Department of Computer, Information Sciences and Mathematics
School of Arts and Sciences
University of San Carlos

Thesis Project Guidelines and Document Format

This thesis proposal document format aims to guide the research students of the Department of Computer, Information Sciences and Mathematics in writing research proposal. Comments and suggestions are continually welcome for the improvement of the research program.

Prepared by:

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CS Thesis 2 Professor

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Section 1. What is Thesis?

THESIS

- Thesis is required for BSCS. It functions as terminal project requirements that would not only demonstrate a student's comprehensive knowledge of the area of study and research methods used but also allow them to apply the concepts and methods to a specific problem in their area of specialization.

- A thesis builds and tests the skills and the knowledge acquired during the education and is an essential part of the training towards becoming a professional.

- Content must be focused on the concepts and theories of computing and it should be in the form of scientific work that may be presented in a public forum.

- Software development projects / special problems

- It may include:

  - A solution
  - An appropriate or partial solution
  - A scientific investigation, or
  - The development of results leading to the solution of the problem

- These solutions, investigations, or results must be anchored on Computer Science principles.

- A thesis that is heavily software systems development should clearly demonstrate a software development that is algorithm-based and founded on Computer Science principles.

- It is expressly understood that Computing Thesis and Capstone Projects need not require surveys, statistics, and descriptive methods, unless appropriate.

Research in Computing

- Systematic method of problem solving

- Use of scientific method

  - Collecting data
  - Formulating a hypothesis or proposition
  - Testing the hypothesis
  - Interpreting results
  - Stating conclusions that can be later be evaluated independently by others.

Section 2. Scope of the Theses

- The Thesis should integrate the different courses, knowledge, and competencies learned in the curriculum. Students are encourages to produce innovative results, generate new knowledge or theories, or explore new frontiers of knowledge or application areas.

- Theses involving the development of the software systems should involve algorithm-based research and development founded on Computer Science principles. This should be reflected in the final report.

- The thesis **adviser should** determine the appropriate complexity level of the specific problem being addressed and the proposed solution, considering the duration of the project, the composition of the team, and the resources available.

Section 3. Suggested Areas for Theses

- **Current Computer Science Topics**
  - Software Development and Theory
  - Mobile Computing Systems
  - Software Extensions or Plug-ins
  - Expert Systems and Decision Support Systems
  - Systems Software (software tools/utilities, interpreters, simulators, compilers, security aspects)
  - Intelligent Systems
  - Game Development
  - Computer Vision
  - Image / Signal Processing
  - Natural Language Processing
  - Pattern Recognition and Data Mining
  - Bioinformatics
  - Graphics Applications
  - Cloud Computing
  - Parallel Computing
  - Embedded Systems
  - Emerging Technologies

- **Foundations of Computer Science**
  - Automata and Formal Languages
  - Data Structures and Algorithm Design and Analysis
  - Web Semantics
  - Coding Theory
  - Programming Languages
  - Visualization Systems
  - Computer and Architecture
  - Modelling and Simulation

- **Human Computer Interaction**

- Usability
- Affective Computing
- Emphatic Computing

Section 4. Suggested Themes for Theses

- The following are Research Themes or Agenda of University of San Carlos:

  - Food
  - Health
  - Water
  - Waste
  - Energy
  - Disaster and Risk Management
  - Governance
  - Education
  - Business

- How can Computer Science be able to contribute to these agenda?

Section 5. Thesis Duration

- Students are given ample time to finish their thesis.

- Students will enrol two semesters to complete their thesis

  - CS 3201N CS Thesis 1 (3 units)
  - CS 4101N CS Thesis 2 (3 units)

- An instructor is assign to handle the course and coordinate with Students and Advisers.

Section 6. Composition of Thesis Groups

- Students should preferably work in teams of two (2) members depending on the complexity of the project. The adviser should be able to determine whether the team can complete the project on time.

- Multidisciplinary teams are also encouraged, provided that team members prepare separate documentations per program

Section 7. Adviser Composition

Panel Composition

- The Project is prepared under the guidance of an adviser and presented and accepted by a Panel composed of at least 3 members: Chair of the Panel and 2 members of the Panel.

- Chair
  - policy same as Adviser's qualification, preferably domain expert
- Panel Member 1
  - Faculty Member with undergraduate or graduate degree ; Full time or Part time Faculty)
- Panel Member 2
  - Faculty Member with Industry Experience or Someone from the Industry

Adviser/Panel Composition

- The adviser must have at least a **Master's** Degree.

- The adviser must have completed a computing project successfully beyond bachelor's degree project or must have experienced and completed a Thesis.

- An adviser must have an experience in:
  - design and create algorithmically software
  - develop new and effective algorithms for solving computing problems.
  - design and develop computing solutions using a system-level perspective

- As much as possible, the adviser should be a full-time faculty member of the HEI. Otherwise a full-time faculty co-adviser is required.

- Advisers and Panel Members should have a degree in a Computing or Allied programs, or must be a domain experts in the area of study.

- At least one of the panel members must have a master's degree in Computing (preferably in the same field as the thesis or project) or allied program.

- For IT at least one of the panel members should preferably have an industry experience.

- The adviser must be able to guide the students throughout the whole project life cycle, including the thesis defense and possible project deployment.

Adviser's Role

- Must guide the advisee to conceptualize the Research Topic.

- Must be involved in the accomplishment of completion of (Chapter 1-4 of Proposal Document) and (Chapter 1-6 of Final Document).

- Must be able to guide the students throughout the whole project life cycle, including the thesis defense and possible project deployment.

