

THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY

Department of Civil & Environmental Engineering

Course	:	CIVL 4460 Process Design of Environmental Engineering Facilities (Fall 2022-23)	
Units	:	[3-0-3:3]	
Instructors	:	Guanghao CHEN Rm 3578 Tel: 2358-8752 Email: ceghchen@ust.hk	
Teaching Assistants	:	Chukuan JIANG Email: cjiangaj@connect.ust.hk	
		Zi ZHANG Email: zzhanger@connect.ust.hk	
Lectures	:	Tu, Th 09:00AM - 10:20AM	G003, CYT Bldg. (30)
Tutorial	:	Mo 10:30AM - 11:20AM	G003, CYT Bldg. (30)

(*Note: Tutorial will be announced in due course.)

***** Course Description *****

This course emphasizes the practical design of various water and wastewater treatment systems elements, including aeration, coagulation & flocculation, sedimentation, filtration, screening, pumping, disinfection, sludge handling & disposal.

***** Course Outline *****

1. Overview

- Introduction of water treatment
- Introduction of wastewater treatment

2. Environmental system

- Determination of design flow and constituent loading
- Material balance

3. Water Treatment

- Bar screening & Grit chamber
- Coagulation & Flocculation
- Sedimentation & Flotation
- Filtration
- Membrane separation
- Disinfection

4. Wastewater Treatment

- Organic matter removal
- Biological nitrogen removal
- Biological phosphorus removal
- Biological biofilm

5. Organic Waste Treatment (Bioenergy)

- Thickening/Dewatering/Drying (Pre-treatment)
- Anaerobic digestion
- Biomass to biofuels and biochar
- Biomass to heat and power

6. Other topics on emerging environmental technologies (option)

*** *Reference Texts* ***

- MWH's Water Treatment: Principles and Design. *John Crittenden et al., Wiley & Sons. Inc.*
- Wastewater Engineering, Treatment, Disposal, and Reuse. *Metcalf & Eddy, Inc.*
- Biological Wastewater Treatment: Principles, Modelling, and Design. *G.H.Chen et al., IWA Publishing.*
- Bioenergy: Principles and Applications. *Samir Khanal, Wiley Blackwell.*

*** *Mark Allocation* ***

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| ➤ One literature review project | 40% of the final mark |
| ➤ Attendance/In-class Exercise | 20% of the final mark |
| ➤ Final Design Project | 40% of the final mark |