ENPM 808N Urban Stormwater Management

Fall Semester, 2017

Professional Master of Engineering Program

College of Engineering

University of Maryland, College Park

Schedule and Location

JMP 2217 and web

One session per week, each from 7 PM to 9:40 PM, includes lecture sessions, one week for midterm exam, and one week for term paper presentation.

Instructor

Huong Li, Ph.D, P.E., enpm808n@gmail.com

Goal

This course is offered to provide knowledge and methodology to manage urban stormwater in an ecologically sustainable manner. Upon completion of this course, students will be able to:

1. Understand the history and paradigm shifts in urban water management.
2. Identify and discuss the benefits and drawbacks of conventional urban drainage management, and how to integrate existing knowledge and infrastructures to low impact development (LID) goals using green engineering principles.
3. Be familiar with the legal principle and legislative framework of stormwater management in Clean Water Act (CWA) and recent regulatory trends in stormwater management at local level.
4. Possess advanced knowledge in stormwater characteristics, best management practices (BMP) and BMP unit process.
5. Formulate integrative goals regarding hydrologic, environmental and social consequences for a sustainable urban stormwater management project.
6. Provide green infrastructure solutions and climate change adaptation strategies for water-abundant and water-limited scenarios.

Abilities and Skills That Will Develop from This Course

Upon completion of this course, students will possess the following skills and abilities:

1. Present and defend, in written and oral formats, a proposal for a sustainable urban stormwater BMP infrastructure.
2. Survey, map and perform necessary engineering calculations and analyses to create conceptual support document for an urban watershed plan.
3. Communicate effectively with other professionals on engineering, health, ecological, and social-economic issues of urban drainage and related measures leading to hydrologic and environmental objectives.
4. Take a professional and critical stand regarding urban water management and sustainability aspects under scientific uncertainty.

Course Webpage

Enterprise Learning Management System (ELMS): Canvas

Homework Policy

Problem sets (pencil-and-paper analysis or computational exercises) will be posted on the course webpage. It is each student’s responsibility to obtain the assignments.

Students do not need to submit homework for grading. However, the problem sets in homework assignments are likely to be used in exams. You are encouraged to bring your homework questions to the instructor. Keys to the problem sets will be posted after the midterm exam.

Grading

40% midterm exam, 40% term paper project (20% term paper+20% oral presentation), and 20% class discussion. The exam will be assigned from homework problem sets, class lecture and discussions, and assigned reading as appropriate.

Text Book

There is no required text book for this course, as I will be teaching from my notes. There are assigned reading for related technical publications as the course progresses, which are listed in this syllabus. Two books are recommended as the following (I will ask the engineering library to reserve the two books during the course semester):


Other references


**Prerequisite**

Hydrology, Hydraulics (or Fluid Mechanics, Hydrodynamics, Open Channel Flow), and General Chemistry at college level.

**Term Paper Project Guidelines**

**Paper**

Length: About 10 pages with 10 references. No more than 15 pages.

Style: Publishable format. Double spaced, 11/12-point font, 1 inch margins, appropriately referenced. Reference style should follow ASCE journal style (e.g. Journal of Hydrologic Engineering).

Subjects: Any area of urban stormwater management focusing on recent, state-of-the-art information. Most reference should be from the last 5 years (more than 5 references). Most information should come from journals and reports instead of books. Do not copy material word-for-word from references. I do not recommend a general topic (from experience).

Grading:

1. Presentation, organization.
2. Relevance to urban stormwater management.
3. Depth of subject coverage.
4. Technical content
5. Critical evaluations of literature. How well do you understand and your discussion of material.

**Oral Presentation (using Power Point)**

Length: 15 minutes of presentation + 5 minutes Q&A.

Style: Presentation should include introduction, body, and concluding remarks. A rule of thumb: 1 slide per minute of presentation. The slides should be well organized and cleared. Do not “read” from the slides during your presentation.

Grading:

1. If the presentation is well prepared and conducted in an organized manner.
2. The speaker’s response to questions.
3. If the presentation provides a comprehensive coverage of the subject.
Term Paper Project Delivery

Please deliver the following submissions according to the class schedule. A penalty of 20% will be assessed for each class period delay.

(1) Concept submission: A 2-page outline of the paper including subject, abstract, and a reference list.
(2) 50% submission: The PowerPoint draft of your oral presentation. I will give you my feedback and recommendation of the first two submissions to improve your term paper and presentation.
(3) Final delivery: The final term paper is due on your presentation date. Two copies required, along with copy of your two most important references.

