Computing Systems

Project Handbook.

COM667 CRN61093

**Introduction.**

Please note that this guide is complemented by a series of lectures where aspects of the project in general will be discussed further.

Lecture slides, assessment criteria, forms and submission areas will be available on the module area of blackboard learn. You can access Blackboard Learn through the portal.

At the beginning of the semester (week 1), you will be allocated a Project Supervisor. The Project Supervisor will guide you and also provide feedback through the execution of your project. Please arrange a first meeting with your Project Supervisor ASAP (certainly before the end of week 2) to discuss your project proposals and meeting arrangements.

Note that the preferred form of communication between your Project Supervisor, module coordinator and yourself is email. P**lease check your email daily for important notifications** regarding your project.

Please read this handbook carefully before you start your project. If you have any queries, raise them with your Project Supervisor in the first instance.

Kenny Adamson COM667 - Module Coordinator.

**1Role and Responsibilities.**

There are several deadlines that have already been set for you (details available on Blackboard) but the planning and implementation of the project is your responsibility. A number of academic staff will provide support along the way:

* **Project Supervisor.**

At the beginning of Semester 1 you will be assigned a Project Supervisor, their role is to guide your work in the project. They are responsible for specifying directed reading material, advising on the technical direction of the project and monitoring and assessing your progress with respect to the overall project schedule. They are also responsible for providing formative feedback for the elements that need to be submitted as part of the module. They will also serve as a marker for your viva and project demonstration and as such, will contribute to the final assessment of the project. It is expected that you will meet with your Project Supervisor regularly to review progress, however, **it is your responsibility to arrange these meetings**.

* **Module Coordinator.**

The Module Coordinator will provide lectures and tutorials on generic project related topics, and is also responsible for the module therefore sets the deadlines, deliverables, schedule of presentations and demonstrations, etc.

* **Markers.**

Your final project submission, viva, and demonstration will be assessed by your project supervisor, a second marker and chaired by the Module Coordinator. The project supervisors are responsible for marking and providing feedback as appropriate to each of your submissions throughout the year.

As a student taking this module and as the leader of your project, **you are expected to:**

* Integrate and apply knowledge and skills acquired from other modules on the course to the project;
* Undertake project specific study and investigation;
* Follow strictly any safety or ethical regime agreed with your Project Supervisor;
* Cooperate in ensuring the security of your project work, and maintain the security of any relevant backups or electronic data of any kind;
* Meet all deadlines specified, ensuring timely submission of correctly prepared deliverables.

**2 Proposing a Project.**

Students propose and execute their own project. This is a 2-step process.

**Step 1 - Each student drafts and submits via email a project proposal (or proposals) to their assigned Project Supervisor.**

Each project proposal must include material under each of the following section headings:

1. A draft title of the project. Create a succinct, yet clear, non-ambiguous title for your project.
2. Project Description **(300 Words)**. Provide a brief background to the origin of the project proposal. Indicate clearly why the project outputs are needed (what is the specific “problem” which the project will address) and the intended user audience (how widely will your software solution be adopted) and what will be produced.
3. Project Aims.
4. Copyright, Intellectual Property Rights or Commercial Sensitivity. If appropriate, provide evidence that any issues of commercial sensitivity, intellectual property rights or data protection associated with the project which may be of concern to stakeholders have been noted and resolved to the satisfaction of all parties. If these matters do not need to be considered simply state that the project does not raise issues relating to copyright, intellectual property rights or commercial sensitivity.
5. Indicative hardware and software resources to be utilised within the project. Indicate the resources required (both hardware and software). There is a need here for you to ensure that there are no restrictions or similar on acquiring or accessing these resources and ensuring appropriate support for these is in place for the duration of the project.
6. References. Where appropriate provide references to published works which support your framing of the project background and/or demand for the project deliverables. If you have none, simply state “None”.

