MASTER OF INFORMATION TECHNOLOGY (GENERAL)/ MASTER OF COMPUTER SCIENCE

DISSERTATION GUIDELINES

MIT(GENERAL)/MCS 3101 – INDIVIDUAL WORK

VERSION 8.3 (DRAFT)

(LAST UPDATE 6TH NOVEMBER 2015)

By MIT (General) & MCS Dissertation Coordinators

Dissertation Guidelines

Each author is required to submit the Dissertation **by the published deadline on the PGVLE.** The Dissertation should be submitted to the **Examination Branch** of the UCSC.

Dissertation Evaluation Process & Rubric:

The following are **COMPULSORY** for submitting a dissertation (MIT/MCS) for evaluation.

- Approved Dissertation proposal
- Interim Report Submission
- Monthly Progress Reports

Marks allocated for Dissertation is **50%** and for Defence/Viva is **50%**. It is important to note that the Dissertation & Defence/Viva are **compulsory** components of the work and candidate should **score at least 50% of marks allocated for each component**.

The Dissertation should be carried out according to the guidelines provided.

You are required to submit your Dissertation at **two stages**.

1. As of the deadline specified on VLE for dissertation evaluation (**spirally bound**)
2. Upon **successful** viva and dissertation components (**hard bound**)

Stage 1:

Two (2) copies **(spirally bound)** of the **final dissertation** should be submitted for evaluation. This dissertation would be evaluated by a panel of examiners. Feedback would be provided to the author upon the completion of the viva process.

Stage 2:

Two (2) copies **(hard bound)** of the dissertation after incorporating the examiners' feedback should be submitted to the examination branch if you were successful at the dissertation evaluation stage. One copy is for the library and the other is for the candidate. Also note that the dissertation results will be released **once the hard bound copies were submitted** to the UCSC examination branch by the announced deadline in the PGVLE.

Along with the Dissertation you ***should submit*** One (1) copy of the duly filled and signed ***Dissertation Submission Form*** **separately** at the time of submission.

The guidelines for contents of the Dissertation are detailed in the following sections.

Basic Formatting Guidelines

Cover

The Dissertation submitted for evaluation should be **Spiral Bound**. It is **NOT** necessary to laminate the cover page or include plastic cover sheets. The title, the author's name, index number and the year of submission should appear in the front cover. Templates for these pages will be available on the PGVLE.

The **Final Dissertation** should be **Hard Bound** and it must have a **dark black cover**. The title, the authors name and the year of submission should appear in the front cover and in the spine in **gold** letters. All text should be centred. The year of submission, the degree for which the thesis is submitted, and the name of the author with initials should also be in gold lettering and in a single line on the spine, running lengthwise in that order from the top. The dissertation should be bound with **two blank sheets**, one each on the inside of front and back cover. Templates for these pages will be available on the PGVLE.

Paper

Each copy of the Dissertation shall be on good quality **A4-sized** clear white paper having at least 80 gsm. Printing should be carried out on **both sides** of the paper.

Font

The general text should be in **12 point Times New Roman**. Chapter headings should be in **16 point** size and subtitles should be in **14 point size**.

Line Spacing

The typing should be with a line spacing of **1.5**. Candidates may choose an appropriate spacing for the **appendices** and it should appear **after** the references.

Margins

Top, right and bottom margins should be equivalent to **2 cm**. The left margin should be **3 cm**.

Pagination

Pages should be numbered consecutively throughout the Dissertation. First page, cover page and title page should **not** be numbered. **Starting** with statement of declaration, abstract, acknowledgements, table of contents, list of figures, list of tables and list of abbreviations should be numbered with **lower case roman numerals** beginning with **i** for the page. General numbering should start with the **Chapter 1** in **Arabic numerals**. All page numbers should be placed on the **bottom** in the middle of the page.

