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	Final Year Project
Course Code	EN4911
Academic Units	8
Contact Hours	288
Research Experience Components	Final Year Project (FYP)

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

You are required to conduct an independent research-based project in any discipline of Environmental Engineering. You will learn to strategize a research programme to solve technical problems and to be a team player as the project may involve 2 to 3 students. You will also learn to write a full individual technical report and do an oral presentation on your FYP work.

Course's Intended Learning Outcomes (ILOs)

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

ILO 1	conduct an independent research-based project
ILO 2	strategize the research programme
ILO 3	solve technical problems
ILO 4	work effectively in teams to meet project deadlines
ILO 5	write a full technical report
ILO 6	present findings clearly and convincingly

Course Content

Not applicable.

Reading and References (if applicable)

Not applicable.

Planned Schedule

Week or Session	Topics or Themes	ILO	Readings	Delivery Mode	Activities
1	Week 1: Project Briefing	a, b		In-person	
2	Week 2-7: Project Planning	a, b, c		In-person	
3	Week 5-25: Project execution	a, b, c		In-person	
4	Week 13: Interim Report	c		In-person	
5	Week 23: Final Report	c		In-person	
6	Week 26: Oral Presentation	d		In-person	

Learning and Teaching Approach

Approach	How does this approach support you in achieving the learning outcomes?
Introduction of Project	You will need to understand the objectives, relevant background and motivation of the project.
Literature Review	You need to review published literature of related topics to your project. The review needs to be critical on what has been achieved and why you are continuing to work on this topic. The review enables you to work out a suitable scope to achieve the objectives of the FYP.
Methodology	This requires you to analyse all factors in the problem and formulate a workable method or approach for the solution, noting dependency of constraints.
Result Analysis and Discussion	You will develop the skills to analyse and interpret the results obtained from the experiments or simulations, and discuss the results and their limitations, and draw conclusions.
Conclusion and Recommendation of Future Work	You will develop the skills to conclude what you have found from the research and to recommend meaningful future works.

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): Others(Continuous Assessment (CA))	1,2,3,4	EAB SLO* a to j	30	Individual	Holistic	Extended Abstract
2	Continuous Assessment (CA): Report/Case study(Final Report)	3,5	EAB SLO* j, l	55	Individual	Holistic	Extended Abstract
3	Continuous Assessment (CA): Presentation(Oral Presentation)	4,6	EAB SLO* j, l	15	Individual	Holistic	Extended Abstract

Description of Assessment Components (if applicable)

* EAB SLO stands for the Engineering Accreditation Board Student Learning Outcomes. The list is below:

Engineering knowledge: Apply the knowledge of mathematics, natural science, engineering fundamentals, and an engineering specialisation to the solution of complex engineering problems.

Problem Analysis: Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

Design/development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

Investigation: Conduct investigations of complex problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions

Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

The engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for the sustainable development.

Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams and in multidisciplinary settings.

Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and economic decision-making, and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

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 change

Formative Feedback

Student is expected to have regular discussions with supervisor on the progress and status of the research project to ensure the objectives are achieved over 2 semesters.

NTU Graduate Attributes/Competency Mapping

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

Attributes/Competency	Level
Communication	Advanced
Critical Thinking	Advanced
Embrace Challenge	Advanced

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)

As a student of the course, you are required to abide by both the University Code of Conduct and the Student Code of Conduct. The Codes provide information on the responsibilities of all NTU students, as well as examples of misconduct and details about how students can report suspected misconduct. The university also has the Student Mental Health Policy. The Policy states the University's commitment to providing a supportive environment for the holistic development of students, including the improvement of your mental health and wellbeing. These policies and codes concerning students can be found in the following link:

Policy (Absenteeism)

Policy (Others, if applicable)

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Rubrics for EN4911 Final Year Project

Appendix 1: Continuous Assessment Criteria for EN4911 Final Year Project

Criteria	Details	Unsatisfactory (25%)	Satisfactory (50%)	Good (75%)	Exemplary (100%)
Approach during year (30 Marks)	**Project Plan/Strategy (5)**	Unable to plan activities to complete tasks assigned, even after supervisor's feedback.	With help from supervisor, able to make reasonable research plan to achieve the goals.	Able to plan research activities with minimal supervision. The plan is reasonable with proper background knowledge.	Able to make clear, reasonable, and effect research plan with all technical details to achieve the objectives without much help from supervisor.
	Ability to extend ideas and expand on suggestions (10)	Unable to extend ideas or expand on suggestions, even after supervisor's feedback.	Able to partially extend ideas and expand on suggestions with basic understanding.	Able to extend ideas and expand on suggestions with good understanding.	Able to extend ideas and expand on suggestions beyond expectation.
	General Initiative on the project (5)	Poor initiative, relying on supervisor, even after supervisor's feedback.	Making some initiative to meet the goals and scope of the project.	Able to take good initiative to achieve the goals and scope of work for most of project duration.	Highly motivated and able to take initiative to gain new knowledge and acquire skills related to project in achieving the goals.
	Progress Report (10)	Unable to complete the progress report on time, even after supervisor's feedback.	Able to complete the progress report but lacking in content, understandings and logic.	Able to complete the progress report with good content, understandings and logic.	The progress report is completed in time, and well written.

