



Civil Engineering Department

College of Engineering

Salahaddin University-Erbil

Subject: Water Supply Engineering

Course Book: 3rd Year

Lecturer's name: Prof. Dr. Shuokr Qarani Aziz

Mr Khasro Kakil (M.Sc.)

Mrs Sarwah Othman Ismael (M.Sc.)

Academic Year: 2022-2023

Course Book

1. Course name	Water Supply Engineering
2. Lecturer in charge	Prof. Dr. Shuokr Qarani, Mr Khasro Kakil (M.Sc.), and Mrs Sarwah Othman Ismael (M.Sc.)
3. Department/ College	Civil/Engineering
4. Contact	e-mails: shuokr.aziz@su.edu.krd , shoker71@yahoo.com kasro.dizayee@su.edu.krd , kasrodizayee@gmail.com , srwa.ismail@su.edu.krd , srwa_othman90@yahoo.com Tel: (optional)
5. Time (in hours) per week	For example Theory: 4 Practical: 1
6. Office hours	According to the time table
7. Course code	CE 403
8. Teachers academic profile	<p>Shuokr Qarani Aziz was born in Erbil, Iraq. He received B.Sc. degree in Civil Engineering and M.Sc. degree in Sanitary Engineering from Salahaddin University-Erbil, Iraq, in 1993 and 2000, respectively; PhD degree in Environmental Engineering from University Sains Malaysia (USM), Malaysia, in 2011. Currently, Dr. Shuokr is a lecturer in the Civil Engineering Department, College of Engineering, Salahaddin University -Erbil, Iraq. He got Professor degree on 17 July 2018. He designed numerous water and wastewater treatment-plant units, sanitary systems for buildings and storm sewer systems. He published 87 papers in local and ISI journals and conferences. Furthermore, he published 25 scientific subjects in local magazines, newspapers and internet sites. In addition, he published 2 books and 5 book chapters on wastewater quality and treatment processes. He is Editorial and reviewer Board for more than 20 International Scientific Journals. His research interests include water and wastewater quality and treatment, sustainability, COVID-19, solid waste management, environmental planning and management and noise pollution.</p> <p>Sarwah Othman Ismael was born in Erbil, Iraq. She received a B.Sc. degree in Civil Engineering from Salahaddin University-Erbil, Iraq, in 2011; and M.Sc. degree in water resource and environmental engineering from Salahaddin University-Erbil, Iraq, in 2020. Currently, she works as an assistant lecturer at the Department of Civil Engineering, College of Engineering, Salahaddin University-Erbil.</p>
9. Keywords:	Water, treatment plant, quality, consumption, demand.

10. Course overview:

This course book includes the knowledge in different stages of work involved in the planning, designing and implementation of water supply to the community. Starting from identification sources, demand estimation, studying the quality aspects of water at these sources, evolving a suitable treatment method (coagulation, flocculation, sedimentation, filtration, disinfection and storage) to bring the quality to the permissible standards and finally the distribution of this treated water for different uses (domestic, commercial, industrial and public).

11. Course objective:

To offer knowledge and experience regarding methods and tools used in the structure of drinking water supply systems, including water quality criteria and standards, water collection and storage, design and operation of drinking water treatment plants, and water distribution.

12. Students' duties

Students are required to do examinations, classroom activities, quizzes, home works, and attend the class.

13. Forms of teaching

Water Supply Engineering lectures and notes are provided for the students. Microsoft word, Excel, Power point, recorded videos, and Epanet Program are applied during academic year. Furthermore, solving of problems and explanations are illustrated on the white board. Online teaching will apply, if required. Site visiting will arrange.

14. Assessment scheme

The final mark will be based on:

Mid-term examination(s)	30 % (Theoretical part)
Quizzes, home works, etc.	10 %
Practical Part	10 %
Annual Effort	50 %
Final Examination	40 % + 10 % = 50%
Total	100%

15. Student learning outcome:

At the end of the course, the student should learn:

1. Water demand estimation for a community.
2. Identifying suitable water sources to meet the water demand.
3. Designing the pipes for transportation and distribution of water.
4. Designing water storage tanks.
5. Measuring physical, chemical and biological characteristics of water and comparing them with standards.
6. Suggestion and design a water treatment plant units to meet given water quantity and quality requirements.
7. Planning and design a good water distribution system collection system for a community.
8. Analyzing water quality data and select the most attractive raw water resource.
9. Designing a surface water intake and a water treatment plant units.

16. Course Reading List and References:

Text Books:

- Brandt M.J., Johnson K.M., Elphanston A.J., and Ratnayaka D.D. (2017) *Twort's Water Supply, 7th Edition, Published by Elsevier Ltd.*

➤ Davis, M. L. (2010) *Water and Wastewater Engineering- Design Principles and Practice*, The McGraw Hill Companies.

References:

➤ Aziz, S. Q. and Mustafa, J. S. (2019) **Step-by-step design and calculations for water treatment plant units**, *Advances in Environmental Biology*, Vol. 13, No. 8, pp. 1-16.

