

LANDSCAPE CONSTRUCTION: TOPOGRAPHIC DESIGN

USC MASTER OF LANDSCAPE ARCHITECTURE PROGRAM

WEEK 1, 01-10-17

COURSE SYLLABUS, LANDSCAPE CONSTRUCTION: TOPOGRAPHIC DESIGN

SUMMARY INFO

- ◆ Course number: ARCH 534
- ◆ Start Date January 10th; last scheduled class at 15th week April 25th (Final Exam date and time to be announced)
- ◆ Class meeting time: Tuesdays, from 9:00 a.m. to 11:50 a.m.
- ◆ Number of class meetings: 15 meetings plus one two-hour Final Exam
- ◆ Units: 3 semester units
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ABOUT TOPOGRAPHIC DESIGN AND LEARNING OUTCOMES

The title of this course, Landscape Construction: Topographic Design (hereinafter to be referred to as Topographic Design, or ARCH 534), is potentially misleading. The word topographic is defined in the dictionary as *relating to the arrangement or accurate representation of physical features of an area on the earth's surface*. Wikipedia defines it as *the study of the shape and features of the surface of the Earth*. Regrettably, neither of these definitions completely defines topographic in the context of landscape architecture. For our purposes, topographic means grading, and grading simply means *the act of moving soil from one place to another to accommodate some human purpose*. In fact, a more comprehensive title for Topographic Design would be *Grading, Drainage and Stormwater Management*, because both drainage and stormwater management are implicit in the act of grading. Consequently, *Topographic Design* could be called *Grading, Drainage, and Stormwater Management*, because that's what this course is all about.

Why grading? Undeveloped land in its raw, undisturbed state, is almost never suited to development without intervention. And even land that has been previously developed must be modified, sometimes extensively, to accommodate a

new design program. What about drainage? All surfaces must have positive drainage away from structures and other site amenities that would be harmed by the intrusion of stormwater. And what about stormwater management? Stormwater management refers to how stormwater is dealt with. Historically, the goal has been to *dispose* of excess stormwater as quickly as possible. Today, the goal is to *retain* as much stormwater on the site as is practical to allow it to percolate into the ground to help replenish ground water and reduce pressure on the drainage infrastructure.

Learning Outcomes: Upon completion of this course, students will:

- ◆ be able to identify natural and manmade contour signatures and utilize these signatures to execute grading design through the manipulation of contours
- ◆ be able to apply the basic grading formulas to calculate grade, length, vertical difference in elevation and cross slope
- ◆ be able to grade a site of moderate complexity
- ◆ be able to apply stormwater management design competencies, including the design of retention and detention basins, control of first flush runoff, erosion control, and knowledge of current regulatory requirements
- ◆ be able to design aesthetically satisfying grading solutions
- ◆ be familiar with the principles of landform grading as they relate to large scale land development
- ◆ be able to design drainage systems; apply common drainage formulae such as the Rational Formula
- ◆ be familiar with other competencies that are traditionally associated with grading, drainage and stormwater management, including:
 - Basic elevation surveying and the creation of topographical maps from raw survey data
 - Cut and fill calculations – cut and fill refers to the measurement of volumes of soil that is removed (cut) or added (fill) when a site is graded
 - Road design through use of horizontal and vertical curve design techniques
 - coordinate systems
 - use of formulas to determine areas of geometric shapes, and use of CAD software to determine areas of non-geometric shapes
 - field grading practices
 - codes and ordinances pertaining to grading and drainage design
 - soil compaction techniques and compaction testing
 - use and correct placement of expansion/contraction joints and control joints in concrete paving
 - familiarity with standard construction details that pertain to grading and drainage design

LEARNING PHILOSOPHY AND COURSE WORK

Confucius said, paraphrasing: *Tell me I forget; show me I might remember; involve me in the doing and then I know.*

- ◆ learning by simply hearing is limited because hearing is the weakest of the seven physical senses
- ◆ learning by seeing is more effective because seeing is one of our strongest physical senses

- ♦ learning by doing encompasses all seven of our physical senses – sight, smell, touch, taste, hearing, intuition, and equilibrium. Learning by doing is at the core of experiential learning

Experiential learning in ARCH 534 is realized through the assignment of progressively more rigorous in-class exercises and homework assignments, a two-part term project, and a midterm and final exam.

- ♦ *Exercises* – Exercises are done in class and are designed to introduce homework assignments. Solutions are provided for all exercises to enable self-evaluate of solutions (exercises are not for credit).
- ♦ *Homework* – Homework consists of 12 assignments. As mentioned above, each is introduced by an exercise that presents similar material. Each homework assignment is worth 50 points, or 600 points total out of a total of 1250 points for the semester.
- ♦ *Two Part Term Project*
 - Part A – The goal of Part A is to gain familiarity with landforms both natural and manmade, and the physical elements that make up drainage systems and stormwater management implementations.
 - Part B – Part B is a capstone project that brings together everything learned during the semester into the design of one project. Work on Part II begins at the beginning of the semester, and progresses incrementally as new skills and abilities are mastered. A series of special Term Project Specific Exercises (SPSE) tailored for Part II are assigned as the semester progresses. In addition, three term project specific desk critiques are required during the semester.
- ♦ *Incremental delivery of course content* – To minimize large leaps in understanding, every reasonable effort has been made to make the flow of information is as *stepless* as possible.
- ♦ *Reading Assignments* – The Week-By-Week Course Outline below assigns required readings from the course reader for each week. In addition to the course reader, reading and comprehension of all course handouts is a requirement.
- ♦ *Field Trip* – Date, time and location to be announced.
- ♦ *Guest Lecturer* – Date and time to be announced.
- ♦ *Exams* – Validation and reinforcement of learned skills is realized through the administration of a mid-term and a final examination. The exam format is comprised of multiple-choice, true/false, and graphic response problems. Exams serve two key purposes:
 - Studying for an exam reinforces learning by obliging the student to review and synthesize what has been previously learned.
 - Testing is the *psychometric* aspect of an exam; it measures what the student has learned, it exposes areas of weakness and it reveals how effectively the teacher is teaching.