Appendix 2: Final Report and Oral Presentation Assessment Criteria for EN4911 Final Year Project

You are expected to submit a full technical report of around 40 pages. The oral presentation will be 30 minutes (including 15 minutes of questioning time).

Criteria	Details	Unsatisfactory (25%)	Satisfactory (50%)	Good (75%)	Exemplary (100%)
Report Presentation **(10 Marks)**	**English, spelling, punctuation and style (5)**	Many typos and grammatical errors with poorly constructed sentences. Report is not properly formatted, even after supervisor's feedback.	Some typos and grammatical errors. Report is properly formatted.	No typos or errors of any kind. Properly constructed sentences. Well-organized chapters and properly formatted report.	No typos or errors of any kind. Properly formatted report. Report is very well organised and written.
	Logical and orderly layout of report (5)	Layout of report is not logical, even after supervisor's feedback.	Layout and order of report is acceptable and reasonable logical.	Layout and order of report is good and logical.	Clear layout and order of report with logical link among the chapters.
Development, discussion and conclusion of work **(45 Marks)**	**Understanding of the problem and limitations as demonstrated in the analysis of all factors in the problem, noting dependency of constraints. (10)**	Poor analysis and not all the factors are considered, even after supervisor's feedback.	Adequate analysis and some factors are considered.	The factors are logically analyzed; trends are identified with further discussion.	Logical in-depth analysis is conducted; new ideas are proposed for possible new knowledge.
	Ability and independence in acquiring relevant data and information for the project. (10)	No relevant data acquired, and poor information and literature reviewed even after supervisor's feedback.	Relevant data acquired, and adequate information and literature are reviewed, but lacking in understandings and logic.	New and interesting data acquired, and information and literature reviewed are good for the project.	High quality and new data acquired, and information reviewed reflecting student's deep understanding of the topic.
	Analysis and discussion of results, showing the ability of the student to interpret the data obtained. (15)	No relevant results and poor discussion. Outcomes are oversimplified, even after supervisor's feedback. No reflection of work done.	Relevant results and adequate discussion are presented, but lacking in understandings and logic. Little reflection of work done.	New and interesting results with good discussion, and suggestions for future work. Highlight some limitations of current work.	High quality and new results, promising for a peer-reviewed publication, reflecting student's deep understanding of the topic. Recognized the limitation of what has been achieved. Good suggestions for future work.

	The use of references - must be critical and give evidence of having read the related subject areas which are pertinent to the topic under investigation (a list of references alone is of NO use). (5)	Few and not up to date references are listed. Lack of citing in literature review of report, even after supervisor's feedback.	Adequate references are listed and cited in the report.	Good references are listed and cited in the literature review and throughout the report.	Excellent use and citing of references throughout the report. An in-depth literature review is conducted to highlight the research gap.
	Conclusions and recommendations, showing the ability of the student in making appropriate and relevant conclusions and recommendations based on the study. (5)	No conclusions drawn; related outcomes are oversimplified, even after supervisor's feedback. No reflection of work done.	Relevant results and adequate conclusions are made, but lacking in understandings and logic. Little reflection of work done.	Good conclusions are made in connection with the results and suggestions for future work. Highlight some limitation of current work.	Logical in-depth conclusions reflecting student's deep understanding of the topic. Recognized the limitation of what has been achieved. Good suggestions for future work.
Oral Presentation (15 Marks)	**Contents, Organisation, and Q & A (15)**	Poor content and slide design and presentation sequence is not logical. Unable to understand and answer questions, even after supervisor's feedback.	Adequate contents, average slide design, and reasonable depth of explanation. Able to understand and answer some questions.	Logical sequence, able to highlight major outcomes and offer good explanation, substantial effort in slide design. Able to understand and answer most questions.	Relevant content beyond the scope of project, able to correlate major outcomes to developments in the field, refreshing slide design. Able to understand and answer all questions, and also provide additional relevant information.