**Step 2 - The Project Proposal Review Process.**

The Project Supervisor, in relation to the following criteria, assesses the acceptability of each project proposal:

1. Does the proposed project title make sense?
2. Does the proposed project meet a real need in a wider context?
3. Does the proposed project provide an opportunity for the student to self-manage a significant piece of work?
4. Does the proposed project provide an opportunity to synthesise information, ideas and practices, to identify a significant problem, produce a significant solution together with an evaluation of that solution?
5. Does the proposed project afford an opportunity for the student to demonstrate innovation and creativity?
6. Are the indicated resources required available to enable the project to be completed?
7. Is the proposed project achievable within the project timescale?
8. Does the proposed project satisfy the BCS requirements for "General project requirements" and "Undergraduate individual project requirements"? (Note sections 2.5.1, 2.5.2)

<http://www.bcs.org/upload/pdf/hea-guidelinesfull-2015.pdf>

The selected **Project Proposal** must be agreed with the supervisor by the end of Week 2 of Semester 1.

**3 Project Deliverables and Deadlines.**

The following table outlines the key dates, actions and responsibilities with respect to the project deliverables:

**Semester 1.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Submission.** | **Deadline.** | **Action.** | **Responsibility.** |
| Agreed project proposal. | Wednesday 11pm, Week 3 (10/10/18). | Ethics database submission. | Project Supervisor. |
| Project stand-up review. | Wednesday 11pm, Week 11 (5/12/18). | Slides with supporting notes uploaded to Blackboard.  Agreed mark.  Written feedback. | Student.  Student and Project Supervisor.  Project Supervisor. |

**Semester 2.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Submission.** | **Deadline.** | **Action.** | **Responsibility.** |
| Final report and code listing. | Wednesday 11pm, Week 11 (10/04/19). | Report and code uploaded to Blackboard. | Student. |
| Project demonstration and oral. | Scheduled during the revision week before the examination period Tuesday 7 May to Friday 10 May inclusive.  After the Board of Examiners. | Demonstrate project and attend oral examination.  Feedback on request. | Student.  Module Coordinator. |

**4 Peer Discussion Groups (PDG).**

A feature of the project module is the concept of Peer Discussion Groups, established during the first two weeks of Semester 1. An objective of these groups is for students to discuss project related topics such as - plagiarism, what constitutes excellence and assessment. At the start of Semester 1, students will be allocated to a group, normally consisting of 5 students. Students will benefit from the critical appraisal and support of colleagues and gain insight into topics closely related to their project. The Peer Discussion Groups mitigate, in the early stages of the project, the potential for student isolation and student apprehension at the perceived scale of the project task.

The Peer Discussion Groups will meet on a weekly basis during Semester 1 and will be guided on topics for discussion by the Module Coordinator.

The intention of the groups is to:

* Provide an informal, safe and non-threatening forum wherein project related topics might be brought forward, explored, and developed among peers.
* Facilitate free discussion and exchange on matters relating to the project.
* Permit members to offer constructive criticism and support to peers.
* Collectively identify the strengths, weaknesses, risks and opportunities of an individual’s approach to, and progress through the project development life cycle.

Each group should meet weekly and maintain a written record of the outcomes of the meeting, along with any issues that require the attention of the Module Coordinator. A different student should chair the meeting each week and that student is responsible for completing the appropriate minutes.

Meeting Format:

Beginning with the Chairperson, each member in turn briefs the group on their individual project. Considering specifically the past week, each speaker will detail progress made, difficulties encountered and workarounds. Each speaker will finish by stating as simply as possible his or her objectives for the week ahead. Future briefing updates will refer to the progress made in achieving these objectives.

Led by the Chairperson, the group will discuss any group topic that may have been set by the Module Coordinator. At the end of the meeting, the Chairperson will agree with the group a record of the meeting under each of the following headings:

* PDG Group Name, Week Number.
* Members of group present/not present.
* Issues discussed.
* Any issues for attention of project coordinator.

The Chairperson will email any issues for attention to the Module Coordinator.

**5 Project Stand-Up Review.**

This presentation is the first summative element of the module. **The presentation is worth 25% of the module mark.**

The presentation serves as the student’s self-assessment of performance in activities to date. The final mark has to be agreed with the Project Supervisor after consultation. The details of the consultation will be provided as written feedback for the student. The purpose of the presentation is to demonstrate an understanding of the project’s progress and identify appropriate corrective actions if needed.

For this element of assessment, you are required to deliver a 30-minute presentation on the progress of the project. You are also required to submit your slides to blackboard on or before the appropriate deadline.

The presentation should be scheduled as a one to one meeting between the student and Project Supervisor at a mutually convenient time before week beginning 7 January 2019.

