



香港大學
工業及製造系統工程系
Department of Industrial and
Manufacturing Systems Engineering
The University of Hong Kong

B.Eng. Final Year Project Handbook



Action Items and Timelines

Milestones	Dates and Deadlines	Action Items
Introduction	Late May	Briefing Session: An Overall Introduction to FYP <ul style="list-style-type: none"> FYP coordinator introduces the FYP Students attend the session
Supervisor Allocation	Mid to Late June	<ul style="list-style-type: none"> Supervisor Selection: Students indicate preferred supervisors
	Mid to Late July	<ul style="list-style-type: none"> FYP coordinator notifies students the supervisor
Proposal	Mid September	Workshop: An Introduction to Proposal <ul style="list-style-type: none"> Invited speaker introduces the Proposal Students attend the session
	Friday of Reading Week of Semester 1	<ul style="list-style-type: none"> Submission: Students submit the Proposal on Moodle
Interim Report	Early January	Workshop: An Introduction to Interim Report <ul style="list-style-type: none"> Invited speaker introduces the Interim Report Students attend the session
	1st Day of Semester 2	<ul style="list-style-type: none"> Submission: Students submit the Interim Report on Moodle
Oral Presentation and Final Report	Late March	Workshop: An Introduction to Oral Presentation and Final Report <ul style="list-style-type: none"> Invited speaker introduces the Oral Presentation and Final Report Students attend the session
	2nd Wednesday of April	<ul style="list-style-type: none"> Presentation: Students do the Oral Presentation
	Last Day of Teaching Period of Semester 2	<ul style="list-style-type: none"> Submission: Students submit the Final Report on Moodle

Assessment

- Proposal (5%)
- Interim Report (10%)
- Final Oral Presentation (15%)
- Final Report (70%)

Communications and ***discussions*** with the supervisor
are included in
ALL components in the Assessment

Introduction

Briefing Session: Late May

FYP is **Critical!**

- An excellent platform to show your capability in leading real-world projects.
- Talk about FYP in your job interview.
- Win Awards (e.g., HKIE Awards) to enrich your CV.

Things you **MUST** know

- Action items and timelines
- Assessment
- Supervisors and potential supervised topics

For more details, see **Appendices A and B**

Supervisors and Research Areas

Supervisors	Research Areas
Mr. Bill K.P. Chan	Information systems; systems simulation; simulation-based optimization
Dr. J.C. Chen	Wearable assistive robotics; bioelectrical signal processing; human-robot interaction
Prof. Y. Cheng	Reliability modeling; resilience modeling; system risk control
Dr. H.H. Cheung	CAD/CAM; smart product and process design; 3D printing; virtual prototyping; digital twin; smart/intelligent manufacturing; e-commerce; RFID, IoT, Robotics, and AI applications
Dr. S.H. Choi	CAD/CAM; 3D printing; virtual prototyping and virtual manufacturing; e-commerce; RFID, smart card and NFC applications
Prof. S.Y. Hu	Internet-of-Things; cyber-physical systems; digital twin; automation; smart manufacturing
Dr. W.J. Huang	Data-driven optimization; reinforcement learning; smart society operations; operations management
Prof. Y.H. Kuo	Computer vision; virtual reality; simulation and optimization; machine learning; logistics and transportation planning; healthcare management
Dr. Jonathan W.C. Ng	Operations management; supply chain management; planning and control of container terminals
Prof. Calvin K.L. Or	Human-system performance analytics; system safety analysis and improvement; information technology for health care
Prof. N. Xi	Robotics for manufacturing and services; sensors development and applications; data analytics; development and applications of digital twins
Prof. M.C. Yue	Optimization algorithms; optimization for machine learning and data science; operations research; decision making under uncertainty
Prof. F.N. Zhang	Smart mobility; shared transportation; parking modeling; autonomous vehicles and drone application in transportation and logistics
Prof. Ray Y. Zhong	Internet of Things enabled manufacturing; smart automated guided vehicle; big data analytics for manufacturing
Prof. Y. Xu	Additive manufacturing; advanced materials; intelligent design; AI-assisted manufacturing systems; AI-driven design methodologies
Dr. S.C. Lin	Data-driven inventory management; interface between machine learning and operations research; smart transportation; healthcare analytics

