Subject Description Form

Subject Code	CSE30337
Subject Title	Water and Waste Management
Credit Value	3
Level	3
Exclusions	CSE335 Water and Waste Management or CSE337 Water and Waste Management
Objectives	To provide a basic appreciation of the environmental issues associated with water, wastewater and solid waste and to introduce the basics of engineered systems for the control of water quality and management of solid waste.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. obtain the basic knowledge and ideas relating to the principle of water and waste management; b. formulate effective solutions to environmental engineering problems relevant to water supply, sewerage, and solid waste management in Hong Kong; c. work with others in group work and take responsibility for shared activities; d. cultivate creative and critical thinking and an ability to work independently; and e. recognize the need for and engage in life-long learning.
Subject Synopsis/ Indicative Syllabus	1. Water Supply and Sewerage Systems (3 weeks) Water demand, Quality and quantity of raw water; Types of water resources; Municipal water supply system; Quality and quantity of municipal wastewater; Types of sewerage systems; Principles of layout and design. 2. Water Quality Control and Treatment (7 weeks) Required standards for portable water and sewage effluents; Layout of water and sewage treatment system. Principles of physical, chemical and biological treatment processes in water and sewage treatment systems. Impact of effluent disposal on receiving water bodies. 3. Solid Waste Management (3 weeks) Management options of municipal solid waste; Waste minimization and recycling; Waste treatment and disposal.
Teaching/Learning Methodology	Lectures will provide fundamental knowledge relating to the theoretical processing operations, and treatment techniques of water purification and wastewater treatment systems. Students will be required to undertake various coursework activities, which will enable them to thoroughly digest the taught contents.

	Tutorials will provide opportunities for students and lecturer to communicate and discuss any difficulties related to the course. It will also provide a forum for students and lecturer to discuss the ongoing coursework and laboratory activities. Laboratory will provide students with opportunities to carry out real experimental tests for water quality analysis and different treatment processes in order to facilitate their learning. Independent study and associated reading will require students to conduct some problem-solving exercises individually, analyze the experimental data obtained from laboratory sessions and prepare integrated laboratory reports.
Assessment Methods in Alignment with Intended Learning Outcomes	

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed				
		a	b	c	d	e
1. Continuous Assessment	25	√	√	√	√	√
2. Examination	70	√	√		√	
3. Seminar Report	5	√	√			√
Total	10					

Students must pass the final examination and achieve a passing overall score/ grade to pass the subject.

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

(1) Tutorials/assignments to exercise and strengthen understanding of the principle of waste and waste management, sewerage design, and solid waste management;
(2) Laboratory work and report writing to work in group with critical thinking and shared activity; and
(3) Mid-term test and end-of-semester examination to work independently to analyze diverse problems arising from various environmental engineering problems with respect to water supply, sewerage, and waste management in Hong Kong.

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<tr><td>Student Study Effort Expected</td><td>
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<tr><td>Class contact:</td><td>Average hours per week</td></tr>
<tr><td>▪ Lectures / Tutorials / Laboratory</td><td>3 Hrs.</td></tr>
<tr><td>Other student study effort:</td><td></td></tr>
<tr><td>▪ Reading and study</td><td>3.8 Hrs.</td></tr>
<tr><td>▪ Assignments and laboratory</td><td>2.2 Hrs.</td></tr>
<tr><td>Total student study effort</td><td>9 Hrs.</td></tr>
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<tr><td>Reading List and References</td><td>

Davis, M.L., Water and Wastewater Engineering: Design Principles and Practice. McGraw-Hill, New York, 2011.

Davis, M.L., Masten, S.J., Principles of Environmental Engineering and Science, 2nd edition. McGraw-Hill, New York, 2009.

Crittenden, J.C., Trussell, R.R., D.W., Howe, K.J., Tchobanoglous, G., Water Treatment: Principles and Design, 2nd Edition. John Wiley & Sons, Hoboken, New Jersey, 2005.

Tchobanoglous, G., Burton, F.L., Stensel, H.D., Wastewater Engineering: Treatment and Reuse, 4th edition. McGraw-Hill, New York, 2003.

Masters, G.M., Introduction to Environmental Engineering and Science, 2nd edition. Prentice Hall, New Jersey, 1997.

Henry, J.G., Heinke, G.W., Environmental Science and Engineering, Prentice-Hall, 1996.

Peavy, H.S., Rowe, D.R., Tchobanoglous, G., Environmental Engineering. McGraw-Hill, New York, 1985.

Relevant websites of Hong Kong Government at (i) www.epd.gov.hk; (ii)www.wsd.gov.hk; and (iii) www.dsd.gov.hk

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