

LARC/CIEG 343 Site Engineering

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Contact Information

These are the office hours I will normally try to keep. Stuff happens, though, so I advise you to check my availability through [Blue Hen Success Collaborative \(BHSC\)](#). , contact me by email, in-person, or on the phone. If you are in the College of Arts & Science (No access to BHSC) or if you need a time outside my regular office hours, contact me by email, phone, or in-person to schedule a meeting.

Instructor: Carmine C. Balascio, Ph.D., P.E.	Office Phone: 302-831-8872 Office: 157 TNS	Email: carmine@udel.edu
Day	Time	Room
Monday	12:30-02:00	PRS 116
Tuesday/Thursday	03:00-04:30	TNS 157
Wednesday	10:30-12:00	TNS 157

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Learning Outcomes

Catalog Course Description: Introduction to land grading, site layout, drainage, earthwork volumes and erosion and sediment control for landscape and construction sites.

Course Objectives: Students will learn the basic systems and components of site engineering as practiced in the constructed landscape. They will gain awareness of the environmental issues and impacts related to site development and become familiar with software used for site planning, design, development, and construction. After completing this course, students will be able to:

1. Create and read a contour map.
2. Create and modify a grading plan with sections.
3. Estimate earthwork volumes for grading plans.
4. Estimate runoff depths and rates from sites using conventional NRCS and Rational Method hydrology.
5. Analyze and do elementary design of vegetated waterways, drainage, and stormwater control measures.

6. Plan erosion and sediment control measures for construction sites.
7. Develop basic skills for doing horizontal and vertical route alignments.

UD General Education Objectives: These UD general education objectives are addressed:

1. Read critically, analyze arguments and information, and engage in constructive ideation.
2. Communicate effectively in writing, orally, and through creative expression.
3. Work collaboratively and independently within and across a variety of cultural contexts and a spectrum of differences.
5. Reason quantitatively, computationally, and scientifically.

EAC of ABET student outcomes: Elements of this course strengthen these EAC of ABET student-learning outcomes:

- (a) an ability to apply knowledge of mathematics, science, and engineering,
- (c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability,
- (d) an ability to function on multidisciplinary teams,
- (e) an ability to identify, formulate, and solve engineering problems
- (g) an ability to communicate effectively, and
- (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Course Logistics

Course Information

Course Number and Title: LARC/CIEG 343 Site Engineering

Semester: 2018 Spring

Meeting Times and Location: Studio, Mon, Fri 9:05 – 11:35 PM, 101D Pearson Hall

Prerequisites: LARC/CIEG222 or LARC150, or CIEG161 or APEC480 or GEOG250 or GEOG372.

Text: Strom, Steven, Kurt Nathan and Jake Woland. 2013. *Site Engineering for Landscape Architects*, Sixth edition. John Wiley & Sons, Hoboken, NJ.

Class Notes: Hard copies of class notes can be purchased at the bookstore.

Note: Any student who has a need for accommodation/s based upon the impact of a disability should contact me as soon as possible. Contact the Office of Disabilities Support Services to coordinate appropriate accommodations.

Assignments/Exams

Information about Exams and Quizzes:

- A brief content quiz will be administered through Canvas before the beginning of each lecture period. The intent is to give you an added incentive to review the reading assignments for that day's activities. The quiz must be completed before you come to class

and will generally be available by the day after the previous quiz was due. The quizzes are individual assignments! You are expected to AVOID COLLABORATION with your fellow students on the quizzes!

- There will be two exams given during the semester and a cumulative final during finals week. Exams will be in two parts: the first part closed book, closed notes; the second part open book, open notes. When you've completed the closed book portion, turn it in to get the open-book part.
- On the days of the exams, you are responsible for having with you a calculator, pencil, eraser, engineer's scale, and any resources you might need for the open-book portion of the exam: text, notes, reference materials, etc.
- For closed-book portions of exams, I don't expect you to memorize extremely detailed procedures or complicated formulas, but you should have a good grasp of the overall concepts, sequence of steps, and underlying theory. Simple formulas that are used all the time (e.g. slope, average end area method, etc.) you should know by heart.

Deliverables (Assignments, Projects, etc.)