Topics to be covered in the Presentation:

1. Cover Slide: Title of Project and Student Details (Name, Registration Number and Course Code).
2. Problem Statement.
3. Proposed Problem Solution and Project Aim.
4. Summary of Requirements Gathering Strategy used.
5. Full list of functional and non-functional requirements in table form (Note: If this takes more than 1-2 slides, please provide a separate printed version with all the requirements).
6. Summary of Requirement Proritisation Strategy.
7. Risk Table including risk description and appreciation for the severity and impact (risk factor) on the project.
8. Summary of Risk Mitigation Strategy.
9. Choice and justification of Software Development Lifecycle Methodology to be used.
10. Project Plan for both semesters adapted to the methodology.
11. Monitoring of the Progress and Expended effort.
12. Summary of Proposed Implementation Strategy including software platform selection and justification.
13. Presentation of Progress to Date with early prototypes if appropriate.
14. Next objective to be achieved along with the plan for achieving it.

**6 The Final Report and Code Listing.**

This is the last submission element of the project module and provides evidence as to how the project was completed. **This submission along with the demonstration and oral examination are worth 75% of the project module.**

The report and code listing must be submitted electronically to TurnItIn via Blackboard Learn on or before the submission deadline (Wednesday 11pm, Week 11 (10/04/19).

Code Listing Structure:

The code for the project should be submitted in a separate file in PDF Format. Only include the files that you directly coded or partially coded. Do not include system made files proprietary to your framework.

The file should include:

1. Code Dictionary (index of files or code structure that make up your project).

2. Code listing for each file/object/code structure in a readable format.

Report Structure:

This is a suggested Project Report structure. The Project Report should be tailored to the specifics of your own project, especially with regard to the Software Development Lifecycle Methodology used and in consultation with your Pproject Ssupervisor. Example copies of past projects are available on Blackboard.

*Title page.*

Project title, student name, student number, course, date, and project supervisor.

*Abstract.*

The purpose of the abstract is to give a summary of the overall project, enabling the reader to gain an impression of the origins, aims, nature and final results of the work without having to read the detail contained in the later chapters. The abstract should not exceed one A4 page.

*Acknowledgements.*

It is customary to acknowledge the help and advice given by staff, fellow students and others.

*Table of contents.*

Listing (title and pagination) of Figures presented.

Listing (title and pagination) of Tables presented.

***Chapter 1.******Introduction.***

Brief background.

Project Aims.

Project Objectives.

Outline of dissertation structure.

***Following Chapters – Literature review, technical background.***

Typically 2 chapters on literature review, technical background, etc.

These chapters provide the foundations for your work, contextualise your effort and give focus to your dissertation. Conclude by reiterating the project Aims and Objectives.

***Following Chapter(s) – Requirements gathering, analysis and design.***

One or more chapters should now be devoted to requirements gathering, analysis and design. The Software Development Lifecycle Methodology that you will have selected to underpin the project drives the nature of the activities/work undertaken. It is important you adhere to recognised methods and the adoption and use of appropriate notations.

***Following Chapter(s) – Implementation.***

Present a high level overview of the proposed system architecture followed by a more detailed treatment of code or pseudo code fragments of elements of development.

Report any significant challenges encountered and associated solutions offered.

***Following Chapter(s) –Testing and Evaluation****.*

Herein you should seek to undertake both validation and verification of the project product(s) or outcomes and consider the appropriateness of the engineering process you adopted in moving to achieve them.

***Following Chapter – Results.***

The results of your work should be presented here. Highlight all the positive outcomes from your dissertation in the fulfilment of the initial project objectives. Individual objectives may be unfulfilled, partially fulfilled, fulfilled or exceeded. The circumstances surrounding and the impact arising from unfulfilled objectives can be expanded upon in the final chapter. Although disappointing, shortcomings of this nature can be compensated for by your approach to the identification and monitoring of risks and by your approach to their mitigation under the umbrella of ‘Project Management Skills’.

***Final Chapter – Conclusions and suggestions for further work.***

In writing the conclusions, undertake a critical evaluation of the project scope, planned outcomes, products produced and of your management of the overall process. One approach to this is to try to write down what advice you would wish to pass on to a future student undertaking a similar project.

In presenting your suggestions for future work you have an opportunity to express your views on a broad spectrum of issues such as, but not limited to, improvements to the existing system; increasing functionality; integration within other systems, etc.

