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UNIVERSITI  
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**FINAL YEAR PROJECT GUIDELINES**  
**FOR**  
**SUPERVISORS AND STUDENTS**

**UNIVERSITI TEKNOLOGI PETRONAS**  
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## **1. INTRODUCTION**

All final year students in UTP are required to undertake a Final Year Project (FYP) course, which is a research / project-based subject. This course is a compulsory element in all programmes offered in UTP.

This course requires students to do research, project and/or development work in their respective discipline, especially on real-world problems which would motivate them to produce practical solutions. It is an opportunity for students to use the tools and techniques of problem-solving to solve the problems they have encountered. With this approach, the learning process is gained through 'by-doing' (practical) experience. Management concepts which provide students with skills required for managing a project are also incorporated. Thus, the students are expected to be well rounded by mastering various useful disciplines, which will enable them to participate and prepare for future employment.

Working under the guidance of a supervisor / supervisors, students may shape the direction of what they want to be, as well as gain better understanding of the responsibilities they have to shoulder when they undertake a research / project. The undertaken research / project can also be used as a basis for job employment by fully exploiting the learning process they have gone through, the skills they have gathered and the experience they have gained from the research / project.

This guideline is prepared for students and supervisors to enable them to execute their respective roles and responsibilities in an effective manner, hence benefiting both parties, in successfully achieving the course learning outcome for the subject. The mapping of Program Outcome / Learning Cluster towards the Course Learning Outcome is given in **Appendix 1.1**.

## **2. PURPOSE**

The purpose of the project is to develop a framework, which will enhance students' skills in the process of applying knowledge, expanding thoughts, solving problems independently and presenting findings through minimum guidance and supervision.

### 3. SCOPE OF WORK

The project can be in the form of laboratory experiments, computer programming, modelling, simulations, analysis and product design. The area and scope of the project should be narrowed down so that the project is feasible and could be completed within the allocated time frame. The project work must exhibit an element of originality and indicates the maturity level for final year bachelor degree programme.

### 4. RESPONSIBILITIES

A team of FYP Committee comprising of the Chairman, FYP Coordinator, Cluster Leaders, Supervisor, Co-supervisor and Panel of Examiners is formed to manage the Final Year Project (**Appendix 1-2**). They should work closely with each other in managing and monitoring students' work progression. It is the responsibility of each party to ensure that the project is completed and delivered within the project time frame. The team responsibilities are as indicated in the *Final Year Project Process Flow* in **Appendix 1-3**.

#### 4.1 FYP Committee

The Chairman of the FYP Committee for each Programme is the respective Department Chair. The Chairman of the FYP Committee is responsible in appointing the FYP Coordinator and the committee members.

4.1.1 The main tasks and responsibilities of the **FYP Coordinator** are as follows:

- (a) To execute the milestone for the managing the final year project as shown in **Appendix 2-1** and **2-2**.
- (b) To identify the students who have registered for the final year project.
- (c) To distribute the *FYP Guidelines* to students and supervisors.
- (d) To plan and manage the final year project process.
- (e) To collect the suggestions of project title proposals from the lecturers, other staff and students. Please refer to **Form 01** in **Appendix 3-1**.
- (f) To submit all project proposals to the FYP Committee for approval and to assign supervisor(s).
- (g) To release the list of approved projects for students' selection.

- (h) To collect the list of project titles selected by students. Please refer to **Form 02** in **Appendix 3-2**.
- (i) To forward **Form 02** to the FYP Committee for approval.
- (j) To release the FYP Committee's decision on project titles and supervisor(s).
- (k) To brief the students and supervisors on the project requirements based on the guidelines.
- (l) To co-ordinate a committee meeting to appoint a panel of examiners.
- (m) To endorse **Form 03** and forward the form to the FYP Committee Chairman for approval to purchase consumables and equipment, technical support, nomination of advisors and other related resources for the project. Please refer to **Form 03** in **Appendix 3-3**.
- (n) To arrange students' oral presentation at the end of the semester.
- (o) To collect the interim report/dissertation final drafts from students and forward it to the examiner for evaluation during oral presentation at the end of the semester.
- (p) To compile the students' assessment marks.
- (q) To collect two (2) hard cover copies and three (3) CD-ROMs of final dissertation from students.
- (r) To compile and retain **Forms 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12, 13** and **14** for at least one year after graduation for auditing purposes.

4.1.2 The tasks of the **FYP Committee Chairman** and **Committee Members** are as follows:

- (a) The Chairman is responsible for all final decisions based on the committee's recommendations.
- (b) To ensure the initial project proposal is relevant to student's field of study.
- (c) To approve project title proposals.
- (d) To assign project supervisor(s).
- (e) To assign project titles to students.
- (f) To appoint Panel of Examiners.

- (g) To endorse final project grades.
- (h) To approve proposal to purchase consumables and equipment, technical support, nomination of advisors and other resources related to projects.

#### **4.2 Supervisor**

Students will be supervised by one main supervisor, who is knowledgeable in the relevant field of expertise. Their responsibilities can be summarised as follows:

- (a) To work together with students until the submission of the final report.
- (b) To assist students on the accessibility of the tools needed for the project.
- (c) To monitor the schedule and progress of the students and their projects.
- (d) To assist and guide students on the project and the preparation interim report and dissertation according to the approved format.
- (e) To assess students' performance, including conducting the continuous assessment. Please refer to **Form 04, 06, 07, 09, 10 and 11** in the Appendix.
- (f) To deliver their part of evaluation. Please refer to grading structure of Table 2 in Section 7.
- (g) To nominate a co-supervisor, if required, and notify the FYP Coordinator.
- (h) To forward a proposal to the FYP Coordinator for endorsement on purchasing of consumables and equipment, technical support, nomination of advisors and other related resources for the project. Please refer to Form 03 in Appendix 3-3.
- (i) To nominate Examiner(s) to FYP Committee.
- (j) To compile and retain all evaluation for at least one year after graduation for auditing purposes.



#### **4.3 Co-Supervisor**

The Co-Supervisor may be nominated by the Supervisor to assist students in very specialized areas. The Co-Supervisor can be internal or external (from outside UTP). The external Co-Supervisor must be officially appointed by the FYP Committee. The Co-Supervisor's responsibility is to guide students in solving specific tasks within his/her expertise as and when necessary within the project time frame. In certain cases, the Co-Supervisor may represent the Supervisor in oral presentations, and evaluate the students' progress and final dissertation.

#### **4.4 Panel of Examiners**

The FYP Committee appoints the Panel of Examiners. The Examiners will function as project evaluators who are responsible to evaluate the oral presentation and dissertation. Refer to **Table 2** in **Section 7**. Examiners will be from the industry while the other will be an internal examiner. If it is not possible to get an External Examiner from the industry, the FYP Committee can appoint another lecturer from the same programme as a replacement.

#### **4.5 Students**

In completing the project, students are required to demonstrate their ability to integrate fundamental knowledge in developing techniques, methods and analyses. Students should take their own initiative by proposing a title for their project. They are also required to work independently through exercising self-discipline, self-management and job co-ordination while undertaking the project. If working in a group, the students are expected to exercise teamwork, co-operation, and trustworthiness to ensure the success of the project.

It is compulsory for students to complete **ALL** assessment processes as follows:

- (a) Proposal Defence
- (b) FYP 1 Interim Report
- (c) Dissertation
- (d) Viva (product demo, where applicable)

Student will be given a grade of F for failing to do so.

Students' responsibilities include the following:

- (a) To select a project topic on their own, or the one suggested by the Supervisor/s.
- (b) To produce a preliminary report which clearly defines the objective(s) and the scope of project work.
- (c) To plan meeting schedules with their Supervisor/s.
- (d) To adhere to the meeting schedule with the Supervisor/s for the purpose of updating their progress and seeking advice on project matters.
- (e) To be responsible in finding alternative solutions for problems encountered such as computer crashes and instrument failure.
- (f) To submit all reports on time with no exception.

## **5. PROJECT PROCESS FLOW**

The *Final Year Project Flow Sheet* is shown in **Appendix 1-3**.

### **5.1 Submission of Titles and Project Synopsis**

- (a) Lecturers will submit project proposals according to their interest and expertise to the FYP Coordinator
- (b) Students are also encouraged to propose their own project proposals based on their interest and experience.
- (c) All proposals must be submitted to the FYP Coordinator for each department using Form 01 as in Appendix 3-1 before the start of the new semester.

### **5.2 Approval on Project Proposal and Assignment of Supervisor/s**

- (a) The FYP Coordinator will forward the list to the FYP committee for approval.
- (b) The project proposal will be reviewed by the FYP Committee to ensure the viability of the project.
- (c) The proposer will be called by the FYP Committee, if any clarification is required.
- (d) Once the project is approved, the FYP Committee will endorse a supervisor for the project.
- (e) The FYP Coordinator will advertise the list of approved projects to the students.

### 5.3 Selection of Project Titles

- (a) Students who do not submit a project proposal or have their proposals rejected by the FYP committee of the department, will have to select **a maximum of three (3) titles** from the given list in any order of preference and submit it to the FYP Coordinator using **Form 02 in Appendix 3-2**.
- (b) The FYP Coordinator will forward the students' selection to the FYP Committee for them to assign approved projects or Supervisors to students.

### 5.4 Allocation of Approved Project Title/ Assigned Supervisors

Students will be informed by the FYP Coordinator on the awarded project or assigned Supervisors.

### 5.5 Approval for Purchase and Usage of Resources and Services

- (a) If required, the Supervisor will forward **Form 03 (Appendix 3-3)** to the FYP Coordinator for the purchase of consumables and equipment, nomination of Advisor(s), request for technical support, visit and other resources related to the project as necessary. The FYP Coordinator or Laboratory Executive will then forward the form to the FYP Chairman for approval.
- (b) For projects involving experimental works, students are required to register with the Laboratory Management Department (LMD). Students are expected to conduct risk assessment, comply with laboratory rules and regulations, and perform good laboratory practices.

### 5.6 Progress Assessment (FYP I and FYP 2)

Progress assessment is a **continuous assessment** carried out by supervisors for student undertaking FYP 1 and FYP 2. It is use to assess the attainment of specific course learning outcome, as well as helping supervisors to monitor the research / project progress of students. Student and Supervisor need to agree on the research / project activities at the start of the research /project work. It is recommended for students to meet their supervisors regularly (at least once every two weeks) in ensuring good research / project work progress.

### 5.7 Proposal Defence (FYP 1)

In this seminar, students should be able to verbally report the progress of their project to the supervisor, fellow students and other lecturers attending the seminar. The seminar is also an avenue for the student to get feedback on how to improve their project. The seminar can be organised in small or large groups. The students need to do the oral presentation to the supervisor and internal examiner as appointed by the FYP Committee. The examiners will evaluate the presentation and submit the marks to the FYP Coordinator using **Form 05 (Appendix 3-5)**. If the students fail to attend the oral presentation, the students will be barred and will not be able to continue the course.

### 5.8 Submission of Interim Report (FYP 1)

Towards the submission, students should be able to:

- (a) Write an abstract of the study
- (b) Identify the problem statement, objective and scope of the study
- (c) Write the literature review
- (d) Explain the methodology to be used in the study
- (e) Plan the deliverables for the whole project (FYP 1 and FYP 2)

The procedures for submission are as follows:

- (a) Students will submit an *Interim Report* to the FYP Coordinator for endorsement prior to submission to the supervisor and internal examiner.
- (b) The supervisor and internal examiner will evaluate the *Interim Report* and submit the marks to the FYP Coordinator using **Form 08** as in **Appendix 3-8**.

### 5.9 Submission of Dissertation (draft final report)

Towards the submission, students should be able to explain in writing about the contents of the project and its significance, the problem statement, objectives, scope, literature review, methodology used, results, conclusions and recommendations.

The procedures for submission are as follows:

- (a) Students are required to submit a *final report* to the Supervisor/s and send a copy to the FYP Coordinator.