RIGOR

The single greatest challenge of any study of grading is that we're obliged to view three-dimensional objects in plan view – on a flat sheet of paper. In order to translate from a two-dimensional representation of a landform to a three-dimensional reality takes experience, which will come with practice. Fortunately, on sites having large vertical differences in elevation (of several feet or more), we have a most ingenious graphic devise called a *contour line*, or just *contour*, that makes that leap relatively easy. Unfortunately, contours can only be used to describe relatively large changes in vertical elevation.

For finer changes, we must rely on elevations represented numerically. Describing a landform numerically is decidedly non-graphic – to visualize a landform described by numbers requires the observer to compare two numeric elevations to one another know how much change in elevation the numbers actually represent. Reading a landform represented by numbers is, to say the least, an abstraction of reality. Fortunately, there are three easy to use formulas that come to the rescue that help make sense of finer landforms.

Most students quickly develop an ability to visualize landforms through contours and numerically. Students that diligently apply themselves find this course fulfilling and come away with a deep sense of accomplishment. More importantly, virtually all students find that being able to apply what they've learned in ARCH 534 to the solution of **design problems** immensely satisfying.

There are several other contributors to rigor. These are:

- ♦ *Quantity of Information and Pace of Delivery* – Topographic Design is an *information intensive* course. To achieve the required learning outcomes, the course is, of necessity, fast-paced.
- ♦ *Foundational Course Structure* – each skill area mastered serves as the foundation for what is to follow, consequently, each skill area is critical. If a skill area is not mastered, it invariably causes a problem later.

IDENTIFIERS USED IN THIS SYLLABUS

The letters and symbol shown below are used in the Week-By-Week Course Outline below to denote and emphasize exercises, homework assignments, term project milestones, and reading assignments in the course *Reader*.

HW Homework Assignment

EX Exercises

TP Term Project

TPSE Term Project Specific Exercises

 Reading Assignments

CRITICAL DATES TO KNOW

TP Week 1, January 10th **Term Project Parts A and B** assigned

TP Week 3, January 24th **1st Term Project Part B Required desk critique** – Term Project Base Sheet due, review and grade in class

Exam Week 7, February 23rd, Midterm exam

TP Week 9, March 7th **2nd Term Project Part B Required desk critique**

Spring Break, March 14th – **No Class**

TP Week 10, March 21st **Term Project Part A**, hand-in

TP Week 11, March 28th **3rd Term Project Part B Required desk critique**

TP Week 13, April 11th **Term Project Part B** due for hand-in

WEEK-BY-WEEK COURSE ROAD MAP**WEEK 1 – JANUARY 10th**

- ◆ Introduction, class roster, name placards, course reader, review of syllabus
 - Grading requirements and how your letter grade is determined
 - Calculator requirements
 - Drafting gear requirements
 - Introduction to course Reader
 - Weekly reading assignments
 - About homework assignments and exercises
- ◆ Grading is Design!

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- ◆ The language of grading – terms used in grading, drainage design, and stormwater management
- ◆ Basic principles of grading – drainage is implicit in grading design
- ◆ Introduction to basic contour signatures
- ◆ Introduction to topographic maps
- ◆ Methods of plotting whole number contours
- ◆ Introduction to grid coordinate systems and engineering stationing

EX Exercise 1, Basic Contour Signatures and Contour Interpolation

HW Homework 1, Plotting Whole Number Contours by Interpolation

TP Term Project Parts A and B assigned, review problem statement

 **Reading – Read this syllabus in its entirety; read all course handouts in their entirety**

WEEK 2 – JANUARY 17th

- ◆ Turn in Homework 1 and review assignment
- ◆ The natural landscape: Dynamics of earth building processes and plate tectonics
- ◆ Basic soils and Soil classification systems
 - Agricultural,
 - Engineering
 - Geologic
- ◆ How to take a soil sample and soil testing
- ◆ How soil pH impacts nutrient availability
- ◆ Flat versus level – what's the difference?
- ◆ Introduction to the three grading formulas (refer to name placard): Grade, Difference in Elevation, and Length
- ◆ Keynote Presentation, focus on grading and drainage – applies to Part A of Term Project

EX Exercise 2, Familiarization with Contours

EX Exercise 3, Introduction to Grading Formulas

HW Homework 2, Using the Grading Formulas

 **Reading – Read course handouts; Reader, read Introduction and Chapter 1 to page 21**

WEEK 3 – JANUARY 24th

- ♦ Return Homework 1 and hand out solutions to Homework
- ♦ Turn in Homework 2 and review assignment
- ♦ Review of the three grading formulas
- ♦ Contours versus spot elevations – what's the difference
- ♦ Where to use spot elevations, where not to use them
- ♦ Existing contours vs. revised contours
- ♦ Plotting contour lines on plane surfaces
- ♦ How contours are manipulated – existing contours versus revised contours

TP 1st Required Term Project Desk Critique – base sheet due, review and grade in class

EX Exercise 4, Plotting Whole Number Contours on Plane Surfaces

EX Exercise 5, Revising Contours

TPSE Term Project Specific Exercise 1, Siting the Building

HW Homework 3, Plotting Whole Number Contours on a Plane Surface

 **Reading – Read course handouts; *Reader*, pages 22 to 38 (to How to Plot Whole Number Contours)**

WEEK 4 – JANUARY 31ST

- ♦ Return Homework 2 and hand out solutions to Homework 2
- ♦ Turn in Homework 3 and review assignment
- ♦ Hand out solutions to Homework 2
- ♦ Turn in Homework 3 and review assignment
- ♦ Introduction to cross slopes and the cross slope formula
- ♦ When a contour encounters a vertical object, such as a curb or a wall

EX Exercise 6, Cross Slopes on Plane Surfaces

EX Exercise 7, Using Contour Run to Determine Vertical Height or Depth

EX Exercise 8, Calculating the Length of a Contour Run

HW Homework 4, Cross Slopes, Revising Contour Lines, & Calculating Spot Elevations