➤ Omar, I. A. and Aziz, S. Q. (2020) **Comparison and Assessment of Ifraz-2 and Qandil Drinking Water Treatment Plant Units**. 6th International Engineering Conference “Sustainable Technology and Development” (IEC). , 26-27 February 2020, Erbil-Iraq. IEEE Publisher.

Omar, I. A. and Aziz, S. Q. (2021) **Optimization of ACH Coagulant, Settling Time and Powdered Activated Carbon as Coagulant Aid with Economic Analysis**, *Global Nest Journal*, Vol. 23, No. 3, pp. 340-350.

➤ Aziz, S. Q., and Mustafa, J. S. (2021) **WASTEWATER SLUDGE CHARACTERISTICS, TREATMENT TECHNIQUES AND ENERGY PRODUCTION**. *Recycling and Sustainable Development*, Vol. 15, pp. 9-27.

➤ Any book on **Water and Wastewater Engineering** and **Water Supply and Sewerage** can be used as reference.

17. The Topics: Theoretical Part, Prof. Dr Shuokr Qarani Aziz

Lecturer

Month	Week No.	Topic description	Dr. Shuokr
September	Week 1	Course book, advising and guidelines	
	Week 2	Fundamental consideration of water ...	
	Week 3	Quantity of water demand and population forecasting	
October	Week 4	Quantity of water demand and population forecasting	
	Week 5	Water quality and analysis, Pipes and pipe fittings	
	Week 6	Water distribution system	
	Week 7	Water distribution system and water tanks	
November	Week 8	Water treatment processes, and Intakes Mid-term Exam	

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	Week 9	Coagulation and Flocculation		
	Week 10	Sedimentation		
	Week 11	Filtration		
	Week 12			
December	Week 13	Disinfection		
	Week 14	Final Exam		

18. Practical Topics: Mr Khasro Kakil (M.Sc.)

18.1 Teacher's academic profile: I born in Erbil and received my BSc in Mosul University in Civil Engineering and MSc in Cranfield University in UK in the field of Water and Wastewater Engineering and now undergoing PhD study in the field of treatment of wastewater technology regarding produced water exploration in the field of gas and oil, also have vast experience (over 38 years) in the field of civil engineering including: supervision, design, implementation and monitoring of different water and sanitation projects and have experience of more than 12 years in implementing humanitarian programs with UN (UN/FAO and UNICEF) and INGOs (IRC and IRD). On 2012, I got a place in Engineering Collage - Civil Engineering Department and now continuing in teaching for nine years, toughing Environmental Engineering and water supply/Practical During this period I was assisting Professor Shoukr in carrying out any tasks during the academic year. I supervised many student project projects for 4th class and also during this period I worked as a deputy of the Salahaddin new Camp committee for preparation of the new SU-E modern Campus.

Lecturer

18.2 Topic Description

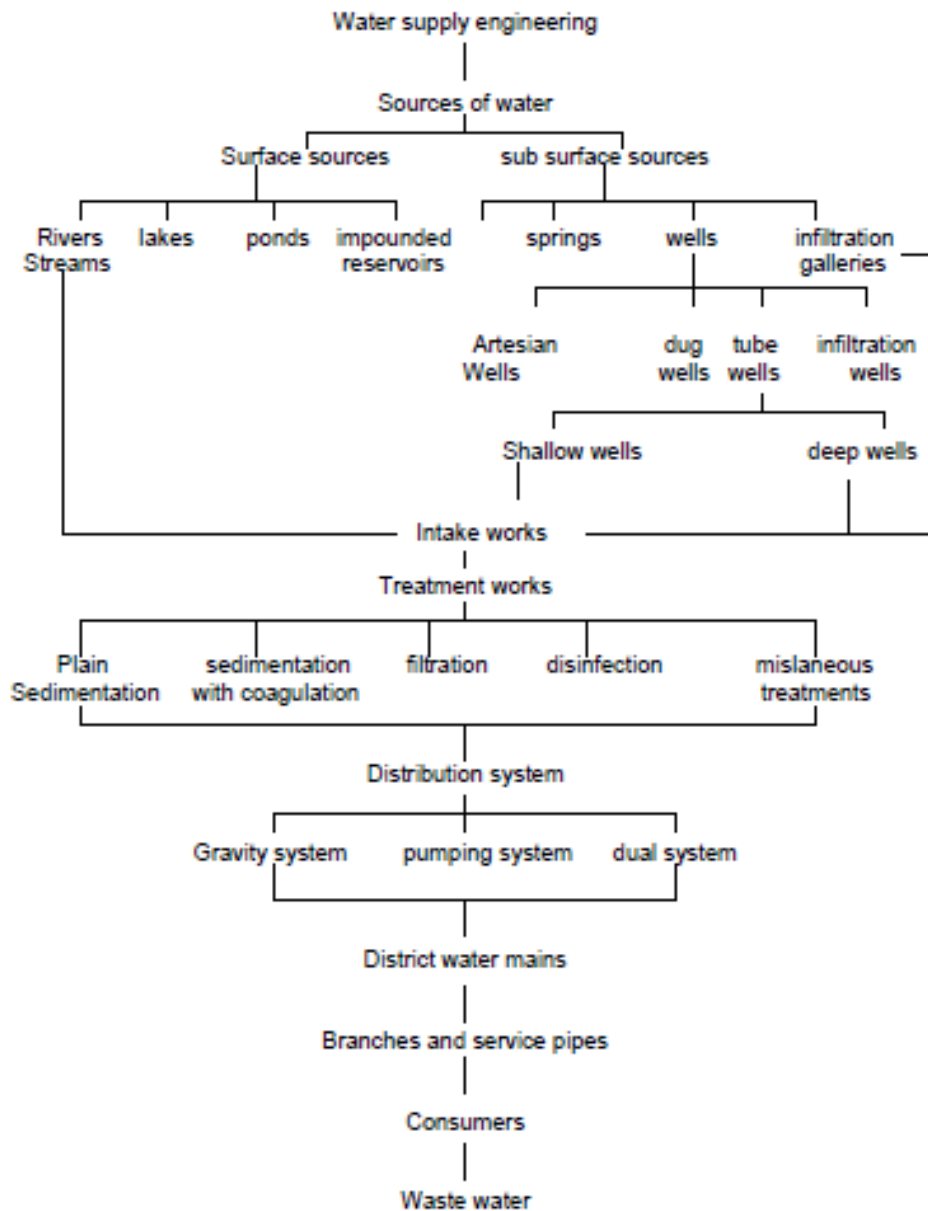
Class No.	Week No.	Topic description		
September	Week 1	Introduction to Water Supply and Sewerage Lab.	Mr. Khasro	
	Week 2	pH test		
	Week 3	pH test		
October	Week 4	Acidity test		
	Week 5	Alkalinity test		
	Week 6	Alkalinity test		