Dissertation Structure

There is no single Dissertation structure applicable to the wide range of work undertaken by the candidates. The example structure given can be adapted based on the nature of the work in consultation with the work supervisor. Before diverging significantly from the given structure you are advised to consult the supervisor and also to refer to the aspects covered in the thesis marking sheet.

In general, all Dissertations should be divided into a set of logical sections, each with appropriate titles. You may consult **your supervisor** should you have any clarifications regarding the structure of the dissertation.

The following pages are **mandatory**:

FIRST PAGE

Use the first page template and the contents published in the PGVLE.

Cover Page

The cover page should include the **full title** of the dissertation, the **author's name with initials** and the **year of submission**. A template of a Cover Page is available in the PGVLE.

Title Page

The title page should include the **university crest**, the **full title** of the Dissertation, the **author's name**, **degree** for which the Dissertation is submitted, the **full name** of the UCSC and the **year of submission**. A template of a Title Page is available in the PGVLE.

Declaration Page

The Dissertation must contain the signed and dated statement of originality and conformity by the candidate and the supervisor. It is necessary to include the **author's registration** and the **index number** after the author's name. A template of a Declaration Page will be published on the PGVLE.

Abstract

The abstract should be written in A4 page and it should **not** exceed **one** A4 page.

The abstract is an **important** element in the dissertation and should cover the entire work, not a simple introduction or a summary. The abstract should be a concise description of the problem addressed in the work, the methodology, results obtained, and conclusions. It should help a prospective reader decide whether to read the entire dissertation or not. The abstract may be the only available part of your dissertation that the readers can obtain via electronic literature searches or through published abstracts. Therefore, only the important aspects should be included to make the abstract useful to someone who may to reference your work. When writing the abstract use the active voice when possible, but much of it may require passive constructions. The abstract contains only text and should **not** contain lengthy background information, references to other literature, figures, quotes, elliptical (i.e., ending with ...), incomplete sentences, abbreviations or terms that may be confusing to readers, any sort of illustrations, figure, table, or references to them.

You are advised to read on *how to write an abstract* and *what to include* etc on web as abstract is an **important component** of the dissertation.

Acknowledgements

It is expected of the candidate to acknowledge all persons and organizations that facilitated the work described in the Dissertation.

Table of Contents

This should list all the chapters, sections, and subsections of the dissertation giving the page number on which each starts. You are required to use the **word processor's tool** for generating table of contents rather than manually typing titles and page numbers.

List of Figures

A list giving the figure number, caption and the page number should be provided. You are required to use the **word processor's tool** for generating List of Figures. All figures **should be cited** in the main text and no figures should exist in the report without cross referencing in the text.

List of Tables

A list giving the table number, caption, and the page number should be provided. You are required to use the **word processor's tool** for generating the list of tables. All table **should be cited** in the main text and no table should exist in the report without cross referencing in the text.

List of Abbreviations

Abbreviations used in the Dissertation should be listed. Common terms that are obvious should not be included in the list.

Dissertation Categories

- Implementation category is **only** applicable to MIT(General) while Research/Innovative Application category is applicable to **both** MIT(General) and MCS. MCS work shall **only** include either Research or Innovative Application type.
- Implementation type include general application development.
- Research category shall contain computer science academic type research work.
- Innovative Application category shall include Research and Development type work.
- Supervisor shall categorize the project into the appropriate category therefore candidates are advised to consult the supervisor in the process of compiling the dissertation. Upon supervisors' approval for the category the **dissertation shall be evaluated according to the assigned category**.

Chapter 1: Introduction

The introduction chapter should provide the overview of the work in a manner that motivates the reader. It is very important to define the problem clearly and concisely.

This chapter puts the work into context. Having read it, the reader should be able to get an idea on the:

- area of study
- rationale
- key information on already available systems/published research
- author's approach to the problem.

The introduction chapter shall contain sections such as Motivation, Statement of the problem (if research type), Aims and Objectives, Scope and Structure of the Dissertation.

