

BANGLADESH SWEDEN POLYTECHNIC INSTITUTE

SEMESTER PLAN

OF

6TH SEMESTER CONSTRUCTION TECHNOLOGY (88)

SUBJECT : ENVIRONMENTAL ENGINEERING – I (6453)

CLASS TEACHER: MD. ABDUL KADER

T		P		C
3		3		4
T.C	T.F	P.C	P.F	Total
20	80	25	25	150

THEORY

Week	Chapter	Lecture	Description	Quiz Test	Class Test
01	1 Understand the concept of environmental engineering	01	1.1 Define environmental engineering. 1.2 State the branches of environmental engineering. 1.3 Explain the scope of environmental engineering. 1.4 Describe the importance of environmental engineering for civil engineers. 1.5 State the role of civil engineers to maintain a healthy environment.		
	2 Understand the various aspects of consumption of water.	02	2.1 Describe population prediction and various methods of population forecast. 2.2 Describe the various needs for clean water and list the quantities required for those purposes. 2.3 Explain the influence of the factors which affect per capita consumption of water: a. Size of city b. Characteristics of population c. Industries and commercial organization d. Climatic condition e. Metering of water 2.4 Explain the demand of water for fire fighting and fire stand post.		
02	3 Understand the different sources of water.	01	3.1 Identify different sources of water. 3.2 Explain the hydrological cycle. 3.3 State the advantages and disadvantages of ground water. 3.4 Mention the advantages and disadvantages of surface water. 3.5 Distinguish between the ground water supply and surface water supply in respect to quality of water. 3.6 Explain rainwater harvesting		
	4 Understand the different type of pipes & pipe joints used in water supply and the reasons for corrosion in metal pipes.	02	4.1 Classify the different type of pipes according to size, materials, quality, and allowable stresses used in Bangladesh. 4.2 Explain the causes of corrosion of metal pipes. 4.3 Describe the methods of prevention and protection against corrosion. 4.4 Explain the causes of deterioration in non-metal pipes. 4.5 Describe with sketches the different joints used in pipes. 4.6 Describe with sketches the fittings of pipes and valves used.		
03	5 Understand the collection and transmission system of water.	01	5.1 Identify the different types of intake used in collecting surface water. 5.2 Describe the different intake systems with sketches. 5.3 Classify the different type of pumps used in water supply. 5.4 Explain the uses and limitations of different type of pumps. 5.5 Distinguish between turbine pump and submersible pump used in deep tube well.		
	6 Understand the various types of impurities in water.	02	6.1 State the different type of impurities present in water. 6.2 Explain the causes of turbidity, color, taste and odor in water. 6.3 Mention the effects and maximum allowable limits(WHO & BSTI) of impurities (pH, colour, Turbidity, TDS, SS, Hardness, chloride, Nitrate, Iron, Sodium, Arsenic, Cadmium, lead, total coliform and faecal coliform) in water.		
04	6 Understand the various types of impurities in water.	01	6.4 Explain the causes and effects of alkalinity, acidity and hardness in water. 6.5 Describe the effects of gaseous impurities(carbon di-oxide, hydrogen sulphide, dissolved oxygen) in water. 6.6 Mention the causes and effects of nitrate (methemoglobinemia) and lead poisoning (plumbism) in water.		
		02	Review Class & Quiz Test		
05	7 Understand the safe water.	01	7.1 Define safe water. 7.2 Mention the common water borne diseases. 7.3 Explain the relationship between safe water and health. 7.4 List the different types of micro-organisms found in water. 7.5 State the relationship between pathogenic bacteria and e-coli bacteria (indicator organism). 7.6 Describe the contamination of water due to cross connection and plumbing defects, storage and back syphonage.		

