

Final Year Research Project Guidelines

Bachelor of Information and Communication Technology Honours Degree

CTEC 43018 - Project

Faculty of Computing and Technology

University of Kelaniya

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Process

1. The fourth year students following the Bachelor of Information and Communication Technology Honours should conduct a project in first and second semesters (CTEC 43018) of the fourth year of study. Students are allowed to suggest a suitable topic of their own and discuss with potential supervisors and get further knowledge about the topic during the first week of first semester.
2. The tentative title, the outline of the project and the assignment of the supervisor (having pre-approval for the topic from supervisor) must be notified by students to the course coordinator on a pre-given date (usually within 2-3 weeks). The student will undertake the project under the guidance of the assigned supervisor.
3. A project proposal presentation will be held at the end of third week of the first semester for the approval of the project.
4. The student and the supervisor will meet periodically (at least once in two weeks), to review the progress of the project. A reflective journal should be maintained during the course of the project, highlighting the learning experiences of the student. The reflective journal should be signed by the supervisor at these periodical meetings and state the works to be done before the next meeting with the supervisor.
5. If there are problems encountered in adhering to the time frame and other constraints, students should contact course coordinator without delay.
6. The student will present the status of his/her project (up to design), at a mid-term Progress Review arranged by the supervisor during the first two weeks of the second semester.
7. The student will complete the project and write a draft thesis and submits it to the supervisor for comments / corrections in 12th week of the second semester. The minimum number of words of this thesis should be not less than 10000 words and students are expected to read and follow the instructions and guidelines given in section 6 when preparing their thesis.
8. The student will submit a soft copy of the final thesis to the department on or before the notified deadline by the course coordinator. The submitting thesis should be the final version of the thesis incorporating all the corrections suggested by the supervisor.
9. The project thesis will be evaluated by the examiners and after receiving ~~his/her~~ their recommendations, an oral examination will be arranged for the student to present and defend the project thesis. The presentation slides should be reviewed and corrected by the supervisor.
10. The project proposal, thesis, reflective journal and oral presentation will be evaluated with the following percentages:

Project proposal	20%
Thesis	50%
Reflective journal	15%
Oral presentation	15%
Preparing a manuscript in IEEE conference format	Extra marks

Responsibilities of students

The students carrying out a final year research project are expected to undertake the following responsibilities:

1. It is a requirement that the students engage in their project work at least 400 hours and complete it (including the thesis) within a period of **one academic year**.
2. Students should have a preliminary discussion with supervisors before starting the project.
3. This project is a compulsory course module, hence it is required to meet and discuss the project related matters regularly obtaining a prior appointment with the supervisor. Contacting through official channels such as emails is also recommended.
4. The student should maintain a reflective diary and need to update the diary regularly with important decision after meeting with the supervisor.
5. Students are highly encouraged to refer library and other academic journals, while they are conducting literature search and research tasks. If any research paper is inaccessible, students can request it from supervisor. Supervisor may get necessary actions to provide the paper in his/her best.
6. The students should keep informed supervisor and course coordinator, if any problem is raised interrupting their research work.
7. The students should maintain friendly environment with supervisors and colleagues in laboratories. If the student requires to access university assets such as computers, routers, sensors, and etc., they need a prior approval through proper channel. In such occasions, students should be responsible for the assets and should avoid misusing them.
8. The students should make 10-minute presentations for defending research proposal. The templates for the proposal document are given in section 4 below.
9. The students should take necessary actions to finish composing the research thesis, and presentation slides providing enough time to review by supervisors (at least a week ahead). Students need to make all marked corrections by supervisor prior to submitting the final thesis. Students should also check the thesis for plagiarism before the final submission.

Role of a Supervisor

The supervisor is expected to help the student, under their supervision by following ways to complete the final research project.

1. Guide students to formulate an appropriate project proposal and outline of the project thesis.
2. Conduct meetings regularly.
3. Conduct the mid-term Progress Review in first and second week of the second semester.
4. Inform the student about the progress of their work whether it is satisfactory or not.
5. Advise students to improve the research activities, composing thesis and presentations.
6. Guide students to publish their work in peer-reviewed conferences or journals.
7. Review the draft of research project thesis, presentation slides and provide suggestions to improve them.
8. Guide students to conduct plagiarism checks on the thesis using a suitable plagiarism detection software prior to final submission.
9. Act as one of the examiners on submission of the project.

Finalizing research project proposal

Research project proposal is the most important document at the beginning of research project. This proposal guides students to conduct research effectively though out the course duration. When the students prepare a research proposal, few important factors should be taken into account such as scope of the project, motivation, feasibility and possibility to complete by given time frame. The project proposal should not exceed 10 pages. Students may choose one of the following two templates.