- (b) The FYP Coordinator will distribute one copy to the Examiners.
- (c) The Supervisor and Examiners will evaluate the *draft final report* and submit the marks to the FYP Coordinator using **Form 14 as in Appendix 3-14** after the viva.

#### **5.10 Viva (product demo, where applicable)**

In this session, students should be able to:

- (a) Verbally report the outcome of their final year project.
- (b) Demonstrate how well they are able to explain and understand the project that they have been working on.
- (c) Utilize their skills in oral presentation.

The procedures are as follows:

- (a) The Viva evaluation will be conducted (at a scheduled time) using **Form 13 in Appendix 3-13**.
- (b) The Supervisor/s and Examiners will give comments on the *final draft of the report* and the oral presentation of the project.
- (c) Students have to defend their findings in the reports and make necessary amendments as suggested by the Supervisors and Examiners before submitting the *final dissertation*.
- (d) The presentation contents may focus on the following items:
  - Problem Statement
  - Objectives and Scope of Study
  - Literature Review
  - Procedure/Methodology
  - Results and Findings
  - Conclusion and Recommendation
- (e) The Panel of Examiners comprise of the supervisor, an external examiner and an internal examiner.
- (f) The Supervisor and Examiners will evaluate the *viva* and submit the marks to the FYP Coordinator by using **Form 13 as in Appendix 3-13** after the viva.

### **5.11 Submission of Hard-Bound Copy of Project Dissertation**

- (a) Students must submit **two (2) hard-bound copies** and **three (3) softcopies** of the project dissertation in CD-ROM format to the FYP Coordinator.
- (b) Students who fail to submit the hard-bound dissertation will not receive their results transcript from the Examination Unit.

### **5.12 Grading of Project**

- (a) The FYP Coordinator will compile all the marks for the purpose of vetting at department level.
- (b) The FYP Coordinator to obtain endorsement of the FYP results from the FYP Chairman after the vetting of the FYP results with the FYP Committee at department level.
- (c) The FYP Coordinator will submit the endorsed result or grading to the Exam Unit as mentioned in **Section 8**.

## **6. WRITING FORMAT**

The writing of the interim report and dissertation should adhere to the following format. The report consists of many parts arranged in a certain order. It is recommended that the contents be arranged in the following order:

### **6.1 FYP 1 Interim Report**

- (a) Title Page
- (b) Abstract
- (c) Chapter 1: Introduction
  - Background
  - Problem Statement
  - Objectives and Scope of Study
- (d) Chapter 2: Literature Review and/or Theory
- (e) Chapter 3: Methodology/Project Work
- (f) Chapter 4: Conclusion and Future work
- (g) References
- (h) Appendices

## **6.2 Dissertation**

- (a) Title Page
- (b) Certification
- (c) Abstract
- (d) Acknowledgements
- (e) Table of Contents
- (f) List of Figures
- (g) List of Tables
- (h) Abbreviations and Nomenclatures
- (i) Chapter 1: Introduction
  - Background
  - Problem Statement
  - Objectives and Scope of Study
- (j) Chapter 2: Literature Review and/or Theory
- (k) Chapter 3: Methodology/Project Work
- (l) Chapter 4: Results and Discussion
- (m) Chapter 5: Conclusion and Recommendation
- (n) References
- (o) Appendices

## **6.3 General Writing Format**

Students must follow specific guidelines for writing all the reports as indicated in **Section 6**.

- (a) Language

The dissertation must be written in acceptable and formal English. Use the passive voice.
- (b) Font and Spacing

All text should be 1.5 spacing between lines and 3 spacing between paragraphs (Times New Roman regular font-style, size 12) typed on a white A4 paper. Interim report should be in the form of double-sided printing. The hard-bound printed copy of the dissertation should be in the form of single sided printing.

The following however should be single spaced:

  - Tables and figures
  - Computer programs/source codes (must be reduced to font size 8)

(c) Length

The maximum length of the report, excluding appendices is as follows:

Interim Report	20 pages
Dissertation	50 pages

Students are encouraged to use brief and straightforward wordings, use passive voice and avoid using jargon as much as possible.

(d) Pagination

All pages must be numbered in proper sequence from introduction to the end of the report including pages on figures, tables, computer programs and appendices. All front materials are numbered in small Roman numerals (e.g. i, ii, iii). Page numbers appear by themselves and are not to be enclosed in parenthesis, hyphens or other decorative symbols. Page numbers must be positioned at the bottom and must be centred. Please refer to **Appendix 4-1**.

(e) Margin

The top, bottom and right margins are 25 mm except the left margin, which is 40 mm. Please refer to **Appendix 4-1**. All paragraphs should start from the left margin.

(f) Mathematical Equations

Mathematical equations must be spaced out; superscript and subscript must be clearly shown and numbered.

(g) Heading

The report should not have more than three levels of numbered headings as follows:

**1. FIRST-LEVEL HEAD**

**1.1 Second-Level Head**

**1.1.1 Third-Level Head**



All headings should be in Times New Roman and bold. Chapter and major headings should be in capitals and in 14 font size and 12 font size, respectively. Secondary and tertiary headings should be in title case and in 12 font size.

(h) Tables and Figures

Tables and figures are considered part of the report if it is within the main text. If it is of the size that is less than a page, it should be inserted into the text near the point of reference with a 3 spacing from the text. Tables should be on the same page. Margin limits of figures and tables should be the same as the full-page text. All tables and figures should be numbered consecutively. Table heading should be positioned at the top and centred. The numbers for figure should be positioned at the bottom and centred. Please refer to **Appendix 4.2**. Refer to each table or figure clearly in the text before placing it on the page. (For example, “Figure 1 shows ....”)

(i) Documenting Sources

Students are required to cite the sources from which ideas were taken. Please refer to **Appendix 5-1. The documentation system to be used is the American Psychological Association (APA) or International Electrical Electronic Engineering (IEEE) format.**

(j) References

The method of writing references must follow the standard format. The sample reference format is in **Appendix 5-2**. This sample is using the APA and IEEE format.

(k) Title Page

The title page of the *interim report* and *dissertation* should be set out in accordance with the attached sample sheet in **Appendix 6-1** and should include the following:

- The title of the reports/ dissertation.
- The name of the candidate in FULL.

- The degree for which he/she is submitting the reports/ dissertation.
- The semester in which the reports/dissertation is submitted.
- The University name and address.

Students must submit **two (2) hard cover copies** and **three (3) softcopies (CD-ROM)** of their dissertation to the FYP Coordinator. The hard cover colour for each programme is listed in **Table 1**. Please refer to **Appendix 6-2** for the writing format for the front hard cover.

Table 1: Hard cover colour for each Programme

Programme	Colour
Applied Chemistry	Purple
Applied Physics	Purple
Business Management	Navy Blue
Chemical Engineering	Dark Green
Civil Engineering	Black
Computer Engineering	Dark Brown
Electrical and Electronics Engineering	Dark Brown
Information Systems	Dark Blue
Information Technology	Dark Blue
Materials Engineering	Maroon
Mechanical Engineering	Maroon
Petroleum Engineering	Dark Red
Petroleum Geoscience	Dark Green

#### 6.4 General Content

This section will elaborate the general content needed in each part for each report format.

##### (a) Title Page

The title of the report should reflect the focus on core issues of the project work or issued related to it.

(b) Certification

This section is divided into two: certification of approval and certification of originality, as in **Appendix 7-1** and **7-2**. The certification of approval should be signed by the Supervisor after he/she is satisfied with the corrections or amendments done by the student.

(c) Abstract

An abstract is a short version of a report. It covers the report's purpose, scope, methodology, results and conclusion. Abstracts should be no longer than one page as in **Appendix 8-1**.

(d) Acknowledgements

Acknowledgements should include the names of the contributors to the project work, including the supervisors and the members of the group, preferably not more than one page.

(e) Table of Contents

Table of Contents lists all headings and sub-headings, tables, figures, appendices and, bibliography with page numbers. It also includes the certification, abstract and acknowledgement (if applicable). Please refer to the sample in **Appendix 9-1**.

(f) Introduction

The Introduction must include the background of the project, the problem statement, the objective(s) and scope of the study. The Problem statement needs to focus on the situation of the problem and research questions which lead to the objective(s) of the study. Students are required to clarify the boundary of the project work to ensure its feasibility within the given time frame.

(g) Literature Review and/or Theory

The Literature Review is the analytical, critical and objective review of written materials on the chosen topic and area. It provides the background information on the research question and identifies what others have said and/or discovered about the

question. It contains all relevant theories, hypotheses, facts and data which are relevant to the objective and findings of the project.

(h) Methodology/Project Work

The Methodology refers to methods/procedures used by the student to achieve the objective(s) of the project. The methods/procedures must be relevant and acceptable.

(i) Results and Discussion

This section presents the findings or outcomes of the project work. All gathered data from the project work must be presented in the form of tables and figures such as graphs, diagrams or appropriate formats. The data needs to be analysed, and the results need to be discussed.

(j) Conclusion and Recommendation

The Conclusion highlights the most significant findings in relation to the objective(s) of the project. This section should also include recommendations for future project work.

(k) References

This section is the list of references used in the project. The method of writing references must follow the standard format. Please refer to the sample reference format in **Appendix 5-2**.

(l) Appendices

Lengthy calculations, figures, raw data, computer programs/source codes, outputs, etc. are to be enclosed as appendices. They should be titled and numbered in chronological order and capital letters. The appendices and their titles need to be listed in the Table of Contents. Provide title for each appendix, for example “Appendix 1. Questionnaire Sample”.

## 7. Evaluation

Students are evaluated based on their capability in undertaking the project, producing the written report and presenting the results. Overall commitment, as well as personal conduct, is also to be observed at all times. The main components of evaluation and the grading structure are given in **Table 2.1** and **Table 2.2**.

**Table 2.1: Grading Structure for FYP 1**

<b>Assessment (FoE &amp; FSIT)</b>	<b>Assessment Contribution (%)</b>	
	<b>Supervisor</b>	<b>Panel of Examiner(s)</b>
Progress assessment 1	10	-
Proposal defence	10	20
Progress assessment 2	10	-
FYP 1 Interim Report	20	30
<b>Total</b>	<b>50</b>	<b>50</b>

**Table 2.2: Grading Structure for FYP 2**

<b>Assessment</b>	<b>Assessment Contribution (%)</b>	
	<b>Supervisor</b>	<b>Panel of Examiner(s)</b>
Progress assessment 1	10	-
Progress assessment 2	10	-
Viva (product demo, where applicable)	10	20
Dissertation	20	30
<b>Total</b>	<b>50</b>	<b>50</b>

## 8. GRADING SCHEME

Students will be graded according to the UTP grading scheme as in **Table 3**.

**Table 3: UTP Grading Scheme**

Score	Grade	Point
85 – 100	A	4.0
80 – 84.9	A-	3.75
75 – 79.9	B+	3.5
65 -74.9	B	3.0
55 – 64.9	C+	2.5
50 – 54.9	C	2.0
45 – 49.9	D+	1.5
40 – 44.9	D	1.0
0 - 39.9	F	0.0

## 9. CLAIMS

Students are entitled to final year project claims of RM 500 (for both FYPI and FYPII) for the following items.

- (a) Consumables and equipment
- (b) Testing/technical support
- (c) Consultation or other support
- (d) Travel/visit for data requisition (with the most economical mode of travel)
- (e) Procurement of data

\* Students are not entitled to claim for the cost of printing hard-bound thesis

All claims shall be submitted using **Form 03** to the Supervisor, requires support from the FYP Coordinator and must be endorsed by the FYP Chairman.

## **10. PLAGIARISM**

Plagiarism is the act of obtaining or attempting to obtain credit for academic work by representing the work of another as one's own without the necessary and appropriate acknowledgment. More specifically, plagiarism is:

- (a) The act of incorporating the ideas, words of sentences, paragraphs, or parts thereof without appropriate acknowledgment and representing the product as one's own work; and
- (b) The act of representing another's intellectual work such as musical composition, computer program, photographs, painting, drawing, sculpture, or research or the likes as one's own.

