Military Institute of Science and Technology

Department of Environmental, Water Resources, and Coastal Engineering (EWCE)

EWCE/EWC 333: Wastewater Engineering and Sanitation (2.0 credits out of 4.0)

Instructor: Lt Col Kazi Shamima Akter, Ph.D., Engrs

Tentative Lecture Plan

Lec	Topics	Sub-Topics
1	Environmental sanitation	• Water, sanitation and health • Objectives of environmental sanitation • Classification of Wastes and Sanitation Systems
2	Sanitation System	• Functions of sanitation system • Types of sanitation system • Appropriateness of sanitation system • Criteria for a good sanitation system
3	Design of Sanitation Systems I	• On-site sanitation systems for rural & low income urban communities • Simple pit technology – design considerations and design
4	Design of Sanitation Systems II	• Two pit latrine systems – design considerations and design
5	Design of Sanitation Systems III	• Ventilated Improved Pit (VIP) Latrine • Reed Odorless Earth Closet (ROEC)
6	Design of Sanitation Systems IV	• Pour-flash sanitation technologies – Appropriateness and design considerations
7	Design of Sanitation Systems V	• Pour-flash sanitation technologies –design of single pit and twin offset pits
8	Septic Tank I	• Septic tank – design considerations and design
9	Septic Tank II	• Disposal of septic tank effluent
10	Small Bore Sewerage System I	• Introduction to Small Bore Sewerage (SBS) system • Changes in design criteria for SBS compared to Conventional Sewerage System
11	Small Bore Sewerage System II	• Technical advantages of SBS system • Application of SBS system

12	Simplified/ shallow sewerage system	• Introduction to Simplified/ shallow sewerage system • Design principles and design
13	Ecological Sanitation	• Ecological sanitation technologies
14	Sewage characterization	• Composition and types of sewage • Physical, chemical and biological characteristics of sewage • Environmental significance of contaminants
15	Sewage Treatment Basics	• Sewage treatment – purpose, phases and unit operations
16	Preliminary treatment II	• Screening, cutting screen or comminutors, and grit chambers
17	Preliminary treatment II	• Skimming tank, pre-aeration and flow equalization
18	Primary Treatment I	• Sedimentation principle
19	Primary Treatment II	• Imholf tank, dissolved air flotation
20	Secondary Treatment I	• Purpose, biological treatment mechanism • Important organisms involved in biological treatment
21	Secondary Treatment II	• Role of bacteria in sewage treatment • Bacterial growth pattern in biological treatment • Relation between Food/Microorganism (F/M) ratio and biomass settling characteristics
22	Secondary Treatment III	• Types of biological treatment process • Activated sludge process • Significance of F/M ratio in activated sludge process
23	Secondary Treatment IV	• Trickling Filter process – mechanisms and biological processes • Advantages, disadvantages, influencing factors in trickling filter process • Design of trickling filter
24	Secondary Treatment V	• Waste stabilization ponds – process involved, advantages, disadvantages • Types of stabilization ponds
25	Secondary Treatment VI	• Anaerobic pond, facultative pond and maturation ponds • Design preliminaries for waste stabilization ponds
26	Secondary Treatment VII	• Design of waste stabilization ponds • Effluent disposal methods

27	Sludge Management I	• Sludge – types, characteristics • Collection of sludge • Importance of sludge management
28	Sludge Management II	• Sludge treatment and disposal methods

References

1. Water Supply and Sanitation- Feroz Ahmed and Mujibur Rahman
2. Environmental Engineering – Howard S. Peavy, Donald R. Rowe and George Tchobanoglous, McGraw Hill International Edition
3. Introduction to Environmental Engineering – Gilbert M. Masters and Wendell P. Ela, 3rd ed., Prentice-Hall Inc.

Grading Policy:

Class Attendance	5%
Class Performance	5%
Class Test/ Assignment	20%
Mid-Term Assessment	10%
Final Examination	60%
Total	**100%**