- Must guide their advisees to secure the following (if applicable)
  - Ethics Clearance Form
  - Consent Forms

- Responsible to submit Student's work in Conference Proceedings or Journal.

Section 8. Presentation of the Thesis and Publication

- Thesis must be presented in a public forum.

- This forum may be an international, national, regional or school-based conference, meeting, or seminar that is announced and open to interested parties.

- A separate from the presentation before the Panel.

- There is an annual culminating event held at the end of the School Year: Best Thesis and Capstone Awarding Ceremony with Panel Members from the Industry.

- Additional requirements from students is to produce Paper in Publication format (for submission to conference o journal)

Section 9. Thesis Project Guidelines

- **Paper and Font.** Use 8.5 X 11. Use one side of the page only. Use Arial for font style and font size 12-point.

- **Margins.** Left 1.5 inches; top, bottom, and right, 1 inch.

- **Spacing.** Use 1.5 spacing for the text. Use single space for table, figure captions and each entry of the bibliography section.

- **Page Numbering.** Pages of the thesis pro include Title Page, ACKNOWLEGDEMENTS, ABSTRACT, TABLE OF CONTENTS, LIST OF FIGURES, LIST OF TABLES. Except for Title Page, pages are to be numbered in Roman numerals **ii, iii, iv..etc.** pages of the text itself (CHAPTER 1) should be numbers consecutively throughout in Arabic numbers, beginning with page number 1 on the first page of the first chapter or INTRODUCTION. Page numbers should be right aligned and place at the bottom of the page. Only the number should appear.

- **Figures and Illustrations.** Figures, tables, graphs, etc., should be positioned and labeled appropriately. Figure # should be placed bottom center of the figure. Table # should be placed upper left of the table.

  ### Figures:
    o A figure is any type of illustration other than a table (chart, graph, photograph, or drawing).

    o Use figures to complement information in text or to simplify text.

    o Number figures in the order they are first mentioned in text. Do not write "the figure above" or "the figure below."

    o Ensure that figures are simple, clear and consistent in presentation and vocabulary.

    o Ensure data are plotted accurately and the grid scale is proportioned.

    o Place labels close to the identified item.

    o Axis labels on graphs should be parallel to their axes.

    o Captions include the figure title and a brief, but descriptive, explanation of the figure.

    o Use 1.5 the caption and place it below the figure.

    o The figure legend should be positioned within the borders of the figure.

  Example

  The following figure and note are each adapted from the Publication Manual of the American Psychological Association (APA, 2001, pp. 182-183).
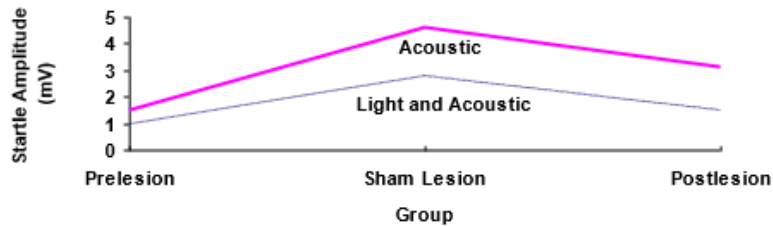
Figure 1. Mean amplitude startle response for prelesion, sham lesion, and postlesion groups in acoustic and light-and-acoustic test conditions.

Tables:

- o Use tables for the purpose of simplifying text. A table with 2 or fewer columns and rows should be presented in text format instead of a table.
- o **Number tables in the order they are first mentioned in text. Do not write "the table above" or "the table below."**
- o Be consistent in the formatting and vocabulary of all tables when writing a paper.
- o Apply 1.5 spacing of the entire table
- o Ensure that your table title is brief but explanatory.
- o Italicize the table title. Do not italicize the table number
- o Standard abbreviations and symbols, such as % or no. may be used in headings without further explanation.
- o Ensure each column has a heading
- o Capitalize only the first letter of the first word of all headings. If a word is a proper noun, however, be sure to capitalize the first letter anyway.
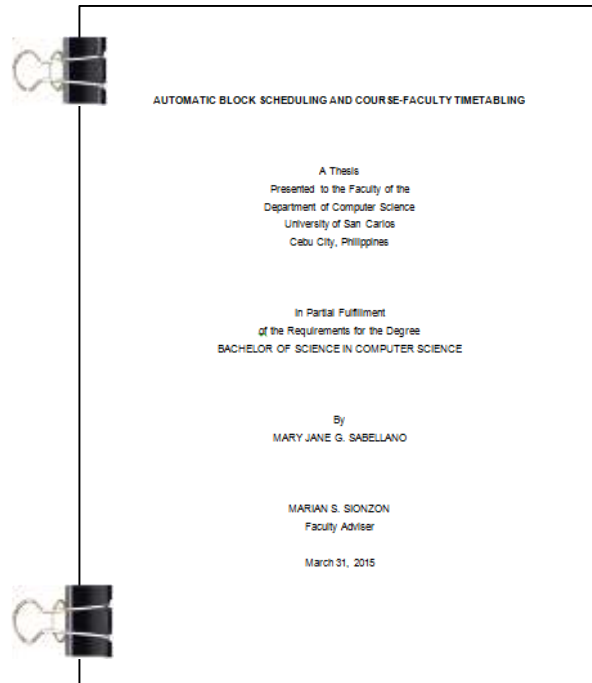
Example

See Table 1 as a guide to the formatting of a table. This table is an example from the Publication Manual of the American Psychological Association (APA, 2001, p. 149). The fictitious general note has been included as an example.