 **Reading – Read course handouts in their entirety; *Reader* from pages 39 to 49**

WEEK 5 – FEBRUARY 7th

- ♦ Return Homework 3 and hand out solutions to Homework 3
- ♦ Turn in Homework 4 and review assignment
- ♦ Keynote presentation – miscellaneous grading
- ♦ Freeboard
- ♦ Role of landscape architect, civil engineer, and grading contractor in the execution of a grading solution

TPSE Term Project Specific Exercise 2, Grading The Parking Lot

EX Exercise 9, Grading a Simple Parking Lot

HW Homework 5, Grading Problems, Various

 **Reading – read all course handouts; *Reader* pages 50 to 55**

WEEK 6 – FEBRUARY 14th

- ♦ Return Homework 4 and hand out solutions to Homework 4
- ♦ Turn in Homework 5 and review assignment
- ♦ Setting finish floor elevations
- ♦ Use of steps in the landscape
- ♦ Introduction to design of horseshoe swales
- ♦ **Mid-term exam** next week; in-class review of what mid-term exam will test

HW No homework assignment this week – use time to study for Mid-Term Exam

TPSE Term Project Specific Exercise 3, Grading the East-West Walk Between Parking Lot and Building

EX Exercise 10, Designing a Horseshoe Swale

EX Exercise 11, Grading a Level Sports Field and a Road

 **Reading** – read all course handouts; *Reader* pages 56 to 90

WEEK 7 – FEBRUARY 21st

- ♦ **Mid-Term Exam** (covers all material covered 1st through 6th week) duration one-hour
- ♦ Review of what Mid-Term exam will test
- ♦ Introduction to drainage design with Keynote Presentation
- ♦ Drainlines and calculating cover
- ♦ Drainage intake structures (e.g., catch basins, area drains)
- ♦ Drainage discharge structures (e.g., underwalk drains)
- ♦ Bench drains, down drains and wattling and other erosion control techniques
- ♦ Endwalls and headwalls

EX Exercise 12, Minimizing Head Loss at Drainage Structures, Setting Invert Elevations

EX Exercise 13, Cover Over Drainlines

HW Homework 6, Intermediate Grading Problems

 **Reading** – read all course handouts; *Reader* pages 92 to 117

WEEK 8 – FEBRUARY 28th

- ♦ Return Homework 5 and hand out solutions to Homework 5
- ♦ Turn in Homework 6 and review assignment
- ♦ Mass gravity retaining structures (gabions)
- ♦ Head loss in drainage systems and setting invert elevations
- ♦ Trail design

EX Exercise 14, Ubehebe Crater Trail Design

EX Exercise 15, Endwall Grading and Setting Invert and Rim Elevations

TPSE Term Project Specific Exercise 3, Walk from Parking Lot to Building

HW Homework 7, Advanced Grading Problems

 **Reading** – read all course handouts; *Reader* pages 118 to 124

WEEK 9 – MARCH 7th

- ◆ Return Homework 6 and hand out solutions to Homework 6
- ◆ Turn in Homework 7 and review assignment
- ◆ Secondary escape of stormwater
- ◆ Rational Formula (for performing surface run-off calculations)
- ◆ Introduction to stormwater management
- ◆ Regulatory
 - National Pollution Discharge Elimination System (NPDES)
 - Standard Urban Stormwater Mitigation Plan (SUSMP)
 - Stormwater Pollution Prevention Plan (SWPPP)
 - City of Los Angeles Stormwater Program
 - Introduction to Best Management Practices (BMP)
- ◆ On-site storage of stormwater
- ◆ Retention versus detention of stormwater
- ◆ Bio swales
- ◆ Permeable paving
- ◆ First flush runoff and debris separators

TP 2nd Required Term Project Desk Critique

TPSE Term Project Specific Exercise 4, Grading the Disabled Person Ramp

EX Exercise 16, Rational Method

EX Exercise 17, Curb Cut at Driveway

EX Exercise 18, The Earthen Dam Contour Signature

HW Homework 8, Rational Method, Pool Deck, and Parking Lot Grading Design

 **Reading – read all course handouts; Reader pages 126 to 149**

WEEK of MARCH 14th Spring Break – NO CLASS

WEEK 10 – MARCH 21st

- ◆ Return Homework 7 and hand out solutions to Homework 7
- ◆ Turn in Homework 8 and review assignment
- ◆ Introduction to erosion control
- ◆ Keynote presentation–stormwater management
- ◆ Wetlands and sustainability
- ◆ Sediment control
- ◆ Design of retention basins based on cubic foot capacity
- ◆ Earthen dam design and contour signature
- ◆ Designing a retention basin on a flat site
- ◆ Designing a retention basin on a sloping site

EX Exercise 19, Retention Pond Based on Existing Swale

EX Exercise 20, Retention Pond Based on Gently Sloping Site

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HW Homework 9, Advanced Rational Method, Design of Retention/Detention Structures



Reading – read all course handouts; in Reader page 150 to page 175

TP Term Project Part A Hand-in

WEEK 11 – MARCH 28th

- ◆ Return Homework 8 and hand out solutions to Homework 8
- ◆ Turn in Homework 9 and review assignment
- ◆ How to prepare a slope analysis map
- ◆ Defining watershed areas
- ◆ Use of CAD software to measure areas of non-geometric shapes
- ◆ Designing to specific grade limits

TPSE Term Project Specific Exercise 5, Swale Around Visitor Center Building

TP 3rd Required Term Project Desk Critique

EX Exercise 21, Defining a Watershed Area and Slope Analysis

EX Exercise 22, Defining a Large Scale Watershed Area

HW Homework 10, Defining a Large Watershed Area



Reading – read all course handouts; in Reader page 176 to page 179 to Velocity of Flow Criteria