	8 Understand the treatment of water by clarification.	02	8.1 Explain a typical flow diagram of treatment plant units. 8.2 Outline the need of screening of water. 8.3 Mention the principle of plain sedimentation. 8.4 Mention the principle of sedimentation with coagulation. 8.5 State different types of coagulants with their purpose and action. 8.6 Describe the process of flocculation. 8.7 Describe a typical sketch of sedimentation tank.		
06	9 Understand the treatment of water by filtration.	01	9.1 Explain the need of filtration of water. 9.2 State the theory of filtration of water for bacteriological removal. 9.3 Explain the characteristics between the slow sand filter and rapid sand filter. 9.4 Describe the operation difficulties of slow sand and rapid sand filters. 9.5 State the meaning of negative head and mud balls.		
	10 Understand the treatment of water by disinfection.	02	10.1 Describe disinfection of water by chlorination. 10.2 Explain the advantages and limitations of disinfection of water by chlorination. 10.3 Compare the pre-chlorination, post chlorination, double chlorination and super chlorination. 10.4 Explain the advantages of break point chlorination. 10.5 Describe the following methods of disinfection of water: a. Heating and boiling b. pH control c. Using oxidizing agent d. Ultra violet Ray e. Ozone		
07		01	Class Test		01
	11 Understand the treatment of water by softening.	02	11.1 Distinguish between hard and soft water. 11.2 Explain the need of softening water. 11.3 list different processes of water softening 11.4 Describe the method of Ion-exchange process water softening		
08	12 Understand the different processes of removing color, odor, taste, arsenic, iron, manganese and salinity.	01	12.1 Explain the purpose of aeration. 12.2 Describe the different methods of aeration. 12.3 Describe the techniques of controlling algae and other aquatic growth. 12.4 Describe the process of removal of color, odor and taste by activated carbon. 12.5 Explain the different methods of removing arsenic, iron and manganese with flow diagram. 12.6 List the different methods of desalination of water.		
	13 Understand the different water distribution methods.	02	13.1 State the different features of the distribution systems. 13.2 Describe with the help of sketches the different methods of supply of water. 13.3 Outline the advantages and disadvantages of different methods of supply of water. 13.4 Describe with sketches the different layout methods of distribution pipes.		
09	13 Understand the different water distribution methods.	01	13.5 Explain the relative advantages and disadvantages of different layout methods of distribution pipes. 13.6 State the different types of- a. Meter b. Valves c. Fire hydrant d. Pipe & Fittings.		
	14 Understand different types of reservoir.	02	14.1 Mention the different types of reservoir according to position and shape. 14.2 Explain the needs of roof tank and typical water reservoir in a building. 14.3 Describe the typical section of roof tank and water reservoir in a building.		
10	15 Understand the construction and maintenance of distribution system.	01	15.1 Describe the procedure of excavation and back filling for laying pipe lines. 15.2 Describe the procedure for- a. handling and laying pipes and their maintenance b. placing and maintenance of hydrants and valves c. cleaning of water mains and use of washout system.		
	16 Understand the water supply systems with specific reference to rural Bangladesh.	02	16.1 Give introduction to different types of hand pumps: No. 6 hand pump, deep-set(tara) pump. 16.2 Describe the procedure of drilling, aquifer selection, back filling and installation techniques including developing of new tube well. 16.3 Explain the design procedure of tube well strainer. 16.4 Describe operation & maintenance of No. 6 hand pumps and deep-set(tara) hand pumps.		

11	16 Understand the water supply systems with specific reference to rural Bangladesh.	01	16.5 Explain the drilling problems in rocky areas. 16.6 Give introduction to alternative technologies in problem areas of Bangladesh: Shallow Shrouded Tube well(SST), Very Shallow Shrouded Tube well(VSST), Pond Sand Filter(PSF), Infiltration Galaries(IG), Iron Removal Unit (IRU) and Deep-set technologies.		
	17 Understand the importance of plumbing system.	02	17.1 Define plumbing system. 17.2 List the requirements of plumbing installation. 17.3 Identify with sketches the various plumbing fittings and fixtures. 17.4 Describe the uses of various plumbing fittings and fixtures.		
12		01	Review & Class Test	02	
	17 Understand the importance of plumbing system.	02	17.5 Differentiate between plumbing fittings and fixtures. 17.6 List the tools required for plumbing works. 17.7 Mention the uses and maintenance of various plumbing tools.		
13	18 Understand the effect of socio-economic factors on water supply and sanitation	01	18.1 Describe the socio-economy of rural and urban area in Bangladesh. 18.2 Give definitions of demographic characteristics, power structure, cultural issues (traits), rural leadership and local government structure. 18.3 Describe the influence of socio-economic aspects on community water supply and sanitation.		
		02	Class Test		

REFERENCE BOOKS