Table 1

Error Rates of Older and Younger Groups

Level of difficulty	Mean error rate		Standard deviation		Sample size	
	Younger	Older	Younger	Older	Younger	Older
Low	.05	.14	.08	.15	12	18
Moderate	.05	.17	.07	.15	15	12
High	.11	.26	.10	.21	16	14

- Submit 3 copies of your Thesis Project Document a week before Thesis Project Defense to the thesis project committee (if face to face defense). Bind your printed Thesis proposal document using clear folder with binder paper clip: (see illustration).

AUTOMATIC BLOCK SCHEDULING AND COURSE-FACULTY TIMETABLING

A Thesis
Presented to the Faculty of the
Department of Computer Science
University of San Carlos
Cebu City, Philippines

In Partial Fulfillment
of the Requirements for the Degree
BACHELOR OF SCIENCE IN COMPUTER SCIENCE

By
MARY JANE G. SABELLANO

MARIAN S. SIONZON
Faculty Adviser

March 31, 2015

- If online defense, send a complete copy of thesis project document a week before Thesis Project Defense to the thesis project committee.

Section 10. Thesis Project Documentation Format

(Sample Title Page)

MOBILE ATTENDANCE MANAGEMENT SYSTEM USING FACE RECOGNITION

A Thesis Project

Presented to the Faculty of the

Department of Computer, Information Sciences and Mathematics

University of San Carlos

In Partial Fulfillment

of the Requirements for the Degree

BACHELOR OF SCIENCE IN COMPUTER SCIENCE

By

CHARLES VAN RYAN S. FLORIDO

JEWEL JOSEF P. SENO

ANGIE M. CENIZA-CANILLO, PhD
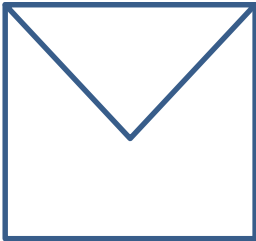
Faculty Adviser

June 2018

HARDBOUND COPY GUIDELINES

You are expected to send a PRINTING APPROVAL from your THESIS COURSE INSTRUCTOR **before submitting 3 BOUND copies of FINAL THESIS DOCUMENT**.

a. Please refer to **HARDBOUND COVER PAGE** and **HARDBOUND SIDE LAYOUT** Guidelines.

b. HARDBOUND COLOR: **YELLOW**

c. Submit **three (3)** HARDBOUND COPIES to your THESIS COURSE INSTRUCTOR

d. Make a video documentation of your Thesis Project with the following content:

- Introduction of the Researchers
- Title of the Thesis
- Purpose of the Thesis

e. Compile all necessary files in a CD such as: PDF format of Thesis Document, Video Documentation and Thesis

f. files (softwares, database, system project files and etc.)

g. Provide one CD for each Hardbound Copy enclosed neatly in a white envelope CD case. Attach it to the last page of the Hardbound copy. See illustration CD CASE and CD COVER.

HARDBOUND COPY SIDE LAYOUT

| USC | BSICT | <TITLE OF YOUR PROJECT> | MARCH 2013 |

CD CASE (WHITE ENVELOPE) ATTACHMENT AREA

HARDBOUND COPY FRONT COVER (INSIDE VIEW)	DOCUMENT PAGES	HARDBOUND COPY BACK COVER (INSIDE VIEW)

CD COVER

Thesis Project Title

Member1
Member2

CERTIFICATE OF AUTHORSHIP/ORIGINALITY

This is to certify that the authors are responsible for the work submitted in this capstone. The intellectual content of this capstone is a product of original work. Any assistance that the authors received in the preparation and work of the thesis itself has been acknowledged. In addition, the authors certify that the materials and literatures taken from other sources are properly quoted.

<author's name, signature and date>

<author's name, signature and date>

<author's name, signature and date>

<author's name, signature and date>

APPROVAL SHEET
This thesis entitled, **"MOBILE ATTENDANCE MANAGEMENT SYSTEM USING FACE RECOGNITION"** prepared and submitted by **CHARLES VAN RYAN S. FLORIDO AND JEWEL JOSEF P. SENO** in partial fulfillment for the degree of **BACHELOR OF SCIENCE IN COMPUTER SCIENCE**, has been examined and is recommended for acceptance and approval for ORAL EXAMINATION.

THESIS COMMITTEE

ANGIE CENIZA-CANILLO, PhD
Adviser

STEPHANIE B. POLINAR, MBA   VINCENT R. RACAZA
Member   Member

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Approved by the Committee on Oral Examination with a grade of **PASSED.**

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Member   Member

Accepted and approved in partial fulfillment of the requirements for the degree **BACHELOR OF SCIENCE IN COMPUTER SCIENCE.**

ANGIE M. CENIZA-CANILLO, PhD
Chair, Department of Computer, Information Sciences and Mathematics

December 8, 2022
Date of Oral Examination

ACKNOWLEDGEMENTS

This section of the thesis document may be written in first-person voice. One has to use one's own words in writing an acknowledgement. This section is an expression of thanks to those who contributed to the completion of the thesis project.

ABSTRACT

This section of the thesis highlights the findings of the study. From 150 to 200 words of short, direct and complete sentences, the abstract should be informative enough to serve as a substitute for reading the thesis itself. Do not put citations or quotes in this section. Avoid beginning the abstract with "This paper/document/thesis/study/project/…"

The abstract structure consists of the following:

Background: A simple opening sentence or two placing the work in context.

Aims: One or two sentences giving the purpose of the work.

Method(s): One or two sentences explaining what was (or will) be done.

Results: One or two sentences indicating the main findings (or what you hope to accomplish with the project).

