BANGLADESH SWEDEN POLYTECHNIC INSTITUTE

SEMESTER PLAN

OF

7TH SEMESTER CONSTRUCTION TECNOLOGY (88)

SUBJECT : ENVIRONMENTAL ENGINEERING – II (6472)

CLASS TEACHER: MD. ABDUL KADER

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

THEORY

Week	Chapter	Lecture	Content	Description	Quiz Test	Class Test
01	1.Understand the general consideration of sewerage system.	01	1.1 1.2 1.3 1.4	Define sewage Explain conservancy system and water carriage system of sewage. Compare various types of sewerage system. Outline the advantages and limitations of sewerage system and septic tank.		
	2. Understand the sewer pipes and techniques of their joint.	02	2.1 2.2 2.3 2.4 2.5 2.6 2.7 2.8	Identify various types of sewers of a complete sewerage system. Compare the advantages and limitations of uses of different kinds of sewer pipes according to materials of construction. Identify the pipes of different materials for different uses. Draw the cross-section of different types of sewers, with different types of bedding and for different individual uses and ground conditions. Describe various kinds of joint in connecting the pipes with the help of sketches. List the requirements of a good sewer joint. Describe the process of jointing two pipes of different materials. Identify methods of limiting the corrosion of sewer pipes.		
02	*3. Understand appurtenances and their purposes.*	01	3.1 3.2 3.3 3.4 3.5 3.6 3.7 3.8 3.9	Identify various sewer appurtenances. Describe various sewer appurtenances with the help of sketches and state their functions. Discuss the factors to be considered for locating the sewer appurtenances so that their function can be achieved. Explain the junction chamber and regulator with sketches. Draw a neat sketch of siphon & inverted siphon and describe their functions. Describe the necessity of pumping sewage. Discuss the requirements of sewage pumps. List various types of sewage pumps. List the points that should be considered in locating the site of pumping station and state the capacity of pump and pumping stations.		
	4.Understand the process of designing sewers.	02	4.1 4.2 4.3 4.4 4.5 4.6 4.7 4.8 4.9	State different conditions of flow through a sewer. Identify self cleansing velocity and grades of sewer. Describe the formulas with notations for various kinds of flow of sewage. Explain dry weather flow and storm weather flow. Calculate the quantity of storm rain by the following methods: a) Rational method b) Empirical method Explain the factors influencing of sewage pipe design. Identify different hydraulic elements that govern the flow or discharge of sewage through a sewer. Identify the common symbols used in hydraulic formula. Solve problems of discharge rates for circular sewers using cheese's of section.		
03	5.Understand the principle of construction of sewers	01	5.1 5.2 5.3 5.4 5.5 5.6	Explain general aspects for preparation of sewerage scheme. Describe procedures followed in the construction of sewers. Explain the procedure of laying a sewer in a trench. Explain under what circumstances the sheeting (timbering), bracing and dewatering of trenches are required. Specify with sketch, the setting- out of the fall of sewer for the continuous gravitational flow of sewage. Describe the construction of brick sewer and concrete sewer.		
		02	5.7 5.8	Describe the remove of sheeting (timbering) of trenches. Describe the techniques of testing sewer lines and the precautions		

			5.9 5.10 5.11	should be taken during back filling of trenches. State different ways of protection for sewer. Explain the reasons why sewers must be properly ventilated. Describe the methods adopted for ventilating sewers.		
04	*6.Understand the process of maintenance of sewer.*	01	6.1 6.2 6.3 6.4 6.5 6.6	Identify the need for maintenance of sewer. List various types of sewer. Identify the precautions to be taken before entering in sewers. Identify the factors to be considered for frequent inspection and supervision of sewer so that proper flow is maintained. List the main problems which are faced in maintenance of sewer. Describe the procedures used to clean and unlock sewer.		
		02		Review Class & Quiz Test		
05	*7.Understand the characteristics of sewage.*	01	7.1 7.2 7.3 7.4 7.5 7.6 7.7	Describe the constituents of sewage. Outline the necessity of examination of sewage. Describe physical characteristics of sewage and their tests. Explain the importance of determination of solids in sewage. Describe various chemical tests of sewage. Describe the importance of common laboratory in the treatment of sewage. Describe the role of aerobic and other micro-organism in the decomposition of sewage.		
		02	7.8	Explain the following terms: a) Anaerobic active in sewage b) Biochemical oxygen demand(BOD) c) Chemical oxygen demand(COD) d) Population equivalent e) Nitrogen and carbon cycles f) pH value and strength of sewage		
06	*8.Understand the methods used for sewage disposal.*	01	8.1 8.2 8.3 8.4 8.5	List various methods of sewage disposal. State the characteristics of soil which influence waste water disposal. Explain the term dilution and its suitability. Describe septic tank. Draw a neat sketch of septic tank and soak well.		
		02	8.6 8.7 8.8	Design septic tank. Compare the design of septic tanks with a soak pit for 20, 50 and 100 users respectively. Explain with sketches the construction and operation of a septic tank.		
07		01		Class Test		01
	9.Understand the method of sewage treatment	02	9.1 9.2 9.3 9.4 9.5 9.6	Identity the various condition which directly affect the self purification of sewage in streams. Identify the conditions for favoring the sewage self-purification in lakes. Outline the stages of sewage treatment. Explain the purpose of preliminary sewage treatment. Explain partial flume. Explain the following with the help of sketches: Detritus tanks (grit chambers) Skimming tanks.		
08		01	9.7 9.8 9.9 9.10 9.11	Describe the function of communicators. Name different kinds of treatment process for removing impurities of each stage of the treatment process. Describe the schematic layout of a typical sewage treatment plant. Describe the vacuum flotation method for removing greases and oils. Describe with the help of neat sketch of a sedimentation tank giving the factors, which reduce the efficiency of sedimentation tanks.		
	10. Understand the principles of sewage treatment	02	10.1 10.2 10.3 10.4 10.5 10.6	Distinguish between primary treatment and secondary treatment and list the various secondary treatment processes. Explain the principle of biological treatment process of sewage. Describe with the help of sketches the construction and working principles of the following filters: a) Intermittent sand filters b) Trickling filters c) Contract beds Describe the re-circulation of sewage and state its advantages. Identify the factors which influence the working of a tricking filter. List the advantages and disadvantages of activated sludge process.		

