-accommodation-policy.pdf>

### **ACADEMIC MISCONDUCT**

Plagiarism involves submitting or presenting work in a course as if it were the student's own work done expressly for that particular course when, in fact, it is not. Most commonly plagiarism exists when: (a) the work submitted or presented was done, in whole or in part, by an individual other than the one submitting or presenting the work, (b) parts of the work are taken from another source without reference to the original author, (c) the whole work (e.g., an essay) is copied from another source, and/or, (d) a student submits or presents work in one course which has also been submitted in another course (although it may be completely original with that student) without the knowledge of or prior agreement of the instructor involved. While it is recognized that scholarly work often involves reference to the ideas, data and conclusions of other scholars, intellectual honesty requires that such references be explicitly and clearly noted. Plagiarism is an extremely serious academic offence. Any suspicion of plagiarism will be reported to the Dean, and dealt with as per the regulations in the University of Calgary Graduate Calendar. For information on academic misconduct and its consequences, please see the University of Calgary Calendar at <http://www.ucalgary.ca/pubs/calendar/current/k.html>

### **COPYRIGHT LEGISLATION:**

All students are required to read the University of Calgary policy on Acceptable Use of Material Protected by Copyright ([www.ucalgary.ca/policies/files/policies/acceptable-use-of-material-protected-by-copyright.pdf](http://www.ucalgary.ca/policies/files/policies/acceptable-use-of-material-protected-by-copyright.pdf)) 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.

### **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.

### **UNIVERSITY STUDENT APPEALS OFFICE:**

If a student has a concern about the course, academic matter, or a grade that they have been assigned, they must first communicate this concern with the instructor. If the concern cannot be resolved with the instructor, the student can proceed with an academic appeal, which normally begins with the Faculty. See: <https://ucalgary.ca/student-appeals/>

More student support and resources (e.g. safety and wellness) can be found here: <https://www.ucalgary.ca/registrar/registration/course-outlines>