

**Bachelor of Science (Ordinary) in Computing
in Information Technology**

TU747, TU764 and TU860

Group Project Handbook

2023-2024

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1 Introduction

1.1 The purpose of this handbook

This handbook has been written to provide project participants with a background to the aims and procedures for the Level 7 Computing in Information Technology group project. The aims include:

- ❑ Aims and intended learning outcomes
- ❑ Assessment requirements and timetable of important dates
- ❑ Guidelines on the project deliverables
- ❑ Example of documentation requirements and style (including project report style, citations and references)
- ❑ Suggestions of other useful resources relating to computing projects
- ❑ To make clear the requirements of individual and group work and avoiding problems of plagiarism

1.2 Introduction to the B.Sc. group computing project

In order to complete the B.Sc. in Computing in IT the group is required to complete a substantial group computing project, run over the entire year. The project is assessed as two modules, part 1 in semester 1 and part 2 in semester 2.

The project aims to:

- ❑ provide students with an opportunity to undertake a substantial, group computing project and take responsibility for a full system life cycle
- ❑ enable students to consolidate and further their chosen area of study, and to integrate knowledge and skills acquired from other studies
- ❑ motivate and support students in their intellectual development, and the development of their independence, confidence and self-esteem
- ❑ provide a vehicle for the development of students' written and oral communication skills
- ❑ an awareness of the need for, and the necessity of, good project documentation
- ❑ an ability to schedule tasks and to meet system deadlines

1.3 Role of supervisor

Group project work is, as the name suggests, a set of activities that a group of students does as a group. However, there will be at least one person you will meet with regularly during each semester, and that is your project supervisor. The project supervisor's role is as follows:

- ❑ Provide feedback about quality of work to date and overall progress
- ❑ Provide advice about project activities, methods and evaluation/monitoring issues
- ❑ Make suggestions about useful sources of information, literature, and technical resources such as international standards and organizations relevant to the project

If the group has any problems relating to their project, the first person to talk to is their supervisor.

The primary role of the supervisor is as a facilitator. The responsibility for the satisfactory completion of the project rests with the group members.

1.4 Important preparation – read about computing projects

In addition to reading everything contained in this handbook, read the following text or a similar one during the first week or two of your B.Sc. The group will find it very useful in forming an overview of the project process and activities as early as possible:

- **Gupta (2021)** *“Real-World Software Projects for Computer Science and Engineering Students 1st Edition”*, CRC Press. ISBN 978-0367635985
- **Dawson (2000)** C. W. Dawson, *“The essence of Computing Projects: a Student's Guide”*, Prentice Hall, NJ, USA ISBN 0-13-021972-X

2 Assessment, deadlines and deliverables

2.1 Overview of project assessment

Assessment will be based on the set of deliverables listed below. The group work will constitute 30% of the overall marks and each separate individual contribution will count for the remaining 70%. This distribution of marks ensures that individuals within the group will not be penalized by the failure of another member of the group to pull their weight.

Individual Assessment

Semester I:

Topic	Mark
System Prototype Documentation	45
Working Prototype & Presentation	50
Individual work diary	5
	100
Percentage mark = total * 0.7	

Semester II:

Topic	Mark
Report	35
Project Implementation & Presentation	60
Individual work diary	5
	100
Percentage mark = total * 0.7	

Group Assessment

An assessment of group work will be carried out at the end of each semester. Marks will be allocated based on the marking scheme below:

Topic	Percentage Mark
Documentation of group work	10%
Ability to work as a team	10%
Meeting deadlines	5%
Attending meetings with supervisor	5%
	30%

The marks given above are a guideline. It may be necessary to alter the percentages breakdown in accordance with the nature of the project.

2.2 Plagiarism

Plagiarism is academic dishonesty

Plagiarism is the presentation by a student as his or her own work of a body of which is wholly or partly the work of another. Therefore, you and the group should never submit as

your own, complete or partial essays/reports/computer programs/images etc. Each group member will be severely penalised if found guilty of plagiarism.

The work submitted for the project must be the group's own individual work.

The need for citation and references to acknowledge work by others

Where reference is made/quotations used from others' work, those parts of the work produced by others must be clearly marked and cited where they appear in the main text, and properly referenced at the end of the document.

The group must make sure that it acknowledges materials from others through the use of quotation marks, and citations to entries in your list of references. Information on the correct way of acknowledging work from other sources is available from the library.

It is not sufficient simply to provide a bibliography of books read or a list of web sites visited at the end of the report. The group must clearly indicate through specific citations in the body of the project report which entries, quotations, diagrams etc. in the project report have come from which sources.

Your project supervisor will be happy to give advice and answer questions on issues of citation and referencing. Also texts, such as Dawson (2000) provide details of referencing methods such as the Harvard system.

