

**Oregon State University**  
**School of Civil and Construction Engineering**  
**CE 540 Special Topics / STORMWATER MANAGEMENT AND MODELING**

**Instructor:** Arturo Leon, Ph.D., P.E. (213 Owen Hall, **2nd floor Owen Lobby**)

**Email:** [arturo.leon@oregonstate.edu](mailto:arturo.leon@oregonstate.edu)

**Meeting time for Lectures:** Tuesday/Thursday 12:00-13:50 KEAR 205

**Instructor Office hours:** Tuesday/Thursday 14:00-15:00 (213 Owen Hall). At other times subject to instructor availability. The instructor encourages visits from students during office hours. In particular, the instructor encourages students to ask questions during lectures.

**Course webpage:** [http://web.engr.oregonstate.edu/~leon/Teaching\\_Stormwater.html](http://web.engr.oregonstate.edu/~leon/Teaching_Stormwater.html)

**Useful webpages for the Class:**

(1) Stormwater Master Plan (SWMP) of Corvallis:

[http://www.ci.corvallis.or.us/index.php?option=com\\_content&task=view&id=3361&Itemid=4009](http://www.ci.corvallis.or.us/index.php?option=com_content&task=view&id=3361&Itemid=4009)

(2) Stormwater program of Corvallis:

[http://www.ci.corvallis.or.us/index.php?option=com\\_content&task=view&id=3752&Itemid=4356](http://www.ci.corvallis.or.us/index.php?option=com_content&task=view&id=3752&Itemid=4356)

**Required textbook:**

Davis, A. P., and McCuen, R. M. (2005). Stormwater management for smart growth, Springer, New York.

**Additional recommended textbooks:**

(1) Bedient, P.B., W.C. Huber and B.E. Vieux, Hydrology and Floodplain Analysis, Prentice-Hall, Fifth Edition, 2012.

(2) Mays, L.W. (2001) Stormwater collection systems design handbook. McGraw-Hill, Inc., New York, NY. ISBN: 0-07-135471-9.

**Course Description**

This course focuses on the analysis of the hydrology and water quality of urban storm drainage systems, including their impacts on the receiving water systems. State-of-the-art practices for controlling runoff and water quality are examined for minimizing the hydrologic and ecologic impacts of urban development. The course includes training on, and extensive use of, the USEPA Stormwater Management Model (SWMM) and the Illinois Transient Model (ITM). Topics of this course include, urban hydrology and hydraulics, modeling of combined sewer overflows (CSOs), stormwater quality and receiving-water impacts, design of drainage systems, best management practices (BMPs), and computer modeling techniques.

**Prerequisites:** None required, however CE 313 (Hydraulic Engineering) and CE 412 (Hydrology) is the preferred minimal prerequisite. Also, basic knowledge of numerical methods and computer programming is desirable but not required.

**Student Learning Outcomes:**

1. Describe characteristics of stormwater runoff quantity and quality and their impacts on receiving water systems.
2. Compute stormwater runoff flow rates, volumes, hydrographs, pollutant loads, and pollutant concentrations.
3. Design stormwater best management practices, control structures, and conveyance systems.
4. Apply state-of-the-art stormwater modeling techniques.

**Professionalism:** Professional behavior is expected from all students in this class. Examples of *un-professional* behavior include arriving late for class; interrupting while someone else is talking; eating, drinking, or sleeping in class; inappropriate cell phone or notebook computer use; or any behavior that interferes with other students' ability to learn or that shows disrespect for others.

**Academic Dishonesty:** At Oregon State University academic dishonesty is defined by the Oregon Administrative Rules 576-015-0020.1.a-c as: *An intentional act of deception in which a student seeks to claim credit for the work or effort of another person or uses unauthorized materials or fabricated information in any academic work.* For more information about the University's policies and procedures in this area see the Student Conduct web site at: <http://oregonstate.edu/admin/stucon/achon.htm>.

**Special Assistance:** Accommodations are collaborative efforts between students, faculty and Services for Students with Disabilities (SSD). Students with accommodations approved through SSD are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through SSD should immediately contact the Students with Disabilities Office, Room A200, Kerr Admin. Building, 737-4098 or T.D.D. 737-3666, e-mail [Disability.services@orst.edu](mailto:Disability.services@orst.edu).

**LECTURES:** Theory and practice will be presented mostly from the textbook, however additional material will be used from various sources. Example problems will be solved in class. Practical applications will be presented. Students are responsible for all lecture and recitation material. There is no attendance policy, however, there will be a

significant amount of information that will be covered in class that is not found in the textbook.

**READINGS:** Readings are assigned from the textbook and handouts that will be provided.

**HOMEWORKS:** Three to four homework assignments will be given, and are to be completed individually.

**FINAL EXAM:** The final exam will take place in the classroom at the time scheduled by the university. The final exam will cover all of the class material (lectures, outside readings, field trip and project). This exam will be open book and open notes.

