

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
Course Author Email	clhlee@ntu.edu.sg
Course Title	Integrated Design Project
Course Code	EN4912
Academic Units	3
Contact Hours	39
Research Experience Components	Research Defined Course (at least 50% of deliverables involve practical research activities: problem identification, hypothesis forming, data collection/analysis/interpretation, result communication)

Course Requisites (if applicable)

Pre-requisites	Year 4 standing
Co-requisites	
Pre-requisite to	
Mutually exclusive to	
Replacement course to	
Remarks (if any)	

Course Aims

The objective of this course is to give you an appreciation of the various aspects of designing environmental and civil engineering projects from conception to completion.

After successfully attending the course, you should be able to undertake basic practical design of environmental projects.

Course's Intended Learning Outcomes (ILOs)

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

ILO 1	Identify the appropriate design factors and parameters when designing environmental and civil engineering projects.
ILO 2	Apply design principles and methodologies when designing environmental and civil engineering projects.
ILO 3	Propose cost effective designs which meet client requirements.
ILO 4	Account for socio-economic and environmental sustainability in design.
ILO 5	Effectively integrate different design components in environmental and civil engineering projects.
ILO 6	Design projects that can be practically implemented.

Course Content

S/N	Topic
1.	Course overview and project briefing
2.	Environmental impact assessment/Sustainable green design
3.	Storm drainage infrastructure/Air, noise and ground pollution
4.	Water resources management/Solid waste management
5.	Water treatment and supply
6.	Wastewater treatment/reclamation

Reading and References (if applicable)

1. Linsley, R. K., Franzini, J.B., Freyberg, D.L., Tchobanoglous, G. (1992) "Water Resources Engineering", McGraw-Hill
2. Wanielista, M.P.(1993): "Stormwater Management: Quantity and Quality", Ann Arbor Science
3. Chow, V.T.; Maidment, D.R.; Mays, L.W. (1988): "Applied Hydrology", McGraw-Hill
4. Wanielista M. P., Kersten, R., Ealgin, R. (1997): "Hydrology: Water Quantity and Quality Control" John Wiley & Sons
5. Peavy, HS; Rowe, DR; Tchobanoglous, G (1987) "Environmental Engineering", International edition, McGraw-Hill Book Co.
6. McGhee, TJ (1991) "Water Supply and Sewerage". International edition, McGraw-Hill Book Co.

Planned Schedule

Week or Session	Topics or Themes	ILO	Readings	Delivery Mode	Activities
1	Course and Project Overview	1, 4, 5, 6	Read course ppt slides	In-person	Consultation with project instructor, Literature search of material for execution of design projects
2	Storm Drainage Design Part 1	1, 2	Read course ppt slides	In-person	Consultation with project instructor, Literature search of material for execution of design projects
3	Storm Drainage Design Part 2	1, 2, 3, 4, 6	Read course ppt slides	In-person	Consultation with project instructor, Literature search of material for execution of design projects
4	Water Resources Design Part 1	1, 2	Read course ppt slides	In-person	Consultation with project instructor, Literature search of material for execution of design projects

Week or Session	Topics or Themes	ILO	Readings	Delivery Mode	Activities
5	Water Resources Design Part 2	1, 2, 3, 4, 6	Read course ppt slides	In-person	Consultation with project instructor, Literature search of material for execution of design projects
6	Water Treatment/Water Supply Design	1, 2, 3, 4, 6	Read course ppt slides	In-person	Consultation with project instructor, Literature search of material for execution of design projects
7	Green Design Concepts for Clean Tech Park	4	Read course ppt slides	In-person	Consultation with project instructor, Literature search of material for execution of design projects
8	Wastewater Treatment, Water Reclamation and Reuse	1, 2	Read course ppt slides Consultation with project instructor, Literature search of material for execution of design projects	In-person	Consultation with project instructor, Literature search of material for execution of design projects

