

COURSE CONTENT

Academic Year	AY2019/20	Semester	2
Course Coordinator	A/P Lo Yat Man, Edmond (CEE)		
Course Code	EN2003		
Course Title	Water Supply Engineering		
Pre-requisites	CV1012		
No of AUs	3		
Contact Hours	Lecture: 26 hrs; Tutorial: 13 hr; Lab: 0 hr.		
Proposal Date	7 Feb 2020		

Course Aims

This course aims to provide a sound understanding of design principles in water supply systems and treatment processes. You will be able to acquire sufficient knowledge on basic design of water supply systems, and conventional and advanced water treatment processes.

Intended Learning Outcomes (ILO)

By the end of this course, you should be able to:

1. Identify and analyse basic water storage and distribution systems
2. Apply conventional water treatment and design principles covering mixing, coagulation and flocculation
3. Analyse and design water treatment units covering sedimentation, filtration and disinfection
4. Analyse taste and odour problems and use activated carbon adsorption for odour control
5. Design basic iron and manganese removal, water softening and ion exchange units
6. Apply concepts of membrane technology in water supply engineering

Course Content

S/N	Topic	Lecture Hrs	Tutorial Hrs
1.	Water storage and distribution systems, pipe networks	4	3
2.	Technology overview	1	
3	Water treatment and design: mixing, coagulation and flocculation	5	2
3.	Water treatment and design: sedimentation, filtration and disinfection.	8	4

4.	Taste and odour control; use of activated carbon adsorption	2	1
5.	Iron and manganese removal, water softening and ion exchange	3	2
6.	Concepts of membrane technology.	3	1
Total:		26	13

Assessment (includes both continuous and summative assessment)

Component	Course LO Tested	Related Programme LO* or Graduate Attributes	Weighting	Team/Individual	Assessment rubrics
1. Final Examination	1, 2, 3, 4, 5, 6	ENE SLOs (a), (b), (c) and (l).	60%	Individual	NA
2 Continuous Assessment (CA1: 2 Quizzes)	2, 3, 4, 5	ENE SLOs (a), (b), (c) and (l).	40%	Individual	NA
Total			100%		

*SLO = Student Learning Outcomes (SLO) for Environmental Engineering majors (as following EAB Student Learning Outcomes)

- (a) Apply the knowledge of mathematics, natural science, engineering fundamentals, and environmental engineering specialisation to the solution of complex environmental engineering problems.
- (b) Problem Analysis: Identify, formulate, research literature, and analyse complex environmental engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- (c) Design/development of Solutions: Design solutions for complex environmental engineering problems and design system components or processes with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
- (l) Life-long Learning: Recognise the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological evolution.

Formative feedback

1. Feedback will be through dissemination of the student's performance in quizzes as well as review of the quiz questions in class. Follow-up consultation will be arranged as needed.
2. Besides having interactive discussion during tutorial, we encourage you to initiate individual consultation sessions on your particular learning needs

Learning and Teaching approach

Class meets thrice per week with 2 hours of lectures and 1 hour of tutorial.

Approach	How does this approach support students in achieving the learning outcomes?
Lecture	Formal lectures on the topics with examples
Tutorial	In depth discussion of tutorial problems with step-by-step solution process discussion.

Reading and References

Reference:

Viesman, W.J. and Hammer, M.J., "Water Supply and Pollution Control", 8th edition, Pearson Prentice Hall, 2004.

Course Policies and Student Responsibilities

Academic Integrity

Good academic work depends on honesty and ethical behaviour. The quality of your work as a student relies on adhering to the principles of academic integrity and to the NTU Honour Code, a set of values shared by the whole university community. Truth, Trust and Justice are at the core of NTU's shared values.

As a student, it is important that you recognize your responsibilities in understanding and applying the principles of academic integrity in all the work you do at NTU. Not knowing what is involved in maintaining academic integrity does not excuse academic dishonesty. You need to actively equip yourself with strategies to avoid all forms of academic dishonesty, including plagiarism, academic fraud, collusion and cheating. If you are uncertain of the definitions of any of these terms, you should go to the [academic integrity website](#) for more information. Consult your instructor(s) if you need any clarification about the requirements of academic integrity in the course.

Course Instructors

Instructor	Office Location	Phone	Email
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A/P Lo Yat Man, Edmond	N1-01b-38	6790 5268	cymlo@ntu.edu.sg
Prof Liu Yu	N1-01c-93	6790 5254	cylu@ntu.edu.sg

Planned Weekly Schedule

Week	Topic	Course LO	Mode
1	Public water supply requirements; review of hydraulics fundamentals	1	Lectures and Tutorials
2	Distribution, storage and pumping systems; pipe network analysis.	1	Lectures and Tutorials
3	Water treatment technology overview and coagulation	2	Lectures and Tutorials
4	Coagulation and flocculation	2	Lectures and Tutorials
5	Mixing, flocculation, sedimentation	2	Lectures and Tutorials
6	Sedimentation	3	Lectures and Tutorials
7	Filtration	3	Lectures and Tutorials
8	Filtration	3	Lectures, Tutorial and Quiz
9	Softening and ion exchange	5	Lectures and Tutorials
10	Disinfection	3	Lectures and Tutorials
11	Odour/taste control, iron and manganese removal and adsorption	4,5	Lectures and Tutorials
12	Adsorption and membrane technology	4, 6	Lectures, Tutorials and Quiz
13	Membrane technology	6	Lectures and Tutorials