ESTR4998/4999 GRADUATION THESIS

1. Composition of the Thesis Assessment Committee

Since projects of interdisciplinary nature are allowed (and even encouraged), it is possible that the thesis supervisor is not in the same department or even in the same Faculty as the ELITE students. To ensure that the Graduation Thesis meets the standard of the Faculty of Engineering, the following should be observed when forming the Committee:

i. The Committee should consist of 2 members, with one being the thesis supervisor and the second one being the reviewer.
ii. If the thesis supervisor is from the Faculty of Engineering, then the reviewer of the Committee should be nominated by the Chairman of the thesis supervisor's home department or his/her designate (the nominee could be from the Faculty of Engineering or outside the Faculty of Engineering, CUHK). The supervisor may supply a list of potential reviewers to the Chairman or his/her designate for his/her consideration.
iii. If the thesis supervisor is from outside of the Faculty of Engineering, then the reviewer of the Committee must be from the major department of the supervisee and should be nominated by the Chairman of the supervisee's home department or his/her designate.
iv. For group projects that involve ELITE students from different major departments, the reviewer should be nominated by the ELITE Stream Director and the Associate Dean (Education).

2. Assessment Formula

(Marks given by Thesis Supervisor) x 60% + (Marks given by Reviewer appointed by Department Chairman) x 40%

For co-supervision case, the formula will be:

[(Marks given by Thesis Supervisor 1) + (Marks given by Thesis Supervisor 2)] / 2 x 60% + (Marks given by Reviewer appointed by Department Chairman) x 40%

3. Assessment Criteria

Research Methodology (25%)

- Ability to identify and formulate engineering problems
- Ability to identify the research issues in the project
- Ability to use appropriate techniques and tools to tackle the research issues
- Ability to design experiments / develop systems to meet the needs of the project within realistic constraints (If applicable)

- Ability to perform critical evaluation of the results and put the results in the context of existing literature

Quality of Results (35%)

- Ability to achieve the objectives of the project
- Novelty of the proposed solutions

Effective Communication in Writing and Presentation (25%)

- Ability to give a clear technical exposition
- Ability to give a clear technical presentation

Research / Independent Learning Ability (15%)

- Ability to conduct independent learning and research
- Ability to conduct self-assessment and monitor one's own learning

4. Grade Descriptors

A set of rubrics and grade descriptors were developed for ESTR4998/4999 and could be found in Annex.

Annex

ELITE Stream Graduation Thesis (ESTR 4998/4999)

Assessment Rubrics and Grade Descriptors

Preamble

This document presents the assessment rubrics and grade descriptors for the ELITE Stream Graduation Thesis (ESTR 4998/4999). Quoting Brookhart,[1] the operating principle of rubrics is "to match the performance to the description rather than "judge" it". Wherever appropriate, references to the Hong Kong Institution of Engineers (HKIE) Graduate Attributes (GA) are given.[2] Most of the assessment dimensions are similar to those for regular final year projects. However, it should be emphasized that ESTR 4998/4999 should involve a heavier research component than regular final year projects.

Dimension 1: Research Methodology (25%)

1. Ability to identify and formulate engineering problems (cf. HKIE GA(e))
2. Ability to identify the research issues in the project (cf. HKIE GA(i))
3. Ability to use appropriate techniques and tools to tackle the research issues (cf. HKIE GA(k), (l))
4. Ability to design experiments / develop systems to meet the needs of the project within realistic constraints (such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability, etc.), if applicable (cf. HKIE GA(b), (c))
5. Ability to perform critical evaluation of the results and put the results in the context of existing literature

Grade	Description
Excellent (A/A-) (21-25)	1. Demonstrate a solid understanding of the problems at hand and strong ability (e.g., with minimal guidance from supervisor) to come up with formulations that are amenable for further study / analysis 2. Demonstrate a solid understanding of the weaknesses in existing solutions and strong ability to formulate concrete research objectives 3. Demonstrate strong ability to understand and apply the relevant tools and techniques for tackling the problems at hand 4. Excellent (e.g., in terms of efficiency / effectiveness) experimental / system designs to meet the needs of the project 5. Comprehensive evaluation of the results via experiments and/or comparison with existing results in the literature
Good (B+/B/B-) (17-20)	1. Demonstrate a good understanding of the problems at hand and good ability (e.g., with some guidance from supervisor) to come up with formulations that are amenable for further study / analysis 2. Demonstrate a good understanding of the weaknesses in existing solutions and good ability to formulate concrete research objectives

