Information on Final-Year Project

For Undergraduate Students

2019 (4-Y) Students

Department of Industrial Engineering and Decision Analytics

The Hong Kong University of Science & Technology

CONTENTS

1. GENERAL INFORMATION

This document gives students an introduction to the final year project. It outlines the objective, schedule, and requirements of the project.

Objective:

To provide students an opportunity to integrate all that they have already learned, and will learn in their final year, into their first large-scale engineering project.

Duration and Credits:

The final year project lasts for <u>two semesters</u>. A total of <u>six credits</u> is assigned, <u>three to each semester</u> (a grade for the whole project will be given after its completion).

While it is possible to begin the project work when the project is formally registered, it is advisable to start the project in the summer (winter) session before that. Obviously, if a student starts too late, it will be very difficult for him/her to produce a result which comes up to the expected standard, from which the student himself/herself would most benefit, and which would most impress a potential employer!

The principle in judging when a student should start his/her final year project is that the project should be done in his/her last two semesters of study. In this way, he/she will have had enough knowledge to do the project (not too early) and will not delay his/her graduation purely due to the late start of the project (not too late). Any students can start their projects this summer, as long as they feel that they can graduate next summer (with some evidence, for example, after finishing this semester's courses and possible summer courses they only have 40 or less credits left).

Project Selection Process

- A list of available projects will be provided to the students for selection. These projects may be industry related or research related.

- The required number of students (team size) will be specified for each project.

- The project teams will be formed by the students, according to their common interests and mutual agreements.

- Each team may select 5 choices among the list of projects. See "**IEDA FYP Project Selection (2022/23) – Guidelines for Students**". Students are encouraged to discuss with the supervisors of those projects which they intend to select as their first two choices.

- The supervisor(s) of each project will then choose a team from those who selected that project. Although the department will try to match the teams with their preferred projects, there may be a small chance that a team is assigned a project other than their five choices.

- If a team did not input their choices on time, a project will be selected for them randomly from the projects left.

Notes for students:

- IEDA/IEEM students are allowed to work on any projects on the list.
- For general IEEM related projects, preference will be given to groups involving IEEM students.
- It is allowed to mix IEDA and IEEM students in a team.

Schedule of Events

	Events	Tentative dates for project to be started in Fall 2022-23
i.	Project information to students	Mid - April
ii.	Formation of teams and discussion with perspective project supervisors	All the time period between *(i)* and *(iii)*
iii.	Project Selection due	May 2, 2022 (Monday)
iv.	Announcement of team-project matching result	Mid May
v.	Project Plan due	Sept 9 (Fri)
vi.	Progress report due + Peer review	Dec. 2 (Fri)
vii.	Draft for the Final Report due	April 8 (Fri)
viii.	Final Report due	May 3, 11am (Wed)
ix.	Presentation + Peer review	TBC. Early May

All the reports should be submitted to the project supervisor(s) on time. Students are strongly encouraged to give a copy of their draft reports and presentation outlines/materials to the communication tutor well before the due dates for comments, suggestions, advice and help.

Presentation

Motivation:

The presentation part of the Final -Year Project is designed to have 3 roles:

- to provide an opportunity for the student to give a technical presentation abstracted from the actual physical setup of the project;

- to provide an opportunity for members of the Department to evaluate both the overall project and each individual's contribution to it, in the case of a team project; and

- to select and recommend outstanding projects for participating student project competitions. etc. organized by HKIE

Procedure:

- Presentation will be organized in parallel sessions. Each session may include 4 to 6 project teams depending on the size of these teams.

- The presentation will be given to an exam panel of several faculty members including the project supervisors. Other members of the department, including students, may also attend the presentation.

- Panel members will circulate the final reports of the projects in their session during the week before the presentation.

- Project teams should set up all the equipment, software, etc. necessary for their presentation before the session starts. Rehearsals are encouraged to be done in the presentation venue on the prior day for practice and to identify and prevent potential equipment or software problem.

- Time will be controlled strictly during the presentation. The time limit (including 5 minutes' question/answer) for a team project involving 2-3 members will be 20 minutes. For a team project involving 4 members will be 25 minutes and so on.