2.3 Important Dates and Deadlines

Semester 1

Week (Approx)	Project activities / deadlines
1	
2	<input type="checkbox"/> Issue of project handbook <input type="checkbox"/> Issue of list of suggested projects <input type="checkbox"/> Issue a list of suggested supervisors
3	Meet and talk to your supervisor.
4	Choose project with supervisor's agreement
5	Group project work and meetings with supervisor
6	Group project work and meetings with supervisor
	Group project work and meetings with supervisor
7	<< <i>MID TERM BREAK</i> >>
8	Group project work and meetings with supervisor
9	Group project work and meetings with supervisor
10	Group project work and meetings with supervisor
10	Group project work and meetings with supervisor
12	Group project work and meetings with supervisor
13	DEADLINE : <ul style="list-style-type: none"> ▫ Submission of Deliverable 1. System Prototype Documentation ▫ Submission of Deliverable 2. Working Prototype & Presentation ▫ Submission of Deliverable 3. Project Diary

Semester 2

Week (Approx)	Project activities / deadlines
1	Group project work and meetings with supervisor
2	Group project work and meetings with supervisor
3	Group project work and meetings with supervisor
4	Group project work and meetings with supervisor
5	Group project work and meetings with supervisor
6	Group project work and meetings with supervisor
7	Group project work and meetings with supervisor
8	Group project work and meetings with supervisor
9	Group project work and meetings with supervisor
	<< <i>EASTER BREAK</i> >>
	<< <i>EASTER BREAK</i> >>
10	
11	<ul style="list-style-type: none">❑ DEADLINE : PROJECT Demo 4. Oral presentation of project to marking team<ul style="list-style-type: none">○ Demonstration of working system○ Oral presentation and defense of project
12	DEADLINE : FINAL SUBMISSION <ul style="list-style-type: none">❑ Submission of Deliverable 5. Project Software❑ Submission of Deliverable 6. Project report
13	

3 Part 1 Project deliverables

Deliverable 1 – System prototype documentation

The group must document your system prototype, explaining what has been achieved to date and the steps remaining for their project work. The prototype documentation should including at least the following:

- ☐ (1) Overview of system
- ☐ (2) Use cases (high level and detailed)
- ☐ (3) System design – highlighting which parts are implemented in the prototype, and which are still to be implemented
- ☐ (4) Detailed project plan for remaining work
 - a list of key tasks and deliverables for the remaining project work, presented in a week-by-week sequence indicating when each task should be completed by.

3.1 Deliverable 2 – Working prototype & Demonstration

The group should have made significant progress by the end of the first project module, and it will therefore be expected to deliver evidence of progress in the system detailed design / development. Each project is different, and the precise form of evidence of progress will vary from project to project, and be negotiated with your project supervisor. However, the group will need to plan to be able to present and demonstrate some form of **working prototype** of all/the main parts of its proposed system.

3.2 Deliverable 3 – Project Diary (Part 1)

Each individual in the group should keep a week-by-week diary of its project activities. Include entries such as the following:

- ☐ A breakdown of how the project work will be divided between each student in the group, in other words who is responsible for doing what.
- ☐ Dates, feedback and outcomes of meetings with supervisor – students are advised to keep their own minutes with action items for each group member.
- ☐ Record of information sources consulted and any useful resources located
 - This should build up to be the group's list of references for its project report
- ☐ A record of work completed, such as analysis diagrams, software coding or testing, or project report chapters completed in a given week
- ☐ A record of monitoring project progress against a project plan that each group member should maintain
- ☐ Some group members use Github commits as a way of tracking progress and each individual contribution to the software and code.

4 Part 2 Project deliverables

4.1 Deliverable 4 – Oral presentation and defense of project

Although not a physical deliverable, the oral presentation and defence by the group of their project is important and the performance of each member of the group will contribute to their overall project grade.

During the project demonstration the group will need to present their working system and give a presentation about the system and their project. The project markers will ask the group questions about their project, for example asking the group to justify design decisions, explain results and explain specific aspects of their implementation.

4.2 Deliverable 5 – Project Software

Github or software repositories can be referenced. Each supervisor will express how they would like the group to upload or make their code available.

As with all submissions for assessment, ensure the following are clearly stated on each item: the names of each group member, their student numbers and a clear title of what is being submitted:

- ☐ Name of each group member
- ☐ Each group member's student number
- ☐ The title of the module for which you are submitted materials for assessment
 - i.e. B.Sc. in Computing in Information Technology Group Project

4.3 Deliverable 6 – Project report

The group must submit copies of their project report as follows:

- ☐ **Upload a copy to Moodle via Turnitin.**

Details of the content and style of the project report are given next.