*(Source: [www.sonoma.edu/uaffairs/policies/cheatingpolicy.htm](http://www.sonoma.edu/uaffairs/policies/cheatingpolicy.htm))*

If a student is in doubt of the nature of plagiarism, he/she should discuss the matter with the supervisor. If a student is caught committing plagiarism, stern action will be taken against the student. This includes the student being given zero marks for the particular assessment in FYPI. However, for FYPII, the student will be given a grade of F.

## **11. COPYRIGHT**

The university shall be the owner for all findings, designs, patents, and other intellectual property rights.

### MAPPING OF SUBJECT – PROGRAM OUTCOME, COURSE LEARNING OUTCOME AND ASSESSMENT TOOLS FOR FYP1 AND FYP2

#### Faculty of Engineering

PO	PO1 (C)	PO2 (C)	PO3 (C)	PO4 (P)	PO5 (C)	PO6 (A)	PO7 (A)	PO8 (A)	PO9 (A)	PO10 (A)	PO11 (A)	PO12 (A)
FYP 1		X						X		X		X
FYP 2				X	X			X		X	X	

	FYP 1	PO2 (C)	PO8 (A)	PO10 (A)	PO12 (A)	Assessment Tools
CLO1	Formulate research problem through critical literature review				X	Progress assessment 1
CLO2	Propose appropriate methodology to solve the research problem	X				Interim Report
CLO3	Communicate the proposed research project through effective presentation and report			X		Proposal Defense, Interim Report
CLO4	Adapt to professional and ethical responsibilities in research work undertaking		X			Progress assessment 2

	FYP 2	PO4 (P)	PO5 (C)	PO8 (A)	PO10 (A)	PO11 (A)	Assessment Tools
CLO1	Analyse and interpret data using appropriate techniques / tools to solve complex research problems with understanding of its limitation	X	X				Dissertation
CLO2	Adapt to professional and ethical responsibilities in research work undertaking			X			Progress assessment 1
CLO3	Communicate effectively in verbal & written form in reporting the research outcome				X		Viva, Dissertation
CLO4	Undertake research / project management effectively					X	Progress assessment 2



## MAPPING OF SUBJECT – PROGRAM OUTCOME, COURSE LEARNING OUTCOME AND ASSESSMENT TOOLS FOR FYP1 AND FYP2

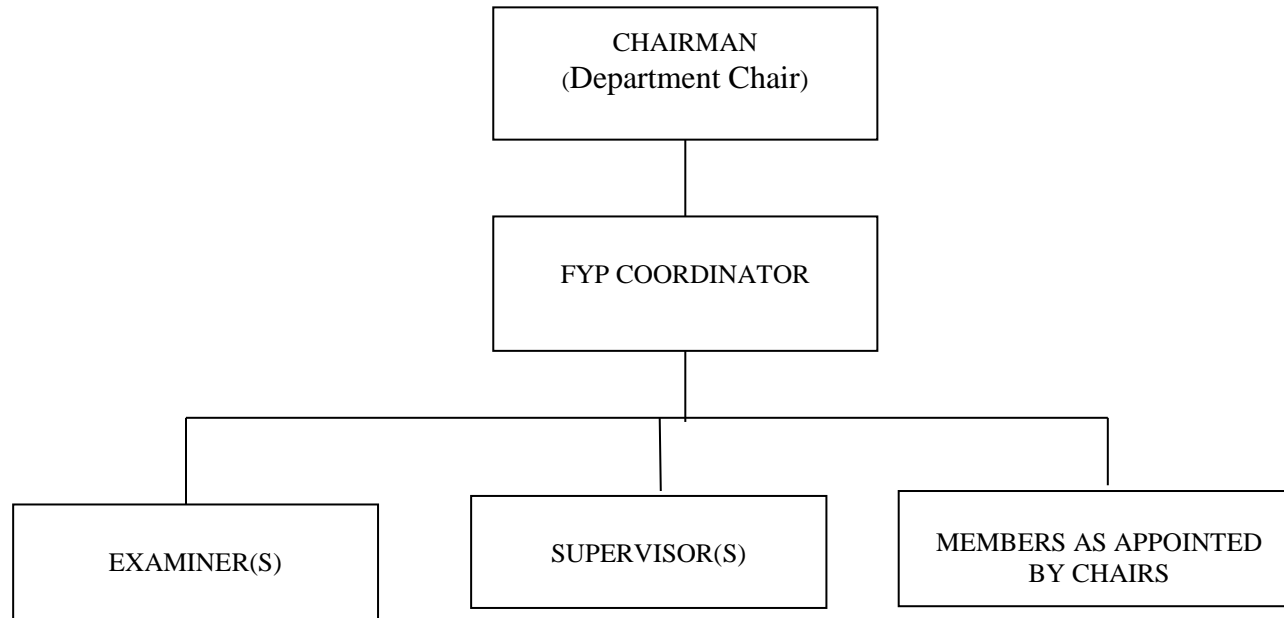
### Faculty of Science and Information Technology

PO (Cluster)	1 (C)	2(C)	3a (P)	3b+c (A)	3d+e (C)	3f (A)	4(A)	5 (A)
FYP 1		X		X			X	X
FYP 2			X	X	X		X	X

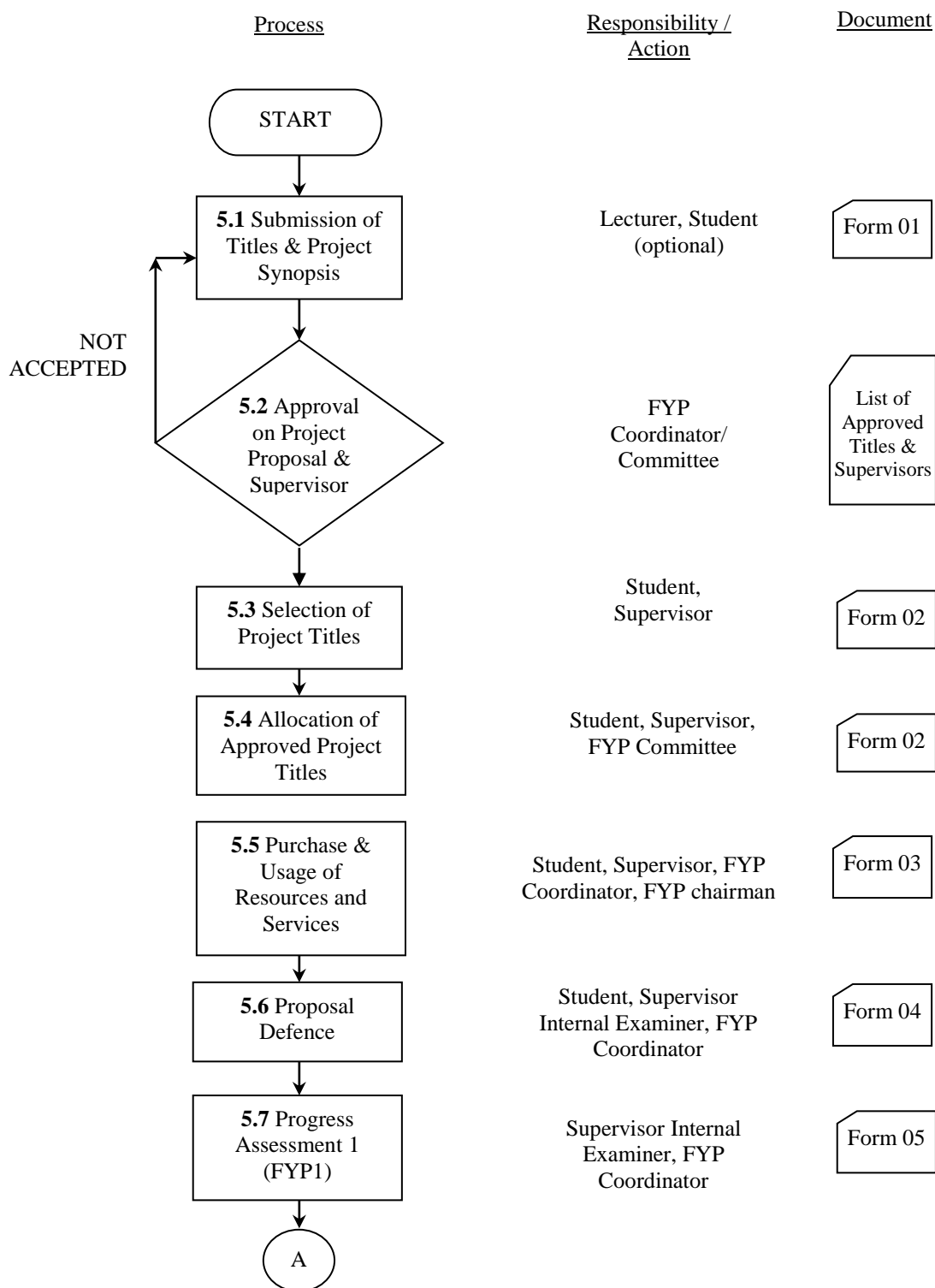
FYP 1		PO (Cluster)				Assessment Tools
		2 (C)	3b+c (A)	4(A)	5 (A)	
CLO1	Formulate research / project problem through critical literature review			X		Progress assessment 1
CLO2	Propose appropriate methodology / conceptual framework for the research / project	X				Interim Report
CLO3	Communicate the proposed research / project through effective presentation and report		X			Proposal Defense, Interim Report
CLO4	Adapt to professional work ethic and practices in research / project work undertaking				X	Progress assessment 2

FYP 2		PO (Cluster)					Assessment Tools
		3d+e (C)	3a (P)	3b+c (A)	4(A)	5 (A)	
CLO1	Analyse and interpret data using appropriate techniques / tools to solve the identified research / project problem with understanding of its limitation	X	X				Dissertation
CLO2	Adapt to professional and ethical responsibilities in research / project work undertaking					X	Progress assessment 1
CLO3	Communicate effectively in verbal & written form in reporting the research / project outcome			X			Viva, Dissertation
CLO4	Undertake research / project management effectively				X		Progress assessment 2