Template 1 (For research projects)

1. **Title:** The title of the project, should not exceed 10 words
2. **Proposer:** Name of the investigator and the student registration number
3. **Research Problem:** The description of the problem which the student is going to solve from the research project
4. **Background:** A summary of the key relevant literature, references, or needs analysis that justifies the project
5. **Aims:** A statement of the expected outcomes of the project, and how they will help to address the problem
6. **Objectives:** An outline of the specific strategies or steps by which students intend to achieve the research aims
7. **Methodology:** A more detailed outline (sometimes called ‘project protocol’) of the actual research, data collection, analysis, design, implementation and evaluation.
8. **Time Frame:** A timetable or plan of the key activities or stages of the project
9. **Ethical concerns (if applicable):** An appreciation of any ethical issues raised and how they will be addressed
10. **References:** Students should follow the IEEE style.

Template 2 (For development projects)

1. **Title:** The title of the project, should not exceed 10 words
2. **Proposer:** Name of the investigator and the student registration number
3. **Project Charter:** The description of the problem which the student is going to solve from the project. Should include the stakeholders, business needs, assumptions, and constraints.
4. **Background:** A summary of the key relevant literature, references, or needs analysis that justifies the project
5. **Aims:** A statement of the expected outcomes of the project, and how they will help to address the problem
6. **Objectives:** An outline of the specific strategies or steps by which students intend to achieve the research aims
7. **Feasibility Analysis:** A more detailed analysis of the feasibility of the proposed project.
8. **Methodology:** A more detailed outline (sometimes called ‘project protocol’) of the actual research, data collection, analysis, design, implementation, evaluation and deployment.
9. **Time Frame:** A timetable or plan of the key activities or stages of the project
10. **Ethical concerns (if applicable):** An appreciation of any ethical issues raised and how they will be addressed
11. **References:** Students should follow the IEEE style.

A few sample project proposal titles are as follows.

For Networking:

- Graphical Password Authentication System
- Hybrid Payment Security Model for E Commerce
- Active Chat Monitoring and Suspicious Chat Detection over Internet
- Secure Remote Communication
- Image Encryption for Secure Internet Transfer
- SQL Injection Prevention
- Video Encryption & Sharing
- School Security System (SSS) using RFID
- Secure File Storage on Cloud Using Hybrid Cryptography
- Cloud Based Student Information Chatbot Project
- Data Duplication Removal Using File Checksum
- Wireless Sensor Networks for Remote Monitoring
- Secure Backup Software System
- Secure File Sharing Using Access Control
- Video Encryption & Sharing

For Software Systems:

- Developing a study planner
- Canteen/restaurant automation system
- Patient tracker system
- Employee tracker system (for field visit employees)
- Tourist guide system
- Farmer assistance system (farmer to supplier, farmer – agriculture officer and farmer to farmer)
- Inventory Management system
- Developing a website for some institute/company

For Games and Animations:

- Game Development with multiple levels and substantial complexity
- Animations Development with substantial complexity
- Gamification of educational concepts – e.g. Games to explain sorting algorithms that were taught i.e. bubble sort, merge sort etc.
- HCI / UX aspects of Games for Education

Project Time Frame

The students are expected to conduct and complete the research project on time. Hence, they need to manage their available time consciously and deliver the outcome in the suggested time frame. The suggested time frame for this project is an academic year and the project time frame is as follows. When students propose a time frame to their research proposal, they should take these major timelines in to account and make proposal accordingly.

No extensions are granted in any circumstance.

Suggested Time Frame	Activity
2-3 Weeks	Finding a supervisor, preliminary discussions with the supervisor and literature survey; submitting the project outline; planning and starting the project
6-7 Weeks	Proposal defending presentation at a seminar
7-15 Weeks	Carrying out the project, analysis of data, preliminary conclusions
16-17 Weeks	Presentation of work carried out at the Mid-term Progress Review Seminar
17-30 Weeks	Continue the project
31 Weeks	Completion of project work, preparation and submission of the draft thesis to the supervisor
32 Weeks	Preparation and submission of the final draft (loose bound form) of the project thesis to the department
33-34 week	Oral Presentation

Structuring your project thesis

Thesis is the most important document for this course and it should be in a form of a document of with not less than 10000 (excluding the appendices). It is recommended to use any text editor to compose the research project. When the students are composing the thesis, one of the following two formats may help to make high-quality project thesis.