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	Week 7		
November	Week 8	Hardness test	
	Week 9	Mid-Term Exam	
	Week 10	Hardness test	
	Week 11	Chloride test	
	Week 12	Chloride test	
December	Week 13	Turbidity test	
	Week 14	Final Exam.	

19. Examinations: Provided separately in the attached files.

20. Extra notes:



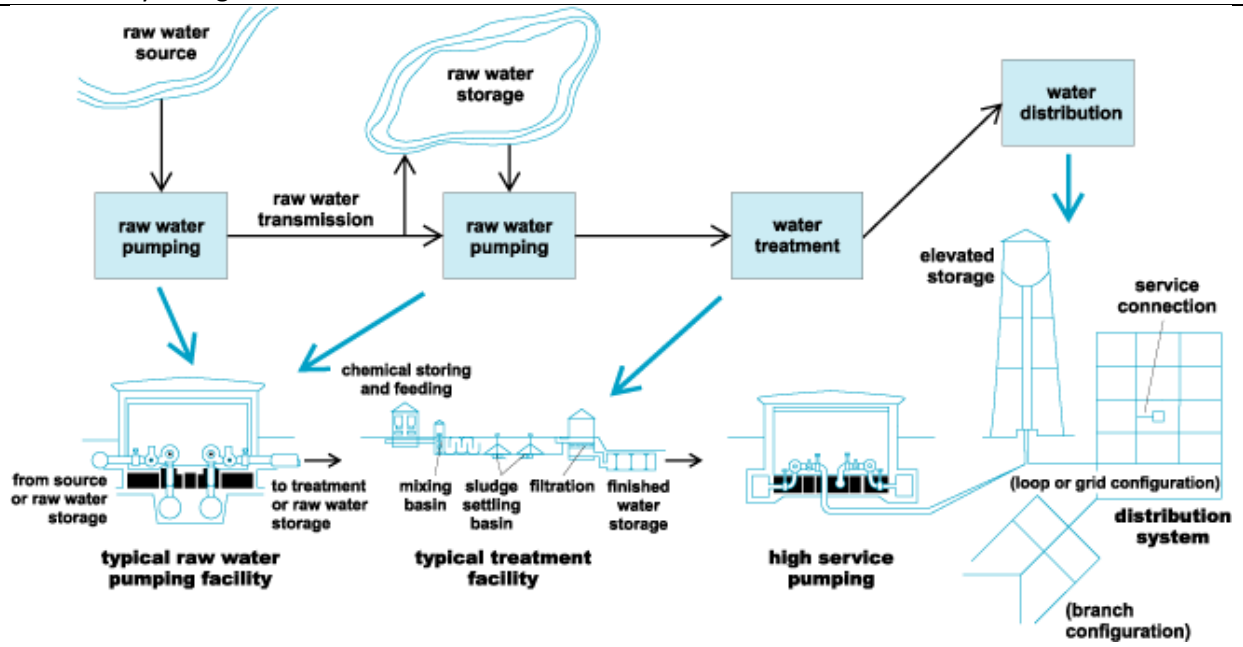


Figure 1: Water supply engineering

21. Peer review