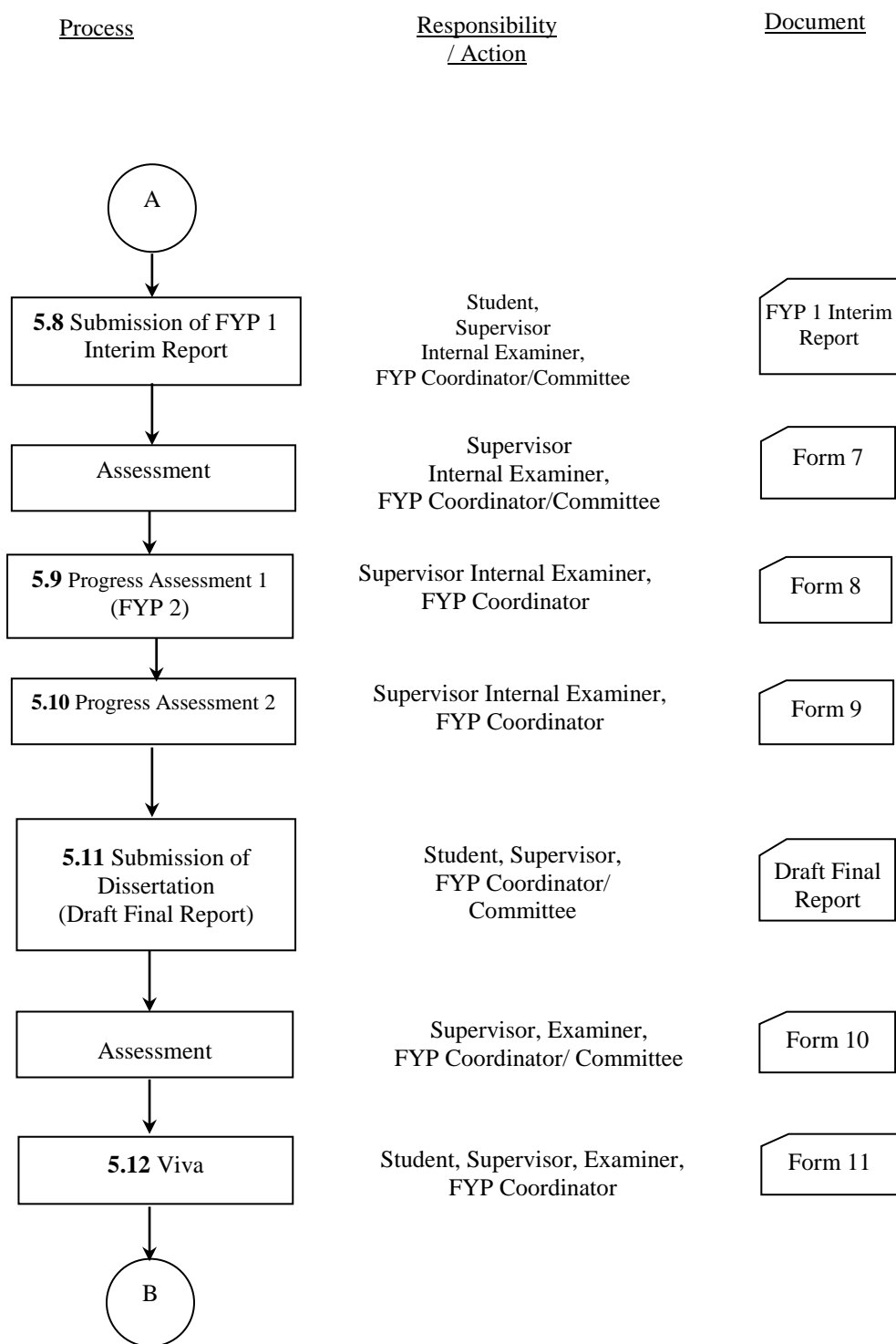
### Organisation Chart for FYP Committee



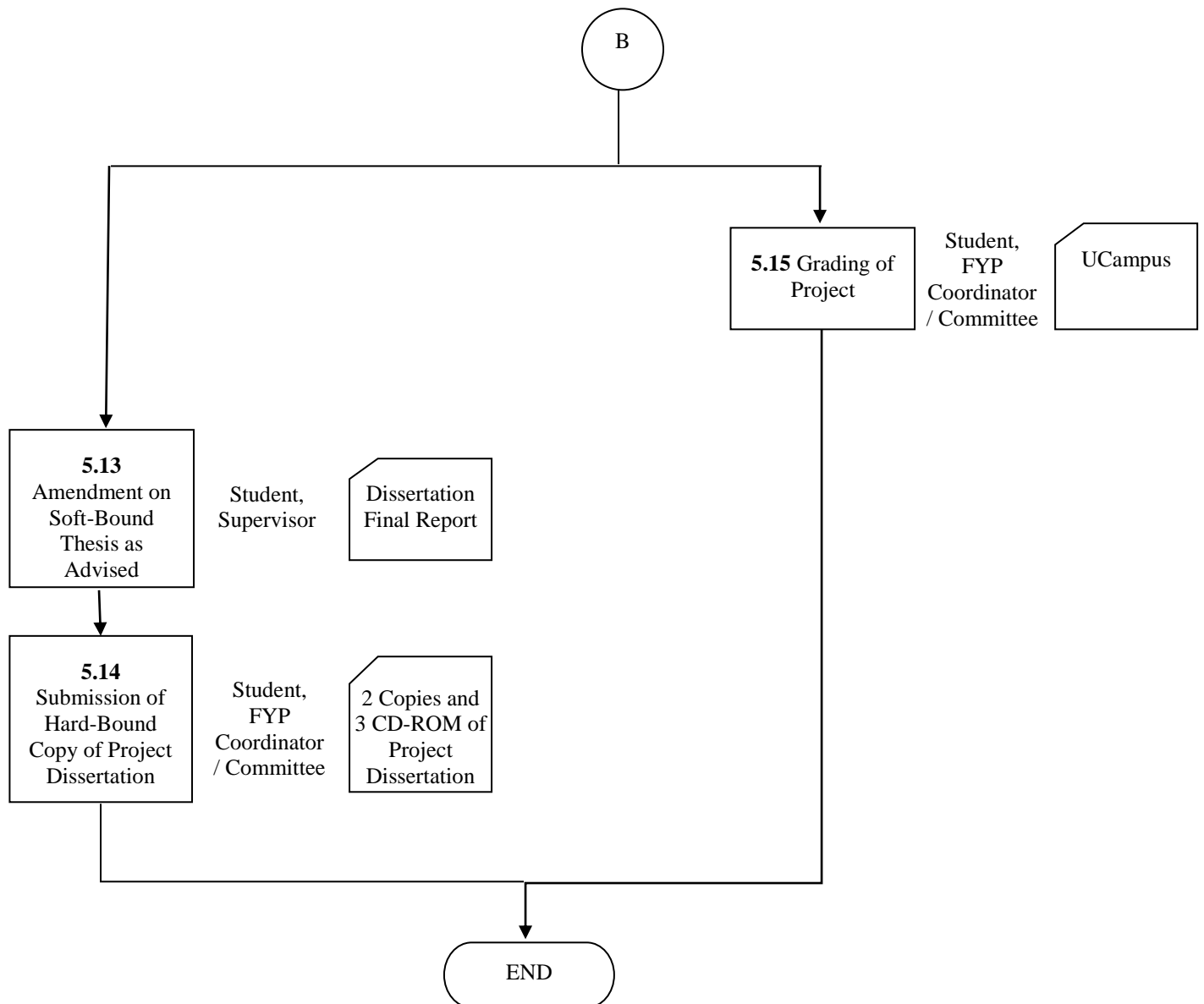
## FINAL YEAR PROJECT FLOW PROCESS



## FINAL YEAR PROJECT FLOW PROCESS



## FINAL YEAR PROJECT FLOW PROCESS



## Timelines for FYP 1

No.	Detail/ Week	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Selection of Project Topic															
2	Preliminary Research Work															
3	<i>Submission of Progress assessment 1 (SV)</i>															
4	Proposal Defence															
5	Submission of Interim Draft Report															
6	<i>Submission of Progress assessment 2 (SV)</i>															
7	Submission of Interim Report															



Suggested milestone





Process

## Note:

- The process of topic selection should start prior to semester commencement. Topics should be finalised and assigned latest by Week 1 of the semester.
- Item 3 and Item 6 is a continuous assessment by SV. Submission of Progress Assessment 1 & 2 is an action item for SV.

## Timelines for FYP 2

No.	Detail/ Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Project Work Continues															
2	Submission of <i>Progress assessment 1</i>															
3	Submission of Draft Dissertation															
4	Submission of Dissertation (soft bound)															
5	Viva															
6	Submission of <i>Progress assessment 2</i>															
7	Submission of Project Dissertation (Hard Bound)															

 Suggested milestone  
 Process

## Note:

- Item 2 and Item 6 is a continuous assessment by SV. Submission of Progress Assessment 1 & 2 is an action item for SV.
- Draft thesis as formative assessment, a pre-requisite to submit final thesis. Failure to submit draft means students will be bar from submitting final thesis.



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**FORM 01A****FINAL YEAR PROJECT TITLE PROPOSAL**

Project Title: \_\_\_\_\_

Proposer's Name : \_\_\_\_\_ Student ID: \_\_\_\_\_

Proposer's e-mail address: \_\_\_\_\_ H/P No: \_\_\_\_\_

CGPA: \_\_\_\_\_ Total Credit Hours This Semester: \_\_\_\_\_

Area / specialization: \_\_\_\_\_

Suggested supervisor (if any) : \_\_\_\_\_

Collaborator(s) (if any) : \_\_\_\_\_

Problem Statement:

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Objectives:

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Pre-requisite (if any):

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Short summary of the research project:

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Tools/equipment required:

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**FORM 01B****FINAL YEAR PROJECT TITLE PROPOSAL**

Project Title:

Supervisor Name : \_\_\_\_\_

Area / specialization: \_\_\_\_\_

Collaborator(s) (if any) : \_\_\_\_\_

Co-Supervisor (s) (if any) : \_\_\_\_\_

Project Background :

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Problem Statement:

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Objectives:

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Tools/equipment required:

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Project Deliverables:

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Doc. Ref. No.	Issue Version	Date
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**FORM 02****TOPIC SELECTION**

(To be completed by student in 2 copies.)

Semester : \_\_\_\_\_ Year: \_\_\_\_\_

Name : \_\_\_\_\_

Student No : \_\_\_\_\_ Programme: \_\_\_\_\_

List of topic chosen (ranking in order of preference):

	Proj. No.	Proj. Title	Supervisor
1			
2			
3			

Justification for the chosen topics:

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Students should return this form at least one week before the start of the semester to the respective department Final Year Project Coordinator

**COMMITTEE DECISION**

Topic approved: \_\_\_\_\_

Approved by FYP Coordinator (only for Supervisor-allocated titles)	
<b>Signature:</b>	
<b>Official stamp:</b>	
<b>Date:</b>	

## FINAL YEAR PROJECT REQUISITION FORM

REQUESTED BY	
Supervisor's Name	
Project Title	
Supervisor's Signature	
Student's Name	
Date	

No.	Description	Purpose	Quantity	Estimated Cost

ENDORSEMENT BY CO-ORDINATOR/ LABORATORY EXECUTIVE		APPROVAL BY COMMITTEE CHAIRMAN	
Name		Name	
Programme		Programme	
Signature		Signature	
Date		Date	
Comment:		Approval <div> <input type="checkbox"/> Approve             <input type="checkbox"/> Not Approve           </div> Comment:	

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**APPENDIX 3-4**

**FORM 04**

## FYP I – PROGRESS ASSESSMENT 1

(To be completed by Supervisor)

Student's Name : \_\_\_\_\_ Student's ID: \_\_\_\_\_ Programme : \_\_\_\_\_

Project Title : \_\_\_\_\_

Evaluation criteria	Very Weak (1)	Weak (2)	Fair (3)	Good (4)	Very Good (5)	Multiplier	Marks
<b>Interest</b>	Lack of interest in exploring issues for a given task	Demonstrate limited interest in exploring issues for a given task	Demonstrate moderate interest in exploring issues for a given task	Demonstrate good interest in exploring issues for a given task	Demonstrate excellent interest in exploring issues for a given task	<b>x 1</b>	
<b>Initiative</b>	Lack of initiative to complete a task	Demonstrate limited initiative to complete a task	Demonstrate moderate initiative to complete a task	Demonstrate good initiative to complete a task	Demonstrate excellent initiative to complete a task	<b>x 1</b>	
<b>Effort</b>	Lack of effort to complete task	Minimal effort to complete task	Moderate effort to complete task	Good effort to complete task	Excellent effort to complete task	<b>x 1</b>	
<b>Self-Learning</b>	<ul style="list-style-type: none"> <li>Not able to self-learn</li> <li>Did not understand project and lack of self-initiative in handling and planning the task for the project</li> </ul>	<ul style="list-style-type: none"> <li>Limited ability to self-learn</li> <li>Have low understanding on the project and show minimal self-initiative in handling and planning of the tasks for the project</li> </ul>	<ul style="list-style-type: none"> <li>Moderate ability to self-learn</li> <li>Understood some part of the project and show moderate self-initiative in handling and planning of the tasks for the project</li> </ul>	<ul style="list-style-type: none"> <li>Good ability to self-learn</li> <li>Understood most part of the project and show good self-initiative in handling and planning of the tasks for the project</li> </ul>	<ul style="list-style-type: none"> <li>Excellent ability to self-learn</li> <li>Understood the project well and show excellent self-initiative in handling and planning of the tasks for the project</li> </ul>	<b>x 1</b>	
<b>Total marks</b>							<b>/ 20</b>

Comments:

\_\_\_\_\_

.....

