Subject Description Form

Subject Code	BRE4393
Subject Title	Temporary Work Design
Credit Value	3
Level	4
Pre-requisite	BRE302 & BRE361or BRE370
Objectives	Bring students' attention to the vertical integration of the subject areas learned in Level 2 such as Structure, Construction Technology, Engineering Mathematics along with the working experience gained in Industrial Centre to the subject areas of Level 3 Structure II & Construction Technology & Materials II through design project whilst the inter-relation of the horizontal integration between subjects are also important in solving a problem-based project work. Integrate and apply knowledge gained from individual subject areas in technology, management, economics and legal aspects.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a) Design falsework and formwork for building construction b) Appraise alternative solutions to falsework and formwork design c) Recognize the inter-relationship and interdependence of various areas in construction related to temporary works, such as cost, time, safety, and quality assurance d) Comprehend the design and construction operations, technology & structure, management, economics and legal impacts of the construction industry both locally and in other countries through guided learning and case study. e) Understand the implications of temporary design and construction in professional and social contexts; develop and improve communications skills and teamwork spirits in term project, and international/comparative study.
Subject Synopsis/ Indicative Syllabus	• Introduction, basic concepts of formwork and falsework. • Bamboo scaffolding: design and safety • Metal scaffolding: components, loads, foundations, and design • shoring design • Formwork materials, formwork types, and quality of finishes • Project handout and briefing • Design of slab forms • Design of wall forms • Design of beam forms • Design of column forms • Selection of horizontal formwork systems • Selection of vertical formwork systems
Teaching/Learning Methodology	Structured lecture/tutorial sessions are carried out at different stages during the progress of project to provide learning support to students in achieving the intended learning outcomes. Lecture/tutorial sessions of 2.0 hours per week are intended for teaching of key concepts, principles, and methods in temporary works design/application. The students are provided with useful resources on Blackboard for self study. A structured design project based on real life situation is to be used for term project and consists of the several components for applied learning:

1. Understand the structural elements of building components,
2. Prepare design of falsework systems to facilitate the construction of the structural elements.
3. Evaluate the different systems of formwork and falsework and to appraise alternation solutions.
4. Propose a suitable structural form for the formwork of various building components, and to prepare the subsequent design drawings, structural calculations and specifications
5. Produce plan and proposal for the falsework/formwork to facilitate building construction
6. Appreciate the multi-objective nature of building construction related to temporary works

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d	e	
Temporary Works Design Report	80% (Group project)	∨	∨	∨	∨	∨	
Temporary Works Design, debate assignment on selection of materials and types of formwork and falsework	10%	∨	∨	∨	∨	∨	
Quizzes and class attendance	10%	∨	∨		∨		
Total	100 %						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:
The subject is mainly project-based, the students will work in groups to complete the design report for a 2000-design school building project, which requires efforts from each team member to demonstrate that the group understands the problem and present the solutions in a professional report. The student in each group will also be individually assessed in contributions, contents, and quality of presentation based on the design report.

In the debate assignment, the school building project of 2000-design is used for study on solutions to temporary works. The students are divided into 2~3 larger groups to represent different options/solutions in each of the tasks (1) Selection of formwork materials; (2) Selection of formwork types; (3) selection of falsework/scaffoldings for working platform, shoring/supporting of formwork, etc. Student groups are required to present their proposal and defend their solutions, and then question the other groups which hold different views and propose different solutions. The groups are required to seek assistance from chatGPT through interactive queries, and make their professional judgement and provide supplementary information based on cited reference sources.

	The students will take 4-5 quizzes in the form of multiple choice questions to assess their understanding of basic design principles, practice, and knowledge in temporary works, the students are required to attend all the lectures. **1. <u>Report assessment (80%):</u>** Report presentation (20%) 1. Report presentation: logical and coherent organization, clarity, citations and appendices, 10% 2. Command of written English: succinct writing, grammar and spelling, 10% Report contents (80%) 1. Project introduction, 5% 2. Introduction to temporary works design: materials, types, and selection, 10% 3. Falsework and scaffolding design (including Bamboo scaffolding), 10%* 4. Formwork design: columns (introduction, calculations, sketches and drawings) , 10%* 5. Formwork design: walls (introduction, calculations, sketches and drawings) , 10%* 6. Formwork design: Beams (introduction, calculations, sketches and drawings) , 10%* 7. Formwork design: slabs (introduction, calculations, sketches and drawings) , 10%* 8. Construction management issues in temporary works, sustainability, organization, environment, time, cost, safety, quality, 10% 9. Conclusions, 5% <u>Assessment criteria</u> *Report presentation (20%)* A+, A, A- (Excellent): 1. Excellent design drawings. 2. Excellent use of English language in the report. 3. Excellent use of tables, charts, figures, sketches in the report. 4. Excellent citation and references (including AI generated contents). 5. The report is organized in logical and professional format. B+, B, B- (Good): 1. Good design drawings, with occasional errors in details. 2. Good use of English language in the report, with few typos, grammatical errors. 3. Proper use of tables, charts, figures, sketches in the report. 4. Good citation and references (including AI generated contents). 5. Overall the report is organized in logical and professional format. C+, C, C- (Satisfactory): 1. Satisfactory design drawings, with some non-critical errors in design and drawing details.

