Swedish College of Engineering & Technology

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Standard Operating Procedure (SOP)

For

Preparation and Submission of

Final Year Projects (FYP)

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1 Introduction:

The purpose of this document is to provide guidelines to students and supervisors to realize their Bachelors of Engineering (BE) Final Year Projects (FYP). The Final Year Project (FYP) is the culmination of students' degree program. The main purpose of the project is to encourage students to apply the knowledge acquired during their studies. It allows them to work on a substantial problem for an extended period of time, show how proficient they are in solving real world problems. It brings them a sound opportunity to demonstrate their competence as professionals and to apply what they have learnt in the other components of the degree. Besides, they get a chance to improve their technical skills, communication skills by integrating writing, presentation and learn how to work in teams. With a real-world problem at hand, they get to learn professional practice and a variety of non-technical issues such as management, finance, safety, reliability, environment and social impacts. Moreover, it provides an integrated assessment of the progress of the students toward the training they went through during their academic tenure at the college.

FYP course is different other courses because it demands independent objective formulation, planning, management and self-motivation. It is therefore essential to design fair and comprehensive guidelines for the students and supervisors.

2. Degree Program Learning Outcomes (PLOs)

Program Learning Outcomes are the narrower statements that describe what students are expected to know and be able to do by the time of graduation. These relate to the knowledge, skills and attitude that the students acquire while progressing through the program. The program must demonstrate that by the time of graduation the students have attained a certain set of knowledge, skills and behavioral traits, at least to some acceptable minimum level. Specifically, it is to be demonstrated that the students have acquired the following graduate attributes (GA's):

(i) Engineering Knowledge: An ability to apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.

(ii) Problem Analysis: An ability to identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

(iii) Design/Development of Solutions: An ability to design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

(iv) Investigation: An ability to investigate complex engineering problems in a methodical way including literature survey, design and conduct of experiments, analysis and interpretation of experimental data, and synthesis of information to derive valid conclusions.

(v) Modern Tool Usage: An ability to create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modeling, to complex engineering activities, with an understanding of the limitations.

(vi) The Engineer and Society: An ability to apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solution to complex engineering problems.

(vii) Environment and Sustainability: An ability to understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development.

(viii) Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.

(ix) Individual and Team Work: An ability to work effectively, as an individual or in a team, on multifaceted and /or multidisciplinary settings.

(x) Communication: An ability to communicate effectively, orally as well as in writing, on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

(xi) Project Management: An ability to demonstrate management skills and apply engineering principles to one's own work, as a member and/or leader in a team, to manage projects in a multidisciplinary environment.

(xii) Lifelong Learning: An ability to recognize importance of, and pursue lifelong learning in the broader context of innovation and technological developments.

3. Objectives of FYP

1. To apply knowledge learned in other courses.
2. To enhance the thought and planning process.
3. To expose students to work in team and design and implementation of problems solutions.
4. To improve the written and oral communication skills of the students.

4. Final Year Project and OBE

Program Learning Outcomes PLOs for the final year project are defined as the part of the FYP policy. FYP is considered as a complex engineering problem and multiple PLOs can be targeted in a single FYP. Each FYP may contain four or more than four PLOs depending upon the nature of FYP i.e. design based, consultancy based, or research based. Project supervisor or Project supervisor along with external examiner will have the flexibility to

decide number of PLOs, their weightage and communicate them to the students. FYP will necessarily cater following five PLOs:

- Individual and team work.
- Communication
- Project management
- Lifelong learning

Project supervisor will decide one or more PLOs from the given below list depending on project nature:

- Problem Analysis
- Design/development of solutions.
- Investigation.
- Modern tool usage

The details of FYP PLOs and their weightage are shown in Table.

Criteria of evaluation as per PLOs (Rubric for FYP Evaluation Attached Annex-F)

PLOs		**Weightage of PLO**
PLO2	Problem Analysis	_%
PLO3	Design/Development of Solution	_%
PLO4	Investigation	_%
PLO5	Modern Tool Usage	_%
PLO9	Individual and Team work	5%
PLO10	Communication (Speech quality, Quality of slides, Maintain formal attire)	20%
PLO11	Project Management (Timely submission)	5%
PLO12	Lifelong Learning	10%
	Total PLO Percentage	100%

a. Standard Operating Procedure

5.1 Supervision

1 Faculty from Departments (EE,ME,CE) with designation lecturer and above is eligible for supervision of FYP Others can co-supervise in relevant discipline.