WEEK 12 – APRIL 4th

- ◆ Return Homework 9 and hand out solutions to Homework 9
- ◆ Turn in Homework 10 and review assignment
- ◆ Grading engineering requirements, utilities, permits, and codes
- ◆ Cut and fill calculations
 - Barrow Pit Method
 - Average End Area Method
 - Planimeter (Contour) Method
- ◆ Compaction of soil
- ◆ The aesthetics of grading
- ◆ Soil modeling, mounding, and land sculpting
- ◆ Introduction to surveying

TPSE Term Project Specific Exercise 6, Retention Pond and Underwalk Culvert

EX Exercise 23, Differentiating Between Cut and Fill in Plan and Section

EX Exercise 24, Calculating Cut and Fill Three Ways

EX Exercise 25, Elevation Survey

TP Term Project – second required in-class review

HW Homework 11, Cut and Fill Calculations



Reading – read all course handouts; final Reader assignment page 179 to page 189

WEEK 13 – APRIL 11th

- ♦ Return Homework 10 and hand out solutions to Homework 10
- ♦ Turn in Homework 11 and review assignment
- ♦ Geotechnical – interpreting soil borings
- ♦ Score lines and control joints in concrete paving

TP Term Project Part B Hand-in

EX Interactive Exercise 26, Grading a Tot Lot

EX Exercise 27, Expansion/Contraction Joints in Concrete Paving

EX Interactive Exercise 28, Screening with an Earthen Berm

HW Homework 12, Grading a Croquet Court (Geotechnical Problem)

 **Reading – read all course handouts**

WEEK 14 – APRIL 18th

- ♦ Return Homework 11 and hand out solutions to Homework 11
- ♦ Turn in Homework 12 and review assignment
- ♦ Golf course design
- ♦ Keynote Presentation – how a golf green is constructed
- ♦ Sub drainage using perforated pipes
- ♦ Capillary action and how it affects the movement of water in soil

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EX LARE Simulation Exercise 29, Grading a Playground

EX Interactive Exercise 30, Grading a Parking Lot and Road

EX Timed Exercise 31, Site Evaluation

EX Interactive Exercise 32, Road Cut Through Berm

 **Reading – read all course handouts**

WEEK 15 – APRIL 25th

- ♦ Return Homework 12 and hand out solutions to Homework 12
- ♦ Final Exam prep – review of what is to be tested
- ♦ Profiles and stationing, coordinate systems
- ♦ Horizontal and vertical curves in road design
- ♦ Course wrap-up

EX Exercise 33, Preparation for Graphic Response Section of Final Exam

EX Interactive Exercise 34, Grading a Hilltop Pad

EX Exercise 35, Horizontal Curve Design

 **Reading – read all course handouts**

WEEK 16 – Final Exam (date, time, and place to be announced)

- ♦ Final Exam tests all material presented during semester. Duration two hours. Points possible = 200

Grading Standards

Homework Assignments, twelve, each worth 50 points	600	points
Mid-term Exam	100	points
Final Examination	200	points
Term Project Part A	100	points
Term Project Part B	250	points
Total Points Possible for Semester	1250	Points

Letter Grade Earned and Point Spread

Grade	From	To	Grade	From	To
A+	1250	1215	C	998	963
A	1214	1179	C-	962	927
A-	1178	1143	D+	926	891
B+	1142	1107	D	890	855
B	1106	1071	D-	854	819
B-	1070	1035	Fail	< 818	

PRINTING – READ VERY CAREFULLY

PRINTING REQUIRED – A requirement of ARCH 534 is that **all class materials posted on Blackboard be printed on paper (hard copy) for use in class before class begins at 9:00 AM** – relying on a laptop or tablet is not a substitute for a hard copy).

Note that files marked with a diamond symbol (◊) are *Printing Optional*. If you opt not to print out hard copies, you are still responsible for reading the material.

All files posted on Blackboard will have been saved in Portable Document Format (PDF) to facilitate printing. Exception: Exercises and/or homework assignments in 11" x 17" (ledger) format will be handed out in class.

To open and print course materials, Adobe's PDF Reader must be installed on your computer (Mac OS users can use either Adobe's PDF Reader for Mac or Preview). Adobe Reader is a free download available from Adobe at:

<<http://www.adobe.com/products/acrobat/readstep2.html>>.

CRITICAL – Most handouts contain drawn-to-scale graphics. It is therefore **essential that all handouts be printed full scale**. Adobe's PDF Reader defaults to Fit to Printable Area, which arbitrarily reduces the scale of the printed page, which in turn makes it impossible to correctly solve graphic problems.

To ensure that printing is full scale, select **None** as the setting for Page Scaling in the printer's print dialog as shown in Figure 1.

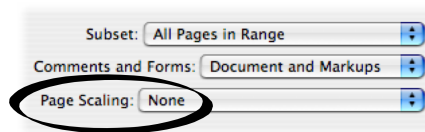


Figure 1, Typical Scale Setting in Print Dialog

Verification – To confirm that graphic files have been printed at the correct scale, a graphic scale similar to that shown in Figure 2 is included on all drawn-to-scale handouts.

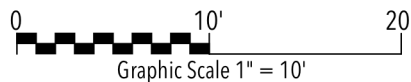


Figure 2, Typical Graphic Scale for 1" = 10'

It is your responsibility to verify that the scale is correct on all printed course materials. Tip: Begin by printing only the first page and verify the scale before printing the entire document.

Caution – Adobe, the author of Reader, frequently issues security patches for its software. When you install a patch, Page Scaling is typically reset to the default *Fit to Page* setting. Therefore, it is necessary to re-verify that Page Scaling is set to *None*. Again, confirm scale with the graphic scale shown in Figure 2.

If your homework is not printed at the correct scale, you risk losing up to 50 points total for that particular assignment.

Organizing Handouts, Homework and Exercises

Students are strongly encouraged to purchase a three-inch (3-inch) 3-ring binder for this class within a week or two of the beginning of the semester to keep the large volume of handouts that will accumulate (expect to fill it). In setting up your notebook, give thought to its organization. Many students have found that keeping all of the exercises and homework assignments in numeric order works well. Keeping general informational handouts organized either by week or by subject is also helpful. Keep completed homework assignments and exercises for future reference.