	2. Proper use of English language in the report, with some typos, grammatical errors. 3. Proper use of tables, charts, figures, sketches, with some formatting errors, in the report. 4. Satisfactory citation and references (including AI generated contents). 5. The report is overall organized in logical and professional format, with some parts of contexts misrepresented. D+, D (Pass): 1. Barely adequate design drawings, with many non-critical errors in design and drawing details. 2. Barely satisfactory use of English language in the report, with typos, grammatical errors, which may prevent understanding of some contents. 3. Use of tables, charts, figures, sketches is marginal, with many formatting and contents errors, in the report. 4. Barely adequate citation and references (including AI generated contents). 5. The report is barely organized in logical and professional format, with some parts of contexts misrepresented, or difficult to understand. F (Fail): 1. Inadequate design drawings, difficult to understand the design and drawing details. 2. Poor use of English language in the report, with typos, grammatical errors, which prevents clear understanding of the report. 3. Managed to use tables, charts, figures, sketches for presentation in the report, with improper use and format. 4. Inadequate citation and references (including AI generated contents). 5. The report is poorly organized, sometimes misrepresented, and difficult to understand. *Report contents (80%):* A+, A, A- (Excellent): 1. All the contents and topics required for temporary works design are completed. 2. The design for each part of the temporary works is excellent, with proper assumptions, design calculation, design analysis and design drawings. 3. Clear statement of design assumptions. 4. No significant errors in design calculations. B+, B, B- (Good): 1. All the contents and topics required for temporary works design are completed, with very few missing contents, or occasionally inadequate presentation. 2. The design for each part of the temporary works is good, with proper assumptions, design calculation, design analysis and design drawings. Occasional inconsistence in design and drawings. 3. Good statement of design assumptions. 4. Few noncritical errors in design calculations, some inaccuracies in design calculations may appear.

C+, C, C- (Satisfactory):

1. All the contents and topics required for temporary works design are completed, with some noncritical contents missing or inadequately presented.
2. The design for each part of the temporary works is satisfactory, with proper assumptions, design calculations, design analysis and design drawings. some errors in design and drawings. Some design errors.
3. Satisfactory statement of design assumptions.
4. Some errors in design calculations, but not critical and not affecting the overall design.

D+, D (Pass):

1. All the contents and topics required for temporary works design are completed, with some contents missing or inadequately presented
2. The design for each part of the temporary works is barely satisfactory, with largely proper assumptions, design calculations, design analysis and design drawings. some errors in design and drawings. design errors are often serious in some items.
3. Barely satisfactory statement of design assumptions
4. Many errors in design calculations, may be critical but not affecting overall design.

F (Fail):

1. Not all the contents and topics required for temporary works design are completed, with many contents or chapters missing and inadequately presented.
2. The design for each part of the temporary works is inadequate, with usually inadequate assumptions, design calculations, design analysis and design drawings. Extensive errors in design and drawings. design errors are usually serious.
3. Inadequate statement of design assumptions.
4. Extensive errors in design calculations, may be critical and affecting the validity of the overall design.

Indicative descriptors for modifier grades

Main Grade (solid)	The student generally performed at this level, indicating mastery of the subject intended learning outcomes at this level.
+ (exemplary)	The student consistently performed at this level and exceeded the expectations of this level in some regards, but not enough to claim mastery at the next level.
- (marginal)	The student basically performed at this level, but the performance was inconsistent or fell slightly short in some regards.

Note: The above indicative descriptors for modifier grades are not applicable to the pass grades D and D+.