Evaluation:

- Students will be evaluated individually. Students within a team may receive different grades. The grade will be a combination of the evaluations from the supervisor(s) and from the exam panel.

- Supervisors' evaluation will be based on the work done and all the reports submitted during the whole project period.

- Evaluation of the panel will be based on the work done as reflected and evidenced in the final report and the performance in the presentation.

Refer "Rubrics of FYP Assessment" under "III. OBE GRADING SCHEME FOR FYP" in page 11.

Student Report submission

1. All final reports have to be submitted to Canvas -> Turnitin for originality checking.

   Multiple submissions are allowed before the presentation date. **One submission for each group**.

   Note: hard copy still needs to be submitted to the department office as instructed before.

2. Peer review for each group in Fall and Spring terms

   "Please allocate total 100 points to each of the team members, including yourself, according to their contribution to the project.

   For example, A: 35%, B: 20%, C:30%, D:15%

   You may also add some comments to explain why you make the allocation above.

   Your input will be put as strict confidential.

   The deadline of the peer review in Fall is: same as the progress report due date (Dec 2, 2022)
   The deadline of the peer review in Spring is: TBC

Roles of Team member / Panel member / Project coordinator

- Panel members will recommend [*Numerical*] panel grade for teams

   Guideline: Grade (Mean)

A+	A	A-	B+	B	B-	C+	C	C-	D	E, F
96	88	80	72	64	56	48	40	32	16	0

- FYP coordinator will determine team [*Letter*] grade for project supervisors (by combining ratings from project supervisors and panel members)

- Project supervisors assign (different) individual grade to each team member

II. GUIDELINE FOR PROJECT REPORTS AND POSTER

Project Plan

Motivation:

To assist students in getting their projects organized early, and to provide a basis for rewarding them for a good start.

One report is to be prepared for each project by the whole project team, as detailed below:

Content:

The report must include:

a) The Project ID Number (in the upper-right corner).

b) The Project Title (at the top, centred).

c) The Name of Supervisor(s) (next line centred).

d) The Names of Participants (next lines, listed one per line, left-justified, surname first with given names separated by a comma, English name last).

e) The Project Summary indicating:
    i)   What is the problem?
    ii) How do you hope to solve it?
    iii) What result do you expect to achieve?
         (A time schedule should also be provided)
    iv) What is important about your expected result?

f) The Author List: Name(s) of the report writer(s). (For multiple writers, indicate sections and/or percentages done by each.)

Progress Report

Motivation:

The primary purpose of the Progress Report is to unambiguously verify the pace at which you are working, the relative difficulty of the Project, and the need for mid-flight correction in either the scope of the Project or in your effort or its intensity. To allow enough time for appropriate corrective action, the report should be prepared for submission as scheduled (see page 2).

Content:

To fulfil its purpose, the Progress Report should relate *directly* to the Project Plan, and have a very similar format. In fact, items (a) through (e) of both Reports should be essentially the same. However, in the schedule part of item (e) in the progress report, you should indicate what you have finished and what are to be done. It is quite possible (and legitimate) that you may have changed some aspects of your plan! To assist your supervisor in his/her analysis of your work, strikethrough the ~~text~~ deleted from the original, and put any new parts in *italics*.

Draft for the Final Report

Motivation:

The primary purpose of the <u>Draft for the Final Report</u> is as a planning document for the preparation of the Final Report, and of the Presentation and Demonstration to follow. As such, it is a very serious pre-step in the completion of your Final-Year Project. Done well, your <u>Draft for the Final Report</u> can make the final stage in your Project a straightforward, enjoyable process. Treated casually, it can be a waste of time for all of us! At the very least, <u>the Draft for the Final Report</u> should serve to focus your attention on the fact that 3/4 of the academic year has already passed; the term is nearly at an end; and *you must make the optimal use of your remaining time*.