[1] Susan M. Brookhart. *How to Create and Use Rubrics for Formative Assessment and Grading*. ASCD, 2013.
[2] The HKIE GAs can be found in Section 2.3 of the HKIE Professional Accreditation Handbook (Engineering Degrees) (https://hkie.org.hk/docs/accreditation/AcrdHB-EngDeg.pdf)

	3. Demonstrate good ability to understand and apply the relevant tools and techniques for tackling the problems at hand 4. Good (e.g., in terms of efficiency / effectiveness) experimental / system designs to meet the needs of the project 5. Sufficient evaluation of the results via experiments and/or comparison with existing results in the literature
Fair (C+/C/C-) (14-16)	1. Demonstrate a fair understanding of the problems at hand and average ability (e.g., with substantial guidance from supervisor) to come up with formulations that are amenable for further study / analysis 2. Demonstrate a fair understanding of the weaknesses in existing solutions and average ability to formulate concrete research objectives 3. Demonstrate average ability to understand and apply the relevant tools and techniques for tackling the problems at hand 4. Average (e.g., in terms of efficiency / effectiveness) experimental / system designs to meet the needs of the project 5. Some but insufficient evaluation of the results via experiments and/or comparison with existing results in the literature
Marginal (D+/D) (11-13)	1. Demonstrate a marginal understanding of the problems at hand and marginal ability (e.g., heavy reliance on supervisor) to come up with formulations that are amenable for further study / analysis 2. Demonstrate a marginal understanding of the weaknesses in existing solutions and marginal ability to formulate concrete research objectives 3. Demonstrate marginal ability to understand and apply the relevant tools and techniques for tackling the problems at hand 4. Marginal (e.g., in terms of efficiency / effectiveness) experimental / system designs to meet the needs of the project 5. Marginal evaluation of the results via experiments and/or comparison with existing results in the literature
Failure (F) (0-10)	1. Demonstrate a minimal / lack of understanding of the problems at hand and minimal / lack of ability to come up with formulations that are amenable for further study / analysis 2. Demonstrate a minimal / lack of understanding of the weaknesses in existing solutions and minimal / lack of ability to formulate concrete research objectives 3. Demonstrate minimal / lack of ability to understand and apply the relevant tools and techniques for tackling the problems at hand 4. Minimal / lack of experimental / system designs to meet the needs of the project 5. Minimal / lack of evaluation of the results via experiments and/or comparison with existing results in the literature

Dimension 2: Quality of Results (35%)

1. Ability to achieve the objectives of the project
2. Novelty of the proposed solutions

Grade	**Description**
Excellent (A/A-) (29-35)	1. Results obtained not only meet but also go beyond the objectives of the project 2. Results obtained significantly advance the knowledge of the field and are of publishable quality

Good (B+/B/B-) (24-28)	1. Results obtained well achieve the objectives of the project 2. Results obtained somewhat advance the knowledge of the field
Fair (C+/C/C-) (19-23)	1. Results obtained barely meet all the objectives of the project 2. Results obtained essentially reproduce those in the literature
Marginal (D+/D) (15-18)	1. Results obtained do not meet some of the objectives of the project 2. Results obtained do not achieve the standard of those in the literature
Failure (F) (0-14)	1. Fail to achieve any or most of the objectives of the project 2. Fail to produce any solution

Dimension 3: Effective Communication in Writing and Presentation (25%)

1. Ability to give a clear technical exposition (cf. HKIE GA(g))
2. Ability to give a clear technical presentation (cf. HKIE GA(g))

Grade	**Description**
Excellent (A/A-) (21-25)	1. Clear organization and logical flow 2. Well-motivated and well-founded technical development 3. Accurately presented technical results 4. Excellent discussion and understanding of the consequences of the results 5. Excellent language usage 6. Informative illustrations / examples 7. Comprehensive references to prior and related works 8. Excellent presentation style 9. Response to questions demonstrate solid understanding of the concepts and the literature
Good (B+/B/B-) (17-20)	1. Sufficiently clear organization and sufficiently logical flow 2. Technical development sufficiently motivated 3. Presented technical results mostly accurate 4. Good discussion and understanding of the consequences of the results 5. Good language usage 6. Sufficient illustrations / examples 7. Sufficient references to prior and related works 8. Good presentation style 9. Response to questions demonstrate good understanding of the concepts and the literature
Fair	1. Somewhat disorganized flow 2. Minimal motivation for technical development