- Research Type: Author should include contribution/novelty/innovation in addition to the other aspects.

The chapter shall conclude with the structure of the dissertation section.

Chapter 2: Background/Literature Review

This chapter shall give essential background information referring to published material in research papers, URLs(from credible sources), magazine articles and similar. Depending on the type of the work, this chapter may include **one** of the following:

- **Implementation Type**: A concise summary of the background information to the implementation shall be presented in this chapter. In addition, a critical review of similar systems available (open source and proprietary) and technologies available and relevant implementation. You should **not** include any standard text book material, definitions (terms, technology, platforms etc.). However it is necessary to identify alternative technology options relevant for the implementation and their pros and cons. The review should not be limited to the technology used to implement and it is necessary to demonstrate the understanding of the alternative options available. Subsequently the selected technologies(s) shall be justified in the implementation chapter with references to the discussion in this chapter. Taxonomies and tabulated comparisons may be used in summarising the findings. In presenting summaries of technology benchmarks in Journals and conference publications, reputed magazines etc. shall be cited. It is important to **cite the reference**s in this chapter appropriately. A concise summary of implementation tools review may be included at the end of background chapter

- **Research/Innovative Application Type**: Critical review of similar research published in recent years in credible publications such as journals and peer reviewed conferences etc need to be included in this chapter.
  ***A literature review*:** A good literature survey should demonstrate your awareness and understanding of the background literature relegated to work. It should begin by setting the proposed work in a wide context, and progress to a more detailed account of the **most relevant work in the area**, taking care to include **up-to-date references**. Reviewing the literature can help to identify questions and issues that have not yet been addressed in the area of study, ideally questions that will be addressed through your work. It may also be appropriate to incorporate criticisms of previous work, although you need to take care here that your criticisms do not reflect a lack of proper understanding.

  Candidates are encouraged to refer web on how to conduct "literature review" and academic writing style. Contents of this section should not just provide a list of references followed by a short summary of each of them. Instead the review should be organized and structured in a meaningful way, and the themes and relationships between the references identified. It may be necessary to redraft the review several times in order to arrive at a text that is clearly written, easy to understand, and **displays an in-depth understanding of the area of research**. The review would include taxonomies, tabular comparisons of past work, approaches etc. In summary, you should consider the following points when writing your literature review:
  In the case of Innovative Application Type work, in addition, a critical review of similar systems available (open source and proprietary) and technologies available and relevant implementation. You should **not** include any standard text book material, definitions (terms, technology, platforms etc.).

However it is necessary to identify alternative technology options relevant for the implementation and their pros and cons. The review should not be limited to the technology used to implement and it is necessary to demonstrate the understanding of the alternative options available. Subsequently the selected technologies(s) shall be justified in the implementation chapter with references to the discussion in this chapter. Taxonomies and tabulated comparisons may be used in summarising the findings. In presenting summaries of technology benchmarks in Journals and conference publications, reputed magazines etc. shall be cited. It is important to **cite the reference**s in this chapter appropriately. A concise summary of implementation tools review may be included at the end of background chapter

- The literature survey should be focused and concise. Only references that are directly relevant to the work should be reviewed.

- A literature review is not undertaken for its own sake; it is included in a dissertation because it allows you to demonstrate that you have an in depth understanding of the background.

- References should **not** be reviewed simply by listing each source of reference in turn and writing a short paragraph on individual paper leading to chronological list of summaries. Rather, the themes and relationships between reference sources should be identified (i.e; the literature review should be organized in a useful and meaningful way.)

- The literature survey should be up-to-date. There should be evidence that the author has read recent literature in the relevant field.

- The citations should be properly included in the text where appropriate. It is advised you refer to **IEEE citation** style in text. Note that there is a clear difference between a list of references and a bibliography.

Chapter 3:
Implementation Type: Analysis and Design

This chapter will demonstrate the use of sound software engineering principles throughout the work.