Where a shortcoming has been identified you can also suggest how it could be avoided and offer reasoned approximations as to the additional time or resources that would be required to resolve the issue.

This chapter should also present a reflection on the entrepreneurial aspects of the project along with a discussion of ethical and sustainability issues arising.

The chapter should clearly highlight aspects of the project that evidence innovative and creative approaches.

***References.***

Use the Harvard Referencing system (refer to [this guide to referencing](http://wiki.ulster.ac.uk/display/SSS/Ulster+Business+School+-+Guide+to+referencing+in+the+Harvard+style) for help and support on referencing using Harvard method).

***Appendices.***

Appendices include material that is relevant, but would be too tedious or not just relevant enough to include in the main text.

**Formatting Guidelines for final submission.**

The project represents a substantial piece of work carrying 40 credit points. In terms of effort it deserves, the guideline figure is 400 hours. The submitted document should contain a minimum of 60 pages of text plus references and appendices.

Students should adopt a clear technical style, avoiding use of the personal pronoun where possible.

Indentations of sub-headings should be used with discretion. The following guidelines for layout and submission should be noted carefully:

Standard presentational guidelines:

*Numbering Convention.*

With the exception of the front page, all the pages before Chapter 1 are numbered with Roman Numerals, so that the page following the front page is ‘ii’. From the start of Chapter 1 decimal numbering is used to the end of the project (i.e. including appendices and references). So Chapter 1 begins on page ‘1’.

Chapters are numbered sequentially 1, 2, 3, etc. Appendices are identified alphabetically in sequence A, B, C, etc.

Chapter, section and sub-sections are numbered as in the following outline example:

Chapter 2

Section 2.1

Section 2.2

Subsection 2.2.1

Subsection 2.2.2

Section 2.3

Figures, tables and code listings are numbered and given appropriate titles. Within a given chapter, all figures, tables and code listings begin with the chapter number, and after a “.” there is a second number. This second number is simply a sequence count, but note that there are separate sequence counts for figures, tables and code listings. So, regardless of how the figures, tables and code listings are intermixed, this simple sequence count for each type is retained. So, for example in Chapter 2 you might have Figure 2.1, Table 2.1, Table 2.2, Table 2.3, Figure 2.2, Code Listing 2.1, Table 2.4, Table 2.5 and Code Listing 2.2 and so on.

*Quotations*

Where a quotation runs to three or more lines, as well as appearing inside quotes, it is usually indented on the left and right margins and is often put in a slightly smaller font size, e.g.

"Info.cern.ch was the address of the world's first-ever web site and web server, running on a NeXT computer at CERN. The first web page address was http://info.cern.ch/hypertext/WWW/TheProject.html, which centred on information regarding the WWW project."

(CERN, 2009)

*Page Formatting*

Use justified alignment throughout the report.

|  |  |
| --- | --- |
| Type Font: | Any clear legible font, e.g. Arial or Times Roman. For code snippets consider using Courier. |
| Font size: | 12 point. |
| Margins: | 1-inch top and bottom of pages. 1.5 inches at the binding margin. |
| Line spacing | Line spacing between of 1. |
| Page numbering: | In bottom centre of each page. |

**9 Project Demonstration.**

As part of the Final Report Submission, you will be required to carry out a demonstration and oral defense of your project to your panel. This exercise will take place during the revision week before the examination period Tuesday 7 May to Friday 10 May inclusive. Notification of your date and time to attend will be snet via email. It is your responsibility to ensure all facilities needed to demonstrate your project are in place for the date and time allocated.

**Note: Failure to attend your demonstration will result in a non- submission being recorded against the entire project module.**

The demonstration includes a question and answer session with your markers and the total exercise will last approximately 40 minutes.

**9 Faculty guidelines and marking schemes.**

Appendix 1 details the faculty code of practice for the management, supervision, and assessment of Capstone projects.

Marking schemes for the project stand-up review and for the final report, code listing, demonstration and oral are included in Appendix 2.

**APPENDIX 1.**

**Capstone Projects**

ULSTER UNIVERSITY  
FACULTY OF COMPUTING AND ENGINEERING

CODE OF PRACTICE FOR CAPSTONE PROJECTS – MANAGEMENT, SUPERVISION AND ASSESSMENT (August 2015)

INTRODUCTION

1. Throughout the Faculty it is common practice to have significant projects that are undertaken by students at the final stages of their programme of study (hereafter referred to as *Capstone Projects*). This Code of Practice is intended to outline the normal practice with respect to such projects in order that key principles are implemented consistently across the Faculty.

