HiLCoE

School of Computer Science & Technology

Senior Project Documentation Guideline

(Version 1.4.3 / 2024)

Introduction

The Senior Project at the undergraduate level is designed to encompass a wide range of endeavors, including both applied computer science and software engineering works. While many projects are anticipated to focus on solving problems using existing technologies, the College also appreciates and encourages students to undertake ICT-related research projects that contribute new findings to the field of study.

Whether the project primarily involves the application of computer science principles or the development of software engineering solutions, the Senior Project provides an opportunity for students to demonstrate their technical expertise and problem-solving abilities. The College welcomes proposals that explore both practical applications and innovative research, recognizing the value that each approach brings to the advancement of the discipline.

In an effort to standardize the activities and deliverables for senior projects, the documentation requirements have been classified into two distinct parts, which are presented as follows:

Part I: Types of Deliverables and Their Basic Content

This section outlines the various deliverables expected for the Senior Project, along with the essential content that must be included in each component.

Part II: Formatting and Citation

This part provides guidelines on the formatting and citation requirements for the Senior Project documentation, ensuring consistency and adherence to academic standards.

The guideline provides detailed information on each of these parts.

General Remarks

- For applied computer science & software engineering works the documentation of your work must exhibit all phases of software development life-cycle.
- Though it is open for students to follow other approaches, the school advocates the Object-Oriented approach to software engineering. Accordingly the template of this documentation will be in line with OOSE.
- Contents listed in each deliverable are basic or general set of requirements that do not stick to any particular template. Thus, students have the freedom to use any appropriate template they believe is best for their work.
- A hard copy of the complete first draft of the final project report should be submitted a week before the final date of the project timeline.

Part I

Required deliverables and their basic content

♦ Applied Computer Science / Software Engineering Projects

The following documents are expected to be submitted successively throughout the course of the project

- Project Proposal Document
- Requirements Analysis and Specification Document
- Design Specification Document
- Implementation Report
- User Manual
- Final Project Report

1. Project Proposal Document

The first deliverable to be produced to get acceptance for doing Senior Project is the Proposal Document. A successful project proposal document is foreseen to exhibit that the problem addressed is new (in some particular context); or add new functionalities to an existing solution; or employ new technologies and/or methodologies to an existing solution. Additional points about how to select project areas and titles will be provided in a separate document (when available). The Proposal Document is likely to have the following basic contents/topics:

Topic	Description
Preliminary Pages - Cover Page (refer to **Annex A**) - Table of Contents	The title page should follow the attached sample title page format. The title page and table of contents should be considered as separate pages.
Introduction/Background	General background information about the area you choose to work on, and the motivational scenario (rationale) where the project idea inspired you.

	A note about any reason for the project initiation, job opportunity, and/or source of information like external advisor (or literature) if any.
Statement of the Problem	A good description stating why the selected problem is a potential problem in relation to the current state of the problem in some organization context or some other situation.
General and Specific Objectives	The general objective of the project can be stated in a single or a couple of sentences. The specific objectives are list of activities that will help you attain the general objective.
Scope of the Project and Limitations	Delimitation of the work in a form of functionalities expected from the solution (system). Describe any factor that delimits or bounded the project work, and limitations that may be beyond your control. Functionalities normally expected from the system, but cannot be incorporated due to some acceptable reasons. Possible problems that may hinder the team from achieving its objectives fully.
Methodology / Approach	A description of the proposed approach or methodology to accomplish the objectives. It includes methods, techniques and tools to be used throughout the process of the project. It is good if you can specify the methods,

	techniques and tools to be used in each phase of the project.
Significance and beneficiaries	The actual utility of the outcome of the project work and who will actually be the possible beneficiary. In this section, anticipated benefits of the project results are presented.
Task Breakdown and feasibility analysis	• Detail list of tasks and the outcome of a given set of tasks. A number of outcomes are expected throughout the project. Example, in the effort of identifying requirements you may be involved in tasks like interviewing, administering questionnaires, reviewing documents, etc. • How feasible your project is with respect to its practicality, resource and time required.
Project Schedule / Timeline	Taking into consideration the tasks identified in the task breakdown section, allocate expected time required using scheduling tools like Gant or PERT charts.
References	All references used throughout the process should be stated as indicated in the citation standard section of this document.
Annexes	If any;

2. Software / System Requirements Analysis and Specification document

The Software/System Requirements Specification Document is the second deliverable in the process of the project work which enables students to have a full understanding of the existing system and a full picture of what the new system/software should look like.