- Hand-graded assignments and projects will be collected for grading on due dates specified at the time they are assigned and will typically be submitted using the Assignments feature of Canvas. NOTE! Hand-graded work submitted late will be subject to a penalty of 10% per day up to a maximum of 50%.
- LON-CAPA problem sets: Computer-graded online problem sets on the LON-CAPA system are used for portions of this course. Access the LON-CAPA problem sets through this URL:

zappa.ags.udel.edu

See http://zaphod.lite.msu.edu/student/getting_started.html for details about using the LON-CAPA system. Some important things to know about my policy for the problem sets:

- Computer-graded problems on the LON-CAPA system must be completed by the due date posted on the web site to receive credit. You know immediately upon submittal whether your answer is correct. You will be able to see the correct answers after the due date.
- You will be given 5 attempts to solve each problem. If you run out of attempts, see me about getting more. We'll try to find out what you're doing wrong before I give you more attempts.
- You will receive full credit for each problem you correctly solve before the due date, regardless of the number of attempts you make. You will receive zero credit for problems not completed by the due date.
- If you can document an erroneous computer solution to a LON-CAPA problem, turn in a written error report. Upon confirmation, you will be awarded five times the point value for that problem as a bonus.
- I use the online system, LON-CAPA, because of the following advantages:
 - Every student gets basically the same questions, but the numbers are different; so each student is forced to work out the solution for him or herself.
 - Mastery-based grading allows you to make multiple attempts to solve the problems. You get immediate feedback and remain engaged with the material until you understand it well enough to solve the problems.

- You have a good shot at getting every question correct and collecting full credit for each problem. Since the LON-CAPA problem sets are worth the largest portion of the 27% of your grade comprised of individual assignments, there is considerable incentive to devote some effort to them.
- Here are my suggestions for getting the most out of the problem sets:
 - By all means, discuss the LON-CAPA problems with your classmates. Talk about the possible approaches to solving the problems. **Do not simply plug your numbers into a class mate’s solution, however!** You need to understand the solution procedure! If you’re having trouble, ask me to help you understand how to solve the problems.
 - Maintain a written record of the solutions to the LON-CAPA problems, just as you would for homework problems assigned from the text. If you like, print out the problem statements to avoid rewriting them. Keep all your solved problems collected in a three-ring binder. Use the collected solutions to review for exams.
 - Please, feel free to contact me for assistance. You can contact me in my office in person, over the phone, or by email. I encourage you to post questions on the Canvas Discussions site so other people who may have similar questions can benefit.
 - I recommend that if you find you are spending more than 20 minutes on any single problem either because you don't understand it or for some reason can't figure it out, **STOP!** Contact me for assistance. Don't waste your time unproductively spinning your wheels!
- In addition to the problem sets I assign, I will sometimes suggest problems from the text for you to work that will be of assistance when you study for exams. These problems will not typically be collected, but they or similar problems may appear on an exam.

Grading/Course Policies

Components of Your Grade:

- You will receive grades for the items in the table below, the components weighted as shown for your overall grade. There will be no opportunity for “extra credit”. Concentrate on making a steady effort throughout the semester.
- I will attempt to inform you periodically of your standing relative to the rest of the class through the Grade Book feature of Canvas. This is an opportunity for you to check my record keeping for your grades. Please, let me know if you find any problems.

Item	Weight (%)
Two Mid-Term Exams	28
Cumulative Final Exam	17
Out-of-Class Content Quizzes	05
LON-CAPA Problem Sets	25
Individual and Group Projects or Assignments	25
Total:	100

Course Policies

- Attendance: Class attendance is critical. Students who consistently miss class will do poorly in this course. You will be working in teams throughout the semester and must be present to support your team. **Each unexcused absence from a class or laboratory during which group activities take place will result in a five-percentage point reduction in your final grade.** Legitimate reasons for missing class must be properly documented (e.g. a note from your doctor).
- Unexcused absence from an examination or quiz results in a grade of zero (0) for that test. Legitimate reasons for missing a test must be well-documented. Oversleeping or “getting caught in traffic” are not acceptable. You must attempt to notify me as soon as possible.
- Preparation for Class: As much as possible I want this to be a learn-by-doing class which will have you spending the bulk of your class time solving problems and doing design work either as an individual or in groups. To spend less time on lecture, I expect you to be prepared for class by having the reading assignments done well beforehand. You’ll have the opportunity before and during class to ask questions about points for which you’d like further explanation. There will be brief Canvas quiz on content of the reading assignments due before the beginning of each lecture period to motivate you to do the assigned reading.
- Academic Integrity: Students are encouraged to help one another in learning the material and even to discuss specific assignments with one another. Copying or "teamwork" on assignments not done as a team or group is prohibited, however. Any work submitted that is the product of collaborative efforts *must* show the names of *all* collaborators. This means, for example: work the assignments and problem sets yourself, write every word of the individual assignments and reports yourself, properly cite the sources you used for information (even if they're class notes or handouts), write any spreadsheet programs yourself, etc.