Save on Printing

The purchase of an inexpensive monochrome laser printer will save time and money on printing over the long haul. Laser printers are faster (typical output is around 30 pages a minute), they avoid the hassle of dealing with clogged ink jet nozzles, and they generally reduce printing costs (less than 3 cents a page). Several good quality laser printers are available for as little as \$50. Some manufacturers offer refurbished units and special promotional deals from time-to-time at even lower prices – check manufacturers' Web sites for refurb and deals.

Required Reading and Course Reader

Course Reader. Available from University Readers, www.universityreaders.com, or by phone at 800-200-3908, extension 503. The selling price has typically been under \$35. Reading assignments begin at the second week, so please order yours as early in the semester as possible.

It is imperative that readings be completed *during the week immediately prior to the next class meeting*. Reading assignments provide a context for material currently being covered. Keeping up with reading assignments will ensure a thorough understanding of the subject currently being taught.

Other Recommended Reading and Reference Resources

- ◆ *Time-Saver Standards for Landscape Architecture* by Charles Harris and Nicholas Dines. Publication Date: February 4, 2002; ISBN-10: 0071357610; ISBN-13: 978-0071357616, Edition 1. Amazon sells this book new for approximately \$150; used copies are usually available for less. This is the one book that should be in every landscape architect's library.
- ◆ *Site Engineering, 6th edition*, by Steven Strom, FASLA, Kurt Nathan, MS, PE, and Jake Woland, ASLA, published by Wiley. ISBN 978-1-118-09086-2 (cloth-bound version). Site Engineering is arguably the most thorough book on the subject of grading, drainage and stormwater management. Many find it too technical, but it is complete.
- ◆ *Landforming: An Environmental Approach to Hillside Development, Mine Reclamation and Watershed Restoration*, Aug 3, 2007, Horst J. Schor and Donald H. Gray. Horst Schor is the creator of landforming.
- ◆ *White Papers*: During the semester, several white papers will be posted for download on Blackboard. These papers supplement the Course Reader by adding relevant content not contained in the Reader. These are to be read in their entirety as they become available. Some of the content in the white papers will be tested on the midterm and the final exams.
- ◆ *The Devil in the White City*, a novel by Erik Larson based on real-life events. This is the story of three men's obsessions with the Chicago World's Fair of 1893 (Columbia Exhibition), one is its architect, one its landscape architect, and the other a murderer. *The Devil in the White City* draws the reader into a time of magic and majesty, made all the more appealing by a supporting cast of real-life characters, including architects Daniel Burnham and Louis Sullivan, landscape architect Fredric Law Olmstead, Buffalo Bill, Susan B. Anthony, Thomas Edison, and others. If you've read *Devil in the White City*, you already know why it is being recommended here; if you haven't read it, the novel is based on the true story of the Columbia Exhibition. It lends a real-world perspective to site grading, site drainage and stormwater management.

Arithmetic

Topographic Design requires simple decimal arithmetic at approximately American primary school fifth grade level. Specifically, you must be able to add, subtract, multiply, and divide decimal numbers, and you must be able to use simple formulas to solve problems. All calculations will be expedited through use of a calculator. It is imperative that you be thoroughly proficient in using all calculator functions, including memory (see next section).

If you consider yourself arithmetically challenged, it is essential that you proactively review arithmetic basics early in the semester, with an emphasis on the multiplication and division of decimal numbers.

Calculators

A suitable calculator is an absolute requirement, and you must have your calculator and be reasonably proficient in its use by the second class meeting (this means being able to add, subtract, multiply and divide decimal numbers; knowing how to use your calculator's memory function to store, recall, clear and sum numbers, and knowing how to use the sign change key. Refer to your calculator's manual as needed to understand and use these functions. Other functions such as reciprocal, square root, and constant will be covered in class at a later time. You are encouraged to choose from one of the calculators recommended below. Calculators are available from Walmart (see "best deals" below), Office Depot, Office Max, Staples, Target, K-Mart, Best Buy, Fry's and other similar. If you purchase online, you are responsible for making sure your calculator arrives in time.

Types of Calculators

An inexpensive basic four-function calculator is perfectly adequate for this course.

- ◆ **Basic Four Function Calculators** – Basic calculators are able to perform virtually any task that will be required during the semester. They are available for as little as \$1.47 (see below). They are easier to learn and use than scientific calculators. Basic calculators usually have a single memory, which is an advantage, as explained further on. Many students find that a basic calculator with oversized keys and display are more comfortable to use, but on the down side, not as convenient to carry.
- ◆ **Mobile Phone Calculator Caveat** – Virtually all smart phones (Android, iOS, Windows Phone) have calculator functions built in. Most display a simple four-function calculator in portrait orientation, or a full scientific calculator in landscape. Smart phone calculators are an acceptable option for this class. Nonetheless, because entries are made on virtual rather than physical keys, there is a greater chance of making an entry error. Most students find that they make fewer errors using a standard calculator with physical keys.
- ◆ **Already Have Calculator Caution** – So-called *already have* calculators have traditionally caused problems: missing manual, and missing functions are most common. Investing a couple of dollars on one of the recommended calculators is money well spent.
- ◆ **Reverse Polish Entry** – Hewlett Packard calculators use Reverse Polish Entry rather than algebraic entry. If you are familiar with Reverse Polish entry, an H.P calculator is a fine choice.
- ◆ **Programmable Calculators** – Programmable calculators **are not permitted** in ARCH 534. (Programmable calculators are also not permitted for use on the Landscape Architectural Registration Exam).

Recommended Basic Four Function Calculators

- ◆ These calculators are referred to as “Standard Function” or “Four Function” calculators. In addition to the four basic arithmetic functions, each of the calculators listed below features a full *single* memory (an advantage as explained further along), a sign change key, a constant function, a square root function, and a reciprocal function (but no dedicated reciprocal key). All those listed are solar or dual powered (dual powered calculators are solar powered but also include a backup battery for low light use). Prices shown are for informational purposes and may vary.
- ◆ Avoid so-called financial or business calculators. Those typically have keys noted as +Tax, –Tax, SELL, COST, MGN.

Best Deals

These calculators are available from Walmart. Unfortunately, there are no brick & mortar Walmart stores in close proximity to USC. The nearest is located at 4651 Firestone Blvd., South Gate, some 7.35 miles from campus, followed by 14441 Inglewood Ave., Hawthorn, 9.43 miles from campus. You can also purchase these calculators through Walmart’s online store at walmart.com. Enter calculators in the search field. Be aware that Walmart charges for shipping on orders under \$50, so the deals shown below may not be as attractive.

Walmart: Here are the best deals recently spotted at a Walmart store:

- ◆ Casemate 8 Digit Handheld Slim Calculator, \$1.47, with metal finish and solar power (see Figure 3)
- ◆ Casio SL-310SV 10 Digit Wallet Size Calculator, with large display, \$5.77, also metal finish plus solar power
- ◆ Casemate 8 Digit Mini Desktop Calculator with angled display, \$2.47, metal finish, solar power and is over-sized



Figure 3, What \$1.47 Will Buy at Walmart

Local Sources for Calculators

Office Depot store near USC: 2020 S. Figueroa Street (Figueroa St. & 20th St.), Los Angeles, Ca 90007 (1.18 Miles)
(213) 741-0576

- ♦ Office Depot Brand Mini Calculator (\$4)–standard handheld format calculator with standard display
- ♦ Office Depot Brand OD024M Standard Desktop Calculator (\$8)–large desktop calculator with large keys and display

Staples store near USC: 1701 South Figueroa, Los Angeles, CA 90015 (1.4 miles) 213.746.6330

- ♦ Staples SPL-120-CC 8 Digit Display Calculator (\$4.20) hand held, standard display
- ♦ Staples SPL-230 8 Digit Display Calculator (\$8.40) desktop calculator with large keys and display

Other Calculators and Sources

- ♦ Canon LS-82Z (\$9) 8 Digit large display desktop calculator
- ♦ Canon LS-555H (\$13) 8 Digit large display handheld calculator with fold-over cover
- ♦ Texas Instruments TI 1706sv Calculator Handheld (\$9) –standard handheld calculator
- ♦ Texas Instruments TI-503SV Display Calculator (\$4)–standard handheld calculator
- ♦ Texas Instruments TI-1795SV Desktop Display Calculator (\$11)–standard desktop calculator

Pros and Cons of Multiple Memories

Most scientific calculators have multiple memory registers – usually three. While this has some advantages, it also has several disadvantages. With a single memory calculator, any value (number) currently displayed can be placed in memory, and recalled from memory, by the press of a single key to place a number in memory, usually M+, and a single key to read a stored number out of memory, usually MR (for memory read). MC clears the memory.

With a scientific (multiple memory) calculator, you must enter the number 1, 2, or 3 before pressing M+ to tell the calculator in which memory register to store the number, and likewise you must enter the number 1, 2, or 3 before

pressing MR to read the stored value. In addition, remembering which memory register the desired number is stored in has the potential to lead to confusion. Of course, on the flip side, having multiple memories does allow the storage typically of three numbers, which for those performing math-intensive calculations is a significant advantage.

Final Word on Calculators

Your calculator decision is one you'll have to live with for the semester – and likely beyond. Buying one of the recommended calculators ensures an appropriate choice. Although doing so is not a requirement, if you do select a calculator that's not on the list, you assume responsibility for confirming its appropriateness for the course.

Required Graphic Gear

- ◆ Pencils – Push-button or side-click style pencils are a good choice because they don't require sharpening or pointing. Choose 0.5 mm for medium touch; 0.7 mm for medium-heavy touch; 0.9 mm for heavy touch; F or H lead
- ◆ Eraser (Magic Rub or other vinyl type eraser is highly recommended; the type of eraser typically found on the end of a pencil is not recommended)
- ◆ Erasing shield
- ◆ Engineer's scale (an architect's scale is not required for ARCH 534, but likely will be for other courses)
- ◆ Glider (also referred to as a glide or hand held parallel) having a 9 or 10-inch blade (see Figure 4)

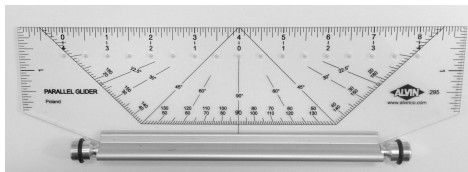


Figure 4, Typical Glider With a Ten-Inch Blade

- ◆ Triangles, both 30°/60° and 45°
- ◆ 12-inch wide roll of sketch paper (trace)
- ◆ Drafting tape or dots

Beginning at the second meeting, in-class exercises will be assigned that will require a calculator and drafting gear. Important: Bring your calculator and drafting gear to all class meetings.

Drawing board and/or parallel bar are not required. Nonetheless, be aware that desktops are Formica laminate. If you find drawing over laminate uncomfortable, bring a sheet of fine textured cardboard that can accommodate an 11" x 17" drawing.

OPTIONAL: If you plan to hand draft your term project base sheet (rather than using CAD software), a full-size Bow compass with appropriate lead and sanding pad for pointing lead will be an essential tool. If you're not familiar with the use of a bow compass, or how to point a compass lead, ask for special compass handout and a demonstration.

Ink is not permitted on exercises, homework assignments, or the term project. The Ink restriction is taken to include fountain pens, technical pens, felt tip markers, ballpoint pens, rollerball pens, or gel pens. Ink used on any assignment may result in a point reduction. Reasons: 1) Ink isn't necessary; 2) it requires more time and a great deal more experience to use well, and finally, 3) Ink is totally unforgiving if you make an error, which is highly likely.

