

CE 492 Stormwater Management (Spring 2016)

- Class:** T, 6-8:50PM, EB 1145
- Instructor:** Dr. Jianpeng (Jim) Zhou, P.E.
- Office:** EB 2057, phone: 650-3221, email: jzhou@siue.edu
- Office hours:** T & Th., 2-4PM and by appointment
- Computer Lab:** EB 1145
- Evaluation:**
- | | |
|------------------|---|
| Assignments | 20% |
| Project Report | 25% (in group) |
| Hour Tests (two) | 25% (two, 2/23 and 3/22, in class) |
| Final Exam | 30% (May 3, 6:30-8:10PM, EB 1145) |
- Text:** Shammas, N. K. & Wang, L. K. (2011) "Fair, Geyer, and Okun's Water and Wastewater Engineering: Water Supply and Wastewater Removal", 3rd Ed. John Wiley & Sons, ISBN 978-0-470-41192-6 (Textbook Rental. Ch. 11-15). Additional are below
- References:**
- USEPA (2015) "Storm Water Management Model, Reference Manual, Volume I – Hydrology" EPA/600/R-15/162 (Blackboard)
 - Metropolitan St. Louis Sewer District (2006) "*Rules and Regulations and Engineering Design Requirements for Sanitary Sewer and Stormwater Drainage Facilities*" (Blackboard, 2015 ed.) www.stlmsd.com
 - Missouri Department of Natural Resources (2012) "Missouri Guide to Green Infrastructure" (Blackboard)
 - Tetra Tech Inc. (2011) "San Diego Low Impact Development Design Manual", 1st ed. (Blackboard)
 - McCuen, R. H. (2005) "Hydrologic Analysis and Design", 3rd ed., Pearson Prentice Hall, ISBN 0-13-142424-6 (Text Rental. Ch. 7-8)
 - Minton, G. (2011) "Stormwater Treatment", Sheridan Books, ISBN 0-9720319-1 (Text Rental/Library Reserve. Ch. 2, 7)
- Software:** SWMM 5.1.010 software, and User's Manual (v.5.1, Blackboard), are available for free download from USEPA web. www.epa.gov/water-research/storm-water-management-model-swmm

Course description: Stormwater management on both quantity and quality, modeling for stormwater management system, engineering principles, planning and design of green Infrastructures for low impact development (LID). Prerequisites: upper-division civil engineering standing, CE 315, 380 or concurrent enrollment, 416 or concurrent enrollment, or consent of instructor. This course is eligible for graduate credits.

Course objectives

Students will be prepared to work at an entry-level engineering position in a municipal government or in a consulting firm providing engineering services to municipal governments or private developers. Upon successful completion of this part of the course, students are expected to be able to:

- Use appropriate design guides and engineering standards for planning and design of stormwater management system
- Develop and design major components of stormwater system, incorporating green Infrastructures for low impact development (LID)
- Perform computer modeling and analysis of stormwater system

ABET Outcomes

Successful completion of this course will contribute towards meeting the requirements of the following ABET (www.abet.org) 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; (d) the ability to function on teams; (e) an ability to identify, formulate, and solve engineering problems; (g) an ability to communicate effectively; (j) a knowledge of contemporary issues; (k) an ability to use techniques, skills, and modern engineering tools necessary for engineering practice.

For the complete list of departmental ABET outcomes, see www.siu.edu/engineering/civilengineering/undergraduate/objectives.shtml

Preliminary class schedule:

Week	Date	Course topics
1	1/12	Introduction. Issues and considerations
2	1/19	Stormwater management regulations and requirements
3	1/26	Stormwater quantity (hydrology, rainfall and runoff) Stormwater quality (solids, nutrients, metals etc.)
4	2/2	Urban stormwater sewer system and detention basin
5	2/9	Low Impact Development (LID), Green Infrastructure (GI), Best Management Practice (BMP)
6	2/16	Engineering principles and design of GI (Bio-retention)
7	2/23	Test 1
8	3/1	Rain garden. Green roof. Infiltration trench
	3/8	<i>Spring Break (no class)</i>
9	3/15	Permeable pavement. Rain barrel. Bioswale. Planter box
10	3/22	Economics. Inspection and maintenance
11	3/29	Planning and selection of GIs for stormwater management
12	4/5	Modeling for stormwater management system (SWMM)
13	4/12	Modeling for stormwater management system (SWMM) - continued
14	4/19	Modeling for stormwater management system (SWMM) - continued
15	4/26	Contingency class. Review
16	5/3	Final Exam 6:30-8:10PM, EB 1145

Course policies

Needs of students with disabilities: if you need special accommodation for academic work of this course, bring the University issued ID to the instructor no later than the end of the second week.