You will be working in small groups or teams for some of the assignments in this course. Typically, you will submit one report or assignment for your entire team. It is important that you list the names of all team members on such submissions. No assignments are collaborative unless specifically indicated as such by the instructor. I would suggest you familiarize yourself with the [university’s code of conduct](#).

<<< DO YOUR OWN WORK! >>>

Teaching Methods

Instructional Approach

- The knowledge you'll gain in this course is technical. It's difficult to understand it without actively working with the material and, perhaps, even struggling with it. The problem sets play an important part in your learning of the material. You will not do well if you don't work the problem sets! Please see comments under the Assignments section that provide more information about the problem sets.
- I will emphasize learn-by-doing methods to the extent that lectures will not be comprehensive and a large portion of the class time will be devoted to work on problem sets and other active learning exercises. Laboratory time will typically be used for problem solving activities or design work. I will briefly review the notes and point out highlights. You may need to do a little digging through the reading assignments for all the information.

Do the reading assignments before class and be prepared to ask questions about points you don't understand!

Continuous Learning and Course Software

- I will offer some pointers, but the objectives of this course ***DO NOT*** include providing the student with detailed instructions for using the software that is installed on the computer stations. The primary responsibility for learning to use the software rests with you. Software changes all the time. When you find yourself in the workforce, you will, for the most part, be expected to learn how to use and keep up with changes to existing software packages and additions of new ones through your own initiative. It's a part of the continuous learning process in which a professional is expected to engage!
- The primary software tools we use in this class will be the CAD packages SketchUp™ and MicroStation™ and some industry standard hydraulics and hydrology software from Bentley Bentley and HydroCAD™ for drainage and runoff calculations. You will be introduced to the underlying theory and procedures for doing what the software does. You will be expected to do equivalent simplified hand calculations to demonstrate your knowledge. You should always verify software output for different exemplary kinds of problems by comparing to hand calculations and by using common sense and logic. After establishing familiarity with a software package and gaining an understanding of what it does and how it works, you can use a new software package correctly and with confidence.
- The software programs are provided as design tools you can use to facilitate the design process for the several team projects. You are welcome to use hand calculations and spreadsheet methods if you don't want to learn how to use the software.

Supplemental References

The following is a list of supplemental references that are sometimes cited in your course materials or are just good sources of information related to the contents of this course.

1. Das, B.M. 2008. Introduction to Geotechnical Engineering. Thomson Learning, Toronto.
2. Hwang, N.H.C., R.J. Houghtalen. 1996. Fundamentals of hydraulic engineering systems, 3rd ed. Prentice Hall, Upper Saddle River, NJ.
3. Kavanagh, B.F. 2007 Surveying with Construction Applications, 6th ed. Pearson Prentice Hall, Upper Saddle River, NJ.
4. Merritt, F.S. 1983 Standard Handbook for Civil Engineers, 3rd ed. McGraw-Hill, Inc., New York.
5. Rossmiller, Ronald L. 2014. Stormwater Design for Sustainable Development. McGraw-Hill Education, New York.
6. Schwab, G.O., D.D. Fangmeier, W.J. Elliot, and R.K. Frevert. 1993. Soil and water conservation engineering, 4th ed. John Wiley and Sons, New York.
7. Seybert, T.A. 2006. Stormwater management for land development, methods and calculations for quantity control. John Wiley & Sons, Inc., New York.
8. Thompson, J. William and Kim Sorvig. 2007. Sustainable Landscape Construction: A Guide to Green Building Outdoors, 2nd edition. Island Press, Washington, D.C.
9. U.S. Soil Conservation Service, Engineering Division. 1986. Urban hydrology for small watersheds (TR-55). National Technical Information Service, Springfield, Virginia.

Tools and Materials

Tools and Materials you will need this semester:

- Engineer's Scale
- Trace paper - either sheets or a roll
- Calculator
- straight-edge such as a ruler for drawing lines
- A student copy of SketchUp CAD software will also be useful. There are two versions of the software you can obtain. The free version is sufficient for this class:
 - [SketchUp Make](#) (somewhat limited free version)
 - [SketchUp Pro](#) (\$49 fully functional student version)

SketchUp Pro, AutoCAD, HydroCAD, WinTR55, MicroStation, and other Bentley products such as FlowMaster and CulvertMaster are available on the computers in the classroom. If you want access outside of class, WinTR55 can be downloaded for free; while a free node-limited version of HydroCAD is also available online. UD students can also acquire copies of all Bentley software free. See the class website for details about obtaining copies of any of this software.