Week or Session	Topics or Themes	ILO	Readings	Delivery Mode	Activities
9	Wastewater Treatment, Water Reclamation and Reuse	1, 2, 3, 4, 5, 6	Read course ppt slides	In-person	Consultation with project instructor, Literature search of material for execution of design projects
10	Wastewater Treatment, Water Reclamation and Reuse	1, 2, 3, 4, 5, 6	Read course ppt slides	In-person	Consultation with project instructor, Literature search of material for execution of design projects
11	Consultation	2, 3, 6		In-person	Consultation with project instructor Literature search of material for execution of design projects
12	Consultation	2, 3, 6		In-person	Consultation with project instructor Literature search of material for execution of design projects
13	Quiz	1, 2, 5, 6	Review of course ppt slides	In-person	

Learning and Teaching Approach

Approach	How does this approach support you in achieving the learning outcomes?
Lectures	Formal lectures on principles related to the design projects
Consultations	To allow you to seek clarifications on the concepts taught during lectures and guidance in completing the design projects
Group Design Reports	You learn to work as a team to complete the design project reports which require self-study and research and team work beyond the lecture materials

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): Test/Quiz(Quiz)	1,2,5,6	ENE 2018 SLOs a, b	30	Individual	Analytic	Relational
2	Continuous Assessment (CA): Report/Case study(Group Project Reports)	1,2,3,4,5,6	ENE2018 SLOs a, b, c, d, f, g, i	70	Team	Holistic	Extended Abstract

Description of Assessment Components (if applicable)

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Formative Feedback

<p>The quiz and project marks are announced to you.</p> <p>You are encouraged to meet Instructors to seek feedback on your project design reports.</p>
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NTU Graduate Attributes/Competency Mapping

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

Attributes/Competency	Level
Care for Environment	Advanced
Care for Society	Intermediate
Self-Management	Intermediate
Project Management	Advanced
Systems 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)

(1) General

You are expected to complete all scheduled project assignments and reports by due dates. You are expected to take responsibility to follow up with course notes, consultations, and self-study to complete the assignments. You are expected to participate in all group project discussions and activities.

Policy (Absenteeism)

(2) Absenteeism

Group work requires each member to contribute to team work. Valid reasons include falling sick supported by a medical certificate and participation in NTU's approved activities supported by an excuse letter from the relevant bodies.

Policy (Others, if applicable)

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RUBRICS FOR EN4912 INTEGRATED DESIGN PROJECT

Appendix 1: Assessment Criteria for Group Project and Presentation

Performance Indicators	Performance Level/Criteria			
	Outstanding: 4	Good: 3	Average, meet expectation: 2	Below expectations: 1
<i>Identify appropriate design factors and parameters</i>	Correct design factors and parameters used in design	Some inaccurate design factors and parameters used in design	Some incorrect design factors and parameters used in design	Many incorrect design factors and parameters used in design
<i>Apply correct design principles and methodology</i>	Correct principles and methodology applied in design	some incorrect principles and methodology applied in design	Many incorrect principles and methodology applied in design	Design based on incorrect principles and methodology
<i>Propose cost-effective designs which meet client requirements</i>	Design is cost effective and meets client requirements	Design is generally cost effective and meets client requirements	Design is lacking in cost effectiveness and in meeting client requirements	Design is not cost effective and does not meet client requirements
<i>Consider socio-economic and environmental sustainability in design</i>	Design pays much attention to socio-economic and environmental sustainability	Design pays sufficient attention to socio-economic and environmental sustainability	Design pays little attention to socio-economic and environmental sustainability	No consideration for socio-economic and environmental sustainability in design
<i>Integrate different components of design proficiently</i>	The various design components are fully and compatibility integrated	Some design components may not function as a whole	Most design components do not function as a whole	The various design components cannot function as a whole
<i>Consider practicality of project implementation</i>	Proposed design can be readily and practically implemented	Proposed design can be implemented with some challenges	Proposed design can be implemented with great difficulties	Proposed design cannot be implemented