Academic honesty: students are expected to be familiar with and abide by SIUE Student Academic Code and Student Conduct Code. Plagiarism, the act of representing the work of another as your own, is a serious offence and will not be tolerated. Academic misconducts on an assignment, paper, or exam will result in a *Fail* in that work.

Expectation: you are expected to attend all scheduled classes. Students who need to be absent from a class due to official University Business are expected to submit written request with supporting signature to the instructor prior to the class. During class time, feel free to raise your hand to ask course-related questions. However, class time is not for social conversations. If you have to leave before a class ends, sit near a door. This portion of the class will be conducted in a computer lab, please limit the computer use to course related activities during class time.

Assignment: assignment will be posted in course Blackboard. Follow instruction to submit assignments as group work (i.e. design project team) or individual work on due date, unless you receive pre-approval for extension. Late hand-in will be deducted at 5% each day (including weekend day) of total available marks of the assignment, except medical (a doctor's note is required) or pre-approved reasons (a written request is required). After an assignment is returned to the class, no more late submission of the same assignment will be accepted. Ensure your submitted work is clear and legible. Write your name on the top of your first page. Staple all pages together. Number each page. Show all necessary steps in analysis and calculation. Use and show correct units and significant figures. Marks may be deducted for submitted work not meeting these expectations.

Special assignment for M.S. students: M.S. students are required to submit an individual technical memo complete with references. This memo should be 3-4 pages, 1.5 line space, 12 point font, 1" margin all around. The references should be from a variety of technical papers such as recent technical journals/magazines, e-journals available at SIUE Lovejoy Library, not from only internet sources. For M.S. students, the "Project" counts for 20%, this Special Assignment memo counts for 5%. The topic should be relevant to the subject of this course, but hasn't been discussed in details in the class. Your selected topic should be approved by the instructor.

Weight distribution of the "20% Assignments": students are expected to complete and submit all assignments. Some submitted assignments may not be graded. If there is any ungraded assignment, the weight distributions are 15% graded homework, 5% completed and submitted but not graded homework.

Project and Report: work in group (3-4 students in a group). Submit the group report on due date. Late hand-in will be deducted at 5% each day (including weekend day) of total available marks, except medical (a doctor's note is needed) or pre-approved reasons (a written request is required). Individual participation, based on the group's report about "who did what" for the project, will be considered as part of the final evaluation.

Tests and Exams: Tests and Final Exam will be open text book, design guides, class handouts and one page (8" by 11" size, front and back) of equation sheet (unnecessary, but permitted if you feel the need); but close notes, assignments and all other materials. The Final Exam will be comprehensive to test all subjects covered during this part of the course. Each student is expected to provide his/her own calculator for the exams. Missing an exam without acceptable reasons (e.g. the written note from a medical doctor) or pre-approval (a written request is required) will result in zero for that exam. There will be no make-up test for the mid-exam. Your final grade will be calculated by assigning the weight of your missed mid-exam to the final exam that you have completed, only if your absence of the mid-exam is approved.

While timely feedback is important to learning, students are afforded certain privacy rights concerning their academic performance under the Family Educational Rights and Privacy Act. No quantitative score or letter grade on any course assignment or final grade can be discussed in a public setting without express written consent of the students. Since email messages, telephones, and other electronic communication are not considered private communication, even if initiated by the student, these media cannot be used. A student may visit the instructor during office hours regarding grades.

Project Report Guide

Report Cover

Executive Summary

- Provide a complete summary of your report. Be concise (2/3 of a page)

Body of the Report

- Should explain the problem and the methodology to solve the problem
- Should describe design criteria, model set-up, major findings and results
- Should include data to support your findings in the form of concise tables or figures

Conclusion and recommendations

- State what you found – often point form is used, though not required
- State what course of action to take next, based on your findings

Report Format

- Number all pages of the report, including those pages in appendix.
- Must be typed using 1.5 line spacing, 1" margins and 12-point fonts
- Must have a table of contents, complete with pages numbers
- Figures and tables must have a number, a title, and proper label of axis and column headings and be properly referred in the text of the report
- Extensive data tables and figures (e.g. computer printout) are in appendix
- If the instructor requests, submit your modeling digital files.