4274 – INDUSTRIAL WATER & WASTE TREATMENT

Teaching Schedule Per Week			Progressive Assessment		Examination Schedule (Marks)			
Lectures	Practical	Credits			Theory		Practical Ex.	Total
2	2	4	25	25	3 Hrs	100	-	150

Pre-requisite	Source
Nil	FOD

Semester	Theory	Test	Total	TW	PR	Gr Total
	75	25	100	50	–	150

Rationale: Water is widely used in food industries as ingredients for cleaning purposes and in processing. It may therefore become one of the source contaminants in the food products. Treatment of raw and wastewater is therefore essential and technician should know the various quality evaluation techniques and treatment methods for raw and wastewater. The course includes chemical and microbiological evaluation techniques, treatment methods and standards required for potable water and water used in food industries and wastewater.

COURSE CONTENTS	Hrs	Mks
1. WATER Introduction- Sources, common impurities, contaminants in water; Examination of water: Physical- Colour, odour, turbidity, pH, methods of estimation; Chemical -Total solids, alkalinity, acidity, hardness, chlorides, sulphates, nitrogen, carbonates, bicarbonates, calcium, iodine, fluorine, iron and magnesium; Microbiological sources of contamination, index organisms and their significance, routine bacteriological analysis of water.	10	30
2. MUNICIPAL AND INDUSTRIAL WATER Uses of water for municipal and industrial purposes; Quality requirements for portability, general purification methods; Filter plants and types of filters, maintenance, dis-infection methods, significance of chlorine demand, residual chlorine and break point chlorination; General purification; Methods used in industries. Methods used for water softening, specific treatment methods for water used in soft drinks, dairy and canning industries; Typical treatment methods for municipal water.	9	30
3. WASTE TREATMENT Industrial and municipal waste water characteristics, pollution hazards on disposal without treatment, treatment methods for municipal water; Analysis of treated and untreated water sample for - Dissolved oxygen, BOD, COD, Coliform and TPC; Characteristics of water, diary, fruit, vegetable, brewery. Meat processing and fish processing.	9	30
4. WATER QUALITY AND HEALTH Water related diseases – Malaria life cycle	4	10
Total	32	100

PRACTICALS

1) Estimation of total solids in water.
2) Determination of acidity of water.
3) Determination of alkalinity of water.
4) Determination of hardness of water.
5) Estimation of calcium in water by permanganate method.
6) Estimation of iodine in water by filtration with nitrous acid.
7) Estimation of chlorine demand of water.
8) Estimation of residual chlorine in water.
9) Estimation of chlorides in water
10) Determination of Total Plate count in water
11) Determination of coliform count by M. P. N. Method
12) Presumptive test for coliform in water
13) Chemical oxygen demand of effluent
14) Biological oxygen demand of effluent
15) Visit to water treatment plant
16) Visit to sewage treatment plant

REFERENCE BOOKS

1. Manual Analysis of Fruit and Vegetable Products by S. Ranganna.
2. Fundamentals of Microbiology by Frobisher
3. Standard Methods of Chemical Analysis by N.H. Furman.
4. ISI standards I. S 2488 (part III) – 1968 and I. S. 1622 – 1964.
5. Official Method of Analysis of the Association of Official Analytical Chemistry.
6. Encyclopaedia of Food Technology by AVI Publication
7. Water & Waste Water Treatment by Schroeder.