URBAN HYDROLOGY, STORM DRAINAGE AND MANAGEMENT

Course Code: 13CE2105

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Course Outcomes:

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

CO1 : Identify basic requirements of urban water supply.

CO2 : Examine the effects of urbanisation catchment and characteristics and hydrological cycle.

CO3 : Estimate Urban Waste water using different methods in different disposal systems.

CO4 : Examine and analyse different storm water disposal facilities.

CO5 : Demonstrate the basic knowledge to improve storm water quality by proper operation, and maintenance of urban drainage system.

UNIT-I

INTRODUCTION – HISTORICAL DEVELOPMENT

Sources of water, Water supply and waste water disposal systems. Urban water supply demand forecast, factors affecting rate of demand, water quantity requirements, water pressure requirements, hydraulics of distribution system.

UNIT-II

URBAN HYDROLOGICAL CYCLE

Effects of urbanization on catchment hydrology, planning objectives, interaction of urban and surrounding areas, approaches to urban drainage, separate and combined systems, data requirements, master drainage plans.

UNIT- III ESTIMATION OF URBAN WASTE WATER QUANTITY AND QUALITY

Estimation of urban storm water quantity, catchment chacteristics, process parameters, hydrological losses in developing, watersheds, design period, calculation of runoff and peak flow. Rational method, NRCS curve number method, hydrologic and hydrodynamic methods. Trends of urbanization and industrialization – domestic waste water and industrial wastewater, various types of urban-runoff, storm runoff and wastewater collection systems – types of sewer systems – sewer network analysis – quality aspects – receiving water quality standards.

UNIT-IV

STORM WATER STORAGE FACILITIES

Planning for local disposal by infiltration and percolation, roof top storage, detention ponds, storage in sewer networks, storage at sewer treatment plants. Estimating the storage volumes – sizing of infiltration and percolation basics, detention facilities, design of storm sewer network systems – Linear Reservoir Model (Viessmen) – Chere and Shubinski model – QUURM model – TVA model.

UNIT-V

STORM WATER MANAGEMENT

Storm water quality enhancement – Storm water pollutants, suspended solids in storm water, sedimentation principles, sizing of basins using surface load theory. Use of models – SWMM, SMADA, Operation and maintenance of urban drainage system, interaction between urban drainage and solid waste management.

TEXT BOOKS

1. Hal M J , "*Urban Hydrology"*, 2nd Edition, Wlsevier Applied Science Publishers, 1984.
2. Viessman W.I., Knapp J.W., Leuis G.L. and Heutrough, T.E., *" Introduction to Hydrology",* 2nd edition, Harper and Row Publishers, 1977.
3. Stephenon D. *"Stormwater Hydrology and Drainage"* 2nd edition, Elwiver publishers, 1981.

REFERENCES

1. Genger, W.F., Marsaiek, J. Zudima and Rawis, G. J, (1987) *"Manual on Drainage in Urban Areas"* 2 volumes, UNESCO, Press.
2. Stalne P Urbonas B,*"Storm Water Detention for Drainage, Water Quality and CSO Management,* Prentice Hall, New Jersey, 1994.
3. Chertus D.E., and Madana M.E., *"Storm Water Modelling"* Academic Press, 2nd edition,NY, 1976.
4. Wanielista, M.P., and Yousef, Y.A, *"Storm water Management",* 2nd Edition, John Willy Sons, Inc. New York, 1993.
5. Adams, B.J. and Papa F *"Urban Storm water Management Planning"* 2000.
6. Overterns D.E., and Medows M.E.*,"Urban Hydrology",* Acadmic Press, NY 1976.
7. Timothy R.Lopenz, *"Urban Hydrology",* Ann Arbor Publisheres Co. M.I., 1979.