Conclusions: One sentence giving the most important consequence of the work – what do the results mean? How will they be used?

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CHAPTER 1
INTRODUCTION

1.1 Rationale of the Study

This section begins discussing the research problem itself. This presents situations that lead to the conceptualization of the study. Convince reader why the problem is important. You may use statistics to add depth and add historical account of recent research literature within the past 5 years. Avoid verbatim quotes except for key definitions. This is a form of plagiarism even with citations!

Discuss key concepts and methods. Discuss the content in your own thoughts in your own words, confirmed by other background information. It is organized to move from general information to specific information. The background must be summarized succinctly, but it should not be itemized. Limit the introduction to studies that relate directly to the present study. End the introduction by explicitly declaring the novelty of your work or your specific contribution. The last sentence is usually a statement of your general objective.

Hint in organization: Start with the big picture about your topic, something that readers will identify in concrete term (non-technical), then limit the problem, gradually focusing on your topic and gently lead the reader to your research problem and justification for choosing it. (Funnel –shape structure).
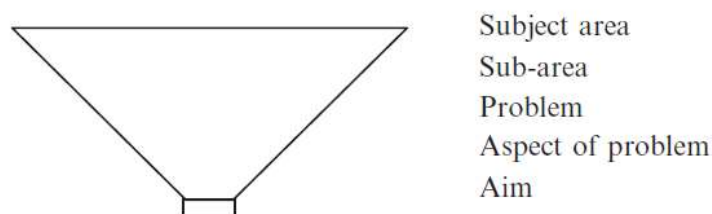
Figure 1. Funnel-shape structure of Introduction chapter

Format of citations and quotations will be based from the APA format. This section must be 1- 2 pages long.

Briefly you have three building blocks to present the overall picture: (1) important concepts and factors (2) motivations behind the aim and (3) the aim.

1.2 Statement of the Problem

This section states what the research intends to do. This section consists of 2 sub sections: General Objective and Specific Objectives.

1.2.1 General Objective

This section is a general statement or project aim written in a short statement in the form of a clear, unambiguous sentence describing the overall goal of the project. It describes the direction or purpose of the research. This general objective is a question or a problem definition within the subject area that the researcher would like to solve.

Example:

Develop a security infrastructure for electronic commerce based on XML

1.2.2 Specific Objectives

The specific objectives are the means on how to achieve the general objective. The specific objectives are usually presented as a numbered list of activities to carry out in order to achieve the general objective. Once you have developed your project aim you can start to develop specific objectives, and later also choose a method for each specific objective. Each objective is a small, achievable and assessable unit. It is formulated in such a way that fulfilling the objectives leads to the overall aim being satisfied.

This consists of clear statements of the intended outcomes, all which can be measured in some way. The SMART (Specific, Measurable, Achievable, Realistic and Time-bound) objectives should break your research proposal into major stages and state an output, which would guide you in planning and negotiating your work with your supervisor.
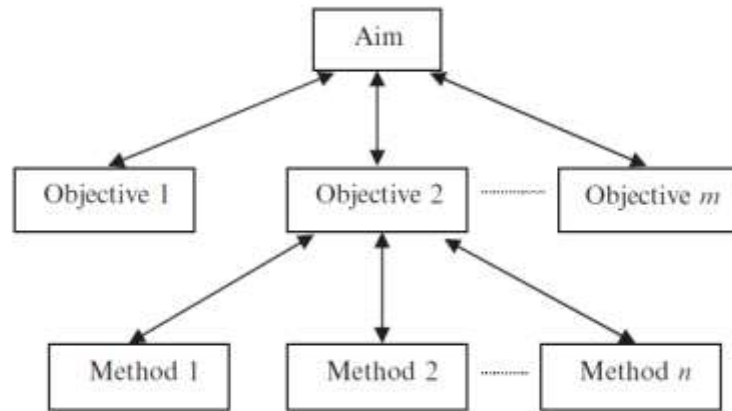
Figure 2. Depicts the relationship between your aim, objectives and methods.

Once you have written down your specific objectives, you can start to identify potential methods for each objective. Think in terms of: how can this objective be achieved or solved? When you have chosen the methods you intend to use, it can be useful to summarize your overall approach. This serves at least two important purposes. First, you will be able to get a bird's eye view of the methods you have chosen and see their relationships. Second, you will be able to present additional details of how you intend to use these methods in your project. Additionally, it will be easier for other people to grasp your approach if you have provided a summary of how you intend to structure your work.

1.3 Significance of the Study

This section presents the importance and contribution of the research to the individuals, groups, institutions and to the discipline. Mention who are to benefit from the research and how each maybe benefited.

1.4 Scope and Limitation

This section discussed the extent of the study and what limitations are there. This section must state the weaknesses and limitation of the study.

CHAPTER 2
REVIEW OF RELATED LITERATURE

This chapter is a review of research works done by others that relate to what you hope to demonstrate with your work. This is also where the literature related to methods that you used in your work should be introduced. This part of your thesis document will form the bulk of your citations.

This chapter is an examination and discussion of the literature and systems in a given area of study. It is a concise overview of what has been studied, argued, and established about a topic, usually organized chronologically or thematically.

It is more than an annotated bibliography or a summary, because you are organizing and presenting your sources in terms of overall relationship to your own study. It evaluates previous and current research in regards to how relevant or useful it is and how it relates to your own research. This chapter must be at least 5 pages long and must at least contain 20-30 author citations.