The purpose of this deliverable is to document the results of the requirements elicitation and the analysis activities. This document completely describes the system in terms of functional requirements, nonfunctional requirements and analysis level models. Though it is the task of the students to work on the detail outlines pertinent to their specific project, the major contents of the requirements specification document are presented as follows.

Topics	Description
Preliminary Pages - Title Page (refer to Annex) - Table of Contents - List of figures, tables etc. - Definitions, acronyms, and abbreviations	The title page should follow the attached sample title page format. Definition and expanded form of new terminologies are also part of this section.
Introduction/Overview	An introduction to the document by creating a link to the previous document. A short and brief description of the purpose and scope of the system.
Current System/(Existing System)	Description of the existing scenario/system and/or problem. If the new system will replace an existing system; this section describes the functionalities and the problems (drawbacks) of the current system.

Proposed System - Function definition - Functional requirements - Non-functional requirements - The proposed system models	This section documents the requirements elicitation and the analysis models of the new system. Description of the system from its function point of view by considering inputs, process, output, prerequisites, conditions, side effects, post conditions, integration of functions (modules) and problems in the process. Functional requirements describe the high-level functionality of the system and must be described as "The system should provide/do" phrase Nonfunctional requirements describe user-level requirements that are not directly related to functionality. The items under nonfunctional requirements taken from the template you followed should be described only in relation to the context of the system under consideration, otherwise no need to mention them in this topic. System models describe the scenarios, use cases, object model, and dynamic models of the system (in the case of OOSE).
User Interface	This section includes mock-ups illustrating the user interface of the system and navigational paths representing the sequence of screens. (User Interface Prototype…)

References	All references used throughout the process should be stated as indicated in the citation standard section of this document.
Annexes	If any; example: questionnaires used, interview questions made, input and output forms collected.

3. System Design Specification Document

Design Specification Document is the third deliverable in the process of the project, which is used to show how the new solution should be implemented. In OOSE, this document is classified into two separate documents. These are the System Design document (SDD) and Object Design Document (ODD).

3.1 System Design Document

System design models are documented in the System Design Document. The following table shows the basic contents of this document.

Topic	Description
Preliminary Pages - Title Page (refer to Annex) - Table of Contents - List of figures, tables etc. - Definitions, acronym , and abbreviations	The title page should follow the attached sample title page format. Definition and expanded form of new terminologies are also part of this section.
Introduction/Overview	An introduction to the document by creating a link to previous documents. A short and brief

	description of the purpose and design goals of the system.
Software Architecture	A short description of candidate software architectures and the existing software architecture, if any, will take the first part of this section. Issues like subsystem decomposition, hardware/software mapping, data persistence management, access control and security are addressed.
Subsystem decomposition	This section is intended to show subsystems of the application and the interaction between them.
References	All references used throughout the process should be stated as indicated in the citation standard section of this document.
Annexes	If any;

3.2 Object Design Document (ODD)

The object design of the proposed system is specified in the Object Design Document (ODD). It describes object design trade-offs, guidelines followed for subsystem interfaces, the decomposition of subsystems into packages and classes, and class interfaces.

Topic	Description
Preliminary Pages - Title Page (refer to Annex) - Table of Contents - List of figures, tables etc. - Definitions, acronym , and abbreviations	The title page should follow the attached sample title page format. Definition and expanded form of new terminologies are also part of this section.
Introduction/Overview	An introduction to the document by creating a link to the preceding documents. It describes the general trade-offs made by developers (e.g., buy vs. build, memory space vs. response time), guidelines and conventions (e.g., naming conventions, boundary cases, exception handling mechanisms), and an overview of the document.
Packages	The second section of the ODD, Packages, describes the decomposition of subsystems into packages. This includes an overview of each package, dependencies with other packages, and its expected usage.
Class Interfaces	This section, describes class interfaces, describes the classes and their public interfaces. This includes an overview of each

	class, dependencies with other classes and packages, its public attributes, operations, and exceptions they can raise.
References	All references used throughout the process should be stated as indicated in the citation standard section of this document.
Annexes	If any;

4. Implementation Report

In this section students are expected to report details of implementing the design specification. Basic contents are as follows:

- Algorithms (flow chart) and / or pseudo-code of the basic functionalities
- Code for major functionalities of the solution
- Full internal documentation (attaching comments to code statements)
- Testing specification and reports (test case, test results, expected results and remarks)

5. User manual

A short description of how the new solution/ software or system will be put in to use (installed) and used by end users. It should also include error handling and reporting mechanisms, and help frames. It will be attached with the final document as an annex.