Class Schedule (tentative)

<table>
<thead>
<tr>
<th>Date</th>
<th>Topics</th>
<th>Activity</th>
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<tbody>
<tr>
<td>8/31</td>
<td>1. Go over syllabus and student survey form</td>
<td>1. Assigned Reading (12)</td>
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<td>2. History and paradigm shifts of urban water management.</td>
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<td>3. Drainage area boundary delineation for small urban watersheds and Win-TR-55 (with class room practices).</td>
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<tr>
<td>9/14</td>
<td>1. Stormwater hydrology (2) WIN TR-20 and SWMM</td>
<td>1. Assigned Reading (4)&lt;br&gt;2. Homework #2 post</td>
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<td></td>
<td>2. Stormwater quantity management and regulations</td>
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<td></td>
<td>2. Drainage infrastructure design&lt;br&gt;Inlet spacing, pipe capacity, channel and swale designs.</td>
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<td>2. Stormwater quality management.</td>
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<tr>
<td>10/5</td>
<td>1. Stormwater quality regulation-Clean Water Act&lt;br&gt;NPDES and TMDL</td>
<td>1. Homework #5 post&lt;br&gt;2. Homework #1-4 key post</td>
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<td>10/12</td>
<td>Mid-term Exam</td>
<td>1. No Lecture&lt;br&gt;2. Homework # 5 key post&lt;br&gt;3. Assigned reading (14)</td>
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<tr>
<td>10/19</td>
<td>1. Maryland stormwater management regulations</td>
<td>1. Assigned reading (3)/(13)&lt;br&gt;2. Term paper project-Concept submission due.</td>
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<td>2. Maryland erosion and sediment control regulations</td>
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<td>10/26</td>
<td>Structural stormwater BMPs</td>
<td>1. Assigned reading (9)(10)&lt;br&gt;2. Comment feedback for the concept submission.</td>
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<td>1. Retention/detention ponds, wetlands Storage types</td>
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<td>2. Conveyance types – swales</td>
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<tr>
<td>11/2</td>
<td>Structural stormwater BMPs</td>
<td>1. Assigned reading (2)&lt;br&gt;2. Comment feedback for the concept submission</td>
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<td>3. Infiltration and filtering types- infiltration trenches, infiltration basins, bioretention, sand and filters.</td>
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<tr>
<td>11/9</td>
<td>Structural stormwater BMPs</td>
<td>1. Assigned reading (8)(11)&lt;br&gt;2. Term paper project- 50% submission due.</td>
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<td>4. Grass roofs and proprietary devices</td>
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<td>11/16</td>
<td>Non-structural stormwater BMPs Introduction to urban stream restoration (time permits)</td>
<td>Comment feedback for the 50% submission.</td>
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<td>11/23</td>
<td>Thanksgiving Recess</td>
<td>No Class</td>
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<td>11/30</td>
<td>BMP selections and watershed management</td>
<td>Comment feedback for the 50% submission.</td>
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<td>1. Low impact development philosophy and green engineering principles</td>
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<td>2. BMP performance metrics and technical uncertainty</td>
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<td>3. Current watershed TMDLs and NPDES practices</td>
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<td>12/7</td>
<td>Urban stormwater management challenges and outlooks</td>
<td>Comment feedback for the 50% submission.</td>
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<td>1. Climate change adaptations</td>
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<td>2. Land development practices</td>
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<td>3. Retrofitting existing drainage with green stormwater infrastructure.</td>
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<td>4. Eco-cities of the future</td>
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<tr>
<td>12/14</td>
<td>Term paper project presentation</td>
<td>Term paper project- Final delivery due</td>
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Scheduled topics may vary due to time or weather constraints. Due dates are tentative.

**Assigned Readings**


Office Hour

1. **On site:** One hour before each class (by appointment)
2. **Virtual:** One hour or more by Skype or Facetime (by appointment)

Academic Integrity

A scholarly community built on individual responsibility and mutual trust is the foundation for learning. The University of Maryland has approved a Code of Academic Integrity ([http://www.president.umd.edu/policies/iii100a.html](http://www.president.umd.edu/policies/iii100a.html)) that prohibit cheating on exams or assignments, plagiarizing papers, buying papers, submitting fraudulent documents and forging signatures.

*Policy on collaboration for this course:* Working with each other among students is an aid to learning, especially in a class such as this where exchange of technical/computational skills is beneficial to everyone, including the instructor. As such, students are encouraged to discuss the homework assignments and work together. However, every student must submit her/his own work when requested, and take ultimate responsibility for her/his own learning. Identical or nearly identical (instructor’s judgment) solution will not be accepted. Unauthorized copying of software constitutes theft. Please make use of the generous computational resources that the University provides. If you wish to own the software, acquire it legally.

Special Needs

The University has a legal obligation to provide appropriate accommodation for students with disabilities. If you have special needs related to a disability, please inform the instructor as soon as possible, so that we will make every effort to accommodate you.

Religious Observances

Students shall be given an opportunity, whenever feasible, to make up within a reasonable time any academic assignment that is missed due to individual participation in religious observances. It is the student’s responsibility to inform the instructor of any intended absences for religious observances in advance.

My Role as a Teacher

I will treat everyone fair and with respect. I will try to lead an interesting, informative, and clear class discussion related to the course topics. I will assign homework and exams that exercise the concepts we discussed in class and return all submissions in a timely manner. I will make every effort for outside class
discussion in person (with appointment) and via email/course webpage. However, please try to avoid unscheduled visit and allow appropriate period for responding on course webpage and through email.

**Your Role as a Student**

You are expected to turn in all assignments on the due dates and finish assigned readings prior to classes in which they are discussed. Come to class and ready to think and discuss, not just taking notes of what I said. If something is unclear, ask questions.