UMBC
Department of Chemical, Biochemical, and Environmental Engineering

ENEN 701 Special Topics in Environmental Engineering:
Green Infrastructure for Stormwater Management

Fall 2023

Instructor
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Class Meeting Time and Place: M W 4:00 – 5:15 PM; TRC 206

Required Text
Davis, A.P., W. F. Hunt, and R. G. Traver. 2022. *Green Stormwater Infrastructure: Fundamentals and Design*. Wiley, Hoboken, NJ.

Supplemental Text (free online)
National Research Council. 2009. *Urban Stormwater Management in the United States*. Washington, DC: The National Academies Press. https://doi.org/10.17226/12465.

Reference: Maryland Stormwater Design Manual
https://mde.maryland.gov/programs/water/stormwatermanagementprogram/pages/stormwater_design.aspx

Preliminary Course Outline

1. Introduction
    - 1.1 Precipitation: The Stormwater Driver
    - 1.2 Water Quality: Parameters and Measures
    - 1.3 Ecosystem Services and Stormwater Management
    - 1.4 Stormwater Quality Metrics
    - 1.5 Watershed Hydrology

2. Hydrologic Unit Processes
    - 2.1 Unit processes for controlling stormwater quantity
    - 2.2 Unit Processes controlling stormwater quality

3. Stormwater Performance Measures and Metrics
    - 3.1 Volume control, peak flow control …
    - 3.2 Pollutant percent removal, target effluent concentrations, mass load targets

3.3 Probability and exceedance; pollutant durations

4. Green Infrastructure Stormwater Controls
    4.1 Green Roofs and Rainwater Harvesting
    4.2 Permeable Pavement
    4.3 Infiltration Trenches and Infiltration Basins
    4.4 Sand Filters
    4.5 Bioretention
    4.6 Vegetated Swales
    4.7 Stormwater Wetlands

5. Designing for Climate Change

Description *(Based on Davis et al., 2022)*
This course presents fundamentals of green urban stormwater infrastructure from an engineering design and performance analysis perspective. The focus is on novel stormwater control measures (SCMs) and related technologies for reduction of impacts from urban stormwater. At the end of the course the student will be able to design a variety of types of SCMs.

It is expected that students would have had a course in engineering hydraulics/hydrology and some exposure to environmental engineering treatment processes and water quality. The course is complementary to graduate surface water hydrology and traditional water and wastewater treatment engineering. While presented with an engineering focus, nonengineers such as landscape architects, planners, and environmental scientists should find the course to be useful.