Analysis: This chapter shall include the aspects related to the Software Requirement Specification. The contents shall include appropriate sections to the analysis of the proposed application. Rather than including a long list of diagrams, only the high level diagrams of analysis shall be included with appropriate descriptions and any detailed diagrams shall be included in the appendices and they shall be referred in the description.

Design: There should be evidence of a methodical approach to the design of the solution. You should discuss alternative solutions and one should be selected based on sound justifications. Coherent and logical arguments are encouraged with respect to the selection with justification. This chapter should include the design aspects such as software architecture, database design, user interface design, security design (if any) etc. Appropriate diagramming artefacts such as UML diagram, entity relationship diagrams, process flow diagrams, software architecture, user interface design, pseudo codes for specific algorithmic components (if any) should include in the design. Description shall include how the software engineering concepts such as life cycles, design patterns etc. have been adopted in the design. Rather than including a long list of diagrams, only the high level diagrams of analysis shall be included with appropriate descriptions and any detailed diagrams shall be included in the appendices and they shall be referred in the description.

Research Type/Innovative Application: Methodology

This chapter is an important chapter in a research/Innovative Application type work and the methodology shall be detailed well. Aspects relating to the proof of concept specification which includes process flow diagrams, design assumptions relating to the scope of the proof of concept, prototype architecture, algorithmic design details etc shall be included. A key aspect to be detailed would be the algorithmic contribution made in a research type project.

For research type work a critical analysis of the problem under investigation is required.

Chapter 4: Implementation

This chapter shall include the aspects such as selection of implementation technology (languages, platforms frameworks, platforms etc.) and the justification for the choices. A **few** screen shots/images of the most important areas of the user interface shall be included. Trivial elements of the user interface such as the login screens should not be included. Areas such as sample reports (text and graphical) generated from the application shall be included among the figures. However only a few images should be included rather than a long list of screen shots of the application. Description of the software engineering aspects used in the implementation such as design patterns etc. shall be included in the text. Source Code **should not** be included. However any specific important code segments shall be described using the notations used to present algorithms in academic writing. You are encouraged to see web and sources provided in this document on how to present the implementation chapter in a dissertation. The text may also include how implementation was carried out and existing tools have been extended (if any) or used, etc.

Chapter 5:
Implementation Type: Evaluation and Testing

This is an important chapter of the dissertation which presents the user evaluation and testing of the application. Usability testing/Evaluation shall include the aspects such as sampling of subjects, evaluation scenarios, tools such as questionnaires, etc. The results obtained shall be critically analysed with tabulated data and charts of analysis. A mere list of charts/tables would **not** be sufficient and a good critical review of the results obtained need to be presented as a description. The chapter shall also include aspects such as test plan, test cases, use of test automation tools and testing frameworks. The test cases and test plan etc shall be included in the appendix and be referred in the text in this chapter. The following example URLs highlights aspects of such testing.

- http://www.usability.gov/how-to-and-tools/methods/planning-usability-testing.html
- http://www.usabilityfirst.com/usability-methods/usability-testing
- http://www.softwaretestinghelp.com/usability-testing-guide/
- www.usability.gov/sites/default/files/usability-test-plan.docx

Research Type/Innovative Application: Evaluation and Results

- This is an important chapter of the dissertation which presents the findings and the evaluation of the proof of concept prototype/Novel Application. Chapter may include aspects such as evaluation protocol, results obtained and critical evaluation of the proof of concept. Evaluation protocol shall include the aspects such as sampling of subjects, evaluation scenarios, tools used such as questionnaires, etc. The results obtained shall be critically analysed using appropriated statistical methods. A mere list of charts would **not** be sufficient and a good critical review of the results obtained need to be presented. Some work shall also include performance analysis using profiling tools.