Topics under different Themes

Theme	Supervisors
Intermodal transportation simulation	Mr. Bill K.P. Chan, Prof. Y. Cheng, Prof. Y.H. Kuo, Prof. F.N. Zhang
Robotics and sensors: planning, control and data analytics	Prof. Calvin K.L. Or, Prof. N. Xi

Proposal

Workshop: Mid September
Submission: Friday of Reading Week of Semester 1 *on Moodle*

Components

- **Title**
- **3-5 Keywords**
- **Problem Statement:** (i) research domain problem and background, (ii) project objectives and expected outcomes, and (iii) originality, significances, and contributions.
- **15+ Key References:** a critical scrutiny of related research.

Focuses

- Relevance and criticality of literature review / background study
- Identification of research problem(s) / gap(s)
- Description and justification of research work
- Fluency and accuracy of written presentation / communication skills

For more details, see **Appendix C**

Interim Report

Workshop: Late December
Submission: 1st Day of Semester 2 *on Moodle*

Components

- **Title and Keywords**
- **Abstract:** summary of the background, necessity, methodology, findings, and academic and practical significances.
- **Chapter 1 Introduction:** (i) research domain problem and background, (ii) project objectives and outcomes, and (iii) originality, significances, and contributions.
- **Chapter 2 Literature Review:** (i) a critical scrutiny of the related research, (ii) comments and discussions on their strengths and weaknesses, (iii) highlights of research gaps, (iv) justifications of project's worthiness and timelines.
- **Chapter 3 Research Methodology:** (i) elaboration of the planned research work, and (ii) originality and effectiveness of methodology

Focuses

- Relevance and criticality of literature review / background study
- Identification and analysis of research problem(s) / gap(s)
- Research methodology: (i) introduction of hypotheses and research methodology, (ii) approaches to data collection, (iii) originality and effectiveness of methodology
- Future plan
- Fluency and accuracy of written presentation / communication skills

For more details, see **Appendix D**

Oral Presentation

Workshop: Late March
Presentation: 2nd Wednesday of April

Components

- **Introduction:** research problem, background, motivation, opportunities, originality, objectives, significances, contributions, and content and flow.
- **Literature Review:** (i) review of the existing research works and technologies, (ii) comments and discussions on their strengths and weaknesses, (iii) highlights of research gaps, and (iv) justifications of project's worthiness and timelines.
- **Research Work:** methodology, mathematical techniques, scope and subjects of survey, system structure, implementation, and nature of experiments.
- **Key Findings:** results, case studies, and analysis.
- **Discussions and Conclusions:** characteristic features, limitations, and possible future.

Focuses

- Clarity of research background and problem(s)
- Description of research objectives and expected outcomes
- Originality and effectiveness of methodology
- Presentation of research data / result
- Fluency of English / oral communication skills / response to questions
- Presentation skills and pace control

For more details, see **Appendix E**

Final Report

Workshop: Late March

Submission: Last Day of Teaching Period of Semester 2 *on Moodle*

Components

- **Title, Keywords, Abstract, Chapters 1 and 2** in the Interim Report.
- **Research Methodology:** a detailed elaboration of the mathematical techniques, subjects of survey, computer program and nature of experiments, etc.
- **Verification or Case Study** of the theoretical research work.
- **Discussions and Conclusions:** characteristic features, originality, significances, limitations, and possible future.
- **References**

Focuses

- Identification and analysis of research problem(s) / gap(s)
- Relevance and criticality of literature review / background study
- Research methodology: formulation / testing of hypotheses, design and implementation of research methodology, data collection, originality and effectiveness of methodology.
- Application of engineering techniques and result
- Fluency and accuracy of written presentation / communication skills

For more details, see **Appendix F**

Appendix A. Tips for the Successful Delivery of the FYP

- Meet the supervisor regularly (e.g., bi-weekly)
- Start to work on the project and write the report ahead of time; do not wait until the last few weeks
- Conduct a comprehensive review of related research literature and governmental and industrial reports
- Collect, process and analyse the required data for the research
- Ensure that the data collected are representative enough to warrant conclusions
- Assumptions should be justifiable and made only when necessary
- Analysis is based on rigorous modeling and/or supported by real-world data
- Write and organize the reports professionally and academically
- Include references to acknowledge the sources where the information and ideas are used and cite only trustworthy sources (e.g., books, journal articles, conference proceedings, newspapers, and governmental/organizational websites)
- Proofread the reports multiple times before submissions

