

“Hydrologic Restoration and Hydro-Chemical Topics In Urban Drainage”

DICAT – DEPARTMENT OF CONSTRUCTION, ENVIRONMENTAL AND TERRITORIAL ENGINEERING

Università degli Studi di Genova

11 – 12 December 2007

Faculty: Prof. John Sansalone of Environmental Engineering Sciences at the University of Florida, USA has conducted research for 12 years focused on the development of material and control systems for rainfall-runoff (urban drainage) and a fundamental understanding of the coupled interactions between hydrologic, physical and chemical phenomena of urban drainage and sustainable infrastructure in the built environment. In the last decade he has published over 50 archival manuscripts, presented over 200 papers, graduated 14 PhD students, and has 8 patents. He has a background as an environmental, geotechnical and hydrologic engineer. His research and teaching includes wastewater treatment design and reuse, infrastructure design, water chemistry, computational fluid dynamics (CFD) and physical-chemical geotechnics including infiltration of urban drainage.

Basic Course Outline: This course examines the inter-related physical, chemical and hydrologic components of urban drainage (rainfall-runoff) as influenced by urban infrastructure systems; as well as quality and quantity restoration through unit operations and processes (UOP) mechanisms of “low impact development” (LID) design. The impacts of anthropogenic activities and the design of infrastructure in the urban environment, on rainfall and runoff chemistry and hydrologic processes are reviewed; with an examination of hydrologic restoration concepts. Examples and a case study of sustainable urban development (SUD) are presented. Transport of urban drainage pollutants will be examined in detail. A primary objective of the course is to provide an understanding of constituent physical properties, chemistry, transport and loads; as such understanding can be used to design BMPs for control, treatment and reuse of rainfall-runoff. The approach to these topics is mechanistic and will include sedimentation, hydrodynamic separation, filtration, adsorption, leaching, coagulation, flocculation; and mechanisms of infrastructure materials such as pervious pavement. The benefits and health issues associated with reuse are introduced.