Content:

1) *Title*.
2) *Project Participant(s).*
3) *Project Supervisor(s).*
4) *Project Purpose* (in a few sentences).
5) *Project Overview* (in one-half to one page).
6) *Project Progress* (as a list of deliverables with the fraction of each now completed).
7) *Table of Contents of the Final Report*: This should include (for example), Title Page, Preface and Acknowledgment, Table of Contents, Introduction to the Problem, Overall Directions to a Solution, Design of the Solution, Testing of the Solution, Results, Conclusions, Appendixes on details of design and test and system components, including software listings, etc. Partial identification of sections and subsections would be also appropriate.
8) *Several Sample Pages* of text for various sections which illustrate your writing style and ability to express yourself: Normally you would provide samples from various Chapters and sections of the Final Report. Note that these need not be complete, nor be completely polished! You can include figures and graphs if you wish, but text is mandatory!

Final Report

Motivation:

Please keep in mind that it is a report of a *complete* Project, a record of the *entire* effort directed toward the Project goal, independent of the size of team that produced it. Thus your <u>Final Report</u> must logically be a complete package. For to be otherwise, (such as providing an uncoordinated package of partial reports) it would have no integrity, nor any archival or autonomous value.

The <u>Final Report</u> for each Project will remain in the departmental archives as a record of *your* integrity, effort and accomplishment, long after you have graduated. In short, it is *your* legacy here! Also, it is the vehicle by which you can communicate your capabilities to others, such as potential employers. Thus it should be as well-done as you can manage!

The Role of the Preface and Acknowledgment:

While the <u>Final Report</u> is all about the Project, to account for individual effort is very very important. To help to do so is the role of the Preface and Acknowledgment which appear after the Title page in your <u>Final Report</u>. It should include: the Title of your Project, the name of your supervisor(s), the name of the Department and of the University, a short Abstract, the names of the members of the Final-Year Project team and of other associated individuals (such as technicians or graduate students) with their status identified. Together with the name of each individual, you will include a list of items (set in parentheses) indicating a) the nature of their contribution to the Project, b) their % of project contribution, c) their % of write-up contribution.

IEDA Final Year Reports General Structure		
Introduction	What is your report about?	
	Why should we care about it?	HK's perspective Global perspective
		Commercial/social perspective
	What's the current world interest in this?	Who else is researching this? How far have other studies reached?
	Technical Focus of project	
	The following structure of this report	
Background	Specific Problem	
	Project's Solution	the logic behind the solution the subsequent design the testing of the solution
Methods	How was the problem tackles	
Results	Describe the general results in writing. Say if there are any conditions. Mention special cases, uncertainties, surprises, etc.	
Conclusion	Discuss your results. What are the implications of the results (commercial/social/global/local/medical)? What is the value of this project? How can the results of the project be used? If the results are used, what effects are there? Question your own methods. How can the project be improved? Identify a logical follow up project.	
References		
Appendix		
Comments	*Make your report USER-FRIENDLY. Assume the reader is someone who does not know much about the topic. Keep the END-USER in mind. It could be a potential employer, or a target company. Make the report a proud example of the professional standards of the HKUST IEEM students.*	
	Keep generating your own special ideas about what you want to convey in this report.	

Project Poster

Motivation:

1. The Project Poster is intended to provide an overview of your Project to non-specialists of various kinds on various occasions.
2. If you prepare it early or make a preliminary version of it, you can use it at your workplace to inform passers by what you are doing.
3. You are encouraged to use it during your Oral Presentation.
4. Your Advisor may use it in the laboratory to inform visitors.
5. It will be retained by the Department, and will be used in open-house presentations by the Department, for example on Congregation Day.
6. It will be displayed on occasion in one of several display cases to be arranged in the Laboratory hallways for that purpose.
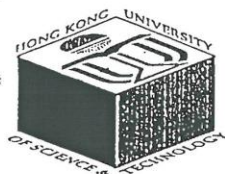7. It is a component of your final grade.