Suggested Content based from PSITE Undergraduate Research and Capstone Project Manual

- An organizational pattern that combines both summary and synthesis to give new interpretations of old material or combine new with old interpretations;
- A tracing of the intellectual progression of the field, including major debates
- An evaluation of the sources and an advise to the reader on which of the materials cited are the most pertinent or relevant in the thesis or capstone
- A review of related systems contains description of existing systems that are relevant to the proposed thesis.
- Discussion of specific features of other systems that you intend to replicate and improve will help define what is to be expected in your project.

Suggested Format from PSITE Undergraduate Research and Capstone Project Manual

- A logical flow of ideas
- Current and relevant references with consistent, appropriate referencing style
- Proper use of terminology

- An unbiased and comprehensive view of the previous research on the topic

Suggestion in organization: Usually starts in general and gradually progresses into published research most related to your specific research's emphasis. Describe the general themes in the research related to your topic. Any gaps in the published research are noted, particularly if the project addresses the gaps. The literature review moves from what is currently published and known about the topic to what your research is going to add to the topic. Include why the particular research focus is important and how it differs from previous research on the topic.

You may present figures and tables if necessary in this section. Figures must be labeled. Figure labels are placed at the bottom of the figure center aligned. Table labels are placed at the top of the table and left aligned.

For relevant sources refer to Journals in Computer Science or make extensive use of the online sources available in the USC library these include: ACM Digital Library, Academic OneFile, Proquest, Science Direct, EBSCO & Springerlink. For more information on how to use and access this online sources visit Josef Baumgartner Learning Resource Center (JB-LRC) and ask assistance from Serials Library Section.

CHAPTER 3
TECHNICAL BACKGROUND

This section may include a comprehensive discussion of **theorems**, **definitions**, **fundamental algorithms**, **mathematical models**, and/or **formulas** relevant in the study. This chapter should be elaborated as much as possible in layman's terms.

The technical background must be written in narrative form. **Subheadings are recommended** for descriptions that are substantially long. Items are arranged by order of importance or theme Aside from texts, the author may put tables, graphs, illustration, pictures and other relevant information as necessary (PSITE Undergraduate Research and Capstone Project Manual).

CHAPTER 4
DESIGN AND METHODOLOGY

The design is a blueprint of the concept of the proposed research project. It specifies the conceptual structure of what the project proponents will do. It provides an outline of the phases and sub-phases that will help the proponents be guided in their choice of techniques that are most appropriate at each stage of the research project. It will also help the project proponent plan, manage, control and evaluate computing research project.

The methodology is defined as collection of procedures, techniques, tools, and documentation aids which will help the proponents in their effort to solve computing problems. Contents of this chapter include the following section

4.1. Research Environment and Respondents *(if applicable)*
Research environment describes the locale/venue of the research.
Research Respondents define the study population and describes the type and characteristics of the respondents/participants. Describes the sampling technique used in selecting study subjects/participants and identifies possible limitations in the choice of respondents/participants

4.2. Research Instrument or Sources of Data *(if applicable)*
Describes the research instrument(s)/tools for gathering data and identify whether they are standardized or researcher-made. The description of the instrument(s) should describe the purpose of the instrument (what it is intend to measure), and available validity and reliability coefficients. Describes the content and preparation of each instrument. Describes other sources of data (e.g. records, documents). Identifies limitations of the research instruments and/or sources of data.

4.3 Research Procedure *(if applicable)*
This section consists of two subsections: Gathering of Data and Treatment of Data.

4.3.1 Gathering of Data

This section describes in detail the phases of data gathering employing the research tools described earlier. The description of procedures should describe in detail all steps which were executed in conducting the study. Consider the following in composing this section:

1. Did you use Qualitative or Quantitative data collection?
2. Did you conduct interview? survey or questionnaire? document review?
3. Respondents were interviewed several times?
4. What other source of relevant documents do you have? name it..

4.3.2 Treatment of Data

This part explains the procedures for processing and analysis of data. Describe the steps necessary in processing your data and the statistical procedures to be used to answer each specific sub-problem of the study. Include a justification of the statistical procedures used and state your level of significance. For qualitative data, include the methods on how data will be presented and analyzed. Consider the following in composing this section:

1. What tool will you use to analyze the data:
   - Consider using Statistical Softwares like IBM SPSS Statistics 19 (analyze using descriptive statistics) see tutorials available
2. How will you present the result of the analysis:
   - Presentation of data : tabular form, graphs or charts
   - SPSS can auto generate this

4.4. Concept

It is narrative description of the design to achieve your project objectives. Most of the concept is illustrated in a graphical diagram to visually present the structure of the concept of the research or project (conceptual framework)

4.5. Analysis and Design

It is either Structured or Object-oriented approach (introduce UML, ER Diagrams if possible).

4.6. Development Model

It may include any of the following models: Conventional waterfall-type, Incremental, Throw-away prototyping, Evolutionary prototyping.

4.7. Development Approaches

It may include either Top down or Bottom-up approach of development.

4.8. Software Development Tools

It should contain the discussion about the programming language tools to be used specifically on: Front and Back-end; Reuse or not; Open vs. licensed software; Criteria of selecting it such as maintainability, support, HCI capability, database connectivity, simplicity, learning.

4.9. Project Management

This section of the document includes subsections on Schedule and Timeline, Responsibilities and Budget and Cost Management.

Schedule and Timeline

It may contain Gantt Chart, Activity Graph, Critical Path Analysis and other scheduling techniques that will list the activities to be done in order to achieve the objective. Usually it includes the phases an its sub-phases of the systems development life cycle.