5 The project report

5.1 Project report overview

One meaning of the word “thesis” is that it is a position or point of view someone holds and defends with academic argument. The project report written by the group relates to this meaning – they are arguing that the way they have gone about their project is a reasonable way to solve the problem they outlined in their project proposal. The group documents their literature review, so a reader can see the previous works that have influenced their point of view, and the group documents their system analysis, design, implementation and testing, so that there is evidence about how the group have followed a system life cycle process to attempt to solve a problem. The group will need to refer to the results of their testing and any user evaluations as evidence to support their project report conclusions about the success of their system as a means of solving the problem they have set out to solve.

Issues to keep in mind when writing the project report is that it is an argument and a story about how the group have chosen to solve a particular problem, including:

- ❑ Academic story with a document / resource trail:
 - Citations to entries in list of references
 - Must present alternatives for important decisions, evaluate each (according to appropriate criteria for their PROJECT GOAL) and then argue the choices they make
 - The important thing is that even if someone reading the dissertation doesn’t agree with the group choices, they can describe them, and understand their arguments

5.2 Project report style

The project report should be written to conform to the “ITB Computing Sample Project Report” document style. A copy is available electronically on the Studentshare as a Microsoft Word document – the group is strongly advised to use this file as the basis for their report. Either write the project report in Microsoft Word with this document template (this is the easiest option) or ensure whatever typographic system the group uses is configured to meet these requirements.

The project report should be typewritten and conform to the following guidelines:

- ❑ Normal text should be in the Times New Roman font (or similar) and be sized 11 point
- ❑ Paragraphs should be fully justified (both left and right margins aligned) and unless immediately after a heading paragraphs should be separated by a blank line
- ❑ Headings should be numbered to level 3 but no further
- ❑ The footer of each page should have at the left the student names of each group member and at the right the page number

5.3 Project report structure

The structure of the project report should conform to the following (although the number of additional chapters and appendices will vary from project to project):

- ❑ Title page
- ❑ Abstract
- ❑ Acknowledgments
- ❑ Contents
- ❑ Chapters
 - Chapter 1: Introduction
 - Chapter 2: System Analysis
 - Chapter 3: System Design
 - Chapter 4: Implementation of system
 - Chapter 5: Testing and evaluation
 - Chapter 6: Conclusions and Further Work
 - Chapter 7: Personal reflections on project experiences
- ❑ Appendices
 - Appendix A: Project Planning
 - Appendix B: Project Diary (parts 1 and 2)
 - Appendix C: Code listings
 - Appendix D: (other technical or data appendices as required)
- ❑ List of References

Chapter 1: Introduction

The first chapter sets the background and motivation for the project. The problem to be solved is stated, with the project aims and a list of specific objectives.

This chapter could include:

- ❑ small number of objectives:
 - analyse situation and document with suitable analysis techniques
 - design a solution – document the design – evaluate resources to implement full solution
 - implement a working prototype
 - evaluate the prototype
 - make proposals for what else needs to be done to move from prototype to full working system
 - CAN MAKE CLEAR WHAT PROJECT IS NOT ABOUT e./g. say at start this is NOT an HCI project, so a functional web interface is sufficient
 - Security is an issue for further work (i.e. beyond the scope of for this final year project – but important if taking project through to final commercial reality)
- ❑ general areas of computing that project covers / requires knowledge of
- ❑ brief summary of structure of rest of dissertation
- ❑ short section arguing WHY this is a good project – “Motivation for choice of project”
 - Specific, well defined topic
 - Require use of computing skills and knowledge related to degree
 - e.g. outline of group’s skills, interests, strengths, the job they’re going to do, and the modules they’ve taken – the group can describe how the project brings together many of the modules they’ve studied etc.

- Not too hard or too easy (ideally can grow to be sufficiently challenging to demonstrate strengths of student/quality of work)

In the first chapter make it clear what is NOVEL about the project, and what the computer system DELIVERABLES are:

- novel aspects – a real world business or organization (if project based around one), or taking advantage of new technology
- SYSTEM deliverables, such as
 - Working system
 - User documentation / manual for prototype
 - Evaluation of system based on functional testing and user acceptance testing
 - Set of recommendations for further work to take prototype forward to full working system

Chapter 2: System Analysis

The overall aim of this chapter is to answer the question – exactly what is the application supposed to do? This should be done in sufficient detail so as to form the basis of a contract between the software developers and the clients. It should be a document that consists of:

- **Functional Requirements**

- Detailed description of the functionality of the proposed system. This should be comprehensive and exact, break up the application into subsystems offering different functionality, and should essentially serve as a checklist that can be referenced at all subsequent stages of the project.
- DIAGRAMS:
 - **Use Case diagrams**, with text descriptions
 - **high-level Class Diagram** (or other high level software structure diagram if not and object-oriented programming language)

- **Data Requirements**

- An overview of the entities and data in the system, and what data needs to be stored about them.
- DIAGRAMS:
 - an **Entity-Relationship Diagram** (with attributes, keys and data types) (even if the system is not finally going to be implemented with a database, such a data analysis is useful)

Chapter 3: System Design

The overall aim of this stage is to answer the question – how will the application be implemented?