Help and Office Hours

Students are encouraged to ask questions concerning the homework at any time during the week of the assignment. Depending on the nature of your question, an email, text message, or a phone call are the most efficient ways to get help. Often, providing a graphic image is an advantage. In such cases, sending the image as an email or text attachment are your best choices. There are several ways to transmit graphic images. For email, the preferred way is to provide a scanned image because the scale of the drawing is preserved. For text messages, you're limited to an image taken with mobile phone camera. Keep in mind that such images are not to scale. One work-around is to include an engineer's scale within your image, which will permit me to make a scale adjustment. Save your scan or photo as a PDF, PNG, or JPEG.

- ♦ *Office Hours* – Office hours are scheduled all Tuesdays from 7:00 am to 8:50 am, and from 12:00 pm to 1:00 pm., Watt Hall, 339a (adjacent to the Landscape Corner). Additional office hours can be scheduled on an as-needed basis.
- ♦ *Beyond Office Hours* – In addition to weekly meetings of the class and office hours, students may also contact me via telephone or email (see page 1 for contact info). When calling, please have a clear idea of what you want to ask before calling. If I am not available to take your call, leave a message (please say your name and phone number distinctly and slowly at the beginning of the message). I'll do my best to return all calls in a timely manner.
- ♦ *Tutoring* – Within reason I'm glad to provide complementary tutoring during office hours or by prior arrangement (refer to office hours above).

Working with Others and Study Groups

To paraphrase an old cliché: Now that I know, I can help others to know, and in so doing, reinforce my own understanding. Studying together, either in pairs or in small groups, is highly recommended, but be aware that all final work must be your own. You only benefit when you do the work yourself. If outright copying is detected (it's always obvious!) those doing the copying, and those permitting it, risk losing some or all of the points for any given assignment. Be aware that those engaged in copying will also be in direct violation of USC's Statement on Academic Conduct, which is rigorously enforced (see Academic Conduct, Plagiarism, below).

Statement on Students with Disabilities

Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP.

Please be sure the letter is delivered to me as early in the semester as possible. DSP is located in STU 301 and is open 8:30 A.M.–5:00 P.M., Monday through Friday. The phone number for DSP is (213) 740-0776.

SCampus Part C, Academic Policies

Go to <https://policy.usc.edu/scampus-part-c/> SCampus consists of six sections:

- Section 1 – Class Notes Policy
- Section 2 – Disputed Academic Evaluation Procedures
- Section 3 – General Academic Petitions
- Section 4 – Timeline for Degree Programs
- Section 5 – Student Education Records
- Section 6 – Falsification of Financial Aid Information

It is your responsibility to be aware of the specific policies contained within this document.

Academic Conduct

Plagiarism – presenting someone else's ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Section 11, Behavior Violating University Standards <https://scampus.usc.edu/1100-behavior-violating-university-standards-and-appropriate-sanctions/>. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct/>. Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the Office of Equity and Diversity <http://equity.usc.edu/> or to the Department of Public Safety <http://capsnet.usc.edu/departments/departments-public-safety/online-forms/contact-us>. This is important for the safety of the whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. The Center for Women and Men <http://www.usc.edu/student-affairs/cwm/> provides 24/7 confidential support, and the sexual assault resource center webpage sarc@usc.edu describes reporting options and other resources.

Withdrawals – Late or Retroactive Withdrawal from One or More Courses

The final deadline for dropping one or more courses is the end of the 12th week of classes or its equivalent for a given term. To officially drop a course, the student must process a drop form through the Registration Department or drop through Web registration and secure a Registration Confirmation as proof of having dropped. This 12-week time period is considered generous. CAPP will entertain petitions for exceptions to the drop deadline when the student has documented extenuating circumstances or the student was unable to evaluate his or her level of performance prior to the drop deadline.

Withdrawal petitions based on medical reasons require accompanying documentation from the student's physician. It is assumed that such requests will usually involve a complete withdrawal from all classes. If the request involves less than cancellation of the whole academic program, a complete explanation must be provided of courses to be dropped or retained, plans for completion of the remaining courses and an explanation of why the student's medical condition allowed completion of some courses but not all. In general, if a student is healthy enough to participate in campus activities outside of class, he or she is considered responsible for all courses undertaken. In all cases, a petition to drop a course must include a statement from the instructor indicating the quality of work and dates of attendance.

A final word of caution: CAPP almost never approves requests for late withdrawals if the student has taken the final exam in a course. However, a student should not take this word of caution as an indication that she or he should purposefully miss a final exam because of a pending petition to drop. A student who misses a final exam because of a pending petition and then discovers that the petition was denied, will surely be in a worse position because the final exam grade will be calculated as an "F."

Accreditation

Information about landscape architecture education and accreditation in the United States may be found on-line at <http://www.asla.org/Education.aspx>.

Religious Holidays

The University of Southern California recognizes the diversity of our community and the potential for conflicts involving academic activities and personal religious observation. The University provides a guide to such observances for reference and suggests that any concerns about lack of attendance or inability to participate fully in the

course activity be fully aired at the start of the term. As a general principle, students should be excused from class for these events if properly documented and if provisions can be made to accommodate the absence and make up the lost work. Constraints on participation that conflict with adequate participation in the course and cannot be resolved to the satisfaction of the faculty and the student need to be identified prior to the add/drop date for registration. After the add/drop date the University and the School of Architecture shall be the sole arbiter of what constitutes appropriate attendance and participation in a given course.

Support Systems

A number of USC's schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the American Language Institute <http://dornsife.usc.edu/ali>, which sponsors courses and workshops specifically for international graduate students. The Office of Disability Services and Programs http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html provides certification for students with disabilities and helps arrange the relevant accommodations. If an officially declared emergency makes travel to campus infeasible, USC Emergency Information <http://emergency.usc.edu/> will provide safety and other updates, including ways in which instruction will be continued by means of blackboard, teleconferencing, and other technology.

School of Architecture Attendance Policy

A student may miss the equivalent of one week of class sessions. In the case of ARCH 534, this means THREE excused absences are permitted without directly affecting the student's grade and ability to complete the course. An excused absence is a confirmed personal illness, family emergency, or religious holiday. For each absence over the allowed number, your grade can be lowered by 1/3-letter grade. If additional absences are required for a personal illness, family emergency, pre-approved academic reason/religious observance, you must discuss the situation with your faculty member immediately.