Responsibilities

It should contain the assignment modules and activities to be done by each team member

Budget and Cost Management

It should contain a detailed budget proposal and how each cost is to be managed effectively in the conduct of research or study.

4.9. Verification, Validation and Testing

It should include the plan of activities to: verify if you are developing the system right, validate if you are developing the right system, and test the system if it works correctly without any bugs or errors. Most importantly, use of any quantitative and qualitative measures should be planned in order to achieve the research projects specific objectives

The items 4.4-4.10 are suggested content from PSITE Undergraduate Research and Capstone Project Manual

Computing Science researchers use several methodologies to tackle questions within the discipline. The idea is not to classify researchers or projects in each of these methodologies or to be exhaustive. Tasks performed by a single researcher fall within different methodologies. Even the activities required to tackle a single research question may include several of these methodologies.

Scientific Methods of Computer Science

- **Formal Method** mostly used to prove facts about algorithms and system. Develop mathematical techniques to address questions. Discovery of more efficient algorithms in many areas including combinatorial problems, computational geometry, cryptography, parallel and distributed computing. They also answer fundamental questions about computability and complexity.

- **Experimental Method** broadly used in CS to evaluate new solutions for problems. Experimental evaluation is often divided into two phases. In an exploratory phase the researcher is taking measurements that will help identify what are the questions that should be asked about the system under evaluation. Then an evaluation phase will attempt to answer these questions. A well-designed experiment will start with a list of the questions that the experiment is expected to answer.

- **Build Method** consists of building an artifact either a physical artifact or a software system to demonstrate that it is possible. Design the software system, Reuse components, Choose an adequate programming language, Consider testing all the time.

- **Process Method** used to understand the processes used to accomplish tasks in Computing Science. This methodology is mostly used in the areas of Software Engineering and Man-Machine Interface which deal with the way humans build and use computer systems. The study of processes may also be used to understand cognition in the field of Articial Intelligence.

- **Model Method** is centered on defining an abstract model for a real system.
  This model will be much less complex than the system that it models, and therefore will allow the researcher to better understand the system and to use the model to perform experiments that could not be performed in the system itself because of cost or accessibility. The model methodology is often used in combination with the other four methodologies.

CHAPTER 5
RESULTS AND ANALYSIS

This section is the presentation and discussion of the result of each Specific Objective. For an organized presentation, provide discussion of results in separate subsections. This part of the thesis document, presents results in raw data, summarized and clarified in tables and figures. It is also a discussion what the proponent has found or built. May also include sample runs, performance analysis and comparisons. Describe architectural design and detailed design enhanced with UML model diagrams. Justify design decisions with supporting data collected. Describe the specific tools and techniques used. Describe testing and evaluation approach. Describe sample test plans and test and evaluation results.

5.1 Applicable Title related to Specific Objective no. 1

5.2 Applicable Title related to Specific Objective no. 2

5.3 Applicable Title related to Specific Objective no. 3

… 5

.N Applicable Title related to Specific Objective no. N

The result of each specific objective can be achieved in different methods or techniques. You need to identify, for each specific objective an appropriate method by which it may be reached. This does not mean using same method for addressing all specific objectives. The choice of method will have impact on both the quality of the resulting data and conclusions made with respect to the general objective (Berndtsson, Hansson, Olsson & Lundell, 2008).

Methods:

Literature Analysis

This method refers to a systematic examination of a problem, by means of an analysis of published sources, undertaken with a specific purpose in mind. In many projects there will be some need for a literature analysis. For example, if you have developed a program for analyzing genome data, then you will need to contrast your program with similar programs that have been reported in the literature. If you have, instead, performed a comprehensive literature analysis on work done for benchmarking database transactions, most of your work will be centred on analyzing the existing literature (e.g. making categorisations and detecting patterns). Hence, we dedicate a special section to validity and reliability issues that concern literature analysis, since it is

relevant to most projects. As already mentioned, in undertaking a literature analysis, it is important that you are aware of the potential consequences of the strategy you choose for searching and collecting material. Moreover, a careful interpretation and systematic analysis of each individual source is very important.

Interview

Interviews can be undertaken in a variety of different ways, and to different ends. There are a number of different aspects which need to be considered when deciding on an appropriate form of interview for your study. Different styles of interviews have different strengths and weaknesses, and these are closely linked with your own ability, as a researcher, to undertake interviews. If you decide to use them, there are a number of issues to consider, both in terms of preparation and with respect to how they are carried out.

Case Study

A case study project is undertaken as an in-depth exploration of a phenomenon in its natural setting. A characteristic of a case study is that it involves a limited number of cases, sometimes even a single case. This allows you to undertake a detailed examination of the phenomenon. It has been suggested that the case study method is especially suitable when there is a desire to understand and explain a phenomenon in a field which is not yet well understood. The actual case to be explored can be, for example, an organisation, a department (within an organisation), a group, an individual, or any other "unit", and the case study aims to understand and explain something within the unit. For example, a study may aim to explore how software developers use tools which support the software development process. The case study may then take place in a specific software development organisation, and focus on examining a certain kind of development tool. Thus, in this case study, the phenomenon to be explored would be a specific type of user and their use of the tool. Hence, the actual study might involve a group of developers who work in the organisation, and concern their perceptions of the role of a tool which they use in their work. However, in reporting from the study, you should aim to generalise from the specific details of the examined setting, attempting to characterise the situation for which the studied organisation is typical.

