

## **31052 ENVIRONMENTAL ENGINEERING AND POLLUTION CONTROL**

### **DETAILED SYLLABUS**

#### **Unit I WATER SUPPLY ENGINEERING**

1.1 QUANTITY OF WATER Water supply - need for protected water supply - objectives of public water supply system – demand -types of demand - per capita demand - prediction of population - problems in arithmetical increase method, geometrical increase method, incremental increase method - sources of water - surface and subsurface sources.

1.2 INTAKES AND CONVEYANCE Intakes - types of intakes-description of intakes-infiltration galleries and infiltration wells in river beds - necessity of pumps - types of pumps - pipes for conveyance of water - cast iron, steel, G.I., cement concrete, R.C.C., Hume and PVC pipes-pipe joints -laying and testing of pipe lines - pipe corrosion - corrosion control.

1.3 QUALITY OF WATER Impurities in water - testing of water - collection of water sample - physical, chemical, bacteriological tests - standards of drinking water - water borne diseases and their causes.

#### **Unit II TREATMENT OF WATER**

Object of water treatment - flow diagram of treatment plants – sedimentation – purpose - types of sedimentation - coagulation - coagulants and their choice - types of sedimentation tanks – filtration - theory of filtration - types and description of filters - disinfection of water – methods - water softening –miscellaneous water treatment(names only) - mineral water – requirements - R.O process

2.2 DISTRIBUTION SYSTEM Distribution system - methods of distribution – gravity system, pumping system, combined system -systems of water supply - continuous and intermittent supply of water - layouts of distribution - dead end , grid iron, radial and circular systems - service reservoirs - types.

#### **Unit III COLLECTION AND CONVEYANCE OF SEWAGE**

3.1 Sanitation – purpose – terms - systems of sanitation - quantity of sewage - variation in rate of flow of sewage - estimation of storm water – problems - minimum size of sewer - shapes of sewer (names only) -materials used for sewer- joints in sewer line - laying and testing of sewer lines - ventilation of sewers -cleaning of sewers.

3.2 SEWER APPURTENANCES Sewer appurtenances – manhole - lamp hole - catch basin - street inlet - grease and oil trap -flushing tanks – drainage arrangements in buildings - sanitary fittings - sewage pumps –necessity - types of sewage pumps (names only).

#### **Unit IV TREATMENT AND DISPOSAL OF SEWAGE**

4.1 Objects of sewage treatment - flow diagram of sewage treatment plants - treatment of sewage - primary and secondary treatments - screens - skimming tanks - grit chambers - sedimentation tanks – filters - types and description of filters - activated sludge process - septic tanks for isolated buildings - construction and working of septic tanks - disposal of septic tank effluent – soak pits, dispersion trenches - oxidation ponds – sludge – types - methods of sludge disposal.

4.2 SOLID WASTE MANAGEMENT Solid waste – classification - collection and conveyance of solid waste - disposal of solid waste – necessity - reduction and reuse of solid wastes - methods of solid waste disposal - incineration, dumping, sanitary landfill , composting - energy from waste

#### **Unit V POLLUTION CONTROL**

5.1 ENVIRONMENTAL POLLUTION Environment – definition - water pollution - sources of water pollution - effects of water pollution - control of water pollution - soil pollution - sources of soil pollution - effects of soil pollution - control of soil pollution - noise pollution - sources of noise pollution - effects of noise pollution - control of noise pollution - air pollution - sources of air pollution - effects of air pollution on human beings, plants, animals, materials - air pollution control equipment - control devices for particulate contaminants - environmental degradation - ozone layer depletion - greenhouse effect - acid rain.

5.2 ENVIRONMENTAL IMPACT ASSESSMENT Environmental impact assessment (EIA) - methodology of EIA - organising the job - performing the assessment - preparation of environmental impact statement (EIS) - review of EIS - environmental risk assessment - limitation of EIA.

**Reference book** 1. N.N. BASAK- Environmental Engineering,Tata McGraw hill publishing company Ltd.,New Delhi, 2010 2. A.KAMALA,D.L.KANTHRAO- Environmental engineering, Tata McGraw hill publishing company Ltd.,New Delhi 3. GURCHARAN SINGH- Water supply and sanitary engineering vol.I &II,Standard publishers & distributors,Delhi 4. Dr.SURESH K.DHAMEJA- Environmental engineering and management,S.K.Kataria &Sons, New Delhi. 5. S.K.GARG- Water supply and sanitary engineering,Khanna publishers, Delhi. 6. M.ANJI REDDI- Text book of Environmental science and technology,BS Publications, Hyderabad. 7. P.VENUGOPALA RAO – Principles of Environmental science and engineering, PHI learning pvt. Ltd., New Delhi.