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Spring 2020

ENE 672-102: Stormwater Management

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EnE 672
Stormwater Management
John A. Reif, Jr. Department of Civil and Environmental Engineering
Section: 102 **Spring 2020**

Course Description

Quantifying water flow in urban watersheds is a crucial step for reducing runoff and improving water quality. This course deals with the water cycle over urban watersheds by addressing the motion of water masses in the atmosphere and in surface. Estimation of runoff by various models will be considered, including the SCS, Rationale, and SWMM (EPA software). Design of culverts and detention basins. Students who successfully pass this class should be able to deal with most urban hydrology problems treated in the industry sector.

Required courses: Calc III and hydraulics/fluid mechanics.

This course provides a comprehensive study of stormwater management with emphasis on design practices. Topics include regulatory framework, an overview of structural and non-structural BMPs, groundwater recharge analysis, estimate of runoff, and design of detention basin and drainage systems.

Text: "Urban Hydrology, Hydraulics, and Stormwater Quality, Engineering Applications and Computer Modeling" John Wiley and Sons, Inc. 2003, by A. Osman Akan and Robert J. Houghtalen. ISBN: 978-0-471-43158-9.

References:

1. NJ Stormwater Best Management Practices Manual:
http://www.nj.gov/dep/stormwater/bmp_manual2.htm
2. NJ DEP Municipal Stormwater Regulation Program: guidance, permits, and status:
http://www.nj.gov/dep/dwq/msrp_home.htm
3. US EPA Stormwater Program: NPDES, rules and notices: <https://www.epa.gov/npdes/npdes-stormwater-program>
4. NJ Stormwater Management Rules (N.J.A.C. 7.8):
http://www.nj.gov/dep/rules/rules/njac7_8.pdf.
5. New Jersey Pollutant Discharge Elimination System (NJPDES) Rules (N.J.A.C. 7:14A):
<http://www.state.nj.us/dep/dwq/714a.htm>.

Classes

Held weekly on Wednesday 6:00 PM-9:00-PM in Central King Building 214. Attendance is expected. Students may leave after 15 minutes if the instructor or a substitute has not arrived by that time.

Instructor

Michel C. Boufadel, PhD, PE, P.Hydro., F.ASCE
boufadel@njit.edu ;

Office hours for the course: Wednesday 1:00-4:00 PM or by appointment.

Grading

Weekly quizzes (15%) and class participation (10%)	25%
Mid term exam	25%
Final exam	35%
Homework	15%

90-100=A

85-90=A

80-85=B+

75-80=B

70-75=B-

65-70=C+

Homework Instructions

- ! Homeworks should be turned in at the beginning of the class on the due date. Late homeworks will receive a zero grade.
- ! The questions sheets should be provided in the beginning of the homework solution.
- ! Only one side of a 8.5x11 sheet must be used.
- ! Include the information that is given and clearly state any assumption. To receive credit for a problem, you must show your work.
- ! No credit will be given if you only write the answer.
- ! If you think that your answer is not correct (i.e., it does not make sense to you) but you don't know what else to do, say so.
- ! Homeworks should be written as technical reports. The text should be reported first followed by tables and then figures. The text should present the question and the solution, and point to the figures and tables. All tables should be numbered, and all figures should be numbered. Tables should have titles but no captions. Figures should have captions but no titles.
- ! All axes in graphs should have titles displaying the name of the variable and the units that are being used in the graph.
- ! Straight lines should be used to connect between data points in graphs. Use of smooth lines from a spreadsheet software, such as Excell, will be penalized.
- ! Printout of columns of numbers from a spreadsheet will be penalized.
- ! Discussing the problems with your colleagues is permitted but copying is not.
- ! Documents should be stapled only on the top left.

Exams Instructions

- Quizzes might be given at the beginning of any lecture.
- Bring a **non-programmable calculator** with you to class, you might need it for a pop quiz.
- Make-up examinations will only be offered with advance permission from the instructor and only under the most extreme circumstances. A typed request and explanation must be provided. But regardless, expect make-up exams to be more difficult.
- To receive credit for a problem, you must show your work. No credit will be given if you only write the answer. If you think that your answer is not correct (i.e., it does not make sense to you) but you don't know what else to do, say so.

PROPOSED TOPICS in chronological order

Topic 1 Evaporation, Evapotranspiration

Precipitation, point and radar measurement, IDF.

Topic 2 Rainfall losses, infiltration, effective rainfall. baseflow separation.

Topic 3	Unit hydrograph, convolution, S-method, deconvolution, HEC-HMS.
Topic 4	Watershed morphology. Synthetic unit hydrographs. Rational and SCS methods.
Topic 5	Hydrologic Routing, Reservoir model, Muskingum.
Topic 6	Hydraulic Routing: Kinematic Wave.
Topic 7	SWMM model.
Topic 8	Detention basin design.
Topic 9	Stormwater Pollution Prevention Plan, Soil Erosion and Sediment Control. Best Management Practices.

Accessibility

Any student who has a need for accommodation based on the impact of a disability should contact the Instructor privately to discuss the specific situation as soon as possible. Contact Disability Resources and Services to coordinate reasonable accommodations for students with documented disabilities. The NJIT web site below provides additional information: <http://www.njit.edu/counseling/services/disabilities.php>

Academic Honesty

Student's expected to abide by the NJIT's Academic Honesty Policy. Any work submitted by a student for academic credit will be the student's own work. You are encouraged to study together and to discuss information and concepts covered in lecture and the sections with other students. You can give "consulting" help to or receive "consulting" help from such students. However, this permissible cooperation should never involve one student having possession of a copy of all or part of work done by someone else. During examinations, you must do your own work. Talking or discussion is not permitted during the examinations, nor may you compare papers, copy from others, or collaborate in any way. Any collaborative behavior during the examinations will result in failure of the exam, and may lead to failure of the course and University disciplinary action.

“Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: <http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf>.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu”