Thesis Structure

**Cover page Should not have page number**. **If you start numbering from the cover page, only the first 90 pages will be evaluated. Nothing beyond that.**

**Starting from abstract to list of abbreviations must use a different numbering system (ex: roman numerals).**

**Introduction to conclusion will be the main content that has 90 pages (these will use the regular indo-arabic numbering).**

**Follow TTT**. **Tell what you are going to tell; Tell it; Tell what you told. Do not put any table/figure that is not done by you or add unnecessary definitions/theory as this can simply be cited.**

**All diagrams must have a small description describing what it illustrates.**

**Do not put important things in the appendix. Examiners usually do not even look at the appendix. Only additional things should be placed in it.**

1. Cover page
   1. Use the standard cover page provided in [google drive](https://docs.google.com/document/d/1xmtpo0_tc67Q9eMlWcS4I-yvJV8Oagd8/edit), but remove the copyright.
2. Abstract
   1. 3 paragraphs. Two thirds of the page:
      1. First paragraph: Problem
      2. Second paragraph: How did you solve the problem (the technical aspects only ex: how did you come up with a CNN and its layers, if in case you used a CNN).
      3. Third paragraph: Test results (not unit/performance tests rather the data science metrics that you used if it is a data science project).
   2. Keywords
   3. Subject Descriptors
3. Declaration page
4. Acknowledgement
5. Table of contents
6. List of figures
7. List of tables
8. List of abbreviations
9. **Introduction**
   1. Chapter overview
   2. Problem background/domain
      1. Divide this into subtopics and discuss separately. Maximum of 1 and half pages and well cited.
   3. Problem definition
      1. Half a page to two-thirds of the page. Well cited.
      2. Problem statement. The problem in a nutshell in one statement.
   4. Research motivation
      1. Can be personal
   5. Research gap
      1. What is the gap and clearly justify why is it a gap.
         1. Use point forms (split it into multiple paragraphs rather than putting the entire thing in a single paragraph).
         2. State the gap, bring in your justification. If you have multiple justifications, for each have a separate heading.

Note: The reason this is done is to make reading easy.

* 1. Contribution to the body of knowledge
     1. Contribution to the research domain
        1. If you have multiple contributions have headings for each, and bring in evidence. This applies to the problem domain contribution as well.
     2. Contribution to the problem domain
  2. Research challenge
     1. There can be multiple challenges. Make the challenge itself **bold** and justify each in a separate paragraph.
  3. Research questions

Note: make it specific to your research project. Answering these questions is your project.

* 1. Research aim

Note: Design, Develop, Evaluate .... This is one sentence. State design develop and evaluate and then elaborate the aim in the next paragraph.

* 1. Research objectives
     1. Start from **problem identification** not from literature review.
     2. The objectives must be **SMART** (Specific, Measurable, Achievable, Relevant, Time bound).
     3. Have a detailed list of research objectives, because these objectives are like a checklist that must be very specific to your research and not generic. Once you have completed this checklist your project can be considered complete.
     4. They must be mapped with the research question and the learning outcomes. The learning outcomes can be found in the [module proforma](j)Functional%20requirements).
  2. Chapter summary.

1. **Literature review**

This chapter is more user-specific so there is no specific structure to be followed.

* 1. Chapter overview
  2. Concept map
     1. can move to appendix with a reference link here.
  3. Problem domain
     1. You can rather give it a name, rather than stating it as “Problem domain”.
     2. Must go from 3-4 pages and **must not repeat the introduction chapter’s content**.
     3. This is in-depth while in chapter one its only a background.
  4. Existing work
     1. Can be divided into sub-topics and discussed.
  5. Technological review
     1. **Every aspect of the project must be reviewed**. For instance, for an ML project, not only the algorithm must be reviewed, rather each stage must be reviewed. This includes the preprocessing, hyperparameter tuning, and evaluation stages etc.
  6. Evaluation and bench-marking
  7. Chapter summary

