

IV Year I Semester
Code: 17CE738

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URBAN HYDROLOGY

Course Learning Objectives

The objectives of this course are:

1. To appreciate the impact of urbanization on catchment hydrology
2. To understand the importance of short duration rainfall runoff data for urban hydrology studies.
3. To learn the techniques for peak flow estimation for storm water drainage system design.
4. To understand the concepts in design of various components of urban drainage systems
5. To learn some of the best management practices in urban drainage.
6. To understand the concepts of preparation master urban drainage system

Course Out comes

At the end of the course the student will be able to

1. Understands the trends in urbanisation
2. Develop intensity duration frequency curves for urban drainage systems
3. Gain knowledge of Precipitation analysis
4. Develop design storms to size the various components of drainage systems.
5. Apply best management practices to manage urban flooding.
6. Prepare master drainage plan for an urbanized area.

SYLLABUS

UNIT-I

Introduction: Urbanization and its effect on water cycle– urban hydrologic cycle– trends in urbanization –Effect of urbanization on hydrology.

UNIT-II

Precipitation Analysis: Importance of short duration of rainfall and run off data, methods of estimation of time of concentration for design of urban drainage systems, Intensity-Duration - Frequency (IDF) curves, design storms for urban drainage systems.

UNIT-III

Approaches to urban drainage: Time of concentration, peak flow estimation approaches, rational method, NRC Scurve number approach, run off quantity and quality, wastewater and storm water reuse, major and minor systems.

UNIT-IV

Elements of drainage systems: Open channel, underground drains, appurtenances, pumping, source control.

UNITV

Analysis and Management: Storm water drainage structures, design of storm water network-Best Management Practices–detention and retention facilities, swales, constructed wetlands, models available for storm water management.

UNITVI

Master drainage plans: Issues to be concentrated upon–typical urban drainage master plan, interrelation between water resources investigation and urban planning processes, planning objectives, comprehensive planning, use of models in planning

Text Books:

1. Manual on Drainage in Urbanised area, Geiger W.F., Marsalek, W.J. Rawls and F. C. Zuidema, (1987-2 volumes), UNESCO,
2. Urban Hydrology, Hall M J(1984), Elsevier Applied Science Publisher.
3. Hydrology–Quantity and Quality Analysis, Wanielista MP and Eaglin (1997), Wile & Sons
4. Urban Hydrology, Hydraulics and Stormwater Quality: Engineering Applications & Computer Modelling, Akan A.O and R.L. Houghtalen(2006), Wiley International.

References:

1. Storm water Detention for Drainage, Stahre Pand Urbonas B(1990), Water Quality and CSO Management, Prentice Hall.
2. Frontiers in Urban Water Management–Deadlock or Hope, by Maksimovic C and J A Tejada-Guibert(2001), IWA Publishing.