

G. Course Content:

UNIT I PLANNING FOR WATER SUPPLY SYSTEMS 9

Public water supply - Objectives - Design period - Population forecasting - Water demand – Surface, sub-surface sources of water and their characteristics - Impounding Reservoir – Well hydraulics- Recuperation test, Pumping test- Legislation requirements for water quality standards – IS 10500 (2012).

UNIT II WATER CONVEYANCE 9

Intake structures – Functions and drawings – Pipes and conduits – Pipe materials – Laying, jointing and testing of pipes – Pipe appurtenances and drawings – Types, capacity and selection of pumps.

UNIT III WATER TREATMENT AND DISTRIBUTION 9

Objectives – Unit operations and processes – Principles and functions of sedimentation tanks, sand filters – Principles and functions of aeration, iron and manganese removal, defluoridation and water softening – Membrane filtration – Advanced treatment - Requirements and components of distribution system – Leak detection – Analysis of distribution networks.

UNIT IV WASTEWATER CONVEYANCE AND TREATMENT 9

Sources, composition and characteristics of sewage – Significances - Estimation of sanitary sewage flow and storm runoff – Design of sanitary sewers - Plumbing system for buildings – One pipe and two pipe system. Sewer appurtenances - Sewage treatment objectives – Selection of treatment processes – Principles and functions of septic tank with dispersion, screen, grit chambers – Principles and design of activated sludge process, trickling filters, oxidation ditch, waste stabilization ponds – Introduction to 4R policy.

UNIT V SLUDGE MANAGEMENT 9

Sludge disposal methods - Dilution – Land disposal – Sewage farming - Self-purification of surface water bodies – Oxygen sag curve – Sludge characterization – Sludge thickening, digestion, conditioning and dewatering – Biogas recovery.

LIST OF EXPERIMENTS

1. Determination of water quality parameters (pH, electrical conductivity, turbidity, fluoride)
2. Coagulation and Precipitation process for treating waste water.
3. Determination of solids in wastewater.
4. BOD test.
5. COD test.
6. Determination of Calcium, Potassium and Sodium in wastewater.

TOTAL: 45+30 = 75 periods

H. Learning Resources:

a) TEXT BOOKS

1. Garg, S.K., Environmental Engineering, Vol.I Khanna Publishers, New Delhi, 2005.
2. Modi, P.N. Water Supply Engineering, Vol. I Standard Book House, New Delhi, 2005.
3. Punmia, B.C., Ashok K Jain and Arun K Jain, Water Supply Engineering, Laxmi Publications Pvt. Ltd., New Delhi, 2005

b) REFERENCES

1. Government of India, Manual on Water Supply and Treatment, CPHEEO, Ministry of Urban Development, New Delhi, 2003
2. Syed R. Qasim and Edward M. Motley Guang Zhu, Water Works Engineering Planning, Design and Operation, Prentice Hall of India Private Limited, New Delhi, 2006.
3. Manual on Sewerage and Sewage Treatment, CPHEEO, Ministry of Urban Development, Government of India, New Delhi, 1997.
4. Metcalf & Eddy, Wastewater Engineering – Treatment and Reuse, Tata McGraw Hill Company, New Delhi, 2003.
5. Garg, S.K., Environmental Engineering Vol. II, Khanna Publishers, New Delhi, 2003.
6. Punmia, B.C., Jain, A.K., and Jain. A., Environmental Engineering, Vol.II, Lakshmi Publications, News letter, 2005.
7. Standards Methods for the Examination of Water and Wastewater, 17th Edition, WPCF, APHA and AWWA, USA, 1989.

c) ONLINE RESOURCES

1. <http://nptel.ac.in/courses/103107084/>
2. <http://nptel.ac.in/courses/105106119/>
3. <http://nptel.ac.in/courses/105105048/>

http://www.vssut.ac.in/lecture_notes/lecture1424353637.pdf