Suggested Poster Structure:

Construction:
a. Use sky-blue poster board (20" x 30") obtained at the Bookstore on campus.
b. Text, Figures, Charts, Graphs, Tables, etc are to be computer-generated on white paper. Their number, size and placement are your choice, except for the title and logo specification noted below.
c. All sheets are to be mounted on (relatively thick) coloured paper (called water-colour paper at the Bookstore) which extends 1 cm or so beyond the edges of the sheet to act as a "shadow frame". The colour and width of the frame are your choice.
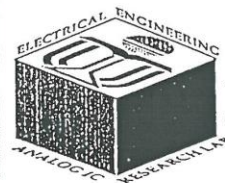
Format:
The general appearance is shown in the attached figures: There are 3 types of sheets:
a) The Title Sheet, which may need to be wide enough to require 2 joined pieces of A4 paper, includes the Project title, the names of the Project participant(s), and of the supervisor(s). The title should be structured in two parts: 1) a "heading" in one-half inch (or slightly larger) upper case, and 2) a subtitle in one-half inch upper and lower case. The names, located in two columns below the title are in one-quarter inch upper and lower case.
b) The Logos(s) which represent the University, the Department, and the Research Group or Laboratory in which the work was done, normally appear in the upper left and right corners of the board. In the event that the title sheet is too long, you may use only the left logo. In that case, use the second logo in the lower right corner.
c) The design of the Information Sheets including their content, size and number, is your choice, with 4 exceptions as follows:
    i. You should try to use paragraphs with centred titles, such as "Overview", and "Results", printed in a one-quarter inch upper and lower-case bold typeface.
    ii. Make effective use of titles for paragraphs, figures, etc. Use the typeface described in iii) below for the major part of the title (for visibility) and regular type for details.
    iii. The introductory paragraph(s) should be in a larger typeface than you will likely use in a detailed descriptive section. It should be readable at a distance of six to 10 feet (while the smallest type you use may be readable at distances of two to three feet). Generally speaking, keep in mind that the larger and bolder your presentation, the more enticing it will be those seeing it at a distance. The real challenge, then, after you have attracted attention to your poster is to provide enough interesting and readable detail to someone who wants to learn more. One compromise might be to have some parts (e.g., notes included in small font with figures, or a section called "Detailed Design", or a Table) which are packed with useful information. However, don't forget that important results should be big enough for reading at a reasonable distance!
    iv. A multi-column format can often improve readability by reducing line-length, allowing for more text structuring, etc.
    v. Figures (including diagrams, charts, graphs, schematics, etc) are a good way to communicate interesting ideas.

Project poster format

20" x 30"

1"

1"

ℓ 4" 5"

t

As needed (eg. 4-5")

ℓ 1"

a_1 a_2 a_3

1" $\frac{1}{2}$"

$\frac{1}{4}$" to $\frac{1}{2}$"

$1\frac{1}{2}$"

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PROJECT TITLE

Student's Name   Supervisor's Name

ELECTRICAL ENGINEERING ANALOGIC RESEARCH LAB

Here should be a Project Description written in brief with Bullet Marks:

Here should be a block diagram or an overview of the project

Here either a layout of a chip, more schematics, or whatever looks good

Here should be a detailed schematic of an important part of the circuit

Here should be a detailed schematic of an important part of the circuit

Measurements or simulation results

III. OBE GRADING SCHEME FOR FYP

An Overview

FYP Learning Outcomes
1. ability to define an engineering problem and articulate its significance to a business/society
2. ability to prepare a clear project proposal identifying the problem statement, the key issue, potential methods or approaches that can solve the issues, and mechanisms to integrate the solutions of these components in an optimal way
3. ability to model the problem to facilitate the analysis
4. ability to run experiments or collect data to estimate accurate parameters for the problem models
5. ability to solve models using IE/OR tools, and to analyse the results
6. ability to product physical or abstract prototype model solutions to problems
7. ability to work in a cross functional team
8. ability to communicate effectively with various parties including with team members, supervisors and possibly industry partners
9. ability to report the findings of the project