			10.7 10.8 10.9	Explain the purification of sewage by activated sludge process. Explain the term aeration in relation to sewage treatment. Identify the function of oxidation ponds.		
09	11. Understand the process of sludge treatment and the method of disposal.	01	11.1 11.2 11.3 11.4 11.5 11.6 11.7 11.8	List the various sources of sludge. Describe the properties of sewage sludge produced in various treatment processes. Mention the amount of sewage sludge produced in various treatment processes. Explain different purposes served by the sludge digestion. Distinguish between anaerobic digestion and aerobic digestion. Describe the working principles of a vacuum filters and drying beds. Identify the methods of ultimate disposal of sludge. Explain advantages and environmental disadvantages of incinerating sludge.		
	12.Understand the water pollution and its effects on the environment.	02	12.1 12.2 12.3 12.4	Identify the undesirable changes and its effects of pollution on- a) Human life b) Animal life c) Aquatic life Describe various sources of water pollution. Classify different types of pollution and explain clearly each type of pollution. Describe the precautions that should be taken to prevent pollution of water sources from domestic and industrial effluent disposal systems.		
10	13.Understand the rural sanitation practices in Bangladesh.	01	13.1 13.2 13.3	Pit latrine technology: a) Describe the ventilated improved pit (VIP) latrine and simple pit latrine. b) Draw a neat sketch of VIP latrine and describe the special features of VIP latrine. c) Mention the advantages & disadvantages of VIP and simple pit latrine. Pour flush technology: a) Describe the single/twin pit pour flush latrine. b)Types of single/twin pit pour flush latrine. c) Mention the advantages & disadvantages of single/twin pit pour flush latrine. d) Compare the advantages and disadvantages of using twin pit latrine over septic tank. Construction and maintenance of sanitation facilities: a) Describe the construction procedures of VIP, simple pit, single and twin pit pour flush latrine. b) Describe the construction procedure of small bore sewer system.		
	14.Understand health and hygiene	02	14.1 14.2 14.3 14.4 14.5 14.6 14.7	Describe the common diseases. Explain the causes of transmission of these diseases. Describe how to control these diseases. Explain the importance of hygiene education. Describe the scope and methodology for hygiene education. Explain the advantages of social mobilization for hygiene practice. Explain integrated approach for water, sanitation and health education.		
11	15.Understand the concept of biogas.	01	15.1 15.2 15.3 15.4 15.5 15.6	Explain the process of generating fuel gas with cow dung /human waste / other organic wastes. Explain the term biogas. Explain the working principle of a biogas plant with the help of neat sketch. Describe the construction procedure of a biogas plant. Specify the energy output and compare with energy input of small scale biogas plant and find the efficiency. Compare the advantages and disadvantages of using small scale biogas plant in Bangladesh.		
	16. Understand the source and classification of solid waste.	02	16.1 16.2 16.3 16.4 16.5 16.6 16.7 16.8	Define solid waste. refuse, rubbish, hazardons waste, recycling, material conversion and energy recovery. List the sources of solid waste. Mention the classification of solid waste. Describe garbage and rubbish with example. Describe pathological wastes. Describe industrial waste. Describe agricultural waste. Describe the solid waste generated in the chemical process industries.		

			16.9	Describe hazardous waste with example.		
12		01		Review & Class Test	02	
	17. Understand the municipal and industrial solid waste.	02	17.1 17.2 17.3 17.4 17.5	Describe the classification of municipal solid waste materials. Describe the general sources of municipal solid waste. Describe the garbage, rubbish and trash. Mention the classification of different types of industrial solid waste. Describe the harzardous industrial solid waste.		
13	18. Understand steps of solid waste management.	01	18.1 18.2 18.3	List different steps for collecting solid waste. Mention different steps for disposal solid waste. Show with neat sketches the flow diagram of different steps of solid waste management from generation to disposal.		
		02		Class Test		02

REFERENCE BOOKS