Appendix B. Guidelines for the Preparation of the FYP Reports

Format

The format of the FYP interim and final reports shall follow the *Regulations Governing the Format, Binding and Presentation of Theses for Higher Degrees by Research*:

The thesis submitted for examination shall be typewritten or printed on one side or both sides of International size A4 paper (except for drawings, maps or tables on which no restriction is placed), with a margin of not less than 35mm on both right and left-hand edges of each page.

The line spacing of all text should be 1.5 or double-space. The fonts must be Times New Roman and 12 points in size.

Style

Chapter titles shall be numbered and indented sequentially. As an example:

CHAPTER 5

TITLE – HEADING LEVEL 1 (18 point, Bold Capitals)

5.1. Heading Level 2 (16 point, Bold and Capitalised)

5.1.1. Heading Level 3 (14 point, Bold and Capitalised)

5.1.1.1. Heading level 4 (14 point, Normal Typeface and Lower Case)

5.1.1.2. Heading level 4 (14 point, Normal Typeface and Lower Case)

5.2. Heading Level 2 (16 point, Bold and Capitalised)

5.2.1. Heading Level 3 (14 point, Bold and Capitalised)

5.2.1.1. Heading level 4 (14 point, Normal Typeface and Lower Case)

5.2.1.2. Heading level 4 (14 point, Normal Typeface and Lower Case)

CHAPTER 6

TITLE – HEADING LEVEL 1 (18 point, Bold Capitals)

6.1. Heading Level 2 (16 point, Bold and Capitalised)

etc.

A formula should be numbered if it is referenced in the text. Below provide two examples.

$$Q_0 = \sqrt{\frac{2DS}{H}} \dots\dots\dots (3.1)$$

The order quantity Q_0 in Equation (3.1) gives the lowest total cost in the EOQ model.

$$|a + b| \leq |a| + |b| \dots\dots\dots (3.9)$$

For any real numbers a and b , the absolute value of their sum is always no more than the sum of their absolute values. This is known as the *triangle inequality*, as expressed in Inequality (3.9).

All figures and tables should be numbered for the purpose of referencing in the report. A concise caption should be included to provide the reader with a brief idea about the material presented. A caption should be centered and placed **under the figure** or **above the table**. Below provide two examples.

Figure 3.1 depicts the relationships between the annual costs and the order quantity....

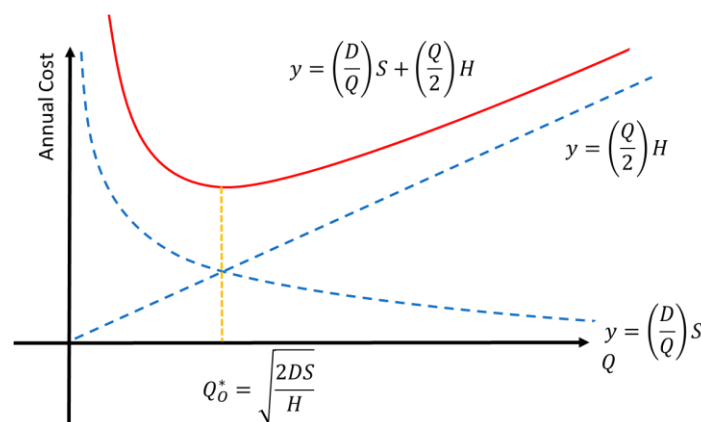


Figure 3.1. The annual costs in the EOQ model.

Table 5.1 presents the unit costs and annual demands for the three types of drugs considered in the computational study....

Table 5.1. The unit costs and annual demands for the three types of drugs.

	Drug 1	Drug 2	Drug 3
Unit cost (HK\$)	10	30	45
Annual demand (x1000 units)	2000	4500	6000

When using information or ideas from sources, students shall acknowledge them in the report. Citations of the sources should be presented in two ways: (i) citations in the text and (ii) a complete list of references. Students should bear in mind that a citation in the text must always come with the source in the reference section, and vice versa. The style of the in-text citations and the section of references should follow the **Harvard Referencing Style Guide**.