PROCEDURE

DUTIES OF THE PROJECT CO-ORDINATOR

2. Capstone projects shall have a module allocated to them, and each module shall have a module co-ordinator referred to hereafter as the *Project Co-ordinator*. The Project Co-ordinator should liaise with the Head of School to ascertain which members of staff are available to supervise Capstone Projects on their module and the quota of projects each staff member can expect. Additionally, the Project C- coordinator should ensure that students are informed of the nature and consequences of plagiarism and have access to appropriate information on referencing available from http://www.ulster.ac.uk/academicoffice/Policies.html

3. The Project Co-ordinator is responsible for monitoring the implementation of the Faculty's Ethical approval process for projects on their module including reporting to the Ethics Filter Committee, prior to each meeting, on the state of completion of the process. Project supervisors shall ensure that all projects are subjected to the ethical approval process.

PROJECTS AND THEIR ALLOCATION

4. Projects may be proposed by potential supervisors and also by students and external bodies, including employers, where appropriate. Project proposals set by staff should include:

* •  Project title
* •  The course(s) or level at which the project is to be offered
* •  Resources required (e.g. hardware, software, data sources)
* •  Desirable interests or skills of student
* •  Module prerequisites (if required)
* •  Description of project.

5. Other proposals should be submitted to the project co-ordinator who will select an academic supervisor who will help refine the proposal along the lines of a staff project proposal or reject it. Proposals shall be checked that they align with PSRB requirements. A record shall be kept in each school of the verification process for relevant projects.

6. A mechanism for allocating projects *not proposed by students* that promotes equality of opportunity should be described clearly in the module handbook and applied consistently. In case of multiple students being equally in favour of one project, Course Teams may use previous academic performance to determine which student will obtain the project or may make the allocation at random.

RESPONSIBILITY OF STUDENTS

7. Students are required to

* •  arrange a meeting with their supervisor promptly on allocation of supervisor
* •  contact the supervisor frequently throughout the duration of the project
* •  meet all deadlines specified in the module handbook, ensuring timely submission of correctly prepared deliverables
* •  co-operate in ensuring the security of their project work, and to maintain the security and any relevant backups of their electronic data of all kinds
* •  follow strictly any safety or ethical regime agreed with their supervisor(s) and project co-ordinator.

RESPONSIBILITIES OF SUPERVISOR

8. Supervisors are required to

* •  be familiar with the module handbook and relevant regulations for all project(s) under their supervision
* •  be normally contactable weekly during the period of the project, except during holidays or illness
* •  inform students of the appropriate means and times of such contacts
* •  inform the Head of School of any absence so that appropriate measures can be taken to provide cover for supervised projects
* •  provide guidance in the management and technical execution of the project, and to provide meaningful and timely feedback
* •  encourage students to produce deliverables on time and to an appropriate level
* •  participate fully in the assessment and moderation process
* •  ensure that all Safety and Ethical Assessments have been completed and a record kept
* •  enter project data on the Faculty web-based Ethics database for approval by

the Faculty Taught Courses Ethics Filter Committee. Where ethical issues are identified these should be discussed with the Project Co-ordinator and, if unresolved, referred to the Committee. Guidance on ethical issues is available from http://research.ulster.ac.uk/office/rofficeeg.html

* •  keep a simple record of all supervisory meetings arranged.

9. Supervisors are reminded that all marks collected within the terms of the project are provisional and subject to the approval of the Board of Examiners. Consequently, while provisional marks may be awarded to the student and discussed with them during the term of the project, this caveat shall be made very clear to the student. Supervisors shall not offer predictions for marks on future deliverables or components of the project.

10. Project Co-ordinators should liaise with the Taught Courses Ethics Filter Committee.

ASSESSMENT

11. At least the final deliverable of a project module shall be double marked, and this component shall have the highest weighting in the overall assessment. After completing their individual assessment the markers will agree and document a recommended mark. If agreement cannot be reached it will be referred to moderation. Where project deliverables are suitable for electronic submission, plagiarism detecting software should be used to check the work.