2 Every faculty member eligible for supervision will supervise or co-supervise at least one project every semester.
3 Maximum Four FYPs can be registered for supervision in a semester.

5.1.1 Supervisors Responsibility

1 Submit ideas for students as per given format before the last date of proposal submission. (ANNEX-A).
2 Help students for the preparation of proposal in a given format (ANNEX-B).
3 Ask students for the proposal submission to relevant person before the final date of submission.
4 Arrange regular fortnightly meetings (at least twice in a month) with students during the whole year and prepare the evaluation report. (ANNEX-C)

5.2 Project teams

All final year projects must be performed as teams consisting of two to three members. In exceptional cases individual projects or teams with more than three members might be allowed subject to approval by FYP supervisor and H.o.D of relevant department.

5.3 Project topics

Project suggestions must meet the following criteria in order to be accepted as an FYP:

1. Each project must be sufficiently complex, yet achievable within the allocated time and resources, with the understanding that a worthwhile product or a functioning prototype will result from the project.
2. Project suggestions may come from a number of different sources such as students, faculty members or industry.
3. All project proposals must be discussed with the prospective team advisor. The final decision, to accept a project proposal or not, will be made by the advisor.

5.4 Proposal Rejection/ Acceptance

- All groups/individuals working on FYPs are required to submit their project proposal forms (attached as ANNEX -B)
- All the groups/individuals working on FYPs are required to present the initial presentation and submit hard copies of presentation with multiple slides on single page not more than 4 slides on single page.
- After the evaluation of initial presentations by evaluators (attached as ANNEX -D) the FYP Committee will decide the Acceptance /rejection of the proposal with the HoD on form (attached as ANNEX -B) .
- FYP Committee will notify decision to the All the groups/individuals working on FYPs

5.5 Project Documents

FYP Proposal

All groups/individuals working on FYPs are required to submit their project proposal forms (attached as ANNEX -B)

Initial Presentation

All group members/ individuals have to prepare the FYP initial presentation on the following order of topic (must be included) with white back ground not more than 2 color scheme. All presentations related to FYP will be assessed on the FYP Evaluation of Presentation form (attached as ANNEX -B)

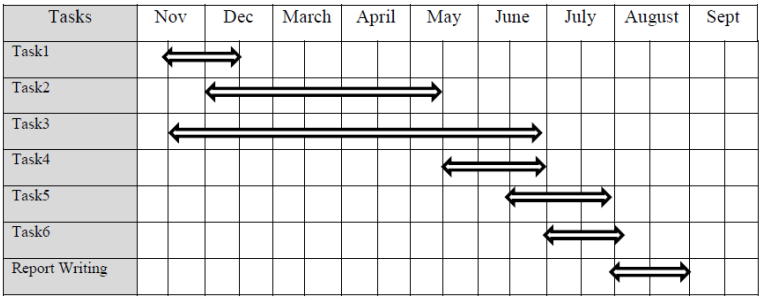
1. Title
2. Group Details (with clearly mentioned the group leader)
3. Advisor (if Any)
4. Funding/Sponsoring Organization (if any)
5. Project Details
6. Project Type

   (New/ Extension/Modification to previous Project (if yes, specify title and year/batch))
7. Nature of Project

   (Simulation based/Hardware based)
8. Executive Summary/Abstract of the Project
   (Summarize main reasons of doing this project, theme of project, need of your design and what ideas you have to achieve the proposed design.)
9. Objectives and Deliverables
   (Specify the tasks/objectives which you are planning to achieve through this project, work which is required to be completed for achieving them and deliverables which you will be giving in the end e.g. a prototype, simulation, an algorithm or a design.)
10. Beneficiaries
    (Specify communities directly and indirectly benefiting from this project. State; who and how (use bullets))
11. Block Diagram with Equipment/components required for making prototype/working model
12. Project Management + Gantt Chart
    (Break your work into number of tasks and associate a logical sequence to them. Generate Gantt chart to mark timelines also mark key miles stones achieved/deliverables in a result of completing an intermediate task.)