(C+/C/C-) (14-16)	3. Fair amount of inaccuracies in the presented technical results 4. Fair discussion and understanding of the consequences of the results 5. Fair language usage 6. Fair illustrations / examples 7. Missing a fair amount of references to prior and related works 8. Fair presentation style 9. Response to questions demonstrate average understanding of the concepts and the literature
Marginal (D+/D) (11-13)	1. Disorganized flow 2. No motivation for technical development 3. Large amount of inaccuracies in the presented technical results 4. Marginal discussion and understanding of the consequences of the results 5. Marginal language usage 6. No / irrelevant illustrations / examples 7. Missing a large amount of references to prior and related works 8. Marginal presentation style 9. Response to questions demonstrate marginal understanding of the concepts and the literature
Failure (F) (0-10)	1. Totally disorganized flow 2. No motivation for technical development 3. Presented technical results completely inaccurate 4. Minimal / lack of discussion and understanding of the consequences of the results 5. Incomprehensible language usage 6. No / irrelevant illustrations / examples 7. Minimal / lack of references to prior and related works 8. Poor presentation style 9. Response to questions demonstrate minimal / lack of understanding of the concepts and the literature

Dimension 4: Research / Independent Learning Ability (15%)

1. Ability to conduct independent learning and research (cf. HKIE GA(j))
2. Ability to conduct self-assessment and monitor one's own learning (cf. HKIE GA(j))

Grade	**Description**
Excellent (A/A-) (13-15)	For independent learning and research: 1. Demonstrate significant initiative in searching for and performing self-study on literature (as evidenced by, e.g., quality of literature, inter-disciplinary nature of literature, etc.) beyond those assigned by the supervisor 2. Demonstrate significant initiative and independence in learning the background knowledge necessary for the project For self-assessment: Maintain excellent progress (e.g., exceed the supervisor's expectation) throughout the project

Good (B+/B/B-) (11-12)	For independent learning and research: 1. Demonstrate <u>good initiative</u> in searching for and performing self-study on literature (as evidenced by, e.g., quality of literature, inter-disciplinary nature of literature, etc.) beyond those assigned by the supervisor 2. Demonstrate <u>good initiative and independence</u> in learning the background knowledge necessary for the project For self-assessment: Maintain <u>good</u> progress (e.g., meet the supervisor's expectation) throughout the project
Fair (C+/C/C-) (9-10)	For independent learning and research: 1. <u>Mostly</u> rely on literature assigned by the supervisor and demonstrate <u>limited initiative</u> in performing self-study on the literature 2. Demonstrate <u>limited initiative and independence</u> in learning the background knowledge necessary for the project For self-assessment: Maintain <u>fair</u> progress (e.g., achieve the supervisor's minimum expectation) throughout the project
Marginal (D+/D) (7-8)	For independent learning and research: 1. <u>Totally</u> rely on literature assigned by the supervisor and demonstrate <u>minimal initiative</u> in performing self-study on the literature 2. Demonstrate <u>minimal initiative and independence</u> in learning the background knowledge necessary for the project For self-assessment: <u>Falling behind</u> (e.g., fail to meet the supervisor's expectation) throughout the project
Failure (F) (0-6)	For independent learning and research: 1. <u>Totally</u> rely on literature assigned by the supervisor and demonstrate <u>complete lack of initiative</u> in performing self-study on the literature 2. Demonstrate <u>complete lack of initiative and independence</u> in learning the background knowledge necessary for the project For self-assessment: <u>Fail</u> to make any progress on the project

Overall Performance

Grade	Description
Excellent (A/A-) (81-100)	Performance meets expectation in all relevant measurement dimensions and far exceeds expectation in most of them
Good (B+/B/B-) (66-80)	Performance meets expectation in all relevant measurement dimensions and exceeds expectation in some of them
Fair (C+/C/C-) (51-65)	Performance meets expectation adequately in all relevant measurement dimensions
Marginal (D+/D) (41-50)	Performance meets expectation adequately in most relevant measurement dimensions
Failure (F) (0-40)	Performance does not meet expectation in most relevant measurement dimensions

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