



Environmental and Sanitary Engineering Course

Civil Department – College of Engineering – Babylon University

Fourth Class

Year -2010 / 2011

Teaching Team

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Lecture Mr. Saif Salah Alquzwini

Course Entries

No.	Sub No.	Item	No. of Weeks
1		INTRODUCTION	1
	1.1	Environmental Engineering	
	1.2	Sources of Environmental Contaminants	
	1.3	Water Supply	
	1.4	Sewerage	
	1.5	Interrelationship of Environmental Engineering	
2		QUANTITY OF WATER AND SEWAGE	2
	2.1	Relation of Quantity and Population	
	2.2	Population Estimation	
	2.3	Water use for different Purposes	
	2.4	Factors Affecting Water Use	
	2.5	Variations in \water Use	

No.	Sub No.	Item	No. of Weeks
	2.6	Fire Demand	
	2.7	Design Periods for Water Supply Components	
	2.8	Sources of sewage	
	2.9	Relation of Water Use	
	2.10	Infiltration and Inflow	
	2.11	Interrelationship of Environmental Engineering	
	2.12	Fluctuations in Sewage Flow	
	2.13	Design Periods for Sewerage System Components	
3		HYDRAULICS	2
	3.1	Scope	
	3.2	Flow in Pipes	
	3.3	Flow Regimes	

No.	Sub No.	Item	No. of Weeks
	3.4	Bernoulli's Equation	
	3.5	The Darcy-Weisbach Equation	
	3.6	The Hazen –Williams Equation	
	3.7	Fittings and Transitions in Pipes	
	3.8	Equivalent Lengths	
	3.9	Flow Coefficients	
	3.10	Open Channel Flow	
	3.11	The Chezy Equation	
	3.12	Manning's Equation	
4		AQUEDUCTS WATER PIPES	1
	4.1	Conveyance and distribution	
	4.2	Aqueducts	
	4.3	Stresses in Pipes	
	4.4	Pipe Lines	

No.	Sub No.	Item	No. of Weeks
	4.5	Iron Pipe	
	4.6	Steel Pipe	
	4.7	Concrete Pipe	
	4.8	Asbestos Cement Pipe	
	4.9	Plastic Pipe	
	4.10	Valves and Appurtenances	
	4.11	Effects of Pipe Materials on Water Quality	
	4.12	Corrosion and Its Prevention	
5		COLLECTION AND DISTRIBUTION OF WATER	2
	5.1	Intakes	
	5.2	Methods of Distribution	
	5.3	Storage	
	5.4	Flow Estimation	
	5.5	Pressure Required	

No.	Sub No.	Item	No. of Weeks
	5.6	The Pipe System	
	5.7	Design of Water Distribution Systems	
	5.8	Construction of Water Distribution Systems	
	5.9	Distribution System Maintenance	
	5.10	Protection of Water Quality in Distribution Systems	
6		QUALITY OF WATER SUPPLIES	2
	6.1	Water and Its Impurities	
	6.2	Waterborne Diseases	
	6.3	Inorganic Contaminants	
	6.4	Organic Contaminants	
	6.5	Common Constituents of Natural Water	
	6.6	Water Chemistry	
	6.7	EPA Standards	
7		CLARIFICATION OF WATER	2

No.	Sub No.	Item	No. of Weeks
	7.1	Purpose of Clarification Processes	
	7.2	Sedimentation of Discrete Particles	
	7.3	Sedimentation of Flocculent Suspensions	
	7.4	Hindered Settling	
	7.5	Scour	
	7.6	Coagulation Processes	
	7.7	Flocculation Processes	
	7.8	Chemical Feeding Materials	
	7.9	Sedimentation Basin Design	
	7.10	Mechanical Equipment Selection	
8		FILTRATION OF WATER	2
	8.1	Slow Sand Filters	
	8.2	Rapid Filtration	
	8.3	Filter Media	

No.	Sub No.	Item	No. of Weeks
	8.4	The Under drain System	
	8.5	The Back Wash Process	
9		MISCELLANEOUS WATER TREATMENT TECHNIQUES	1
	9.1	Disinfection	
	9.2	Organic Contaminants	
	9.3	Algae Control	
	9.4	Chemistry of Activated Carbon	
	9.5	Iron and Manganese Removal	
	9.6	Aeration	
	9.7	Water Softening	
	9.8	Stabilization	
	8.1	Ion Exchange	
10		SEWARAGE – GENERAL CONSIDERATION	2
	10.1	Definitions	