Supervisor signature

Name: \_\_\_\_\_

Date: \_\_\_\_\_



## FYP I – PROPOSAL DEFENCE

(To be completed by Supervisor/ Examiner)

Student's Name : \_\_\_\_\_ Student's ID: \_\_\_\_\_ Programme : \_\_\_\_\_

Project Title : \_\_\_\_\_

Evaluation criteria	Very Weak (1)	Weak (2)	Fair (3)	Good (4)	Very Good (5)	Multiplier	Marks
<b>Subject knowledge and content</b>	Not able to present research ideas* and its implementation clearly and require major improvements	Able to present research ideas* and its implementation with limited clarity and require further improvements	Able to present research ideas* and implementation fairly clearly and require minor improvements	Able to present the research ideas* professionally and clearly, with some concern on its implementation	Able to present the research ideas* and its implementation professionally and clearly, showing mastery of the materials.	<b>x 5</b>	
<b>Confident delivery of research ideas</b>	Not able to deliver research ideas confidently, with poor language choice and frequent use of filler words	Able to deliver research ideas with limited confidence and occasional use of filler word, thus requiring major improvements	Able to deliver research ideas with fair confidence, with little use of filler words, and require minor improvements	Able to deliver research ideas confidently, with good language choice and tone	Able to deliver research ideas with excellent confidence	<b>x 1</b>	
<b>Effective and articulate delivery of research ideas</b>	Not able to deliver research ideas effectively	Able to deliver research ideas with limited effect and require major improvements	Able to deliver research ideas fairly effectively and require minor improvements	Able to deliver research ideas effectively and articulately	Able to deliver research ideas with great effect and articulate	<b>x 1</b>	
<b>Use of visual aids and supportive materials</b>	Not able to use visual aids / supporting materials effectively (disorganised slides, unreadable materials)	Able to use visual aids / supporting materials with minimum impact, requiring major improvement	Able to use visual aids / supporting materials that shows general understanding of the research ideas	Able to use visual aids / supporting materials that shows enhanced understanding of the research ideas.	Able to use visual aids / supporting materials that significantly support the research ideas and shows excellent understanding on the research ideas	<b>x 1</b>	



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APPENDIX 3-5

FORM 05

## FYP I – PROPOSAL DEFENCE

Evaluation criteria	Very Weak (1)	Weak (2)	Fair (3)	Good (4)	Very Good (5)	Multiplier	Marks
Response to questions	Not able to understand and respond to a question	Able to understand and answer questions but not able to accurately answer the question	Able to understand and answer questions satisfactorily	Able to understand and answer questions well	Able to fully understand and responds to questions extremely well	x 1	
Total marks							/ 45

Comments:

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Supervisor/ Examiner signature

Name: \_\_\_\_\_

Date: \_\_\_\_\_



## FYP I – PROGRESS ASSESSMENT 2

(To be completed by Supervisor/ Examiner)

Student's Name : \_\_\_\_\_ Student's ID: \_\_\_\_\_ Programme : \_\_\_\_\_

Project Title : \_\_\_\_\_

Evaluation criteria	Very Weak (1)	Weak (2)	Fair (3)	Good (4)	Very Good (5)	Multiplier	Marks
Work Ethics	Practice inappropriate working culture such as bad behavior, no punctuality as well as not being efficient, productive and ethical at work in all situations	Practice less appropriate working culture such as inconsistent behavior, less punctuality as well as being less efficient, productive and ethical at work in many situations	Practice good working culture such as good moral, timeliness as well as being efficient, productive and ethical at work in general	Practice good working culture such as good moral, timeliness as well as being efficient, productive and ethical at work in most situations	Always practice excellent working culture such as good moral, timeliness as well as being efficient, productive and ethical at work in all situations	x 1	
Integrity	Perform a task with lack of trust, honesty, sincerity and transparency	Perform a task with limited trust, honesty, sincerity and transparency	Perform a task with acceptable trust, honesty, sincerity and transparency	Perform a task with trust, honesty, sincerity and transparency in most situations	Always perform a task with trust, honesty, sincerity and transparency in any situation	x 1	
Work Responsibility	Does not perform assigned tasks within the scope of work even with close supervision	Perform assigned tasks within the scope of work with close supervision	Perform assigned tasks within the scope of work and meet expectation	Perform assigned tasks within the scope of work and exceed expectation	Perform assigned tasks beyond the scope of work and exceed expectation	x 1	
Total marks							/ 15

Comments:

\_\_\_\_\_  
\_\_\_\_\_

.....  
Supervisor

Name: \_\_\_\_\_

Date: \_\_\_\_\_



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**APPENDIX 3-7**  
**FORM 07**

**FYP I – PROGRESS MONITORING (To be used together with Form 06)**

*(To be completed by Supervisor/ Examiner)*

Student's Name : \_\_\_\_\_ Student's ID: \_\_\_\_\_ Programme : \_\_\_\_\_

Project Title : \_\_\_\_\_

**PROGRESS MONITORING REPORT**

Project title			
Student Name		Student ID	
Supervisor Name		Program	

**A. PROJECT STATUS**

No.	Task / Milestone	Progress status					
		Progress Meeting 1	Progress Meeting 2	Progress Meeting 3	Progress Meeting 4	Progress Meeting 5	Progress Meeting 6





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APPENDIX 3-7

FORM 07

## FYP I – PROGRESS MONITORING (To be used together with Form 06)

**B. RISK MANAGEMENT – Please list the identified risk that will delay the project progress, and its mitigation plan.**

Student Signature:

Date:

Comments:

.....  
Supervisor signature

Name: \_\_\_\_\_

Date: \_\_\_\_\_



## FYP I – INTERIM REPORT

(To be completed by Supervisor/ Examiner)

Student's Name : \_\_\_\_\_ Student's ID: \_\_\_\_\_ Programme : \_\_\_\_\_

Project Title : \_\_\_\_\_

### PART A

Evaluation criteria		Very Weak (1)	Weak (2)	Fair (3)	Good (4)	Very Good (5)	Multiplier	Marks
INTRODUCTION (20)	ABSTRACT (5)	<ul style="list-style-type: none"> <li>Problem statement</li> <li>Objective</li> <li>Methodology</li> <li>Future work</li> </ul> <p>Abstract is irrelevant and does not provide the summary of the whole project</p>	Abstract is relevant but did not include some of the elements stated	Abstract is relevant, and include all elements, however, is vague and fail to highlight appropriate details about the research	Abstract is relevant, include all elements, and highlight appropriate details about the research.	Abstract is relevant, clear and concise description of all elements, highlighting the importance of the research.	x 1	
	Background of Study and problem statement	Irrelevant background of study and problem statement	Background of study is partially relevant, and unclear problem statement	Background of study is sufficient to highlight the research work, however, problem statement is generic and unclear	Good background of study that shows connection to the problem statement. Problem statement is clearly presented.	Well written, articulate and concise background of study that justifies the problem statement. Problem statement is clearly presented.	x 2	
	Objective	Research objectives irrelevant to the problem statement. Unachievable within the time frame	Research objectives are unclear and partially relevant to the problem statement. Unachievable within the time frame	Research objectives are clear, however, partially relevant to problem statement. Achievable within the time frame	Research objectives are clear, relevant to problem statement and achievable within the time frame	Research objectives are clearly stated and justified towards answering the problem statement, and achievable within the time frame	x 1	
	Scope of Study, including relevancy and feasibility	Scope of Study are irrelevant to research objectives	Scope of Study are partially relevant to research objectives	Scope of Study are relevant to research objectives but poorly described	Scope of Study are relevant to research objectives and fairly described	Scope of Study are relevant to research objective and clearly stated, highlighting the feasibility of the work within the time frame	x 1	

## FYP I – INTERIM REPORT

Evaluation criteria		Very Weak (1)	Weak (2)	Fair (3)	Good (4)	Very Good (5)	Multiplier	Marks
CONCLUSION (10)	Summary of project progress and future work	Insufficient conclusion and irrelevant with objective. No future work recommended	Insufficient conclusion and irrelevant with objective. Insufficient future work recommended	Sufficient conclusion and sufficiently relevant with objective. Sufficient future work recommended	Provide good conclusion and recommendation for future work, relevant to the objective.	Provide excellent conclusion that is comprehensive, and recommended future work is relevant to objective.	x 2	

### PART B

Evaluation criteria		Very Weak (1)	Weak (2)	Fair (3)	Good (4)	Very Good (5)	Multiplier	Marks
ORGANISATION AND CLARITY (15)	Standard Guidelines and formatting	Report does not follow the standard guidelines and formatting	Report that has frequent major mistakes with the standard guidelines and format	Report that has frequent minor mistakes with the standard guidelines and format	Report that has some mistakes with the standard guidelines and format	Report that complies with the standard guidelines and format	x 1	
	English usage and writing skills (writing skills refers to clear, coherent and systematic writing of ideas)	Very poor English and writing skills.	Poor English and writing skills with many spelling and grammar mistake	Fair English and writing skills with noticeable spelling and grammar mistake	Good English and writing skills with minimal spelling or grammar mistake	Excellent English and writing skills with no spelling or grammar mistakes	x 1	
	Referencing and citations	Most reference are missing from reference list and did not follow style guide	Many reference are missing from reference list and did not follow style guide	Some reference are missing from reference list and / or most did not follow style guide	Most references are cited in the reference list, which follow the style guide	All references are cited in the reference list, which follow the style guide	x 1	
	Total marks							/ 100

Comments:

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Examiner signature

Name: \_\_\_\_\_

Date: \_\_\_\_\_



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APPENDIX 3-9

FORM 09

## FYP II – PROGRESS ASSESSMENT 1

(To be completed by Supervisor)

Student's Name : \_\_\_\_\_ Student's ID: \_\_\_\_\_ Programme : \_\_\_\_\_

Project Title : \_\_\_\_\_

Evaluation criteria	Very Weak (1)	Weak (2)	Fair (3)	Good (4)	Very Good (5)	Multiplier	Marks
Work Ethics	Practice inappropriate working culture such as bad behavior, no punctuality as well as not being efficient, productive and ethical at work in all situations	Practice less appropriate working culture such as inconsistent behavior, less punctuality as well as being less efficient, productive and ethical at work in many situations	Practice good working culture such as good moral, timeliness as well as being efficient, productive and ethical at work in general	Practice good working culture such as good moral, timeliness as well as being efficient, productive and ethical at work in most situations	Always practice excellent working culture such as good moral, timeliness as well as being efficient, productive and ethical at work in all situations	x 1	
Integrity	Perform a task with lack of trust, honesty, sincerity and transparency	Perform a task with limited trust, honesty, sincerity and transparency	Perform a task with acceptable trust, honesty, sincerity and transparency	Perform a task with trust, honesty, sincerity and transparency in most situations	Always perform a task with trust, honesty, sincerity and transparency in any situation	x 1	
Work Responsibility	Does not perform assigned tasks within the scope of work even with close supervision	Perform assigned tasks within the scope of work with close supervision	Perform assigned tasks within the scope of work and meet expectation	Perform assigned tasks within the scope of work and exceed expectation	Perform assigned tasks beyond the scope of work and exceed expectation	x 1	
Total marks							/ 15

Comments:

.....  
Supervisor signature

Name: \_\_\_\_\_

Date: \_\_\_\_\_



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APPENDIX 3-10

FORM 10

## FYP II – PROGRESS ASSESSMENT 2

(To be completed by Supervisor)