Course Events

LARC/CIEG 343 – Site Engineering, Tentative Schedule, Spring 2019

Week # / Monday's date		Monday Studio (9:05 – 11:35)	Friday Studio (9:05 – 11:35)
1	Feb 11	Introduction to Course, Chapter 1: Site Engineering <i>Is</i> Design, Maps and Scale, Problem Set: Maps & Scale	Chapter 2: Grading Constraints, Assignment 1: Locating Your Place on Earth
2	Feb 18	Chapter 3: Contours and Form, Assignment 2: Sections	Chapter 4: Interpolation and Slope, Assignment 3: Interpolation of Contours on a Grid and a 3-d Model
3	Feb 25	Chapter 5: Grading of Simple Design Elements – Linear Elements; Assignment 4a: Grading a Swale	Grading of Simple Design Elements – Area Elements, Assignment 4b: Grading of Linear and Areal Elements
4	Mar 04	Chapter 6: Grading Process	Chapter 7: Introduction to Soils and Soil Properties, Soil-Mass-Volume Relationships, Problem Set: Soil-Mass-Volume Relations
5	Mar 11	Chapter 7: Soils in Construction, Engineering Properties of Soils	Chapter 7: Soils in Construction, Soil Classification Systems, Assignment 5: Soil Classification Laboratory
6	Mar 18	Chapter 8: Review of Earthwork Volumes for cross-sections, contours, and borrow pits, Problem Set: Earthwork Volumes	Chapter 8: Compaction, Cut and Fill Operations, Swell and Shrinkage Factors, Problem Set: Earthworks Operations, exam review
7	Mar 25	Exam 1: Covers from beginning of course through Soil Classification	Introduction to Water Flow Concepts and Open-Channel Hydraulics, Problem Set: Intro to Water Flow and Hydraulics Concepts
Spring Break			
8	Apr 08	Review of Exam, Chapter 9: Stormwater Management, Chapter 10: Stormwater Management System Components	Watershed Delineation, Assignment 6: Delineation of Watershed Boundaries
9	Apr 15	Chapter 11: Soil Erosion and Sediment (E&S) Control, E&S Plans	Chapter 11: Soil Erosion and Sediment (E&S) Control, E&S Plans
10	Apr 22	Chapter 12: Introduction to Hydrology, Time of Concentration, The Rational Method for Peak Flow Estimation, Problem Set: Intro to Hydrology and the Rational Method	Chapter 13: TR-55, Curve Number, Rainfall, & Runoff Volume, Non-Standard CNs, Problem Set: NRCS CN and Runoff Depth, Graphical Peak Discharge (GPD) Method & Problem Set, Exam Review
11	Apr 29	Tour of E&S Control Sites and Stormwater Facilities	Exam 2: Covers from Chapter 8: Earthwork through Introduction to Hydrology and the Rational Method
12	May 06	Assignment 7: Developed NRCS Hydrology from Site Plans , Group Work on Project, Problem Set: NRCS TR-55 GPD,	Review of Exam, Chapter 14, Elementary Swale Design, Group Work on Project, Problem Set: Normal depth in swales,
13	May 13	Chapter 14: Designing & Sizing Piping Systems, Problem Set: Swale Stability and Gravity-Flow Storm-Drain Design, Group Work on Project	Chapter 16: Horizontal Road Alignment, Problem Set: Horizontal & Vertical Curves, Problem Set: Horizontal & Vertical Curves
14	May 20	Chapter 17: Vertical Road Alignment, Problem Set: Horizontal & Vertical Curves	Finals Week
Finals Week – Final on Tuesday, May 28, 10:30am to 12:30pm, 101D Pearson Hall			

CIEG/LARC343 " Site Engineering. CIEG/LARC431 " Urban Hydrology and Drainage Design. CIEG/LARC442 " Stormwater Management for Sustainable Development. Research. Urban hydrology and stormwater management. The Condor: Ornithological Applications 119(2):327-343. <http://www.bioone.org/doi/pdf/10.1650/CONDOR-17-20.1>. 18. Archibald, K. M., J. J. Buler, J. A. Smolinsky, and R. J. Smith. 2017. Migrating birds reorient toward land at dawn over the Great Lakes, USA. 343 Industries, : developer Xbox ; 1/2 Game Studios : Editor Copyright 2020 Microsoft / 343 Industries, . All rights reserved. See more of 343 Industries on Facebook. Log In. or. Create New Account. See more of 343 Industries on Facebook. Log In. Forgotten account? Keene Engineering has reliable, authorized dealers all over the nation. Each carries a full range of Keene products and would be happy to show them to you. Locate a local authorized dealer near you today! Alabama. Alabama Gold Camp 1398 County Road 5 Lineville, AL 36266 Visit Thier Website. Tel: (256) 396-0389 Email: gold@alabamagoldcamp.com. Back To Top