    - *List all the tasks:*
      Task 1:
      Task 2:
      Task 3:

    - Gantt Chart Must be on the following format



13. List of Accessed Resources
(Specify most important Human/Internet/Literature resources /research papers which you accessed for initial presentations)

FYP Report

After the completion of project, students are required to submit four hardbound copies of the FYP report along with a CD on the given format the FYP. FYP will be assessed by internal/external examiner on the FYP Report Assessment form (attached as ANNEX -E). The project CD must contain the following items:

1. FYP report
2. Software developed (if any, along with the code)
3. Presentations
4. All other material consulted/utilized
5. Certificate for FYP+ report submission

Following is the generic format for the final documentation. Your advisor and co-advisor may suggest modifications to the given report format.

1. **Sequence of Pages for Final Report**
    a. Title Page
    b. Approval Page
    c. Dedication
    d. Acknowledgment
    e. Abstract
    f. Table of Contents
    g. List of Abbreviations (where applicable)
    h. List of Figures
    i. List of Tables
    j. Chapters
        i. Chapter 1- Introduction
        ii. Chapter 2- Literature Review
        iii. Chapter 3-Methodology \ Observation & Calculation
        iv. Chapter 4-Results
        v. Chapter 5-Conclusions, Future Recommendations
    k. References
    l. Appendix (where applicable)

2. **Font Size and Line Spacing:**
    i. Font size for main text body=12, Times New Roman, Bold main heading font size=14, Subheadings Font size=12
    ii. Figures and tables caption font size=10
    iii. The title of a chapter should be typed using capital letters (font size=16) and centered. A new chapter must start on a new page. Chapters and their sub-sections must be given titles. The titles should be typed using bold letters and should not be underlined.

iv. The spacing between the top margin and the chapter number should be 2.5 cm;
v. The spacing between the chapter number and the title, and between the title and the first line of a text should be four (4) line spacing from line spacing option;
vi. The spacing between the title of a sub-section and the first line of a text should be two (2) line spacing from line spacing option;
vii. The spacing between the last line of a text with the title of a sub- section should be four (4) line spacing from line spacing option;
viii. The spacing between paragraphs should be two (2) line spacing from line spacing option;
ix. The number and the title of sub-section should be aligned with the left margin;
x. The first line of a paragraph should be indented by 1.27 cm (0.5 inch) from the left margin;

xi. A new paragraph should not begin on the last line of a page.
xii. The spacing between the last line of a text and a table, or a figure or an illustration should be two (2) line spacing.
xiii. The spacing after a full stop should be two (2) character spacing.
xiv. The spacing after a comma (,) should be one (1) character spacing.
xv. Preliminary pages of a thesis, starting from the title page should be numbered using small letter Roman numeric (i, ii, iii, etc.); the texts should be numbered using Arabic numeric (1, 2, 3, etc.).

3. **Figures, Tables and Equations**:

i. Equations must be numbered chapter wise e.g. equation 7 in chapter 2 would be refer as Equation (2.7) and numbered as (2.7). Numbering should be right intended, whereas the equation is left aligned.
ii. Figures, Tables and Equations should be numbered chapter wise, e.g. For chapter 2-Figure 2.3, Chapter 3-Table 3.6 and For Chapter 4- Equation (4.1)
iii. Every table must bear a title and table number which should be written on the top of the table (Table 1: Abc)
iv. Titles of the figures should be written under the figures, along with the figure number (Figure 1: Xyz)

4. References

All of the references should be alphabetically ordered

A- Journals

Author Name/s (Surname, initial), year of publication in-parenthesis, title of the article, name of the journal, volume number, issue number (in parenthesis) followed by a colon and page numbers

B- Books

Author Name/s (Surname, initial), year of publication in-parenthesis, title of the book, publisher's name, place of publication, page numbers