In-text citations can be classified into two types: information prominent and author prominent. Information prominent citations focus on the information itself, and the authors are cited as references. The authors' names and publication years are provided in brackets, e.g., (Little, 1954) and (Jewell, 1967; Bertsimas and Nakazato, 1995). Author prominent citations emphasize the authors' and their findings. The authors are placed in a prominent position in a sentence, and their findings follow, e.g., Blei et al. (2003) presented a model....

The formats of citations of books, journal articles, book chapters, conference papers, and websites are different. Below provide examples of more common types of citations. However, students are strongly encouraged to read the Harvard Referencing Style Guide for more guidance. Some reference materials can be found at:

- Harvard Reference Style Guide (Openjournals.net)
<http://openjournals.net/files/Ref/HARVARD2009%20Reference%20guide.pdf>
- Harvard Referencing Quick Guide (Staffordshire University)
http://ukrbulletin.univ.kiev.ua/harvard_quick_guide_tcm44-47797.pdf

Appendix C. General Structure of the Proposal

The purpose of the FYP proposal is to set out the objectives of the research study. The FYP proposal may include the following components. **Students are strongly encouraged to consult the supervisor for the more specific details to be included in the proposal.**

Title

The title of the research project. The title shall precisely reflect the topic of the project.

Keywords

3-5 keywords that capture the essence of the topic of the project.

Problem Statement

A one-page problem statement that clearly introduces the domain problem and background, the research problem and itemized objectives, and the significances and contributions of the project.

Key References

No less than 15 pieces of references as a critical scrutiny of the related research.

Appendix D. General Structure of the Interim Report

The purpose of the interim report is to plan how the research objectives can be achieved. The interim report also serves to document the progress to date. Based on the interim report, the supervisor is able to provide constructive advice and feedback to facilitate the successful delivery of the project.

The FYP interim report may include the following chapters. **Students are strongly encouraged to consult the supervisor for the more specific chapters to be included in the interim report.**

Title page

The title of the research project. The title shall precisely reflect the topic of the project.

Table of Contents

A list of the main chapters with page numbers in the report.

Lists of illustrations / diagrams / tables / appendices

Lists of illustrations / diagrams / tables / appendices with page numbers in the report.

Abbreviations / Nomenclatures

A lists of abbreviations / nomenclatures with full definitions.

Chapter 1 *Introduction*

A description of the research problem and background, the proposed research objectives, methodology, expected outcomes, the originality, and the academic / practical significances and contributions of this research work.

Chapter 2 *Literature Review*

A detailed study and critical scrutiny of the existing research works and technologies related to the project, with comments and discussions on their strengths and weaknesses, if any (it is advisable that the reference citation format follows the Harvard Referencing Guide). At the end of this chapter, justifications for the research work should be provided and its methodology and expected outcomes should be outlined.

Chapter 3 *Research Methodology*

Detailed elaboration of the planned research work, such as methodology, mathematical technique, scope and subjects of survey, computer programme and system structure, nature of experiments, etc.

Chapter 4 *Preliminary Results and Findings*

Presentation of the preliminary work, such as mathematical models, data collected, computational experiments, preliminary analysis of results, etc.

Chapter 5 *Discussion*

Discussion on the preliminary results and findings, limitations of research methodology and potential ways to improve the research.

Chapter 6 *Future Plans*

Planned tasks to be carried out in the rest of the FYP. Potential challenges may also be discussed in this chapter.

References

A list of the reference materials used for and cited in thesis (it is advisable that the referencing format follows the Harvard Referencing Guide).

Appendices

Supplementary information, such as derivations of mathematical equations, details of survey questionnaires, data tables, figures, detailed statistical analyses etc.

Appendix E. Guidelines for the Preparation of the Final Oral Presentation

The function of the final oral presentation of the FYP is to communicate the main ideas and important findings of the study. It also provides students and academic staff members with a platform to exchange ideas in an interactive way. Feedback from the academic staff members can be collected to improve the quality of the final report.