Any student not in class within the first 10 minutes is considered tardy, and any student absent (in any form including sleep, technological distraction, or by leaving mid class for a long bathroom/water break) for more than 1/3 of the class time can be considered fully absent. If arriving late, a student must be respectful of a class in session and do everything possible to minimize the disruption caused by a late arrival. It is always the student's responsibility to seek means (if possible) to make up work missed due to absences, not the instructor's, although such recourse is not always an option due to the nature of the material covered.

Sustainability Initiative

The School of Architecture has adopted the 2010 Initiative for Sustainability. Solutions to design problems must engage the environment in a way that dramatically reduces or eliminates the need for fossil fuel.

Class Specific Policies That Pertain Specifically to Topographic Design

- ♦ **Due Date** – All homework and both parts of the term project are due at the beginning of class on the dates noted on their respective assignment pages. Late work will be penalized by a point reduction of 10% *per week* (for example, a homework assignment that would have earned a maximum of 50 points will get 45 points for being one-week late, and so on).
- ♦ **Assignment Submission in Case of Absence** – If you are unable to attend class for any reason, you are still responsible for turning in your work on the date it is due. You have several choices, given here in order of preference:

1) you may have another person submit your work on your behalf; 2) you may scan your work, save it as a PNG, JPEG, or PDF and attach it to an email addressed to me at the email address shown on the first page of this syllabus (a digital photo is not an acceptable substitute for scanning because digital photos are not to scale); or 3) you may mail the work to me at the address shown on the first page of this syllabus. It is your responsibility to verify that your name appears in the space provided at the top of the assignment. Also, please staple your work prior to hand-in (please do not fold and tear the corner of the pages as a substitute for stapling). If you do not own a stapler, one will be available at the front of the classroom for your use.

Legibility

All work must be legible. Legibility is a function of penmanship and using a lead grade that can be easily read. HB, F or H leads are recommended, and yield good contrast between writing and white background. Do not use a lead harder than H (e.g., 2H, 3H, 4H). Illegible answers will be marked as incorrect (no benefit of the doubt).

Professional Licensure

The focus of Topographic Design is grading, drainage and stormwater management as practiced by professional landscape architects. Although ARCH 534 does not specifically prepare you to sit for the licensing exam, the material presented corresponds to what the exam tests.

Course Enhancement and Enrichment

Free Magazines – There are two free high quality online magazines relevant to ARCH 534: *Stormwater* and *Erosion Control*. To receive a free online subscription, copy the Web addresses below from an electronic version of this syllabus (posted on Blackboard) into your browser:

- ♦ For Erosion Control: <<http://www.erosioncontrol.com/subscription/erosion-control-subscription-form-19327.aspx>>
- ♦ For Stormwater: <<http://www.stormh2o.com/subscription/stormwater-subscription-form-3431.aspx>>

Class Participation and Asking Questions

Asking questions relevant to the current discussion benefits all and is strongly encouraged. Ask questions at any time. Qualification: If your question reveals failure to do the assigned reading, I may elect not to immediately respond, but will do so during the break or after class. In all cases, I reserve the right to control questions if I deem they are disruptive or excessive.

Personal Problems

Problems happen. If you're experiencing personal problems that are adversely affecting your performance, let me know. There are usually ways to accommodate or mitigate them.

A Short Bio

Education – B.S. Landscape Architecture California Polytechnic University, Pomona, 1970. Am a California licensed landscape architect (license number 1577).

Work – 48 years' experience working in both the private and public sectors as a landscape architect and project manager. Partially retired in 2001. Since then, doing business as Jerry Hastings, ASLA, a landscape architectural consulting practice. Prior to retirement: City of Los Angeles' Department of Recreation and Parks. Served in a number of capacities including designer, project manager, and division supervisor.

Teaching – Teaching has been a passion and essentially a parallel career since 1979. Taught for the University of California at Los Angeles for 33 years, also for the University of Southern California, and California State University at

Northridge in the 1990s. Between 1984 and 2012, taught license preparatory workshops to assist candidates for licensure in preparing for the Landscape Architects Registration Exam (LARE). These three-day workshops were offered through UCLA and later independently across the country.

Books Authored

- *LARE Review Section E Vignettes*, published by Professional Publications, Inc. (license prep textbook).
- *The Grading Book*, 5th Edition, (self-published)
- *The Book*, (self-published) textbook used to teach license preparatory workshops
- Coauthor of soon to be published *Grade Easy II* (working title); the course Reader is based on this work

Involvement in Your Professional Organization

You are strongly encouraged to become involved in the American Society Landscape Architects (A.S.L.A.). Founded in 1899, the A.S.L.A. is the national professional association representing landscape architects in the United States and internationally. Over 15,203 members strong, ASLA promotes the profession and advances its practice through advocacy, education, communication, and fellowship. ASLA also works to increase the public's awareness of and appreciation for the profession of landscape architecture and its contributions to quality of life and the environment.

There are two important steps you can take now to enhance your journey toward becoming a landscape architect. First is to join your student chapter here at USC. Second, because you are enrolled in an accredited landscape architecture program leading to a MLA, you are eligible to join the American Society Landscape Architects as a *Student Member*. The cost is \$55 for the first year. Membership includes a one-year digital subscription to *Landscape Architecture Magazine*. Student Members are also eligible to participate in the Southern California Chapter's mentoring program. You're encouraged to attend ASLA meetings and events both on and off campus. Attending meetings gives you direct access to those already in the field, and, perhaps more importantly, to those who can offer internships or positions in firms. Plus, getting your name and your face "*out there*" gives you a definite advantage as an emerging professional.

If you'd like to become an ASLA Student Member, or participate in the mentoring program, or have any questions about the student chapter or landscape architecture in general, don't hesitate to ask me. You may also contact our Chapter's Student Liaison, Carlos Flores, ASLA, at Carlos at carlos_fores@partner.nps.gov. I'll keep you informed of upcoming Chapter meetings and events that are likely to be of interest.