1. **Methodology**
   1. Chapter overview
   2. Research methodology
      1. Simply citing Saunders here is enough without having to put any definition/theory.
      2. State your selection in each layer and justify what you have selected.
   3. Development methodology
      1. State the methodology you have selected and justify why you have selected it over the other.
   4. Project management methodology
      1. State the methodology you have selected and justify why.
      2. Schedule
         1. Gantt chart
            1. Can be placed in appendix.
         2. Deliverables and dates
   5. Resources
      1. hardware resources
      2. Software resources
      3. Technical skills
         1. New technical skills that you have acquired. Do not put soft skills such as report writing and presenting.
      4. Data requirements
   6. Risks and mitigation
   7. Chapter summary
2. **Software requirements specification**
   1. Chapter overview
   2. Rich picture
   3. Stakeholder analysis
      1. Stakeholder onion model
      2. Stakeholder viewpoints
   4. Selection of requirement elicitation methodologies
      1. Select the methodology and justify why over the others.
   5. Findings
      1. Findings of each methodology separated.
      2. Order it based on the importance of the methodologies (ex: Literature review; Interview; Survey).
   6. Summary of findings
   7. Context diagram
   8. Use case diagram
   9. Use case description
      1. Must be created for all use cases. Place only the main ones in the report and move the rest to appendix.
      2. For each alternative flow you might have to write a use case specification. You might have more use case specifications than what is shown in the use case diagram.
   10. Requirements

Must follow the MoSCoW principle (Must have, Should have, Could have, Will not have)

* + 1. Functional requirements
    2. Non-functional requirements
  1. Chapter summary

1. **Social, Legal, Ethical and Professional issues (SLEP)**

The [BCS code of conduct](https://www.bcs.org/media/2211/bcs-code-of-conduct.pdf) must be reviewed and detailed if any of the mentioned SLEP issues have been faced and how they were mitigated. Must be very specific to your project.

Putting anyone’s name (ex: the ones who you interviewed) requires written consent.

* 1. Chapter overview
  2. SLEP issues and mitigation
     1. Social issues
     2. Legal issues
     3. Ethical issues
     4. Professional issues
  3. Chapter summary

1. **Design**
   1. Chapter overview
   2. Design goals
      1. These are the important quality attributes that are very specific to your architecture that must be considered when designing your architecture.
      2. Can be moved to the appendix and put a reference link here.
   3. System architecture design
      1. Either tiered/layered architecture design.
      2. Explain each tier/layer
   4. Detailed design
      1. Choice of design paradigm
         1. Either SSADM/OOADM state and justify why.
      2. For OOAD - Component diagram; class diagram. For SSADM = data flow diagrams.

Note: Diagrams may differ based on the design paradigm and on the project.

* + 1. Algorithm Design
    2. For a CNN project, how you designed the layers can be put here.
    3. UI Design
       1. Low fidelity wireframes
       2. High fidelity prototype

Note: These can be moved to the appendix. Either you can have the UI Design in the design chapter or the actual UI in the implementation chapter. It is not necessary to have both in the report. Either have the actual UI or the design in the report, the other one can be moved to the appendix.

* + 1. System process workflow
       1. flow chart or activity diagram
    2. Chapter summary