MODERATION

12. There should normally be a mechanism for ensuring that the rank order and moderation of projects within a module is correct, e.g. an overview carried out by the Project Co-ordinator, a Chair who oversees the assessment of all such projects or a meeting between all relevant supervisors to discuss all relevant projects.

**APPENDIX 2.**

**BSc Computing Systems – COM667 Computing Systems Project – Project Stand-up Review Marking Scheme.**

**This form is used by the project supervisor to capture the student’s self-assessment immediately after the presentation. The student may provide a rationale for their judgement. An actual mark should be agreed between the project supervisor and the student. In the absence of agreement the decision of the module coordinator is final. This assessment contributes 25% of the overall marks for the module.**

Student:­­­­­­­­­­­­­­­­ Reg Number: Project Supervisor:

|  |  |  |
| --- | --- | --- |
| **Skills** | **Details of project performance and progress should be presented. Professional observations of the following are important.** | **Student’s self-assessment for each skill; categorised as High, Medium or Low)**  **Student’s reflection and rationale for judgement** |
| Processes, Techniques and Work Products  **(**Understand, use, synthesize and evaluate the processes, techniques and work products  of development, project management and supporting activities**)**  **50 Marks** | * Professional observation of actual values of planning parameters against those expected * Professional observation of commitments against those originally identified. * Effectiveness of risk strategy. * Adequacy of security of project data. * Stakeholder involvement against plan. | https://documents.lucidchart.com/documents/419b79b6-bb21-4ae1-bf1b-9b294e5e8e88/pages/mR1iaFx5ufZ-?a=18228&x=-1596&y=-964&w=451&h=88&store=1&accept=image%2F*&auth=LCA%209a110548cb72a23dff5e956001120eea4c1edfdf-ts%3D1521114302 |
| Evaluation, Problem Solving and Decision Making  (Solve problems using a range of professional and appropriate causal analysis methods)  **30 Marks** | * Appropriate assessment of project’s progress, performance, and issues. * Realistic appraisal of project’s accomplishments and results. * Appropriate analysis of issues and reasoned determination of corrective actions to address them. * Evidence of corrective actions managed to closure. | https://documents.lucidchart.com/documents/419b79b6-bb21-4ae1-bf1b-9b294e5e8e88/pages/mR1iaFx5ufZ-?a=18228&x=-1596&y=-964&w=451&h=88&store=1&accept=image%2F*&auth=LCA%209a110548cb72a23dff5e956001120eea4c1edfdf-ts%3D1521114302 |
| Communication  (Communicate concepts, designs and technical details effectively in visual, oral and  written forms, to a variety of audiences)  **20 Marks** | * Is the presentation delivered clearly and professionally? * Is the presentation structured appropriately and is it coherent? * Is the media appropriate and professionally created? | https://documents.lucidchart.com/documents/419b79b6-bb21-4ae1-bf1b-9b294e5e8e88/pages/mR1iaFx5ufZ-?a=18228&x=-1596&y=-964&w=451&h=88&store=1&accept=image%2F*&auth=LCA%209a110548cb72a23dff5e956001120eea4c1edfdf-ts%3D1521114302 |
| Agreed Mark | Examiner Comments | |

**Signed:**

**Student Project Supervisor**

**BSc Computing Systems – COM667 Computing Systems Project - Final Report, Oral and Demonstration Marking Scheme**

**(This form is used to assess the final report, demonstration and oral). This assessment contributes 75% of the overall marks for the module.**