Student's Name : \_\_\_\_\_ Student's ID: \_\_\_\_\_ Programme : \_\_\_\_\_

Project Title : \_\_\_\_\_

Evaluation criteria		Very Weak (1)	Weak (2)	Fair (3)	Good (4)	Very Good (5)	Multiplier	Marks
PROJECT MANAGEMENT	Progress discussion and time management	<ul style="list-style-type: none"> <li>Meet supervisor less than 4 times during the semester</li> <li>Never show any improvement on research / project progress during discussion with supervisor</li> <li>Always late for meeting</li> </ul>	<ul style="list-style-type: none"> <li>Meet supervisor less than 4 times during the semester</li> <li>Shows very little improvement on research / project progress during discussion with supervisor</li> <li>Almost always late for meeting</li> </ul>	<ul style="list-style-type: none"> <li>Meet supervisor at least 5 times during the semester</li> <li>Shows moderate improvement on research / project progress during discussion with supervisor</li> <li>Sometimes late for meeting</li> </ul>	<ul style="list-style-type: none"> <li>Student meet supervisor at least 7 times during the semester</li> <li>Student shows improvement as per project timeline on research / project progress during discussion with supervisor</li> <li>Punctual most of the time</li> </ul>	<ul style="list-style-type: none"> <li>Student meet supervisor more than 7 times during the semester</li> <li>Student shows improvement as per project timeline as well as able to constructively discuss the research / project progress the during discussion with supervisor</li> <li>Always punctual</li> </ul>	X 2	

## FYP II – PROGRESS ASSESSMENT 2

Evaluation criteria		Very Weak (1)	Weak (2)	Fair (3)	Good (4)	Very Good (5)	Multiplier	Marks
PROJECT MANAGEMENT	Project implementation	<ul style="list-style-type: none"> <li>Research / project work does not follow the proposed methodology</li> <li>Less than 20% key milestone achieved within timeline</li> </ul>	<ul style="list-style-type: none"> <li>Research / project work follows the proposed methodology with major modification</li> <li>40% key milestone achieved within timeline</li> </ul>	<ul style="list-style-type: none"> <li>Research / project work follows the proposed methodology with minor modification</li> <li>60% key milestone achieved within timeline</li> </ul>	<ul style="list-style-type: none"> <li>Research / project work follows the proposed methodology</li> <li>80% of key milestone achieved within timeline</li> </ul>	<ul style="list-style-type: none"> <li>Research / project work follows the proposed methodology</li> <li>All key milestone achieved within timeline</li> </ul>	X 1	
	Risk Management	Unable to identify any risk that may delay the project completion	Risk identified, but no action taken to mitigate risk	Risk identified, and 50% of risk are mitigated	Risk identified, and 80% of risk are mitigated	Risk identified, and all risk are mitigated	X 1	
TOTAL MARKS								/ 20

Comments:

.....  
Supervisor signature

Name: \_\_\_\_\_

Date: \_\_\_\_\_



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**APPENDIX 3-11**  
**FORM 11**

**FYP II – PROGRESS MONITORING (To be used together with Form 09 & Form 10)**

*(To be completed by Supervisor)*

Student's Name : \_\_\_\_\_ Student's ID: \_\_\_\_\_ Programme : \_\_\_\_\_

Project Title : \_\_\_\_\_

**PROGRESS MONITORING REPORT**

Project title			
Student Name		Student ID	
Supervisor Name		Program	

**A. PROJECT STATUS**

No.	Task / Milestone	Progress status					
		Progress Meeting 1	Progress Meeting 2	Progress Meeting 3	Progress Meeting 4	Progress Meeting 5	Progress Meeting 6

**FYP II – PROGRESS MONITORING (To be used together with Form 09 & Form 10)**

**B. RISK MANAGEMENT – Please list the identified risk that will delay the project progress, and its mitigation plan.**

Student Signature:  
Date:

Comments:

.....  
Supervisor signature

Name: \_\_\_\_\_

Date: \_\_\_\_\_





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UTP-ACA-PROG-FYP-01.12	6.0	Sept 2019

APPENDIX 3-12

FORM 12

## FYP II – PRACTICAL SKILLS (FOR FACULTY OF SCIENCE & INFORMATION TECHNOLOGY ONLY)

(To be completed by Supervisor)

Student's Name : \_\_\_\_\_ Student's ID: \_\_\_\_\_ Programme : \_\_\_\_\_

Project Title : \_\_\_\_\_

Evaluation criteria		Very Weak (1)	Weak (2)	Fair (3)	Good (4)	Very Good (5)	Multiplier	Marks
PRACTICAL SKILLS	Originality	Lack of original idea to solve the research problem	Weak idea to solve the research problem	Moderate idea to solve the research problem	Good original idea to solve the research problem	Excellent new and original idea to solve the research problem	X 1	
	Critical observation	Lack of attention to research activities	Limited attention to research activities	Moderate attention to research activities	Good attention to research activities	Mindful of research activities	X 1	
	Critical thinking	Lack of analysis of results to form conclusions	Limited analysis of results to form conclusions	Moderate analysis of results to form conclusions	Acceptable analysis of results to form conclusions	Clear and extensive analysis of results to form conclusions	X 1	
	Curiosity	Lack of curiosity/motivation to complete the project	Demonstrate limited curiosity/motivation to complete the project	Moderate curiosity/motivation to complete the project	Good curiosity/motivation in completing the project	Excellent curiosity/motivation in completing the project	X 1	
TOTAL SCORE								/ 20

Comments:

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.....  
Supervisor signature

Name: \_\_\_\_\_

Date: \_\_\_\_\_



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APPENDIX 3-13

FORM 13

## FYP II – VIVA

(To be completed by Supervisor/ Examiner)

Student's Name : \_\_\_\_\_ Student's ID: \_\_\_\_\_ Programme : \_\_\_\_\_

Project Title : \_\_\_\_\_

Evaluation criteria	Very Weak (1)	Weak (2)	Fair (3)	Good (4)	Very Good (5)	Multiplier	Mark
Subject knowledge and content	<ul style="list-style-type: none"> <li>Not able to present research outcome* clearly</li> <li>Presentation contains multiple fact errors, some are major in nature</li> </ul>	<ul style="list-style-type: none"> <li>Able to present research outcome* with limited clarity</li> <li>Presentation contains multiple fact errors</li> </ul>	<ul style="list-style-type: none"> <li>Able to present research outcome* fairly clearly</li> <li>Presentation contains minimal fact errors</li> </ul>	<ul style="list-style-type: none"> <li>Able to present the research outcome* professionally and clearly</li> <li>Major facts are accurate</li> </ul>	<ul style="list-style-type: none"> <li>Able to present the research outcome* professionally and clearly, showing mastery of the materials.</li> <li>Facts presented are accurate</li> </ul>	X 5	
Confident delivery of research ideas	Not able to deliver research outcome* confidently, with poor language choice and frequent use of filler words	Able to deliver research outcome* with limited confidence and occasional use of filler word, thus requiring major improvements	Able to deliver research outcome* with moderate confidence, with little use of filler word, thus require minor improvements	Able to deliver research outcome* confidently, with good language choice and tone	Able to deliver research outcome* with excellent confidence	X 1	
Effective and articulate delivery of research ideas	Not able to deliver research outcome* effectively	Able to deliver research outcome* with limited effect and require major improvements	Able to deliver research outcome* with moderate effect and require minor improvements	Able to deliver research outcome* effectively and articulately	Able to deliver research outcome* with great effect and articulate	X 1	



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APPENDIX 3-13

FORM 13

## FYP II – VIVA

Evaluation criteria	Very Weak (1)	Weak (2)	Fair (3)	Good (4)	Very Good (5)	Multiplier	Mark
Use of visual aids and supportive materials (including product demo, if applicable)	Not able to use visual aids / supporting materials effectively (disorganised slides, unreadable materials)	Able to use visual aids / supporting materials with minimum impact, requiring major improvement	Able to use visual aids / supporting materials that shows general understanding of the research outcome*	Able to use visual aids / supporting materials that shows good understanding of the research outcome* .	Able to use visual aids / supporting materials and shows excellent understanding on the research outcome*	X 1	
Response to questions	Not able to understand and respond to a question	Able to understand and answer questions but not able to accurately answer the question	Able to understand and answer questions satisfactorily	Able to understand and answer questions well	Able to fully understand and responds to questions extremely well	X 1	
TOTAL MARKS							/ 45

Comments:

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.....  
Examiner signature

Name: \_\_\_\_\_

Date: \_\_\_\_\_



## FYP II – DISSERTATION

(To be completed by Supervisor/ Examiner)

Student's Name : \_\_\_\_\_ Student's ID: \_\_\_\_\_ Programme : \_\_\_\_\_

Project Title : \_\_\_\_\_

### PART A

Evaluation criteria		Very Weak (1)	Weak (2)	Fair (3)	Good (4)	Very Good (5)	Multiplier	Marks
Abstract (10)	<ul style="list-style-type: none"> <li>Problem statement</li> <li>Objective</li> <li>Methodology</li> <li>Future work</li> </ul>	Abstract is irrelevant and does not provide the summary of the whole project	Abstract is relevant but did not include some of the elements stated	Abstract is relevant, and include all elements, however, is vague and fail to highlight appropriate details about the research	Abstract is relevant, include all elements, and highlight appropriate details about the research.	Abstract is relevant, clear and concise description of all elements, highlighting the importance of the research.	X 2	
	<ul style="list-style-type: none"> <li>Background of study and problem statement</li> </ul>	Irrelevant background of study and problem statement	Background of study is partially relevant, and unclear problem statement	Background of study is sufficient to highlight the research work, however, problem statement is generic and unclear	Good background of study that shows connection to the problem statement. Problem statement is clearly presented.	Well written, articulate and concise background of study that justifies the problem statement. Problem statement is clearly presented.	X 1	
Introduction (10)	<ul style="list-style-type: none"> <li>Objective and scope of study</li> </ul>	<ul style="list-style-type: none"> <li>Research objectives irrelevant to the problem statement.</li> <li>Scope of Study are irrelevant to research objectives</li> </ul>	<ul style="list-style-type: none"> <li>Research objectives are unclear and partially relevant to the problem statement.</li> <li>Scope of Study are partially relevant to research objectives and poorly described</li> </ul>	<ul style="list-style-type: none"> <li>Research objectives are clear, however, partially relevant to problem statement.</li> <li>Scope of Study partially relevant to research objectives, and fairly described</li> </ul>	<ul style="list-style-type: none"> <li>Research objectives are clear and relevant to problem statement</li> <li>Scope of Study are relevant to research objectives and sufficiently described</li> </ul>	<ul style="list-style-type: none"> <li>Research objectives are clear and justified towards answering the problem statement</li> <li>Scope of Study are relevant to research objective and clearly described, highlighting the limitation of the study</li> </ul>	X 1	



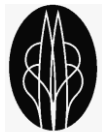
## FYP II – DISSERTATION

Evaluation criteria		Very Weak (1)	Weak (2)	Fair (3)	Good (4)	Very Good (5)	Multiplier	Marks
Literature Review (10)	<ul style="list-style-type: none"> <li>Critical analysis, relevancy and recentness of literature</li> </ul>	Irrelevant literature review	Literature review explains previous study, without connecting it to the current study. Lack in critical analysis.	Literature review explains previous study relevant to the current study, however, lack in critical analysis.	Literature review provides good discussion on previous study relevant to the current study, and sufficiently highlight the problem statement.	Literature review is comprehensive, critically analyse previous work relevant to current studies, with proper cross referencing. Clearly established the importance of the current work.	X 1	
	<ul style="list-style-type: none"> <li>Quality of references (journals/conferences/etc.)</li> </ul>	Insufficient references, none from published journal / conferences	Insufficient references, minimal number of reference from published journal / conferences	Adequate references, some are relevant, and from published journal / conferences.	Sufficient references, almost all are relevant, and almost all are from published journal / references	Sufficient references, all are relevant, and almost all from published journal / references	X 1	
Research methodology (5)		Insufficient and poorly described methodology	Methodology is unsuitable to achieve the objectives	Methodology is partially relevant to achieve the objectives	Methodology is relevant to achieve the objectives and fairly described and achievable within the time frame	Methodology is relevant to achieve the objectives and comprehensively described, and highly achievable within the time frame	X 1	