Survey

Survey research is closely associated with the use of questionnaires, and statistical techniques for analysing their responses. Such research is often used for exploring arelatively well-known phenomenon, for which there exists a large sample of respondents having some knowledge of the issue of concern. The advantage with this form of research is that, with relatively limited means, you can reach a large number of respondents,

and thereby quickly cover a large number of informants. You can quickly reach a very large number of individuals and companies. Also, in a properly designed survey, you can control many uncertainties and estimate (using statistical techniques) the significance of the findings. In addition, as questionnaires are often highly standardised, there is the possibility of automating the handling of responses.

Implementation

Many projects in computer science and information systems consist of developing new solutions. Such a solution can consist of new software architecture, method, procedure, algorithm, or some other technique, which solves some problem in a new way, which has some advantage over existing solutions. In a project of this type, it is often necessary to implement the proposed solution, in order to demonstrate that it really does possess the proposed advantages. The goal of the implementation, then, is to demonstrate that the solution has certain properties, or that (under certain conditions) it behaves in a specific way. This implementation often needs to be compared with implementations of existing solutions, before conclusions can be drawn. The implementations of the existing solutions may or may not be done by yourself. When using the development of an implementation as your research method, it is of course of vital importance to use good software development practice to ensure the validity and reliability of your work. In this context, validity means that your implementation properly reflects the solution that you propose. Issues concerning validity and reliability also arise when deciding how to evaluate the implementation. For example, a new form of graphical user interface may be evaluated using human subjects who test the interface and are subsequently interviewed. Although these implementation studies are very different from each other, you must in both cases make sure that your evaluation method leads to results which are both valid and reliable.

Experiment

An experiment focuses on investigating a few variables and the ways in which these are affected by the experimental conditions. Typically, experiments are used to verify or falsify a previously formulated hypothesis. In the computer and information sciences experiments are often done by implementing a model of some system and running simulations to see how the model is affected by different variables. This raises the issues about validity and reliability of implementations, since the implementation must obviously correctly reflect the model. In addition, the model itself must also be a correct characterisation of the system being studied, which adds an additional level of difficulty to simulation as a research method. If you are using experiments in your projects, you are advised to consult the literature on experimental design. When, for example, designing experiments involving human subjects you need to design the choice of subjects so as to ensure statistically

valid results. Consulting additional literature and discussing the experimental design with your supervisor, should both be considered mandatory if you are planning to use this type of method.

Presentation of results

As you follow the objectives you will start to gather data (e.g. data from simulations, data from interviews, or data from literature analyses). The collected data needs to
be properly presented to the reader.

Presenting Non-Numerical Data

Presenting Data from a Literature Analysis

When you present what you have found in your literature analysis, the most important thing to keep in mind is its purpose in your project. This purpose must always be at the forefront when you decide how to structure your presentation.

Presenting Data from Interviews and Questionnaires

If you have conducted interviews, you will probably have a pile of tapes or notes that together represent your material from the interviews. This material must now be structured and presented to the reader in an appropriate form. If you have used questionnaires you probably want to present your data by using figures or tables.

Presenting Data from Implementations

An example is to show the algorithm in pseudo-code and explain relevant parts of the pseudo-code in writing. You can then show a graphical representation of the code, using, for example, flowcharts or some other graph format, which is appropriate for the particular algorithm at hand. This graphical representation should also be discussed in the text so that the reader has a very clear understanding of it. Finally, you can present relevant parts of the code, i.e. those parts that contain the key features of the implementation.

Testing and Evaluation/ Performance Evaluation

It is quite frequent that computer science researchers ask which algorithm, program, or system performs better in some way. The use of statistical techniques is recommended:

Accuracy

Precision

Recall

F Measure

Measure of central tendency

Correlation and covariance

Indices of dispersion

Sampling

Hypothesis testing

Confidence intervals

T-tests

Regression (mainly simple linear regression and some multiple regression)

Allocation of Variation

ANOVA

Cross tabulations (Chi-Square)

There are times that a consultation of experts (in the specific field) is needed to validate the result.

CHAPTER 6
CONCLUSION AND RECOMMENDATION

This section is a summary of the results and discussion. State what the proponent has achieved. Describe the most important findings of the research in descending order of importance. This section also provides a statement about the possibility of future researches. The proponent presents all questions that was not address in the work and discuss its significance. What needs to be done and what does this research contribute? The most important thing to remember is that is must refer back to the general objective and specific objectives. This chapter can be discussed based on four major parts:

Summarizing the Results

Guide questions:

 "What were the main findings in the results chapter?"

In the results chapter, you may have used several pages to show the detailed results of your experiment, and to explain the statistical test that you applied to test for significance. In the conclusions chapter, however, this can be summarized in a few sentences.

"What was I able to show with confidence, and what was uncertain?"

For a very certain result, it is highly relevant to discuss what the impact of the result on the subject area may be, and in what ways the result will be useful in the future. For an uncertain result, however, it is more relevant to discuss what further work needs be done in order to obtain a more certain result.

Putting the Results into Context

After summarizing the results, the next step is to discuss how they fit into the wider context of the subject area as a whole. By doing this, you help the reader understand the impact, meaning and usefulness of your work. In a sense, this is the most important section of your whole report, because it is here that the whole point of the work and its results is explained.

Guide questions:

"What can my results be used for?"

"Who can use my findings, and in what different ways?"

 "Have I made a contribution to my field of research?"

"Are there related research areas which may benefit from my results?"

"Are my results useful in real-world applications, or are they a contribution of a theoretical nature, so that they deepen our understanding of the subject?"

"How do my results compare with those of others?"

"Are my findings in line with other related work?"

