Module (Water Supply and Sewerage) Catalogue

2022-2023

College/ Institute	College of Erbil Technical Engineering	
Department	Civil Engineering	
Module Name	Water Supply and Sewerage	
Module Code	WSS704	
Degree	Technical Diploma ☐ Bachler ■ High Diploma ☐ Master ☐ PhD ☐	
Semester	7	
Qualification	PhD	
Scientific Title	Lecturer	
ECTS (Credits)	6	
Module type	Prerequisite ☐ Core ■ Assist. ☐	
Weekly hours	4	
Weekly hours (Theory)	(4) hr Class	(162) Total hrs Workload
Weekly hours (Practical)	(0) hr Class	(0) Total hrs Workload
Number of Weeks	15	
Lecturer (Theory)	Dr Fahid Abbas Tofiq	
E-Mail & Mobile NO.	fahid.tofiq@epu.edu.iq	
Lecturer (Practical)	N/A	
E-Mail & Mobile NO.	N/A	
Websites	http://staff.epu.edu.iq/public/faculty/fahid.tofiq	

Course Book

Course Description	Sanitary Engineering is that branch of engineering which has to do with constructions effecting health. In common practice, the term Sanitary Engineering is taken to include only Water Supply Engineering and Sewerage Engineering, the former branch dealing with securing a satisfactory supply of water, and the latter with the satisfactory removal of surplus and waste liquids. The term Environmental Engineering is defined as all the systems namely atmosphere, lithosphere, hydrosphere and biosphere surroundings us. It includes air, water, food, the pollutions, waste materials and other ecological problems, which affect the life and health of human beings and other life. Environmental engineering is concerned with the control of all those which exercises or may exercise deleterious effect on his development. Provision of water resources plays an important role in the development of the socioeconomic status of a country. Limited land and freshwater resources are subject to continuous contamination and are to be conserved against increasingly growing demands of various kinds by implementing several structural measures and by developing wise water shed management policies. Environmental impacts of all types of structural and non-structural measures are to be assessed jointly in the long term in order to maintain sustainable development of land and water resources.

<table>
<tr><td>Course objectives</td><td>This course is designed to give the ability to design water supply and sewer systems (both sanitary sewer and storm drain). Students will study and analyse the design criteria of overall water supply and sewer system; they will learn to layout and design a water distribution system, layout the gravity sanitary sewer and storm drain system, and also, studying principles of engineering design of water and wastewater treatment systems and processes, including physical, chemical, and biological treatment and handling of treatment residuals. On the other hand, the main objective is also to learn how to treat and keep both sanitation and environmental projects developable and economic.</td></tr>
<tr><td>Student's obligation</td><td>Attending the lecture is a fundamental part of the course. Students are expected to attend every class meeting for the entire class period. Only extreme circumstances should require your missing class. If you do miss class, it is your responsibility to obtain announcements, course documents and assignments. You are responsible for material presented in the lecture whether or not it is discussed in the textbook. You should expect questions on the exams to test your understanding of concepts discussed in the lecture and in the homework assignments.
It can be very helpful to study with a group. This type of cooperative learning is encouraged; however, be sure that you have a thorough understanding of the concepts besides the mathematical steps used to solve a problem. You must be able to work through the problems on your own.
Students will need to submit the required homework, reports, seminars and/or any other assignments requested by the lecturer in time and in a proper way.</td></tr>
<tr><td>Required Learning Materials</td><td>lecture halls with data show equipment for lecture presentations, white board, overhead projector, posters, and the handouts of lecture notes will be used as forms of teaching. Also, the online lectures and Moodle platform may be used.</td></tr>
<tr><td>Evaluation</td><td>
<table>
<tr><th colspan="2">Task</th><th>Weight (Marks)</th><th>Due Week</th><th>Relevant Learning Outcome</th></tr>
<tr><td colspan="2">Paper Review</td><td></td><td></td><td></td></tr>
<tr><td rowspan="6">Assignments</td><td>Homework</td><td>10%</td><td>1-12</td><td>All</td></tr>
<tr><td>Class Activity</td><td>2%</td><td>1-12</td><td>All</td></tr>
<tr><td>Report</td><td>8%</td><td>10</td><td>All</td></tr>
<tr><td>Seminar</td><td>8%</td><td>8</td><td>All</td></tr>
<tr><td>Essay</td><td></td><td></td><td></td></tr>
<tr><td>Project</td><td></td><td></td><td></td></tr>
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	Quiz	8%	1-12	All
	Lab.			
	Midterm Exam	24%	8	All
	Final Exam	40%	14	All
	Total	100%		
Specific learning outcome:	On successful completion of this module, students should be able to 1. Learning fundamentals of water supply, sanitary wastewater, storm water drainage, water treatment plant, and wastewater treatment plant, 2. To design and maintain the system that is economical and reliable, 3. Students will learn how to deal with technical aspects of drinking water treatment and distribution in an integrated way, 4. Paying attention to the choice of technologies and tools, ranging from low-cost to advanced options, 5. Students will be able to define and evaluate project alternatives on basis of chosen selection criteria, 6. Learning hydraulic concepts and their relationship to water transport in treatment plants, pipelines and distribution networks; and also, physical, chemical and biological phenomena, and their mutual relationships, occurring within water supply systems, 7. Learning the structure of drinking water supply systems, including water transport, treatment, and distribution.			
Course References:	▪Key references: 1. Terence, J. McGhee, “Water Supply and Sewerage”, 6th Edition, Mc Graw-Hill. 2. Fair, Geyer & Okum, “Water and Wastewater Engineering”, Vol.1, John Wiley & Sons Inc. 3. Introduction to Environmental Engineering by P. Aarne Vesilind, PWS Publishing Co., 1997. ▪Useful references: 1.Introduction to Urban Water Distribution by Nemanja Trifunović, 2. Design of Water Supply Pipe Networks by PrabhataK.Swamee Ashok K. Sharma 3. Metcalf & Eddy, Inc., Wastewater Engineering: Treatment, Disposal, Reuse, McGraw Hill, 1991.			

