Subject Description Form

Subject Code	**CSE2704/IC2704**
Subject Title	Integrated Project for Environmental Control
Credit Value	3 Training Credits
Level	2
Pre-requisite/ Co-requisite/ Exclusion	CSE2701/IC2701 Construction Drawing and Modelling
Objectives	This subject aims to equip students with the techniques to manage waste treatment facility projects by adopting industry's latest technologies, techniques, methods and practices. This subject also aims to provide students an opportunity in applying the techniques in real-life situation. It is aimed for students, upon completion of this subject and IC2701, to attain professional competence equivalent to CIC-accredited BIM Manager (CCBM).
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. Plan and set up the operations of building information modelling systems in construction projects; b. Be aware of the industry's latest design and construction practices and their implication on BIM; c. Apply manufacturing techniques and waste handling processes for environmental engineering; and d. Suggest advanced construction practices for construction projects.
Subject Synopsis/ Indicative Syllabus	<u>Advanced Building Information Modelling (BIM)</u> • Digital information management, collaboration and integration; and • Commercial and contractual issues of BIM projects. <u>Modular Construction Practices</u> • Introduction to the concept of design for manufacture and assembly (DfMA) and the development from in-situ to modular integrated construction (MiC); • Use of advanced technology such as VR/AR, AI, RFID, BIM, high performance materials, 3D printing etc. in MiC; and • Advantages and technical challenges of MiC. <u>Waste Management for Manufacturing</u> • Introduction to manufacturing techniques; • Use of metal surfacing techniques such as cladding, hard-facing, build up, and buttering for waste water treatment; and • Waste handling and disposal process for metal surfacing generated waste. <u>Mini Project</u> • Design for and produce by traditional and advanced methods such as in-situ casting and modular construction using 3D printing;

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- Technical and economical characteristics of traditional and advanced production methods; and
- Advantages and technical challenges of traditional and advanced production methods.

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<tr><td>Learning Methodology</td><td>

The subject will be delivered through the following learning methods:

a. Mini-lectures – Lectures and demonstrations are used to introduce and explain key concept, definition and application of BIM and industry's latest practices. Multi-media illustrations are used for students to appreciate the good practices of the practices, as well as case studies and small group discussions are used to relate these knowledges with real-life practices;
b. Hands-on workshop - Students are organized to perform hands-on works in small groups under supervision of IC training staff in workshops. A wide range of practices are demonstrated. Hands-on sessions are arranged, if appropriate, for students to practice the industry standards and techniques;
c. Assignments - Individual assignments are arranged to deepen students' knowledge and sharpen their skills on BIM operation and industry's latest practices;
d. Mini-project – Students are organized in groups to carry out design, production and post-project evaluation to apply their training experiences and appreciate the challenges of construction practices in real-life applications; and
e. Self-learning - Independent on-line learning materials are provided for students to broaden their horizon of industry development.

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<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>

<table>
<tr><th rowspan="2">Assessment Method</th><th rowspan="2">Weighting (%)</th><th colspan="4">Intended Subject Learning Outcomes Assessed</th></tr>
<tr><th>a</th><th>b</th><th>c</th><th>d</th></tr>
<tr><td>Assignments</td><td>30</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Reports</td><td>40</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Tests</td><td>30</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
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Assignments - Students' performance are assessed continuously by assignments in the form of worksheets. Students' performance in the context of project work will also be monitored and assessed accordingly by IC training staff.

Reports - Students' reflection on their learning outcomes are captured by their training report.

Tests - Multiple-choices and short-question type on-line tests are used to assess students on their declarative knowledge and their analytical thinking.

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Student Study Effort Expected	**Class Contact**	
	Mini lecture and demonstration	24 Hrs
	Hands-on practice, tests and project work	66 Hrs
	Other Study Effort	
	Assignment and report	9 Hrs
	Self-learning	6 Hrs
	Total Study Effort	**105 Hrs**
Reading List and References	**Essential Textbooks/Reading Materials:** • Construction Industry Council DfMA Alliance Learning Resources (http://www.cic.hk/eng/main/dfma_alliance/knowledge_sharing/) • Construction Industry Council BIM Publications (https://www.bim.cic.hk/en/resources/publications) **References:** • Davis, M.L., Water and Wastewater Engineering: Design Principles and Practice. McGraw-Hill, New York, 2011. • Sanjayan, Nazari, Nematollahi, Sanjayan, Jay G., Nazari, Ali, and Nematollahi, Behzad. 3D Concrete Printing Technology : Construction and Building Applications. Oxford, England ; Cambridge, Massachusetts: Butterworth-Heinemann, 2019.	