**FIELD TRIP:** A field trip to some of Corvallis stormwater controls is scheduled; a 1-2 page summary report of this field trip is required.

**GROUP PROJECT:** Project teams of two to three students will develop and design stormwater conveyance and controls for a small watershed. Project teams will prepare a progress (mid-quarter) and final written report and give two oral presentations (mid-quarter and final).

<b>Grading:</b>	Homework/Field Trip Report .....	30%
	Final Exam.....	20%
	Project (max. three students)	
	Progress presentation.....	5%
	Progress report .....	5%
	Final presentation .....	20%
	Final report .....	20%
	<u>Participation in class .....</u>	<u>Up to 10%</u>
	<b>Total possible .....</b>	<b>110%</b>

Letter grades will be based on the weighted average specified above and assigned as follows:

<b>A</b>	> 95%	<b>B-</b>	75– 79.99%	<b>D</b>	52– 59.99%
<b>A-</b>	90– 94.99%	<b>C+</b>	70-74.99%	<b>F</b>	< 51.99%
<b>B+</b>	85– 89.99%	<b>C</b>	65-69.99%		
<b>B</b>	80– 84.99%	<b>C-</b>	60-64.99		

**CE 540 Schedule Fall 2012**  
**(Subject to change)**

Wk	TUE	Lecture/topic	Reading	THU	Lecture/topic	Reading
1	25-Sep	Review of Syllabus, Test #0 (Will not be part of your score). Introduction to Urban Sprawl and smart growth.	1 (Ch. 1), 3 (Ch. 1), 4	27-Sep	Water Quality parameters	1 (Ch. 2)
2	2-Oct	Water Quality parameters	1 (Ch. 2)	4-Oct	Water Quality parameters / Stormwater Hydrology	1 (Ch. 2), 1 (Ch. 4), 2 (Ch. 1)
3	9-Oct	Stormwater Hydrology	1 (Ch. 4), 2 (Ch. 2- 3)	11-Oct	<b>Field trip</b>	1 (Ch. 4), 2 (Ch. 6)
4	16-Oct	Stormwater Hydrology	8, 5, 3 (Ch. 21)	18-Oct	<b>Guest Lecture on Stormwater Practices in Corvallis. Public Works, City of Corvallis</b>	
5	23-Oct	Class Project explanation, Introduction to Stormwater Modeling (HEC-HMS, SWMM and ITM)		25-Oct	Introduction to Civil 3D and Stormwater Modeling (HEC-HMS, SWMM and ITM)	
6	30-Oct	Introduction to Stormwater Modeling (HEC-HMS, SWMM and ITM)		1-Nov	Introduction to Stormwater Modeling (HEC-HMS, SWMM and ITM)	
7	6-Nov	Stormwater Quality/sedimentation	1 (Ch. 6), 6, 7	8-Nov	<b>Project Progress presentation (Presentation: 25 - 30 min, Questions/discussion: 10 min)</b>	
8	13-Nov	Improvement of Stormwater Quality and Storage and Flow Control	1 (Ch. 7), 1 (Ch. 8)	15-Nov	Improvement of Stormwater Quality and Storage and Flow Control	1 (Ch. 7), 1 (Ch. 8)
9	20-Nov	<b>Guest Lecture on the Portland Combined Sewer System. BES of the City of Portland</b>		22-Nov	<b>No Lecture. Thanksgiving Holiday</b>	
10	27-Nov	<b>Presentation on Special topics in Storm-water and Final Exam Review</b>		29-Nov	<b>Final presentation (Presentation: 30 min, Questions/discussion: 5 min)</b>	
11				7-Dec	<b>Final Cumulative Exam and Due of Final Report, 9:30 AM</b>	

**Reading Assignments:**

- (1) Davis, A. P., and McCuen, R. M. (2005). Stormwater management for smart growth, Springer, New York.
- (2) Bedient, P.B., W.C. Huber and B.E. Vieux, Hydrology and Floodplain Analysis, Prentice-Hall, Fifth Edition, 2012.
- (3) Mays, L.W. (2001) Stormwater collection systems design handbook. McGraw-Hill, Inc., New York, NY. ISBN: 0-07-135471-9.
- (4) EPA web site: [http://cfpub.epa.gov/npdes/home.cfm?program\\_id=6](http://cfpub.epa.gov/npdes/home.cfm?program_id=6)
- (5) ITM User's Manual available at the web site  
<http://web.engr.oregonstate.edu/~leon/ITM.htm>
- (6) Pitt, R.E. (1999). "Chapter 4: Source characterization." In: Innovative urban wet-weather flow management systems, EPA600/R-99/029, U.S. Environmental Protection Agency, Washington, DC.
- (7) Pitt, R.E. (1999). "Chapter 5: Receiving water and other impacts." In: Innovative urban wet-weather flow management systems, EPA600/R-99/029, U.S. Environmental Protection Agency, Washington, DC.
- (8) SWMM Users Manual, Help Topics, and Example Problems.