Each student will be allocated a time slot of 25 minutes for the final oral presentation, which consists of two parts:

- Presentation of the study (18-20 minutes)
- Q&A session (5-7 minutes)

The presentation of the study may include the following components. **Students are strongly encouraged to consult the supervisor for the more specific components to be covered in the presentation.**

Introduction

A description of the research problem and background, the motivation and opportunities, the originality, the objectives, the academic / practical significances and contributions of the research work. The content and flow of the presentation may also be briefly introduced here.

Literature Review

A brief review of the existing research works and technologies related to the project, with comments and discussions on their strengths and weaknesses. After reviewing the existing studies, justifications for the research work should be provided.

The Research Work

Presentation of the research work, such as methodology, mathematical technique, scope and subjects of survey, system structure, implementation, nature of experiments, etc.

Key Findings

Results, case studies, and analysis.

Discussion and Conclusion

Discussion and conclusion of the research work, highlighting the characteristic features, originality, significances, limitations, and possible future development/improvement of the study.

Tips for Delivering an Effective Oral Presentation

- Have a detailed plan for the presentation (e.g., content, organization and structure of the presentation, time spent on each slide)

- Focus on the research project and avoid excessive general discussions and project background
- Keep the slides concise (wordy sentences should be avoided; figures are more effective in delivering messages in a presentation)
- Dress professionally and look presentable
- Be confident throughout the whole presentation
- Maintain eye contact throughout the presentation and avoid just reading from slides and notes
- Ensure good voice quality (e.g., volume, speed, fluency, clarity, and pronunciation)
- Practice the oral presentation multiple times
- Time the presentation when practicing and having the actual presentation
- If a question from the audience is not clear to the student, try to rephrase the question to ensure that it is correctly interpreted

The Centre of Applied English Studies (CAES) has prepared some useful materials on the preparation of an oral presentation. Students can access the materials through the link:

<http://www4.caes.hku.hk/epc/presentation/>

Appendix F. General Structure of the Final Report

The FYP final report may include the following chapters. **Students are strongly encouraged to consult the supervisor for the more specific chapters to be included in the final report.**

Title page

The title of the research project. The title shall precisely reflect the topic of the project.

Declaration of authorship

To declare that the research reported in the final report is an original work that has not been published for any other purposes.

Acknowledgements

To express students' gratitude to those who have supported or helped them in the process of the research work and writing up the final report.

Abstract

To highlight the objectives, characteristic features of the methodology, outcomes, and academic / practical significances of the research work reported in the final report.

Table of Contents

A list of the main chapters and chapters with page numbers in the final report.

Lists of illustrations / diagrams / tables / appendices

Lists of illustrations / diagrams / tables / appendices with page numbers in the final report.

Abbreviations / Nomenclatures

A lists of abbreviations / nomenclatures with full definitions.

Chapter 1 *Introduction*

A description of the research problem and background, the proposed research objectives, methodology, expected outcomes, the originality, and the academic / practical significances and contributions of the research work.

Chapter 2 *Literature Review*

A detailed study and critical scrutiny of the existing research works and technologies related to the project, with comments and discussions on their strengths and weaknesses, if any (it is advisable that the reference citation format follows the Harvard Referencing Guide). At the end of this chapter, justifications for the research work should be provided and its methodology and expected outcomes should be outlined.

Chapter 3 *The research work*

Detailed elaboration of the research work, such as methodology, mathematical technique, scope and subjects of survey, computer programme and system structure, nature of experiments, etc.

Chapter 4 *More about the research work*

More about the research work, including details of methodology, results, case studies (more chapters may be added if necessary).

Chapter 5 *Verification or case studies of the research work*

Verification or case studies of the outcomes of the research work.

Chapter 6 *Discussion and conclusion*

Discussion and conclusion of the research work, highlighting the characteristic features, originality, significances, limitations, and possible future development/improvement of the research work.

References

A list of the reference materials used for and cited in thesis (it is advisable that the referencing format follows the Harvard Referencing Guide).

Appendices

Supplementary information, such as derivations of mathematical equations, details of survey questionnaires, data tables, figures, detailed statistical analysis etc.

Publications

A list of the publications on this research work, if any.

Remark:

Between Chapters 3 and 6, chapters may be reduced or added to suit the scope and nature of the research work, if necessary.