Annexe A: New/Revised Course Content in OBTL+ Format

Course Overview

The sections shown on this interface are based on the templates UG OBTL+ or PG OBTL+
If you are revising/duplicating an existing course and do not see the pre-filled contents you expect in the subsequent sections e.g. Course Aims, Intended Learning Outcomes etc. please refer to Data Transformation Status for more information.

Expected Implementation in Academic Year	
Semester/Trimester/Others (specify approx. Start/End date)	
Course Author * Faculty proposing/revising the course	Lee-Chua Lee Hong
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Course Title	Environmental Engineering Laboratory B
Course Code	EN2712
Academic Units	1
Contact Hours	30
Research Experience Components	Not Applicable

Course Requisites (if applicable)

Pre-requisites	
Co-requisites	
Pre-requisite to	
Mutually exclusive to	
Replacement course to	
Remarks (if any)	

Course Aims

The aim of this lab is to provide you with practical application experiences and an understanding of theories relating to areas in hydraulics and hydrology, and structures and mechanics. By completing ten lab sessions, you are able to appreciate typical applications of important concepts, which include Coagulation treatment, momentum equation, energy loss, unit hydrograph, load-deformation behaviour, bending stress distribution, and trial mix composition.

Course's Intended Learning Outcomes (ILOs)

Upon the successful completion of this course, you (student) would be able to:

ILO 1	Carry out experiments and verify theories in ENV courses relating to hydraulics and hydrology, and structures and mechanics.
ILO 2	Carry out investigative open-ended projects to include independent methodology to relate theories and principles to experimental results on various test apparatuses relating to above courses.
ILO 3	Estimate percent uncertainty in experimental data and results.
ILO 4	Analyse, interpret and infer from experimental data and results.
ILO 5	Write a project report with professional and technical competency and clarity.

Course Content

S/N	Topic
1	Coagulation treatment of raw water using precipitation
2	Jet impact
3	Losses in pipe flow
4	The hydraulic jump phenomenon
5	The unit hydrograph method
6	Braced Member: Equilibrium and elasticity
7	Torsion
8	Beam bending
9	Concrete mixing, casting, demoulding and slump test
10	Tests on hardened concrete & tensile test of reinforcing bars

Reading and References (if applicable)

Beyond the laboratory manual, reference materials are also provided/recommended by instructors.

Planned Schedule

Week or Session	Topics or Themes	ILO	Readings	Delivery Mode	Activities
1	-				
2	Coagulation treatment of raw water using precipitation	(a), (b), (c), (d), (e)		In-person	Manual, Experiment, Data analysis, Discussion, Report-writing
3	Jet impact	(a), (b), (c), (d), (e)		In-person	Manual, Experiment, Data analysis, Discussion, Report-writing
4	Losses in pipe flow	(a), (b), (c), (d), (e)		In-person	Manual, Experiment, Data analysis, Discussion, Report-writing
5	The hydraulic jump phenomenon	(a), (b), (c), (d), (e)		In-person	Manual, Experiment, Data analysis, Discussion, Report-writing
6	The unit hydrograph method	(a), (b), (c), (d), (e)		In-person	Manual, Experiment, Data analysis, Discussion, Report-writing

Week or Session	Topics or Themes	ILO	Readings	Delivery Mode	Activities
7	Braced Member: Equilibrium and elasticity	(a), (b), (c), (d), (e)		In-person	Manual, Experiment, Data analysis, Discussion, Report-writing
8	Torsion	(a), (b), (c), (d), (e)		In-person	Manual, Experiment, Data analysis, Discussion, Report-writing
9	Beam bending	(a), (b), (c), (d), (e)		In-person	Manual, Experiment, Data analysis, Discussion, Report-writing
10	Concrete mixing, casting, demoulding and slump test	(a), (b), (c), (d), (e)		In-person	Manual, Experiment, Data analysis, Discussion, Report-writing
11	Tests on hardened concrete & tensile test of reinforcing bars	(a), (b), (c), (d), (e)		In-person	Manual, Experiment, Data analysis, Discussion, Report-writing

Learning and Teaching Approach

Approach	How does this approach support you in achieving the learning outcomes?
Laboratory	In each session, the lab instructor first gives an introduction to the experiment, which includes relevant theory, experimental setup, and data analysis. Then technical staff shows main steps for conducting the experiment and collecting data. Finally, the students formed in groups conduct experiment, collect data, perform data analysis and write a report. This helps students to achieve one or more of the outcomes as they need to work as a group for experimental setup, data sampling and processing.
Individual and group report	Group reports are submitted for 9 labs. To run experiments, the class is organized into several groups, each having 3-5 students. Each group conducts experiment, collect data, perform analysis and complete a report within a 3-hour session. This helps students to achieve one or more of the outcomes as they need to work together for data analysis and report-writing. Individual reports are submitted only for 1 pre-arranged lab, within two weeks from the date of the lab attended. This helps students to achieve one or more of the outcomes as they need to do self-study and research, on individual basis, for a lab-specified topic.

Assessment Structure

Assessment Components (includes both continuous and summative assessment)

No.	Component	ILO	Related PLO or Accreditation	Weightage	Team/Individual	Rubrics	Level of Understanding
1	Continuous Assessment (CA): Assignment(Continuous assessment)	a,b,c,d,e	CEE SLOs (a), (b), (d), (e), (i), (j) and (l)	100	Team	Analytic	Multistructural

Description of Assessment Components (if applicable)

Formative Feedback

All reports submitted will be marked by tutors. They are kept in the lab for students' view.

NTU Graduate Attributes/Competency Mapping

This course intends to develop the following graduate attributes and competencies (maximum 5 most relevant)

Attributes/Competency	Level
Collaboration	Advanced
Communication	Advanced
Curiosity	Intermediate
Critical Thinking	Intermediate
Design Thinking	Intermediate

Course Policy

Policy (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. On the use of technological tools (such as Generative AI tools), different courses / assignments have different intended learning outcomes. Students should refer to the specific assignment instructions on their use and requirements and/or consult your instructors on how you can use these tools to help your learning. Consult your instructor(s) if you need any clarification about the requirements of academic integrity in the course.

Policy (General)

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Policy (Absenteeism)

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Policy (Others, if applicable)

(1) Students must abide by the lab protocols and regulations shared during the safety briefings at all times.

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