

EVDL 603 Site Technology I: Grading & Landform

Contact Info

Site Technology I: Grading & Landform // EVDL 603 // H(2-2) // Fall 2016

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PF 3181, hours by appointment

“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.”

Catherine Dee, from *Form and Fabric in Landscape Architecture*

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 built 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 and individual take home assignments.

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 (EVDL 605).

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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.

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.

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 texts are 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>
- 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>

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 technical reference material.)

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- 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.*

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

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 (10:00am collection and/or pin-up).

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 6 will utilize CAD software.

Drafting supplies

- A hand held calculator for this class (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!)
- Mechanical pencils (.3, .5, .7 and .9 recommended). Lead holders also work.
- Pencil sharpener / lead sharpener (for lead holders)
- Erasers – white plastic, yellow (ink). There are other types, but they are not as effective.
- Erasing Shield
- Drafting brush (clean up those big mistakes)
- Drafting (or painters) tape or dots, (tape is more flexible and can be used for model building)
- Rolls of trace paper: comes in 12", 18", 24", long rolls, yellow, canary or white.
- Other paper: vellum, mylar (can handle more erasing than trace)
- Triangles: 45/45/90 degree and 30/60/90 degree (with inking edges)
- Adjustable Triangle (with inking edges, if available)
- Circle Templates – Large and small (with inking 'bumps')
- Colored pencils (Prismacolor or equivalent)

Model building supplies

- Cutting mat (you are responsible for purchasing a cutting surface and not damaging the desks).
- Metal straight edge(s) – with non-slip backing
- Cutting mat – 12" x 18" minimum
- Scissors (with sharp, clean blades!)
- Xacto knives, and refill blades (#11 blades or "snap-off" blades) for your knives.
- Heavier duty blade – Olfa or Xacto with "snap-off" blades (utility knife / box cutter)
- Variety of glues (Elmer's, wood, Weldbond, glue stick, Superglue)
- Modelling clay (plastilina / oil-based works best: Roma Plastilina "soft-med" is highly recommended)

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Course Schedule

Date	In-Class / Lecture	Reading	Assignment / Deadlines
Sept 12	Introduction		Brief Campus Walk Text, CH 1 & 2
Sept 14	Contours, Slopes, Sections and Visualization Technical Drawings and Conventions	Text, CH 3 Review CH 15	Assignment 1 – issued WB, CH 3 in-class
Sept 19	EVDS Field Trip - Portland		No Class
Sept 21	EVDS Field Trip - Portland		No Class
Sept 26	Slope Formula and Interpolation Work Day	Text, CH 4	Assignment 1 – DUE WB, CH 4 in-class Assignment 2 – issued
Sept 28	Slope Formula, Terrace Grading & Swales The Context of Calgary – Guest Lecture (GH)	Text, CH 5 Pg 90-99	
Oct 3	Drainage and Swales Work Day		
Oct 5	Grading Process; Drainage and Buildings Surveying: guest George Harris		Assignment 2 – DUE
Oct 10	Canadian Thanksgiving		No Class
Oct 12	EVDS Block Week		No Class
Oct 17	Grading of Roadways	Text, CH 5, Pg 77-89	Assignment 3 – issued WB, CH 5 in-class
Oct 19	Grading of Parking Lots, Parking Dimensions Work Day		
Oct 24	Stairs, Ramps and Walls Accessibility Guides (AB, BC, ADA / LARE)	Text, CH 6	Assignment 3 – DUE Assignment 4 – issued
Oct 26	Work Day		

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Date	In-Class / Lecture	Reading	Assignment / Deadlines
Oct 31	Storm Water Management Built Elements	Text, CH 9 & 10 LID Manual	
Nov 2	Guest – Bernie Amell, Source2Source Hydrology – The Rational Method, TR55, SCS	Text, CH 12 & 13	Assignment 4 – DUE Assignment 5 – issued (In-class Workshop)
Nov 7	Guest – Bernie Amell, Source2Source Hydraulics - Manning Equation and Storm Water Systems	Text, CH 13 & 14	In-class Workshop cont.
Nov 9	Comprehensive Grading Design Project Intro and site walk (on campus)		Assignment 5 – DUE Assignment 6 – issued
Nov 14	Stormwater Design Principles Work Day		
Nov 16	Assignment 6 progress presentations		Assignment 6 – pin-up
Nov 21	Stormwater Design Principles Work Day	TBA	
Nov 23	Soils; Cut and Fill (Guest TBA) Work Day	Text, CH 7 & 8	WB, CH 7 & 8 in-class
Nov 28	Assignment 6 progress presentations		Assignment 6 – pin-up
Nov 30	Erosion Control Ponds, Dams, Sedimentation Control	Text, CH 11	
Dec 5	Work Day		
Dec 7	Assignment 6 presentations		Assignment 6 – DUE

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

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Means of Evaluation

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

Preliminary Course Assignment List & Values

Assignment	Title	Value
1	Topography, Landform and Interpolation	8%
2	Developing Grading Plans for Terraces and Pads on Slopes	17%
3	Developing Grading Plans for Roadways and Parking Lots	17%
4	Developing Grading Plans for Stairs, Ramps and Walls	17%
5	Stormwater Management	8%
6	Comprehensive Grading Design	33%
Total		100%

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.

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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.

Notes:

1. Written work, term assignments and other course related work may only be submitted by e-mail if prior permission to do so has been obtained from the course instructor. Submissions must come from an official University of Calgary (ucalgary) email account.
2. Academic Accommodations. Students who require 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 or the designated contact person in EVDS, Jennifer Taillefer (jtaillef@ucalgary.ca). Students who require an accommodation unrelated to their coursework or the requirements for a graduate degree, based on a protected ground other than disability, should communicate this need, preferably in writing, to the Vice-Provost (Student Experience). For additional information on support services and accommodations for students with disabilities, visit www.ucalgary.ca/access/
3. Plagiarism - 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 (this includes having another impersonate the student or otherwise substituting the work of another for one's own in an examination or test),(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. It is recognized that clause (d) does not prevent a graduate student incorporating work previously done by him or her in a thesis. Any suspicion of plagiarism will be reported to the Dean, and dealt with as per the regulations in the University of Calgary Graduate Calendar.
4. Information regarding the Freedom of Information and Protection of Privacy Act (<http://www.ucalgary.ca/secretariat/privacy>) and how this impacts the receipt and delivery of course material
5. Emergency Evacuation/Assembly Points (<http://www.ucalgary.ca/emergencyplan/assemblypoints>)
6. Safewalk information (<http://www.ucalgary.ca/security/safewalk>)
7. Contact Info for: Student Union (<https://www.su.ucalgary.ca/contact/>); Graduate Student representative(<http://www.ucalgary.ca/gsa/>) and Student Ombudsman's Office (<http://www.ucalgary.ca/ombuds/>).