2. <u>In-class debate assignments (10%):</u>

A+, A, A- (Excellent):

1. Make very good use of chatGPT or other Gen-AI tools with interactive queries designed with a professional manner

2. Make strong persuasive points to defend his/her solutions.
3. Make very good citations of reference sources (including AI generated contents), use of facts, data, cases, etc. to the statements, claims, etc.
4. Excellent presentation/debate skills.

B+, B, B- (Good):

1. Make good use of chatGPT or other Gen-AI tools with interactive queries designed with a professional manner. Some improvements can be made to make better use of the AI tool for designing an engineering solution.
2. Make good persuasive points to defend his/her solutions.
3. Make proper citations of reference sources (including AI generated contents), use of facts, data, cases, etc. to support the statements, claims, etc.
4. Relatively good presentation/debate skills.

C+, C, C- (Satisfactory):

1. Make use of chatGPT or other Gen-AI tools with interactive queries designed with a professional manner. Many improvements should be made to make good use of the AI tool for designing an engineering solution.
2. Make fairly persuasive points to defend his/her solutions.
3. Demonstrate ability in citing reference sources (including AI generated contents), to a satisfactory level, in using facts, data, cases, etc. to support the statements, claims, etc.
4. Demonstrate satisfactory presentation/debate skills in a professional context.

D+, D (Pass):

1. Can barely use chatGPT or other Gen-AI tools with interactive queries designed with a professional manner. Major improvements should be made to make good use of the AI tool for designing an engineering solution.
2. Make persuasive points to defend his/her solutions.
3. Demonstrate minimum ability in citing reference sources (including AI generated contents), in using facts, data, cases, etc. to support the statements, claims, etc.
4. Demonstrate minimum satisfactory presentation/debate skills in a professional context.

F (Fail):

1. Clear difficulty in using chatGPT or other Gen-AI tools with interactive queries designed with a professional manner.
2. Make some points to defend his/her solutions but not persuasive.
3. Demonstrate poor ability in citing reference sources (including AI generated contents), in using facts, data, cases, etc. to support the statements, claims, etc.
4. Fail to demonstrate basic presentation/debate skills in a professional context.

3. Quizzes and class attendance (10%)

	A+, A, A- (Excellent): A+: Over 95% of the questions are answered correctly A: 90% - 95% of the questions are answered correctly A-: 85% - 90% of the questions are answered correctly B+, B, B- (Good): B+: 80% - 85% of the questions are answered correctly B: 75% - 80% of the questions are answered correctly B-: 70% - 75% of the questions are answered correctly C+, C, C- (Satisfactory): C+: 65%- 70% of the questions are answered correctly C: 60%- 65% of the questions are answered correctly C: 55%- 60% of the questions are answered correctly D+,D (Pass): D+: 50% - 55% of the questions are answered correctly D: 45% - 50% of the questions are answered correctly F (Fail): F: Under 45% of the questions are answered correctly The grade will be lowered by at least one letter grade if the student is absent from the lectures for up to 3 weeks; a failure grade will be given if the student is absent from the lectures for up to 6 weeks.	
Student Study Effort Expected	Class contact:	
	▪ LEC	26Hrs.
	▪ Tutorial/Project Consultation	13 Hrs.
	Other student study effort:	
	▪ SELF-STUDY/REPORT WRITING	90 Hrs.
	§	Hrs.
	Total student study effort	129 Hrs.
Reading List and References	**Reading List:** No standard textbook is recommended, since students have to refer to various literatures in order to achieve the requirement of the design project. Reference will be made to current articles in journals, local newspaper, would press, proceedings dealing with topics of current importance. **Recommended:** The Concrete Society (2012), *Formwork A guide to good practice*, 3rd Edition, the Concrete Society, London. Illingworth J.R. (1987). *Temporary Works: Their Role in Construction*, Thomas Telford, London. Labour Department (2017). Code of Practice for Bamboo Scaffolding Safety. Available from: http://www.labour.gov.hk/eng/public/os/B/Bamboo.pdf	

	Buildings Department (2001). Guidelines on the Design and Construction of Bamboo Scaffolds. Available from: http://www.bd.gov.hk/english/documents/code/GDCBS.pdf Wong, Francis K.W. (1998). Bamboo Scaffolding Safety Management for the Building Industry in Hong Kong. Labour Department (2013). *Code of Practice for Metal Scaffolding Safety.* Available from: http://www.labour.gov.hk/eng/public/os/B/mss.pdf Chudley, R. (1999). *Advanced Construction Technology*, 3rd ed. revised by Roger Grano, Longman. Illingworth, J.R. (2000). *Construction Methods and Planning*, 2nd ed., E & FN Spon.