
Postgraduate Certificate in Sanitary Engineering

Drainage and Stormwater Management

Drainage and Stormwater Management: Key Terms and Vocabulary

Sanitary engineering encompasses a wide range of disciplines, including Drainage and Stormwater Management. This field is crucial for the proper functioning of urban areas, ensuring the safe disposal of wastewater and effective management of stormwater runoff. To fully grasp the intricacies of Drainage and Stormwater Management, it is essential to understand the key terms and vocabulary associated with this area. Below, we delve into the most important concepts and definitions that are vital for professionals pursuing a Postgraduate Certificate in Sanitary Engineering.

1. Drainage System:

A drainage system refers to the network of pipes, channels, and structures designed to collect and convey wastewater from buildings and surfaces to treatment facilities or natural water bodies. It plays a fundamental role in preventing flooding, protecting public health, and maintaining the overall integrity of the environment.

2. Stormwater Management:

Stormwater management involves the control, collection, treatment, and disposal of runoff water resulting from precipitation events. This process aims to reduce the impact of urbanization on natural drainage systems, mitigate flooding risks, and safeguard water quality in receiving water bodies.

3. Runoff:

Runoff refers to the excess water that flows over surfaces such as roads, rooftops, and pavements during rainfall or snowmelt. It is a key component of stormwater and must be effectively managed to prevent flooding and erosion.

4. Infiltration:

Infiltration is the process by which water seeps into the soil or porous surfaces, replenishing groundwater reserves and reducing surface runoff. It plays a crucial role in sustainable stormwater management by promoting natural water filtration and recharge.

5. Retention Basin:

A retention basin, also known as a detention pond, is a constructed water storage facility designed to temporarily hold stormwater runoff and release it at a controlled rate. These basins help reduce peak flows, prevent downstream flooding, and improve water quality through sedimentation.

6. Green Infrastructure:

Green infrastructure refers to natural or engineered systems that mimic the functions of natural ecosystems to manage stormwater and provide additional environmental benefits. Examples include green roofs, permeable pavements, rain gardens, and bioswales.

7. Combined Sewer System:

A combined sewer system is a type of drainage system that carries both sanitary sewage and stormwater in the same pipe network. During heavy rainfall, these systems can become overwhelmed, leading to combined sewer overflows (CSOs) and pollution of water bodies.

8. Separate Sewer System:

In contrast to combined sewer systems, separate sewer systems have distinct pipes for sanitary sewage and stormwater runoff. This separation allows for more effective treatment of wastewater and reduces the risk of overflows during storm events.

9. Hydrologic Cycle:

The hydrologic cycle, also known as the water cycle, describes the continuous movement of water between the atmosphere, land, and oceans. Understanding this natural process is essential for effective stormwater management and sustainable water resource planning.

10. Urban Drainage Design:

Urban drainage design involves the planning and implementation of systems to manage stormwater runoff in urban areas. It considers factors such as land use, rainfall intensity, topography, and infrastructure capacity to develop efficient and resilient drainage solutions.

11. Floodplain:

A floodplain is a low-lying area adjacent to a river or stream that is prone to flooding during heavy rainfall or snowmelt. Proper management of floodplains is essential to minimize flood risks, protect infrastructure, and preserve natural habitats.

12. Water Quality Standards:

Water quality standards are regulatory guidelines that establish the acceptable levels of pollutants and contaminants in surface waters. Compliance with these standards is crucial for protecting human health, supporting aquatic ecosystems, and ensuring sustainable water use.

13. Best Management Practices (BMPs):

Best Management Practices (BMPs) are techniques or strategies designed to minimize the impact of stormwater runoff on the environment. Examples include vegetated swales, filter strips, permeable pavement, and erosion control measures.

14. Hydraulic Modeling:

Hydraulic modeling involves using mathematical and computational tools to simulate the flow of water through drainage systems. This technique helps engineers assess system performance, predict flooding risks, and optimize infrastructure design.

15. Water Sensitive Urban Design (WSUD):

Water Sensitive Urban Design (WSUD) is an integrated approach to urban planning that aims to incorporate sustainable water management principles into the built environment. WSUD strategies focus on minimizing runoff, enhancing water quality, and promoting water reuse.

16. Nonpoint Source Pollution:

Nonpoint source pollution refers to pollution that originates from diffuse sources, such as urban runoff, agricultural activities, and construction sites. Managing nonpoint source pollution is a key challenge in stormwater management due to its widespread and complex nature.

17. LIDAR (Light Detection and Ranging):

LIDAR is a remote sensing technology that uses laser pulses to create detailed three-dimensional maps of the Earth's surface. It is commonly used in drainage and stormwater management to assess topography, analyze flood risks, and plan infrastructure projects.

18. Permeability:

Permeability is a measure of a material's ability to allow water to pass through it. In the context of stormwater management, permeable surfaces such as permeable pavements and green roofs are essential for promoting infiltration, reducing runoff, and enhancing groundwater recharge.

19. Inflow and Infiltration (I&I):

Inflow and infiltration (I&I) refer to the excess water that enters a sanitary sewer system through unauthorized connections, leaks, or cracks. I&I can overwhelm treatment plants, increase operating costs, and lead to sanitary sewer overflows if not properly managed.

20. Sump Pump:

A sump pump is a device used to remove excess water from basements or crawl spaces to prevent flooding. It is commonly employed in stormwater management to mitigate the risk of water intrusion and protect buildings from water damage.

In conclusion, mastering the terminology and concepts related to Drainage and Stormwater Management is essential for professionals working in the field of Sanitary Engineering. By understanding these key terms and vocabulary, individuals can effectively design, implement, and maintain sustainable drainage systems that protect public health, preserve the environment, and enhance urban resilience.