6. Final Project Report

The Final Project Report is a final deliverable document, which is the compiled version of all the deliverable documents described in sections 1 to 4.

Topic	Description
Preliminary Pages - Cover page (refer to **Annex A**) - Title page (refer to **Annex B**) - Approval page (refer to **Annex C**) - Acknowledgement - Table of Contents - List of Figures - List of Tables - Executive Summary	- Every preliminary page should be presented in a separate page. - Executive summary should include statements about the problem raised, methodologies used and solutions provided and challenges encountered, in one page.
Introduction/Background	**This section is the revised version of the proposal document in a form of a report and is considered as the first chapter of this document.**
System/Software Requirements Specification Document	The final version of the specified document after commented by advisors.
Design Specification Document - SDD - ODD	The final version of the specified document after commented by advisors.
Implementation Report	The final version of the specified document as commented by advisors.

Reference/Bibliography	All references used in all previous deliverable documents.
Annexes - User Manual - Data Collection methods/tools - Forms and any other relevant input documents - milestones	Milestone refers to a formal reporting format at the end of every important and major stage. It will contain information like Title of the project, names of team members and advisor, undertakings, report number, date, tasks accomplished and signature on a single page.

♦ Computer science Research Projects

The following are documents expected to be delivered successively throughout the course of the research:

- Proposal document
- Literature Review
- Data Collection and Analysis Report
- Conclusion and Recommendation

1. Proposal document

The contents and formatting of this proposal document is similar to the project proposal document presented in section 1.1 of this document.

2. Literature Review

Literature review is the second deliverable which is a review and report of related works to justify both that the work is new in a sense that it adds to the universe of knowledge and that it is worthy doing.

3. Data Collection and Analysis Report

This document includes detail description of the data collected and the process of analysis with its outcome or result

4. Conclusion and Recommendation

This is a final deliverable document which includes a summary of the results and possible recommendations for those who want to extend the research in the future.

5. Final research report document

The Final **research report document** is a final deliverable document, which is the compiled version of all the deliverable documents described above in sections 1-4.

Remark

- Preliminary pages, references and annexes will follow the guidelines and formats presented.

Part II

Formatting and Citation

2.1 Formatting

As to the formatting of the documents students should strictly follow the following guidelines

- Any deliverable should be submitted to the advisors with the understanding that it is done with the best of knowledge that the student can do.
- All deliverables should follow the following formatting guidelines
    - Page size should be 8.5” X 11” (A4 size paper)
    - Line spacing 1.5
    - Font type and size: One of the following fonts should be used: Times, Times New Roman, or Calibri. Use a 12-point font size. Use bigger fonts (incrementing by 1) for titles and subtitles depending on the depth (hierarchy) of titles.
    - All pages are numbered consecutively in the bottom, center position. The pages must be numbered starting from the introduction page.
    - Alignment: 1” at all sides
- Under normal circumstance the final project report should be between 70 to 100 pages.

2.2 Citation

With respect to citations students should strictly follow IEEE citation standards presented as follows with examples

- **For books:**

  Peck, R. B., Hanson, W. E., and Thornburn, T. H., *Foundation Engineering*, 2nd ed. New York: McGraw-Hill, 1972, pp. 230–292.

- **For articles in a periodicals**

  Boggs, S. A. and Fujimoto, N., "Techniques and instrumentation for measurement of transients in gas-insulated switchgear," *IEEE Transactions on Electrical Installation*, vol. ET-19, no. 2, pp. 87–92, Apr. 1984.

- **For Web Documents**

- **Other types of bibliographies**

  Articles in corporate reports

  Dale, S. J., "Performance of a technical and economic feasibility study of an HVDC compressed gas-insulated transmission line," Westinghouse Electric Corporation, Trafford, PA, Final Report, Dec. 1983.