Student:­­­­­­­­­­­­­­­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Reg.Num:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Examiner: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |  |
| --- | --- | --- | --- |
| **Skills** | **Achievements/outcomes evidenced in the Report, Software, Demonstration, Oral *(BCS expectations shown in italics*)** | | **Examiner’s Specific Comment** |
| Processes, Techniques and Work Products  **(**Understand, use, synthesize and evaluate the processes, techniques and work products  of development, project management and supporting activities**)**  ***Mark (30%)*** | * Is the range and depth of functionality sufficient? * Is the usability of HCI appropriate? * Is security appropriately addressed * Is a systematic approach to **technical solution** evident? * Are appropriate processes and techniques used? * Are the essential concepts, principles and practices understood? * *Are tools used appropriately to support life-cycle processes?* * Is **version management** appropriately deployed? * Have appropriate quality standards in the engineering of the project been applied? * Are **verification and validation** appropriately used throughout the development cycle? * Are **requirements development and management** appropriately utilised? * Is **testing** methodically applied using appropriate techniques? * Is there sufficient complexity in the problem/solution? * Is there evidence of structured **decision analysis and resolution** including rationale for decisions * *Is an appropriate lifecycle adhered to during solution* * Is code self-documented and appropriately structured? * Have **engineering project management** standards been applied? * Is there evidence of both **process and product quality assurance**? * *Have information, ideas and practices been properly synthesised into a quality solution?* | |  |
| Evaluation, Problem Solving and Decision Making  (Solve problems using a range of professional and appropriate causal analysis methods)  ***Mark (20%)*** | * *Is there appropriate critical appraisal of the project, indicating the rationale for any design/implementation decisions, lessons learnt during the course of the project, and evaluation (with hindsight) of the project outcome and the process of its production (including a review of the plan and any deviations from it)* * *Is the problem and objectives for the work properly elucidated?* * *Have all appropriate work products been sufficiently evaluated?* * *Has the product been sufficiently evaluated?* * *Have the processes deployed in the project been sufficiently evaluated?* * Is there an awareness/use of quality standards in the evaluation of the project work products? * *Are objectives, requirements and project outcomes appropriately evaluated?* * Is there a clear solution to the defined problem? * *Is context of the problem thoroughly investigated and have similar products/solutions been fully explored?* * Is there evidence that underlying causes of problems, both technical and organisational, have been discovered and processed? * Is the satisfaction of requirements demonstrated? * Is there an understanding of appropriate alternatives and selection criteria? * Is there application of analytical skills? * *Is there evidence of sufficient critical appraisal?* * *Are formal decisions made in a professional and ethical manner*? * *Does the outcome of the project meet a real need?* * *Is the outcome of the work clearly and appropriately evaluated*? | |
| Self-development, learning and organisation  (Manage and reflect on one's own learning and development including time management  and organizational skills)  ***Mark (10%)*** | * Are appropriate future intentions identified? * Is the student able to suggest how the work could have been improved? * Are there reflections on progression of learning, understanding, skills evolution, management and organisation? * *Have lessons been learned and improvement leveraged from the experience of undertaking the project?* * Have resources been managed effectively? * Is there an evaluation of self? * Is use made of metrics? * Is the demonstration organised and structured? * Did the student show tenacity when project difficulties were encountered? * Is the student’s effort self-managed? * Are key resources appropriately utilised? | |
| Communication  (Communicate concepts, designs and technical details effectively in visual, oral and  written forms, to a variety of audiences)  ***Mark (20%)*** | * *Is the life-cycle clearly described?* * Is the outcome of the work clearly and appropriately communicated? * Has there been systematic and appropriate investigation of the problem and its context? * Is documentation structured and complete? * Is the work readable and grammar, spelling and punctuation acceptable? * Is the student’s response to questions during demonstration robust, clear and sufficient? * Are logical arguments formalised and articulated? * Is communication effective for various audiences? * Are arguments appropriately defended? * *Is work appropriately referenced*? * Is the student able to discuss limitations of the work? * Did the student clearly and comprehensively defend the work and decisions made? * Is documentation complete? | |
| Professionalism and Opportunity  (Reflect on professionalism, entrepreneurial opportunity, ethics and sustainability)  ***Mark (10%)*** | * *Does the solution meet or have the potential to meet a real need in a wider context?* * Is there any evidence of entrepreneurial activity? * Has commercial, social or academic opportunity been adequately explored? * Are the social implications considered? * Is there sufficient understanding and adherence to professional, legal, moral and ethical issues * Are there reflections on key issues such as entrepreneurship, employability, professionalism? * Are environmental issues appropriately explored? * Has sustainability been explored? * Have ethics been a concern especially during requirements elicitation? * Have any ethical dilemmas occurred and have they been appropriately dealt with? * Have legal issues been considered? | |
| Innovation  (Demonstrate innovation and creativity)  ***Mark (10%)*** | * Is novelty evident in the processes deployed in the project? * Is Innovation evident in the work products produced by the project? * Is originality displayed during problem solving? * Are there any inventive steps in process or product? * Have techniques been utilised creatively? | |
| **Examiner’s Mark (100%)** | | **Agreed Final Mark (100%)** | |