Evaluating the Process

Another part of the conclusions chapter should be an evaluation of your work. The importance of this section is that it helps the reader see the weak and strong points of the work, which is useful in deciding which of your results can be trusted most. So after having discussed the usefulness of your findings, you must also discuss to what degree they can be trusted.

Identifying Future Work

Readers to plan new projects using your work as a starting point.

Guide questions:

"Of the objectives I had, are there any that are still not fulfilled?"

"If I had more time to devote to my project, what would be the most important things to do?"

"Have my results revealed new open questions which need to be addressed?"

"What still needs to be done before my results can be applied in practice?"

GLOSSARY

This section of the capstone document provides operational definitions of key terms that appear in your title and statement of the problem and sub-problems (terms are arranged alphabetically) as used in your study.

(Sample GLOSSARY)

Block Section is a grouping with arrangement of schedules of courses intended for a group of students. Example Block A has the same set of courses to be taken but of different schedules compared to Block B.

Block Scheduling is the process of organizing a certain number of schedules of classes that would be enrolled by students on a first-come first served basis for all year levels per curricular program that conforms to required courses stated in the prospectus.

Capabilities refer to the power or ability to generate an outcome. The ability or characteristic associated with desirable performance on a job.

Constraints are the conditions that a solution to an optimization problem must satisfy. It is divided into two types:

Hard Constraints have to be satisfied under any circumstances.

Soft Constraints need to be satisfied as much as possible. Due to the complexity of the real-world timetabling problem, the soft constraints may need to be relaxed since it is not usually possible to generate solutions without violating some of them.

BIBLIOGRAPHY

Only sources that were used or cited in the research work are included at least containing 20-30 author citations for undergraduate thesis (Masters may contain at least 50, PhD at least 100). Bibliography section of the document will use American Psychological Association (APA) style format. Entries in the bibliography listing must be sorted alphabetically by categories. The following are the suggested categories.

Book
Journal Article
Conference Proceedings Article
Web Article
Interview

APPENDICES

Appendices are blocks of relevant data and information presented at the end of the documentation. An appendix section gives the readers additional explanations on topics or discussions. Always provide at least one paragraph to introduce the material being provided in each of the appendix chapter.

Plural (appendices) singular (appendix)

If two or more appendices are included in a proposal, they should be designated Appendix A, Appendix B, etc.

Appendix A

Transmittal Letter

January 14, 2021

Christian V. Maderazo, M.Eng.
Chair, Department of Computer, Information Sciences and Mathematics
University of San Carlos

Dear Sir Maderazo,

Greetings!

May I request from your office the permission to gather information from Department of Computer and Information Sciences for our **research study entitled** "MOBILE ATTENDANCE MANAGEMENT SYSTEM USING FACE RECOGNITION".

The above research study is a requirement for the completion of the degree in Bachelor of Science in Computer Science (BSCS) in the University of San Carlos. We believe that the result of our study would be useful and helpful in the department.

Thank you very much. We are looking for your positive response.

Respectfully yours,

Charles Van Ryan S. Florido

Jewel Josef P. Seno
BSCS Students, University of San Carlos

Endorsed by:

Angie M. Ceniza-Canillo, PhD
Thesis Adviser

Approved by:

Christian V. Maderazo, M.Eng.
Chair, Department of Computer, Information Sciences and Mathematics

Appendix B

Interview Guide

Appendix C

Questionnaire

Appendix D

Certificates

Appendix E

Published Paper/Manuscript

<div align="center">CURRICULUM VITAE</div>

A curriculum vitae (CV) provides an overview of a person's experience and other qualifications.

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CONTACT INFORMATION

Name:

Address:

Telephone:

Cell Phone:

Email:

PERSONAL INFORMATION

Birthday:

Religion:

Civil Status:

EDUCATION

University of San Carlos

Bachelor of Science in Computer Science

Tertiary Level (year started – present)

University of San Carlos

Secondary Level (year started – year ended)

University of San Carlos

Primary Level (year started – year ended)

TECHNICAL SKILLS

WORK EXPERIENCE

TRAININGS

Section 11. Intellectual Property Rights

- All Thesis and Projects must not infringe on existing IP. All prior works, including open source, open content, and creative commons content, shall be properly cited.

- Copyright and other Intellectual Property Rights arising from the Thesis or Capstone Projects shall be bound by the IP Policies of the University of San Carlos approved as of April 2013.

- The major categories of IPR dealt with in the USC IP Policy are (1) copyrights, (2) trademarks, (3) patents, (4) utility models, (5) designs, (6) layout designs (topographies) of integrated circuits and (7) undisclosed information.

Section 12. Ethics Review

- The University of San Carlos Institutional Ethics Review Committee (USC-IERC) provides services to the researchers in the review of the ethical aspects of the research project.

REFERENCES

About Computing Science Research Methodology
penned by Jose Nelson Amaral with significant contributions from Michael Buro, Renee Elio, Jim Hoover, Ioanis Nikolaidis, Mohammad Salavatipour,
Lorna Stewart, and Ken Wong

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Experiences Teaching a Graduate Research Methods Course
Clifford A. Shaffer
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Research Methodologies in Computer Science and Information Systems
Mohannad M. Ayash
Alquds Open University
College of Technology & Applied Science

Research / Scientific Methods in Computer Science
Vera Goebel & Thomas Plagemann
Department of Informatics, University of Oslo

PSITE Undergraduate Research and Capstone Project Manual
Authors: Cherry Lyn Sta. Romana, Randy Gamboa, Dave Marcial, Gregg Victor Gabbison, Allan Sioson
ISBN: 978-971-95389-0-5

Thesis Projects

University of San Carlos
Intellectual Property Policy Manual