## FYP II – DISSERTATION

Evaluation criteria	Very Weak (1)	Weak (2)	Fair (3)	Good (4)	Very Good (5)	Multiplier	Marks
Result and discussion (40)	<ul style="list-style-type: none"> <li>All results do not meet the research / project objectives</li> </ul>	<ul style="list-style-type: none"> <li>Few results validate some of the project objectives</li> <li>Analysis and discussion of the results are poor or inaccurate</li> </ul>	<ul style="list-style-type: none"> <li>Few, or most results validate some of the project objectives</li> <li>Analysis and discussion of the results are correct</li> </ul>	<ul style="list-style-type: none"> <li>Results validate most of the research / project objectives</li> <li>Analysis and presentation of results are correct, but does not linked to theory</li> <li>Significance of results mentioned but deviation from literature is not properly discussed.</li> </ul>	<ul style="list-style-type: none"> <li>Results validate most of the research / project objectives</li> <li>Analysis and presentation of results are correct, critically analysed and linked to theory</li> <li>Significance of results and its deviation from literature is sufficiently discussed.</li> </ul>	X 8	
Conclusion & recommendation (10)	<ul style="list-style-type: none"> <li>Insufficient conclusion and irrelevant with objective.</li> <li>No future work recommended</li> </ul>	<ul style="list-style-type: none"> <li>Insufficient conclusion and irrelevant with objective.</li> <li>Insufficient future work related to the research / project recommended</li> </ul>	<ul style="list-style-type: none"> <li>Most conclusion is relevant with objective, but some are not clearly written.</li> <li>Future work recommended is related to the research and briefly outlined.</li> </ul>	<ul style="list-style-type: none"> <li>Provide good conclusion relevant to the objective</li> <li>Future work recommended is related to the research and briefly described.</li> </ul>	<ul style="list-style-type: none"> <li>Provide excellent conclusion that is comprehensive</li> <li>Future work recommended is related to the research is well described.</li> </ul>	X 2	



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APPENDIX 3-14

FORM 14

## FYP II – DISSERTATION

### PART B

Evaluation criteria		Very Weak (1)	Weak (2)	Fair (3)	Good (4)	Very Good (5)	Multiplier	Marks
ORGANISATION AND CLARITY (15)	Standard Guidelines and formatting	Report does not follow the standard guidelines and formatting	Report that has frequent major mistakes with the standard guidelines and format	Report that has frequent minor mistakes with the standard guidelines and format	Report that has some mistakes with the standard guidelines and format	Report that complies with the standard guidelines and format	X 1	
	English usage and writing skills English usage and writing skills (writing skills refers to clear, coherent and systematic writing of ideas)	• Very poor English and writing skills.	• Poor English and writing skills with many spelling and grammar mistake	• Fair English and writing skills with noticeable spelling and grammar mistake	• Good English and writing skills with minimal spelling or grammar mistake	• Excellent English and writing skills with no spelling or grammar mistakes	X 1	
	• Referencing and citations	• Most reference are missing from reference list and did not follow style guide	• Many reference are missing from reference list and did not follow style guide	• Some reference are missing from reference list and / or most did not follow style guide	• Most references are cited in the reference list, which follow the style guide	• All references are cited in the reference list, which follow the style guide	X 1	

Comments:

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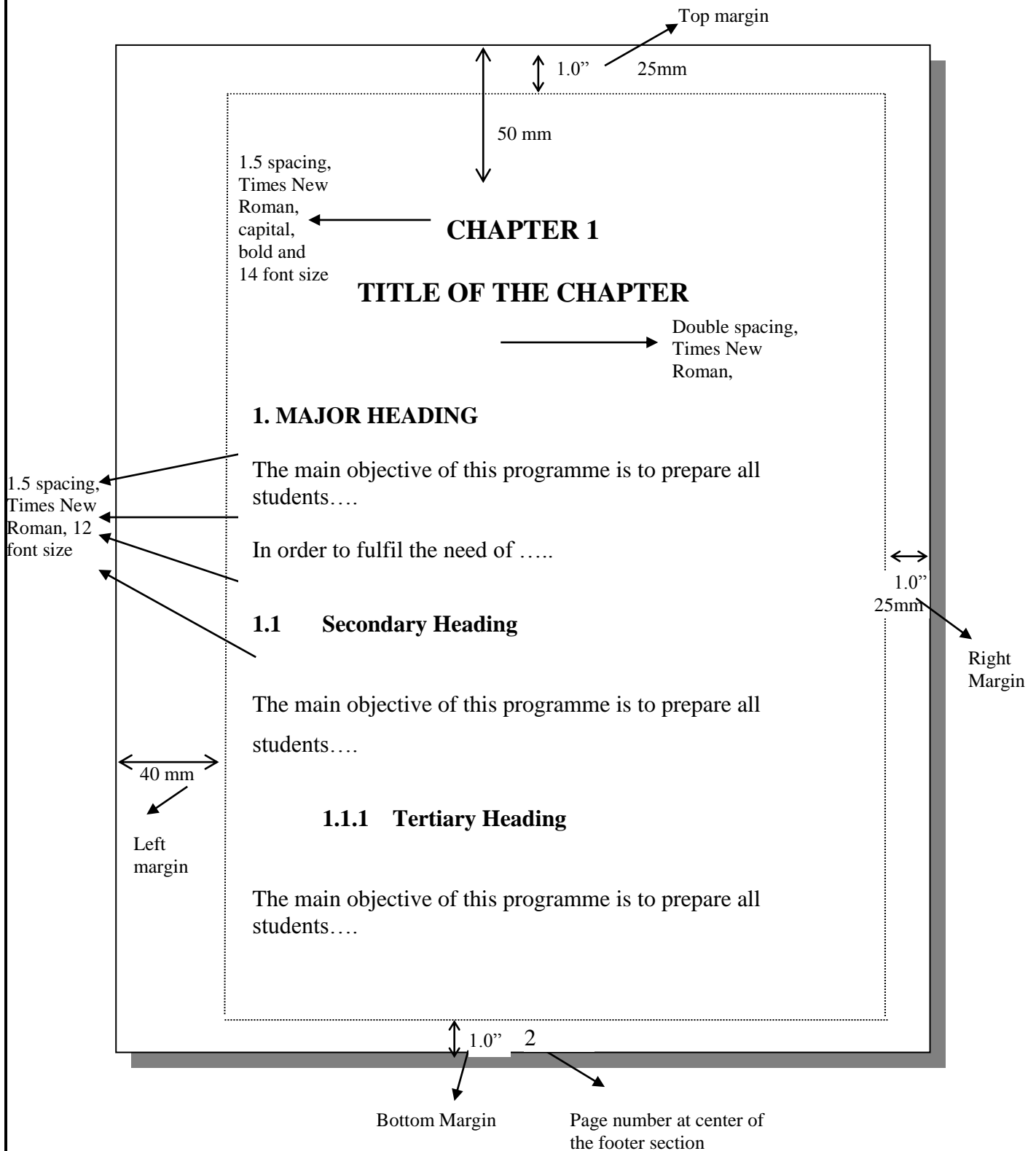
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Examiner signature

Name: \_\_\_\_\_

Date: \_\_\_\_\_

## SAMPLE OF PAGE SETUP







SAMPLE OF TABLE AND FIGURE

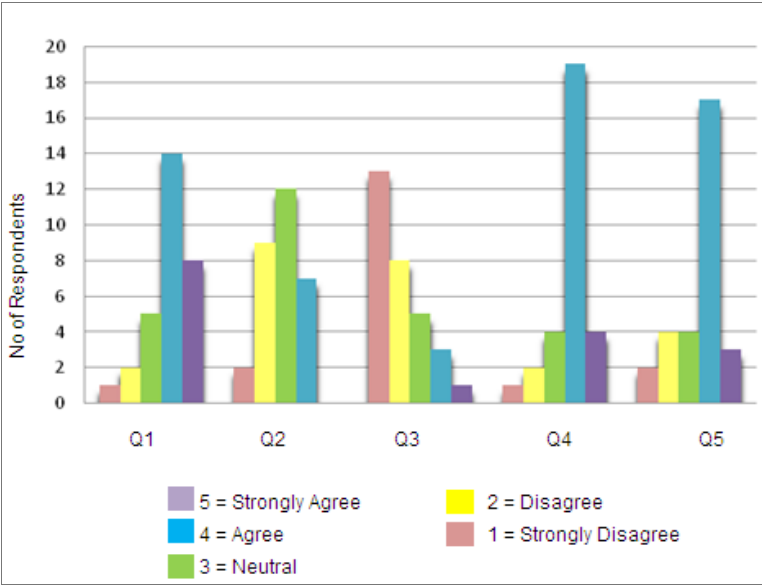


FIGURE 1. Pre-Test Survey Result

TABLE 1. Table Type Styles

Table Head	Table Column Head		
	Table column subhead	Subhead	Subhead
text	text	text	text

**SAMPLE OF DOCUMENTING SOURCES**

- A.** The followings are the variations of APA Citations. For further reference, please refer to the internet under Documenting Sources.

1. The author's name appears as part of the introduction to the quotation or paraphrase.

Gilster (1993) is very definite: "Simply put, the Internet is changing so rapidly, with so many new databases, services, addresses, and projects, that it can't be neatly encapsulated in any one set of commands or maxims" (p.2).

2. The author is not named in the introduction to the quotation or paraphrase.

What is entirely clear is that the Internet "can't be neatly encapsulated in any one set of commands or maxims" (Gilster, 1993, p.2).

3. The author has several works listed in the References. If they have different dates, no special treatment is necessary; if an author has two works dated the same year, differentiate them in the text and in the References with a lower-case letter after each date (1993a,1993b).

Gilster (1993a) points out that the Internet " can't be encapsulated in any one set of commands or maxims" (p.2).

4. Paraphrases are handled like quotations. Give the author's last name, the date, and the appropriate page numbers.

Gilster (1993) says that the Internet changes so fast that you must come to see your experience with it as daily learning process.

## APPENDIX 5-1

5. When citing block quotations, the period is placed *before* the page parentheses. Do not place quotation marks before and after a block quotation. Indent the left margin 5 spaces and double-space. Do not indent the right margin.

According to Gilster (1993)

There can be no complete printed directory of the Internet. Those who write about this globe-spanning network are destined to labor forever behind the technological wave. Simply put, the Internet is changing so rapidly, with so many new databases, services, addresses, and projects, that it can't be neatly encapsulated in any one set of commands or maxims. The more you use the Internet, the more you will realize that each day is itself a learning process.(p. 2)

- B.** The followings are the variations of IEEE Citations. For further reference, please refer to the internet under Documenting Sources.

For IEEE referencing, please refer to Appendix 5-2

## SAMPLE OF REFERENCE FORMATS

## A. APA

The formats of references for the respective sources are as follows:

## 1. Journal

Meguid, S.A. and Zhu, Z.H., 1995, "A novel finite element for treating inhomogeneous solids," *International Journal Numerical Methods Engineering* **38 (2)**: 1579-1592

## 2. Book

Glister P. 1993, *The Internet Navigator*, New York, John Wiley & Sons

## 3. Book in series

Ochoa, O.O and Reddy, J.N. 1989. *Finite Element Analysis of Composite Laminates*, (7), New York, Pergamon Press

## 4. Article in book/conference proceedings

Eskey, D and Grabe, W. 1988, "Interactive models for second language reading" in P. Carrell, J. Devine and D. Eskey (Eds) *Interactive approaches to Second Language Reading*, Cambridge; Cambridge University Press

## 5. Thesis

Mohd Shariff, A. 1995, *Steam Regeneration of A Fixed Bed Adsorption System*, Ph.D. Thesis, Leeds University, United Kingdom

## 6. Interview

Abu Bakar, R. Manager of Technical Services. Intel, Penang. Personal Interview. Dec. 14. 2003.