  Articles presented at conferences

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

  Government publications

  Cookson, A. H., "Particle Trap for Compressed Gas Insulated Transmission Systems," U.S. Patent no. 4554399, Nov. 1985.

  Theses, dissertations, and other unpublished works

  Diessner, A., "Studies on Compressed Gas Insulation." Master's thesis, Stanford University, 1969.

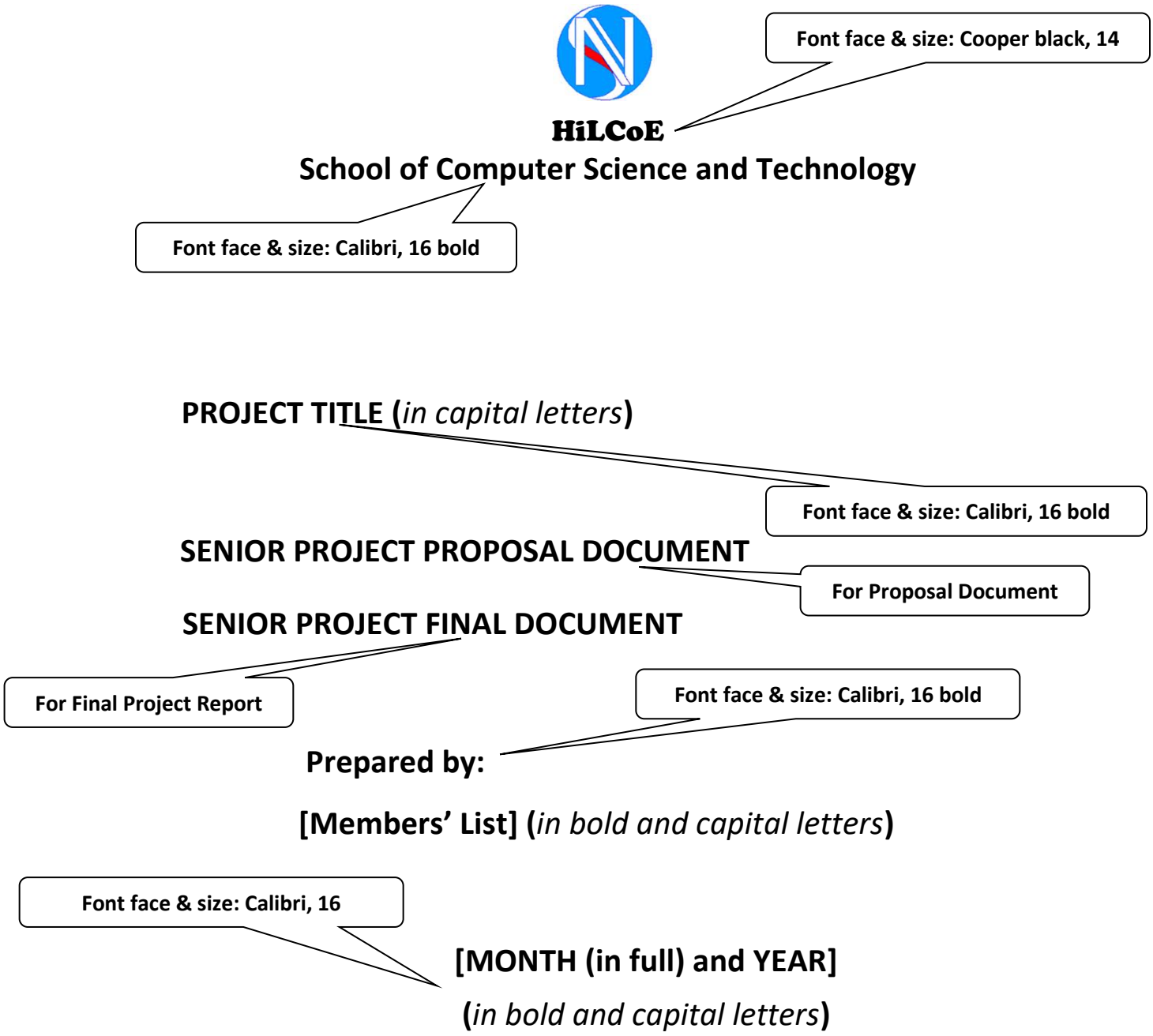
  Hazel, R. L., "DC Breakdown and Anode Corona Characteristics of Sphere and Rod-Plane Gaps Insulated With Compressed Sulphur Hexafluoride." Ph.D. diss., University of Windsor, 1974.