Course topics (Theory)	**Week**	**Learning Outcome**
Introduction to Water Supply and Sewerage	1	1
Quantity of water and sewerage	2	2,3
Quantity of water and sewerage (cont..)	3	1,2
Aqueducts and water pipes (water distribution network)	4	3, 4

Sewer Pipes and Flow in Sewers.	5	6
Collection and distribution of Water	6	4, 6
Intake structures and pumping installations	7	2, 7
Amount of storm water and storm water sewerage system	8	6,7
Design of sewer system	9	2,5,6
Water treatment & Quality of Water	10	6, 7
Water treatment system & Quality of Water	11	6, 7
Environmental Engineering	12	5
Practical Topics	**Week**	**Learning Outcome**
N/A		

Questions Example Design

The exam questions may have similarities with the examples and Homework assignments taught during the course, but it is not necessary to be the same.
For example:

1. 20 % of the questions are descriptive questions, and the rest of the questions are numerical.

Ex1. What are the main factors that cause destruction of environment?(descriptive)
Ans.
1. The population explosion,
2. The concentration of population in urban areas,
3. The tempo of industrial and agricultural developments.

Ex2.
A community has an estimated population in a period of 25 years ahead which is equal to 40000 capita. The present population is 30000 capita and the present average water consumption is 20000 m3/d. The existing natural treatment plant has a design capacity of 26000 m3/d. Assuming an arithmetic rate of population growth, determine for how many years the existing plant will reach it is design capacity?
Ans.
P = p+n*c, c = (40000 – 30000)/25 = 400 capita/year (population growth)
Rate of water demand per capita = capacity/ population, = 20000/30000 = 0.666 m3/day/capita
Plant capacity/capita = 26000/0.666 = 39000 capita
39000 = 30000 + 400 *(t), t = 22.5 years.

Extra notes:

Since there is no time in class to include everything in the reference books, it is essential that the book be studied outside of class. Assigned reading should be done before the class in which the topic is covered, and then studied after class in order that the concepts are thoroughly grasped, and you are able to complete the assigned problems. Lecturing will be kept to a level necessary to create greater understanding of the principles and techniques described in the textbooks. Students will be actively involved in learning during the class. Always bring your calculator and paper.

Because each class builds on previous classes, it is essential to keep up with assignments. Collaboration on homework is allowed for the purpose of improving learning. Any student may be called upon at any time to present a homework solution to the class. Homework will be checked for completion; problem solutions will be returned with the checked homework, so late homework will not be possible.

External Evaluator