## 7. Technical report

Wawrznek, P.A. and Ingraffea, A.R. 1991. *Discrete modeling of crack propagation: theoretical aspects and implementation issues in two and three dimensions*. Report Number 91-5, Cornell University, New York, USA

## 8. Website

Duncan, Donna. 6 Sept 1998 <<http://www.geocities.com/SoHo/Coffe/1652/>>.

Klein-Smith, Sarah. 6 Sept 1998 <<http://members.aol.com/~sklein2/>>

## B. IEEE

The formats of references for the respective sources are as follows

### Sample IEEE Documentation Style for References

(Monash University (2012, May) Institute of Electrical and Electronics Engineers (IEEE) style examples [online]. Available: <http://www.lib.monash.edu.au/tutorials/citing/ieee.html>)

References to sources should be numbered sequentially by order of mention in the text, with the number placed in brackets and printed on line (not as a super- or subscript) like [1]. The list of all references used in the text should appear in numerical order of mention at the end of the document. Further examples in this style can be found in the [Institute of Electrical and Electronics Engineers](http://www.ieee.org/portal/site) site <http://www.ieee.org/portal/site>.

### In-text references

Using this system, references are numbered in the order in which they are first cited in the text. If the same reference is cited later in the text, the same number is given. For example

"The theory was first put forward in 1987 [1]"

"Scholtz [2] has argued that....."

"Several recent studies [1], [3], [4], [15], [16] have suggested that..."

Preferred            Acceptable

[1], [3], [5]        [1, 3, 5]

[1] - [5]            [1-5]

## 1. Books

### Elements of the citation:

Author(s) First name or initials. Surname, or name of organisation, *Title of book followed by fullstop if no edition statement, or comma if there is an edition statement*, ed., Edition (except the first). Place of publication City: Publisher, Year of Publication.

In addition, to the above citation details, provide page numbers if you have quoted specific facts or materials e.g. pp. 28-30.

Example:

C. W. Lander, Power Electronics, 3rd. ed., London: McGraw-Hill, 1993.

B. Hancock, *Advanced Ethernet/802.3 Network Management and Performance*. Boston: Digital Press, 1994, pp. 5-8.

## 2. Sections / chapters of books

Elements of the citation:

Author(s) First name or initials. Surname, "Title of the chapter," in *Title of the book*, ed., Edition (except the first) vol., volume if available, Ed. editor if available, Place of publication: Publisher, Year of Publication, pp. Chapter/s or First and Last pages of the article.

Example:

G. K. Knopf and A. S. Bassi, "Biological-based optical sensors and transducers," in *Opto-mechatronic Systems Handbook: Techniques and Applications*, Hyungsuck Cho, Ed. Boca Raton, FL: CRC Press, 2003, pp. 195-210.

## 3. Papers from conferences

Elements of the citation:

Author(s) First name or initials. Surname, "Title of paper," in *Title of the Conference*, Editor/s first name last name if available, Ed. Place of publication: Publisher if available, Date of publication, pp. first and last pages of the paper.

Example:

A. H. Cookson and B. O. Pedersen, "Thermal measurements in a 1200kV compressed gas insulated transmission line," in *Seventh IEEE Power Engineering Society Transmission and Distribution Conference and Exposition*, 1979, pp. 163-167.

## 4. Journal articles

Elements of the citation:

Author(s) First name or initials. Surname, "Title of article," *Title of journal*, vol. volume, (issue number), pp. first and last pages of the article, Date of issue month if available year.

Example:

K. P. Dabke and K. M. Thomas, "Expert system guidance for library users," *Library Hi Tech*, vol. 10, (1-2), pp. 53-60, 1992.

## 5. Theses or dissertations

The following example is taken from the IEEE Computer Society Style Guide <<http://www.computer.org/author/style/index.htm>>

Elements of the citation:

Author(s) First name or initials. Surname, "Title of thesis," Type of thesis PhD dissertation or doctoral dissertation or master's thesis, Department, University, Place, State, Country, Year of Publication.

Example:

*S. Birch, "Dolphin-human interaction effects: frequency mediated psychophysiological responses in biological systems," doctoral dissertation, Dept. Electrical and Computer Systems Engineering, Monash University, Victoria, Australia, 1997.*

6. Electronic sources (Electronic book)

Elements of the citation:

Author(s) First name or initials. Surname. (date of publication year, month day). Title. (ed. edition except the first) [Type of medium]. *volume number if needed. (issue number if needed).* Available: site/path/file

Example:

A. K. Salkintzis. (2004). Mobile Internet: *enabling technologies and services*. [Online]. Available: [http://www.engnetbase.com/books/1253/1631\\_fm.pdf](http://www.engnetbase.com/books/1253/1631_fm.pdf)

V. Guruswami. (2004). *List decoding of error-correcting codes: winning thesis of the 2002 ACM doctoral dissertation competition*. (2nd ed.) [Online]. 3282. Available: <http://portal.acm.org/3540240519.pdf>

Note: Fictitious examples

7. Online journal article

Elements of the citation:

Author(s) First name or initials. Surname. (year, month). Title of article. *Title of Journal*. [Type of medium]. *volume number (issue number)*, pp. pages. Available: site/path/file

Example:

J. S. Fulda. (2000, Mar.). The Internet as an engine of scholarship. *ACM SIGCAS Computers and Society*. [Online]. 30 (1), pp. 17-27. Available: <http://doi.acm.org/10.1145/572217.572222>

J. Farrell. (2007, May). In Wikipedia we trust? *Cosmos Online* [Online]. Available: <http://www.cosmosmagazine.com/node/1339>

8. Electronic conference paper

Elements of the citation:

Author(s) First name or initials. Surname. (year, month). Title. Presented at Conference title. [Type of Medium]. Available: site/path/file

Example:

X. Yang. (2003, Aug.). NIRA: a new Internet routing architecture. Presented at ACM SIGCOMM FDNA 2003 Workshop. [Online]. Available: <http://www.isi.edu/newarch/DOCUMENTS/yang.nira.pdf>

9. Website



Elements of the citation:

Author. (year, month). Title. [Type of Medium]. Available: site/path/file

Example:

Dr Jean Armstrong. (2007, March): Brief Biography [Online]. Available:  
<http://www.ecse.monash.edu.au/staff/jeana/aboutarmstrong.html>

### Reference list - sample format:

References must be listed in the order in which they were cited (numerical order) not in alphabetical order.

- [1] C. W. Lander, *Power Electronics*, 3rd. ed., London: McGraw-Hill, 1993.
- [2] B. Hancock, *Advanced Ethernet/802.3 Network Management and Performance*. Boston: Digital Press, 1994, pp. 5-8.
- [3] G. K. Knopf and A. S. Bassi, "Biological-based optical sensors and transducers," in *Opto-mechatronic Systems Handbook: Techniques and Applications*, Hyungsuck Cho, Ed. Boca Raton, FL: CRC Press, 2003, pp. 195-210.
- [4] A. H. Cookson and B. O. Pedersen, "Thermal measurements in a 1200kV compressed gas insulated transmission line," in *Seventh IEEE Power Engineering Society Transmission and Distribution Conference and Exposition*, 1979, pp. 163-167.
- [5] K. P. Dabke and K. M. Thomas, "Expert system guidance for library users," *Library Hi Tech*, vol. 10, (1-2), pp. 53-60, 1992.
- [6] S. Birch, "Dolphin-human interaction effects: frequency mediated psychophysiological responses in biological systems," Ph.D. dissertation, Dept. Electrical and Computer Systems Engineering, Monash University, Victoria, Australia, 1997.
- [7] A. K. Salkintzis. (2004). *Mobile Internet: enabling technologies and services*. [Online]. Available:  
[http://www.engnetbase.com/books/1253/1631\\_fm.pdf](http://www.engnetbase.com/books/1253/1631_fm.pdf)
- [8] V. Guruswami. (2004). *List decoding of error-correcting codes: winning thesis of the 2002 ACM doctoral dissertation competition*. (2nd ed.) [Online]. 3282. Available: <http://portal.acm.org/3540240519.pdf>
- [9] J. S. Fulda. (2000, Mar.). The Internet as an engine of scholarship. *ACM SIGCAS Computers and Society*. [Online]. 30 (1), pp. 17-27. Available: <http://doi.acm.org/10.1145/572217.572222>
- [10] J. Farrell. (2007, May). In Wikipedia we trust? *Cosmos Online* [Online]. Available: <http://www.cosmosmagazine.com/node/1339>

- [11] X. Yang. (2003, Aug.). NIRA: a new Internet routing architecture. Presented at ACM SIGCOMM FDNA 2003 Workshop. [Online]. Available: <http://www.isi.edu/newarch/DOCUMENTS/yang.nira.pdf>
- [12] Dr Jean Armstrong. (2007, March): Brief Biography [Online]. Available: <http://www.ecse.monash.edu.au/staff/jeana/aboutarmstrong.html>

**Project Title**

by

Student name

Student ID number

Dissertation submitted in partial fulfilment of  
the requirements for the  
Degree of Study (Hons)  
(Programme)

FYP II Semester and Year

Universiti Teknologi PETRONAS  
Bandar Seri Iskandar  
31750 Tronoh  
Perak Darul Ridzuan

**SAMPLE OF TITLE PAGE**

**Application of Collagen as a Filter Aid in Water Treatment Process**

by

Ahmad Nawab Bin Ahmad Al-Bab

123456

Dissertation submitted in partial fulfilment of  
the requirements for the  
Bachelor of Engineering (Hons)  
(Chemical)

JANUARY 2006

Universiti Teknologi PETRONAS  
Bandar Seri Iskandar  
31750 Tronoh  
Perak Darul Ridzuan

INTAN BT. A. RAHIM

B. ENG. (HONS) CHEMICAL ENGINEERING

J JANUARY 2006

EFFECT OF pH AND TEMPERATURE ON THE  
RATE OF MINERALS LEACHED FROM  
MINERAL STONES

INTAN BINTI A. RAHIM

CHEMICAL ENGINEERING  
UNIVERSITI TEKNOLOGI PETRONAS  
JANUARY 2006

*\*Font : 14 Times New Roman*

SAMPLE OF CERTIFICATION OF APPROVAL

CERTIFICATION OF APPROVAL

**Application Of Collagen As A Filter Aid In Water Treatment Process**

by

Ahmad Nawab Bin Ahmad Al-Bab  
123456

A project dissertation submitted to the  
Chemical Engineering Programme  
Universiti Teknologi PETRONAS  
in partial fulfilment of the requirement for the  
BACHELOR OF ENGINEERING (Hons)  
(CHEMICAL)

Approved by,

\_\_\_\_\_  
(Name of Main Supervisor)

UNIVERSITI TEKNOLOGI PETRONAS

TRONOH, PERAK

January 2006

**SAMPLE OF CERTIFICATION OF ORIGINALITY****CERTIFICATION OF ORIGINALITY**

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.

---

AHMAD NAWAB BIN AHMAD AL-BAB

## SAMPLE OF ABSTRACT

The following abstract is taken from Ramos, Juan, Florentina Davalos, and Jorge Sandoval. High-brightness CMP from *Eucalyptus globulus* using a nitric acid pretreatment. TAPPI Journal 79 (12 December 1996): 169-177. Copyright TAPPI 1996.

A high-brightness, high-yield cheminmechanical pulp was obtained from *Eucalyptus globulus* using low-environmental-impact chemical reagents. The pulping chemicals were nitric acid and sodium hydroxide, and bleaching chemical was hydrogen peroxide. Chips were impregnated for 24 h in nitric acid, cooked under variable conditions, washed, impregnated with soda for 24 h, cooked again, rewashed, defibrated, refined, screened, and finally bleached under variable conditions. Under the optimal pulping conditions identified in this study, pulp strength was not especially high (tensile strength 2.04 km, tea strength 3.9 mN m<sup>2</sup>/g), but the ease of bleaching and final pulp brightness were impressive enough (light-scattering coefficient 49.3 m<sup>2</sup>/kg, brightness 81.3% Elrepho) to warrant further research.



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**TABLE OF CONTENTS**

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