1. **Implementation**
   1. Chapter overview
   2. Technology selection
      1. Technology stack
         1. Take the architecture diagram, remove the contents within each tier/layer, and at each tier/layer add the technologies instead.
         2. This can contain everything you have used (IDEs, frameworks, libraries etc.)
      2. Data selection (for data science projects)
         1. If there are multiple options justify why you selected a specific one
      3. Selection of programming language
         1. Select and justify why over the other.
      4. Libraries you have selected
         1. Choose and justify why over the other.
         2. No need to compare and contrast. If you have done so these can be put in literature review or appendix. Same applies to frameworks you have selected.
      5. Frameworks you have selected
         1. Choose and justify why over the other.
         2. Can be further divided as you wish (ex: UI framework, Data persistence framework, API framework).
      6. IDEs
      7. Summary of technology selection (in tabular format)
   3. Implementation of core functionalities (this is specific to your project)
      1. Put a screenshot of the code (to avoid plagiarism) and briefly explain what you have put. Do not take screenshot of the entire window, rather take screenshot of only the code what you are going to briefly explain about.
      2. Separate each section if required.
      3. If there is not enough space, prioritize and put the most important in the report and the balance in the appendix.
   4. User interface (if its important or if you have not put the wireframes in design chapter)
      1. If there is not enough space you can move it to the appendix.
   5. Chapter summary
2. **Testing**
   1. Chapter Overview
   2. Objectives and Goals of Testing
   3. Testing Criteria
   4. Model Testing (If Data Science Project – **Model Evaluation**,can change based on the project)
      1. Confusion Matrix
         1. Accuracy
         2. F1 Score
         3. Precision
         4. Recall
      2. AUC/ROC Curve
   5. Benchmarking (If Data Science Project)
   6. Functional Testing
   7. Module and Integration Testing
   8. Non-Functional Testing (Changes based on the nature of the project – related to prioritization of non-functional requirements in the RE chapter)
      1. Accuracy Testing
      2. Performance Testing
      3. Load Balance and Scalability
      4. Security Testing
   9. Limitations of the testing process
   10. Chapter Summary

1. **Evaluation**
   1. Chapter Overview
   2. Evaluation Methodology and Approach
   3. Evaluation Criteria
   4. Self-Evaluation – (Your own evaluation of your work)
   5. Selection of the Evaluators
   6. Evaluation Result
      1. Expert Opinion – (Evaluate with experts, 5 technical experts and 5 domain experts, sub topics below depend on applicability)
         1. Domain Experts
            1. Concept
            2. Solution
         2. Technical Experts
            1. Scope
            2. Architecture of the Solution
            3. Implementation of the Solution
      2. Focus Group Testing – (with customer/user – depends on applicability)
         1. Prototype Features
         2. Usability – (if the solution is based on end user)
   7. Limitations of Evaluation
   8. Evaluation on Functional Requirements
   9. Evaluation on Non-Functional Requirements
   10. Chapter Summary

1. **Conclusion**
   1. Chapter Overview
   2. Achievements of Research Aims & Objectives (Based on chapter 1)
   3. Utilization of Knowledge from the Course
   4. Use of Existing Skills (What is learned from the course applied to the project)
   5. Use of New Skills (What you have learned through the project – Not part of the curriculum) – Technical skills should be given preference
   6. Achievement of Learning Outcomes
   7. Problems and Challenges Faced – Need to mention how did you overcome the problems and challenges
   8. Deviations – Any deviations from the original plan should be mentioned and justified
   9. Limitations of the Research – Should be linked with the test output
   10. Future Enhancements
   11. Achievement of the contribution to body of knowledge
   12. Concluding Remarks

References

Appendix

Appendix 1, 2,3,4,5 – Anything related to the project (limitless pages)

**Divide your entire thesis into three parts**

Part 1 – Coversheet to List of Glossaries (For numbering use lowercase roman letters)

Coversheet no number

Numbering starts from the abstract to list of glossaries

Part 2 – Introduction to Conclusion **(90 pages maximum)**

References (not bibliography) – References are the ones which correspond to the citations in the document, referencing style is Harvard reference, **not included in the 90 page count.**

Part 3 – Appendices (Numbered using uppercase roman letters)

Appendix 1 onwards (no limit for page count when comes to appendix)

Note – Above is just an indicative structure of your thesis. The topics and sub topics might change depending on the type of project that you do. At the end you need to cover everything that is necessary as for the marking scheme. How you cover and what you cover is up to you as far as there is a logical flow.