- **User Interface Design**

- This should contain an argument as to how this suggested interface supports each of the use cases specified in the analysis
- DIAGRAMS:

- **Screen designs**, either pen-and-paper or computer drawn “mock-ups” of how the user interface will appear
- **Functional Design**
 - Functional design should model both the structure of each software component in the systems, and also how they interact with each other.
 - **DIAGRAMS:**
 - Detailed **class diagram** (or if an non-OO language, some other detailed form of software component structure and relationship diagram)
 - An **Interaction Diagram** to show the interaction between objects in the system (or non-OO equivalent of relationships between software components over time)
- **Data Design**
 - Whether to be implemented as a database or some other central data repository, a detailed design of the data storage components should be presented
 - **DIAGRAMS:**
 - **Normalised database tables** (or some non-relational equivalent depending on language of implementation)

Chapter 4: Implementation of the system

Details of how the group implemented a working system based on their design.

Chapter 5: Testing and evaluation

Details of the group’s test plans, test results, user evaluations (if any were conducted) and discussion of these results in detail and in summary.

Possible entries in this chapter might include:

- **Functional correctness**
 - Set of tasks system should be able to perform
 - Part of requirements specification of system
 - efficiency
 - Set of inputs and correct outputs
 - Set of “test scripts”
 - Objective of test / statement of which part of system being tested
 - Input data / situation
 - Correct output data / state / behaviour
 - >> need to show **ACTUAL** results of test
 - screen shots
 - list of results from SQL
 - evaluation – if **ACTUAL** matches **CORRECT** then working
 - if not match then can state error in tested part of system & begin debugging / put onto list of required **FIXES** etc.
- **Usability**
 - List of usability **REQUIREMENTS**
 - Set of tasks user should be able to perform
 - Have set of tasks for **EACH** type of user
 - System Response times

- Time for user to complete a task
 - Aesthetic
 - Acceptable navigation of site & layout etc. of pages
- Set of “test scripts”
 - Instructions for user
 - Observation / measure time / evaluate success of task
 - Analyse results to come up with usability result
- Can also measure qualitative usability aspects with questionnaires / structured interviews etc.
- Commercial / marketing –registration of web site
 - Requirements
 - Registration on web search engines
 - Direct marketing
 - Talk about it – can say things like IF THIS WERE A REAL COMMERCIAL PROJECT tasks X, Y Z would also need to be specified and performed ...
 - Evaluation
 - Have set of key words / phrases for targeted web sites and try they out

Chapter 6: Conclusions

The group needs to review the entire project against their problem definition, aims and objectives, and evaluate project success and results.

- this may also include a section for suggestions for further work, or if there are many then a Further Work chapter may follow the conclusions chapter

Appendix A: Project Planning

The project planning should be described, and critically evaluated with suggestions for how the project planning could have been improved upon (or not, if the project went well). Indicate how the project monitoring raised any issues and if the group needed to re-plan their project at any point(s).

Appendix B: Project Diary

Present evidence of the group’s project diary over the two semesters as an appendix.

Appendix C: Program listings

This and later appendices provide the technical detail of the group’s project. They should have only included selected code fragments or algorithm summaries in the main chapters, otherwise the project report can become a monotonous technical manual rather than a story of what they did and why they did it.

6 Reading lists (essential and recommended reading)

6.1 Essential Reading

ITB (2004) **ITB_computing_sample_project_report.doc**

The sample project report file the group should use as the basis for their project report

Dawson (2000) C. W. Dawson, “*The essence of Computing Projects: a Student's Guide*”, Prentice Hall, NJ, USA ISBN 0-13-021972-X

6.2 Recommended reading

Cornford & Smithson (1996) T. Cornford & S. Smithson, “*Project Research in Information Systems*”, Macmillan, Hampshire, UK ISBN 0-333-64421-2

Rogerson (1989) Simon Rogerson, “*Project Skills Handbook*”, Chartwell-Bratt, Bromley, UK ISBN 0-86238-146-0

Branscomb (2000) H. E. Branscomb, “*Casting Your Net: A Student's Guide to Research on the Internet*”, 2nd edition, Allyn & Bacon, MA, USA ISBN 0205322727

Murphy (2000) Ann Murphy, “*Project Management in a Commercial Environment*”, pp76-100, Issue 2, ITB Journal – The Academic Journal of the Institute of Technology Blanchardstown, Dublin, Ireland