STORMWATER MANAGEMENT: FUNDAMENTALS AND DESIGN

John J. Ramirez Avila, Associate Professor of the Watersheds and Water Quality Research Lab at Mississippi State University, will lecture a short-term course for undergraduate and graduate students called "Stormwater Management: Fundamentals and Design", and exchange with professors of the Federal University of Mato Grosso do Sul about his ongoing research activities related to this topic.

Course Overview:

Effective implementation of stormwater management infrastructure requires the proper understanding of the hydrological processes that occur within a drainage area, especially after being altered by anthropogenic activities (i.e. urban development), the selection of adequate stormwater management strategies and infrastructure, and the adequate tracking of the runoff from pervious and impervious areas to and through the proposed stormwater control infrastructure. This course will offer fundamental concepts and hands-on experience to the participants about watershed characterization, assessment of watershed hydrologic response (volumes and rates), and design of stormwater management strategies implementation.

Objective:

- Increase the course participant's knowledge of the role and application of Stormwater Management Practices and Techniques, how Stormwater Management effectively reduces flooding, and the aesthetic and societal benefits of Stormwater Management.

Expected output and outcome of the project

- Enhanced collaboration between the Federal University of Mato Grosso do Sul (Brazil) and Mississippi State University (USA) on water resources and hydrological sciences;

Upon completion of the course, participants will be able to:

- Determine runoff (peak flows and volumes) from watersheds
- Identify types of Stormwater Management Infrastructure
- Apply basic hydraulic principles to design (size and/or analyze) stormwater management systems
    - Porous pavement
    - Green roofs
    - Rain gardens
    - Detention ponds
    - Infiltration basins
    - Filter strips
- Short course (plan and material), with the following learning objectives and provisional content:

Learning Objectives:

upon successful completion of the course, students should be able to:

- Short course (plan and material), with the following learning objectives and provisional content:
- Define, explain and correctly use terms and concepts to describe basic physical hydrologic processes and stormwater management.
- Use basic hydrologic methods, equations, and models to characterize watersheds and quantitatively measure and estimate a drainage area hydrologic response
- Understand and be able to develop fundamental stormwater management design applications that are routinely used in engineering and related analyses.

Course Provisional Content:

Day 1	Course Introduction. **Watershed Hydrology**: Watershed characterization, precipitation, design storms, (hands-on software and spreadsheet class exercises)
Day 2	**Watersheds Hydrologic Response**: runoff, NRCS Curve Number method, time of concentration, unit hydrograph, convolution, stormflow hydrograph (hands-on software and spreadsheet class exercises)
Day 3	**Stormwater Management**: Types of stormwater control, stormwater performance measures and metrics, Curve Number reduction, pollutant percent removal, target effluent concentrations, annual mass load (hands-on software and spreadsheet class exercises)
Day 4	**Green Stormwater Infrastructure**: vegetated stormwater control measures, green roofs, bioretention, vegetated swales, and filter strips (hands-on software and spreadsheet class exercises)
Day 5	**Grey/Green and Grey (Conventional) Stormwater Infrastructure**: non-vegetated stormwater control measures, permeable pavements, detention ponds (hands-on software and spreadsheet class exercises)

Course duration/daily hours: 5 days (Monday to Friday); 4 hours per day.

Practical examples of application are considered throughout the course to bring students a better understanding of discussed topics through hands-on practice activities.

Dates: August 12 to August 16, 2024
Course Schedule: 8 am to 12 pm

Schedule:

Time	(8:00 – 12:00)	(14:00 – 17:00)
Day 1 (Monday)	C	R
Day 2 (Tuesday)	C	R
Day 3 (Wednesday)	C	IT
Day 4 (Thursday)	C	R
Day 5 (Friday)	C	R

C-Class; R-Research; IT-Invited talk.