The following URLs contain some useful important information on userbility evaluation

Usability Evaluation of User Interfaces by Melody Ivory on http://goo.gl/KKx6ou

Chapter 6: Conclusion and Future Work

This chapter summarizes the work, discusses its findings and contributions, points out limitations of the current work, and also outlines directions for future research. This is an important chapter in a dissertation therefore you are encouraged to refer web on how to write the conclusion chapter. The chapter may include aspects such as major findings, lessons learnt, and achievement of objectives, how the work could be extended. The future work should not be a mere list functions rather author's recommendations on areas for improvements and how the work would be extended. The research type dissertation need to highlight the contribution made in the work and novel applications need to highlight benchmarking of the work with already available similar applications.

References

References and citations should be included according to the IEEE format given in the File called "Masters_Work_IEEE-ReferenceGuide.pdf". This file is available on the PGVLE.

You are required to use the **word processor's tool** for generating references rather than manually typing their details and citations.

Appendices

Appendices contain the material that is related but supplementary to the main work. Adopt a system of lettering appendices and keep to the system. For example, the first appendix referred to in the main text could be 'A', the second 'B', etc. Similarly, if you give one appendix a title, name any others. A list of appendices should appear after the Contents page.

Examples of appendix materials:

- User Manual
- User evaluation Tools (e.g. questionnaires)
- Test plan and Test cases
- Detailed Design Diagrams
  The source code should not be included in Appendices or dissertation and may be included in as a softcopy with the final dissertation. Source code will be examined during the viva.

General Points on Writing Style

- An introduction to each chapter and a summary at the end of each chapter shall be included except for the first and the last chapters.
- Omit needless words—redundant modifiers, pompous diction, excessive detail.
- Avoid stringing nouns together (make the relationship clear with prepositions).
- Eliminate "narration," expressions such as "It is my opinion that," "I have concluded," "the main point supporting my view concerns," or "certainly there is little doubt as to. . . ." Focus attention solely on what the reader needs to know.
- It is recommend to read a couple of good dissertations on web to understand how to write and what to include in each chapter.
- It is important to perform through proof reading several times by another person to check the appropriateness of formatting compliance, grammar, spelling mistakes, incorrect punctuations and writing style etc.
- Minimize the use of bullets a common mistake would be to include bullets all over. The description has to be written in paragraph style mostly with few bullet points. The document should have a flow like a narration throughout.
- First chapter concise and should not include a large segments of background material.
- It is important to use the recommended referencing style (IEEE) diligently. Care should be taken to avoid sources such as Wikis, blogs, other sources which may not be credible.
- Should have sufficient number of good quality references in the dissertation. It preferred to have up-to-date references from recent years.
- Each chapter should start in a new page.
- Avoid sections with one or two sentences. Either merge sections or elaborate with sufficient text to be a section.
- All equations should be numbered and cited in the text.
- Any diagrams, images that are not created by the author should have a citation to source in the figure, table caption. However such elements should be minimized in the report.
- Sub section numbering should not exceed three levels of hierarchy.
- It is necessary check consistency in the use of capital and simple in headings and captions of the figures, tables.
- You are advised to strictly follow the formatting guidelines such as line spacing, margins, font sizes etc.
- Motivation is not the author's personal motivation to learn some technology etc. It is the rationale behind the study or Significance/importance of the work. Author may cite statistics, references if necessary.
- Sentences should cite to source of reference in the correct place. It is a common mistake to cite references at the end of each paragraph throughout.
- Avoid making superficial claims in without proper understanding and without reference to literature.
- It is advised to see web on how to present aims and specific objectives
- It is important to avoid writing styles like simple essay writing, use of informal slang with marketing terms/claims.
- It is important to read the sources such as the following in order to understand the academic writing
  1. **Writing for Computer Science**, By J. Zobel
     (**pdf book available on** http://goo.gl/iqYryb)
  2. Tips for Academic Writing and Other Formal Writing
     http://homepages.inf.ed.ac.uk/jbednar/writingtips.html
  3. Advice on Academic Writing
     http://www.writing.utoronto.ca/advice

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