Format 1:

- Title Page
- Declaration
- Abstract
- Acknowledgement
- Table of Content
- List of Figures/ Tables
- List of Abbreviations
- Main text
 - Introduction
 - Literature Review
 - Methods
 - Results
 - Discussion
 - Conclusion
 - Recommendation
- References
- Appendices (If available)

Format 2 (For Development Projects):

- Title Page
- Declaration
- Abstract
- Acknowledgement
- Table of Content
- List of Figures/ Tables
- List of Abbreviations
- Main text
 - Project Charter
 - Requirements Specification
 - Analysis and Design
 - Implementation
 - Testing
 - Deployment
 - Project Management
 - Evaluation
 - Conclusion
- References
- Appendices (If available)

The brief guide for each components of the project thesis is as follows:

Acknowledgement – The students should acknowledge the assistance given by their supervisors, and any other person or organization that has helped them in the planning, conduct, analysis or reporting of the project.

Abstract - This is an outline of the study question, aims and objectives, background literature, methods, results, key conclusions and recommendations. This should be 250– 300 words long and should be very clear and easy to follow. It is recommended to include quantitative or qualitative outcomes which drawn from the research in brief.

Introduction - This section is basically used to introduce the research problem or knowledge gap, outline of aims and objectives and the motivation to conduct the particular study.

Literature review – This section is used to demonstrate student’s investigation ability in particular research problem considering different potential dimensions. Students are expected to conduct thorough literature review on current work of the research problem and structure the review with a smooth flow as to make easy to understand by the reader. It is required to cite appropriately when the students draw conclusion out of current works.

Methods – This section includes the methodology of the research. It can be a form of the study design, the study population, sampling frame and numbers, sampling method, survey design, survey or data collection instruments, protocol for obtaining data, ethical issues and how they are addressed, data management and analysis methods and statistical analysis and tests.

Results – This section includes the entire outcomes from the research project. This section includes qualitative or quantitative measures in form of figures, graphs and tables. All tables, figures and graphs, should be numbered consecutively throughout the whole thesis and labelled with a clear and concise descriptive title. Students should pay special attention about the effective presenting techniques while drawing figures and graphs.

Discussion – The proper interpretation of the findings presents in this section. Any limitations in the research methodology should also be referred to here. Examiners expect students to acknowledge these limitations as an integral part of the evaluation of the project.

Conclusion - This section summarizes the key results and the conclusions that the student can draw from these results. It also needs to reflect what the initial project aims and objectives were.

Recommendation - It is good research practice to make recommendations or to suggest directions for further research or actions as a result of the project findings.

References – As a professional researcher, students are expected to avoid plagiarism and if any other researcher's work is considered or based in the project, it is required to properly refer these works with original researcher details. This is a list of all such references and sources which were used in the literature review, methodology and discussion. The references can be books (monographs), journal articles, letters, abstracts, patents, conference and symposium papers, media articles, and any form of published literature or comment both offline and online forms. It is important that every claim of scientific fact the students make is supported by a valid, relevant, accessible reference, and that every idea or argument, and every verbatim quotation or paraphrase of someone else's work, is correctly attributed to its source. Students are advised to follow IEEE Reference style.

Appendices - Students may include the external resources which were used to conduct the research in this section. Those resources can be any questionnaires or evaluation instruments used, covering letters, participant information and ethics approvals, statistical formulas, mathematical proofs or additional explanations.

Project Charter

This section includes the scope of the project. It documents the stakeholders, business needs, assumptions, constraints, the understanding of the customer's needs and high-level requirements, and the new product, service, or result that it is intended to satisfy.

Requirements Specification

This includes the purpose, scope, functional and nonfunctional requirements, software and hardware requirements of the project. In addition to this, it also contains the information about environmental conditions required, safety and security requirements, software quality attributes of the project etc.

Analysis and Design

This section includes the analysis and design processes of the project. It should document all the analysis and design models considered and justify the design decisions.

Implementation

This section should describe the technology stack of the project. The hardware and software requirements of the project along with justifications for each choice is typically expected.

Testing

This section should describe how the developed system is tested.

Project Management

This section documents the project management related decisions of the project. It should include the overall plan and any other tools used to control and mitigate risks associated with the development process.

Evaluation

This section includes how the final system is evaluated. It may include feedback from users / experts' reviews.

Preparing Oral presentation

Students are notified the date and venue for the oral presentation through course coordinator after submitting the final version of the thesis.

This presentation includes two sessions: students presenting session which stands for 10 minutes and panel questioning session which stands for 5 minutes. Students should be vigilant about the time constraints when creating the presentation slides and students will be penalized if he/she could not finish the presentation in the allocated time.

The presentation slides can be organized in the same flow that has been used for the project. In the first slide, title, supervisor name and student index number should be clearly shown. Students should pay special attention to the best practices for making an effective presentation. The recommended structure for the presentation is as follows

- First slide with title, supervisor name and student index number
- Introduction
 - Research Problem
 - Aims & Objectives
- Motivation
- Literature Review
- Proposed Methodology
- Results
- Discussion
- Conclusion
- Recommendation
- Reference