Annexes

These include short source listings and other detailed information that cannot be put within the body of the pages. Each annex should be titled and listed in the Table of Contents.

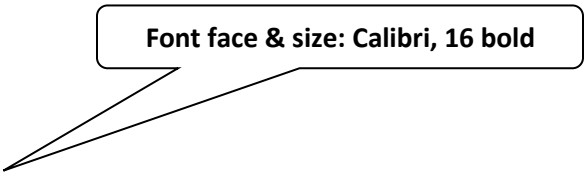
Annex A: Cover Page

All deliverable documents should have a cover page in a separate page as is shown below:



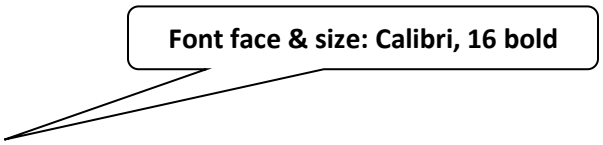
Annex B: Title Page

PROJECT TITLE (*in bold and capital letters***)**

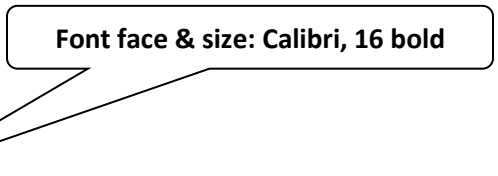


Prepared by:

[Members' List] (*in bold and capital letters***)**

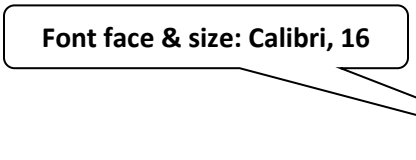


A SENIOR PROJECT DOCUMENT SUBMITTED TO THE UNDERGRADUATE PROGRAMME OFFICE IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF BACHELOR OF SCIENCE IN COMPUTER SCIENCE (/SOFTWARE ENGINEERING) (*either CS or SE***)**
(in bold & capital letters)



Advisor:

[Name of Advisor] (*in bold and capital letters)*

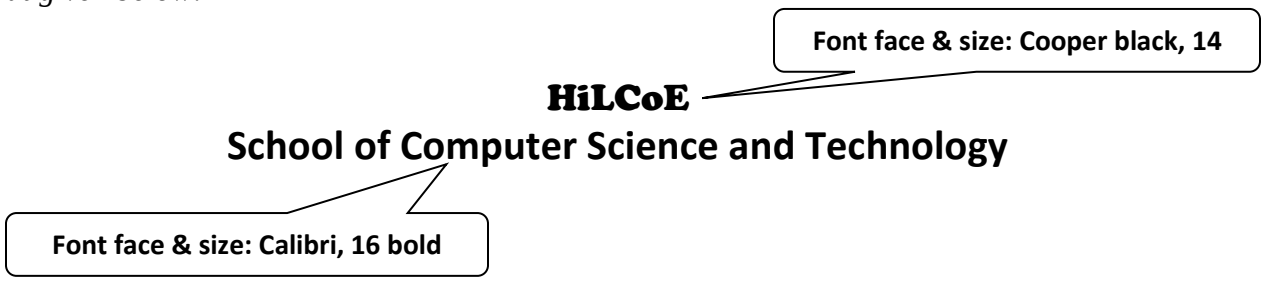


[MONTH (in full) and YEAR]

(*in bold and capital letters***)**

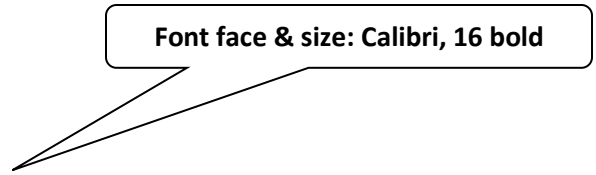
Annex C: Approval page

The advisor and examiner name and signature should be left blank as shown in the approval page format given below:



Project Title

(Headline form; bold; size 16; type Calibri)



[Members' List] (*in bold and capital letters***)**

Approved By:

Advisor:	**Signature:**
_____	_____
Examiner:	**Signature:**
_____	_____