No.	Sub No.	Item	No. of Weeks
	10.2	General Considerations	
	10.3	Combined and Separate Sewer	
	10.4	Liability for Damages Caused by Sewage	
11		STORM WATER FLOW	1
	11.1	Urban Hydrology	
	11.2	The Rational Method	
12		SEWER MATERIALS	2
	12.1	Precast Sewers	
	12.2	Strength and Bedding of Sewers	
	12.3	Other Fabricated Sewers	
	12.4	Infiltration and Sewer Joint	
	12.5	Built – in – Place Sewers	
	12.6	Corrosion of Sewers	
13		SEWER APPURTENANCES	1

No.	Sub No.	Item	No. of Weeks
	13.1	Manholes	
	13.2	Inlets	
	13.3	Inverted Siphons	
	13.4	Sewer Outlets and Outfalls	
	13.5	Alternative sewer Systems	
	13.6	Pumping of Sewage	
	13.7	Miscellaneous Appurtenances	
14		DESIGN OF SEWER SYSTEMS	۲
	14.1	Preliminary Investigation	
	14.2	Detailed Design Requirements	
	14.3	Design Principles	
	14.4	Sanitary Sewer Design	
	14.5	Storm Sewer Design	
	14.6	Major System Design	

No.	Sub No.	Item	No. of Weeks
15		SEWER CONSTRUCTION AND MAINTENANCE	۲
	15.1	Maintenance of line and Grade	
	15.2	Excavation Techniques	
	15.3	Sheeting and Bracing	
	15.4	Dewatering of Excavations	
	15.5	Pipe laying and Jointing	
	15.6	Maintenance of Sewers	
	15.7	Sewer repairs and Connections	
	15.8	Sewer Gases	
16		CHARACTERISTICS OF WASTEWATER	۲
	16.1	Variability of wastewater and wastewater analyses	
	16.2	Physical Characteristics	
	16.3	Solids Determinations	
	16.4	Chemical Characteristics	

No.	Sub No.	Item	No. of Weeks
	16.5	Biochemical Oxygen Demand	
	16.6	Chemical Oxygen Demand	
	16.7	Total Organic Carbon	
	16.8	Microbiology of Sewage and Sewage Treatment	
	16.9	Sampling	
	16.10	Typical Characteristics	
17		NOISE POLLUTION CONTROL	1
18		RADIOACTIV WASTES	
19		THERMAL POLLUTION	1
20		SOILD WASTES	
21		AIR POLLUTION CONTROL	1

References

No.	Item
1	Terence J. McGhee , 1991: Water Supply and Sewerage: Sixth Edition, McGraw-Hill Series in Water Resources and Environmental Engineering
2	Bailey and Ollis : Biochemical Engineering Fundamental: McGraw-Hill Series in Water Resources and Environmental Engineering
3	Chanlett : Environmental Protection : McGraw-Hill Series in Water Resources and Environmental Engineering
4	Eckenfelder: Industrial Water Pollution Control: McGraw-Hill Series in Water Resources and Environmental Engineering
5	Metcalf and Eddy : Wastewater Engineering ,Collection and Pumping of Wastewater: McGraw-Hill Series in Water Resources and Environmental Engineering
6	Metcalf and Eddy : Wastewater Engineering, Treatment, Disposal, Reuse: McGraw-Hill Series in Water Resources and Environmental Engineering

No.	Item
7	Peavy , Rowe, and Tchobanoglous : Environmental Engineering: McGraw-Hill Series in Water Resources and Environmental Engineering
8	Rich : Low Maintenance , Mechanically – Simple wastewater Treatment Systems: McGraw-Hill Series in Water Resources and Environmental Engineering
9	Sawyer and McCarty : Chemistry for Environmental Engineers : McGraw-Hill Series in Water Resources and Environmental Engineering
10	Tchobanoglous , Theisen , and Elissen: Solid Wastes, Engineering Principles and Management Issues: McGraw-Hill Series in Water Resources and Environmental Engineering

Course Rating

First Semester Exam	Quizzes	Laboratory	First Semester Rating
15%	5%	5%	25%
Second Semester Exam	Quiz	Laboratory	Second Semester Rating
15%	5%	5%	25%
			Total Rating 50%
			Final Exam 50%