Rubrics of FYP Assessment

FYP outcomes	Excellent [3.4 – 4.3]	Good [2.4 – 3.3]	Acceptable [1.4 – 2.3]	Unsatisfactory [0 – 1.3]
1 (define a problem)**[10%]**	Able to clearly identify and define the problem with realistic concerns	Able to clearly identify and define the problem with simplified concerns	Able to clearly identify and define the problem under the ideal case	Unable to clearly define the problem
2 (proposal, **by advisor**) **[10%]**	The proposal includes all desired information concretely	The proposal includes all desired information, but some are vague	The proposal may miss some desired information	No submission on time
3 (model) **[10%]**	The model reflects the real problem accurately	The model reflects the real problem with simplification	The model is valid theoretically	The model is wrong or inappropriate
4 (estimate data) **[10%]**	The parameters are collected/estimated realistically	Parameters are collected/estimated under simplified assumptions	Parameters are collected/estimated theoretically	Parameters are arbitrarily collected/estimated
5 (problem solving) **[10%]**	Problem is solved correctly with creative approach	Problem is solved correctly with standard approach	Problem is solved in compromised way	The solution approach is wrong
6 (prototype) **[10%]**	The prototype works for most real cases within the defined scope	The prototype works for common real cases within the scope	The prototype works for reasonable special cases	The prototype is wrong/inappropriate
7 (team work) **[10%]**	The member has a clear duty and contributes substantially	The member has a clear duty and contributes enough	The member makes ad hoc contribution	The member makes no contribution to the team
8 (communication) **[15%]**	Communicate actively in the FYP process (**by advisor**), Presentation and Q/A clear (**by panel**)	Communicate regularly in the FYP process (**by advisor**), Presentation and Q/A can be followed (**by panel**)	Communicate at the minimum level in the FYP process (**by advisor**), Presentation and Q/A understandable (**by panel**)	Communicate poorly in the FYP process (**by advisor**), Presentation and Q/A not clear (**by panel**)
9 (report and poster) **[15%]**	Well organized, tables/figures properly used, no obvious grammar mistakes	Having the basic structure, tables/figures properly used, only minor grammar mistakes	Poor organization but still readable, with some grammar mistakes	Not readable, many grammar mistakes

Remark:
1. Each outcome will be separately assessed by the FYP advisor and the panel, unless otherwise specified.
2. Some outcomes may not be applicable for some special cases, which can be determined by the FYP advisor.
In case of that, the weight(s) of the inapplicable outcomes will be evenly distributed to other outcomes.

IV. FINAL YEAR PROJECT SELECTION METHOD

IEDA FYP Project Selection (2022-23) – Guidelines for Students

1. Go to the website: http://ieda.ust.hk/fyp
2. Login to the site with your ITSC account and password
3. View the project details by clicking the button "***Project List***"
4. For project selection, **Project Group Leader** enters the page "***Project Selection (to be completed by team leader)***". **Other students must *not* enter this page**.
5. Project Group Leader enters the information according to the instructions on the page.
6. Each group member goes to the page "***Personal Profile***" to input the required course grades **SEPARATELY**. If grades are not yet announced or you have not taken this course, input "N/A" in the field.
7. The input process is then finished.

Note:
All processes must be done before the deadline **(May 2, 2022)** for inputting information. Otherwise students will be randomly assigned a project that is left over by the system.

FYP Project Selection – Student Page

A) Before project selection

Project List

Project Selection (to be completed by team leader)

Team Member			
Member Info		Student ID	Email
	Team Leader	123456789	likeielm@ust.hk
	Team Member 1		
	Team Member 2		

Project Choices	
Project Choice 1	-- Please Select --
Project Choice 2	-- Please Select --
Project Choice 3	-- Please Select --
Project Choice 4	-- Please Select --
Project Choice 5	-- Please Select --

B) After project selection

Project List

Personal Profile

General Information

Name likeielm
Student ID 123456789
Program of Study   Program of Study   Year

Email likeielm@ust.hk
Mobile
Latest CGA 2
Project Choice 1 CD_Testing1
  Required Course 1 (IELM 3250) - Grade
  Required Course 2 (IELM 3150) - Grade
  Required Course 3 (IELM 3270) - Grade
Project Choice 2 IELM - Engineering of Making Smart Decisions
  Required Course 1 (IELM 3150) - Grade
  Required Course 2 (IELM 3270) - Grade
  Required Course 3 (IELM 3330) - Grade
Project Choice 3 Six Sigma related final year project will become HKSQ-certificated Six Sigma Green Belts
  Required Course 1 (IELM 3150) - Grade

Other Group Member(s)

Other Member(s) webproject3
ielmwebsite (Leader)

Save   Back