Honours Project Paper Assessment 2016[1]

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1. Introduction

The project mark represents ⅜ of the entire Honours course mark. In addition, students must achieve at least 50% for the project in order to pass the Honours year[2].

Of the 100 marks allocated to the final Honours project, 80 depend on the final project paper. An initial paper mark is determined by the project supervisor and second reader and, in difficult cases, a third examiner. Project marks are moderated and then given to the external examiner for consideration.

2. Project Paper Format

The project paper must conform to the Association for Computing Machinery (ACM) proceedings format. No other formats are permitted.

MSWord and LaTex templates for this format are available from the ACM website http://www.acm.org/publications/article-templates/proceedings-template.html/

Papers are to be a *maximum of ten pages* in the ACM proceedings format, *excluding references*.

3. The Project Paper Mark

The following marking scheme will be used to assess all Computer Science Honours project *papers*. Cross-disciplinary projects will also be subject to this scheme. In the unlikely event that this marking scheme is inappropriate for a project, a new *ad hoc* scheme must then be agreed upon by the supervisor and Honours coordinator, in consultation with the CS staff. A deadline is set for such changes and is usually as soon as the projects have started in earnest.

The marking scheme is divided into categories shown in Table 1 and described in detail in Section 4.

	Category	Min	Max	Evidence
1	Requirement Analysis and Design	0	20	**Project Paper Only** (individual work)
2	Theoretical Analysis	0	25	
3	Experiment Design and Execution	0	20	
4	System Development and Implementation	0	15	
5	Results, Findings and Conclusion	10	20	
6	Aim Formulation and Background Work	10	15	
7	Quality of Paper Writing and Presentation	10		
8	Quality of Deliverables	10		
9	Overall General Project Evaluation (this section allowed only with motivation from supervisor)	0	10	**Paper** + [3]
Total marks		**80**		

Table 1. Summary of assessment categories indicating maximum and minimum marks that can be chosen. All choices have to add up to 80 in total.

These component categories may not necessarily map directly onto individual sections in the final project paper, but those reading the paper must be able to assess the student's work or contribution for

[1] This document may be revised during the year; the date of this revision is at the foot of this page.
[2] For CSC4016W the minimum mark for the project is 40% but an average of 50% overall for honours.
[3] Apart from the project paper the additional evidence for this category can include, for example, notes from the demonstration, minutes of meetings as posted on website or a supervisor's report on the project.

each of the listed categories. Categories 7 and 8 have fixed weights and are therefore the same for all projects. The weights of other categories may be adjusted within the specified range – these optional components allow for many different types of project. Suggestions for common weightings are provided in the next section.

The mark for the project paper is, rather obviously, determined by the paper (the only partial exception is the category "Overall General Evaluation" category, which **requires explicit motivation from the project supervisor**). However, the supervisor and second reader will also view a demonstration of the project, to allow for a better understanding of the context of the work.

3.1 Project Paper Categories (80 Marks)

The supervisor, in consultation with the student, selects weightings of the variable categories, depending on the suitability of the category for the work done and the objectives of the project. The category weightings are then displayed on the cover sheet of the final project paper.

Category selection should aim to maximize the student's final mark. The following table provides possible point allocations for three quite different projects (of course, any other combination adding up to 80 and within the category ranges specified is also acceptable).

	Category	***Development***	***Experimental***	***Theoretical***
1	Requirement Analysis and Design	15	0	0
2	Theoretical Analysis	0	0	25
3	Experiment Design and Execution	0	20	0
4	System Development and Implementation	15	10	5
5	Results, Findings and Conclusion	10	20	20
6	Aim Formulation and Background Work	10	10	10
7	Quality of Paper Writing and Presentation	10	10	10
8	Quality of Deliverables	10	10	10
9	*Overall General Project Evaluation* [**requires explicit motivation from the project supervisor**]	10	0	0
Total marks		**80**	**80**	**80**

Table 2. Possible assignment of optional categories for a few different types of honours projects

3.2 Paper Draft

A full draft of the final paper must be submitted to the project supervisor **ten days before** the final paper deadline. This paper must be submitted on the Vula course management site. If this is not done, **a penalty of 10%** of the total will be subtracted from the student's final mark.

4. Ancillary Project Documents and Deliverables (20 Marks)

In addition to the final paper, there are four other project deliverables:

1. Project Demos 5 points
2. Project Poster 5 points
3. Web Pages 5 points
4. Self reflection 5 points

Note: these components have their own mark schedules, which are not reproduced here.

Students perform two demonstrations of their project software: an initial Prototype (Feasibility) Demonstration and a Final Demonstration.

5. Assessment Categories

The mark categories for the final paper are here described in more detail.

5.1 Requirement Analysis and Design

Please note that the term "design" as used below stands for "Software Engineering and/or Design". This category assesses the strategy adopted in analysing and designing a computational artefact,

according to Software Engineering *or* Design practice. The artefact is usually a prototype of a software product, but it can also be a testbed of an experimental system. Requirements for evaluation:

1. The system design must be justified in terms of the expected behaviour of the final product.
2. The design process must be structured so that a modular, robust system results.
3. The project should employ concepts and techniques appropriate to modern computer science.

Software engineering or experimental projects may include supporting supplementary information on the software engineering or design process in online appendices.

0-39%	Little or no evidence of any design whatsoever.
40-49%	No evidence that the design process is understood.
50-59%	Design carried out in a way that makes sense, but process has flaws. It is readily apparent that the programming project analysis was not written by a first year.
60-69%	Logical design process followed, but design decisions mostly not justified. Used relevant design tools/techniques.
70-74%	Clear understanding of the design process shown. Proceeded in a logical manner and justified most decisions. Used proper design tools/techniques in a rigorous and intelligent manner.
75-84%	Clear understanding of the design process shown. Proceeded in a logical manner and justified all decisions. Fluent use of design tools/techniques. Design shows ingenuity in approach.
85-95%	Very clear understanding of the design process shown. Proceeded in a logical manner, considering all options and fully justifying all decisions. Showed understanding of the purpose of design tools/techniques in their use. Design shows considerable ingenuity in approach.
95%+	Design shows considerable originality of approach.

5.2 Theoretical Analysis

This category evaluates the theoretical analysis for those projects which require it. Theoretical analysis is *either*,

- theory of computation (proofs, algorithm analysis and derivation of computational complexity etc).
- *or*, where the background theory must be adapted to deal with the problem being addressed and a theoretical understanding of computational aspects of an application area has to be developed (for example, theory in this sense includes how a specialized CODEC for the application would work, and so on).

Questions to ask include:

1. How sound is the analysis? Is it correct, are the assumptions valid?
2. What is the relative complexity? Is it appropriate for a 4th year project?
3. Is it well presented/accessible?

0-39%	Little or no understanding demonstrated.
40-49%	Shows little understanding, and cannot relate the work to underpinning theory.
50-59%	Shows understanding of some aspects, at a fairly superficial depth. Unable to present theoretical basis for work, though has identified some relation between the work and underpinning theory.
60-69%	Shows understanding of what has been done. Theory applied but paper fails to demonstrate understanding of theory.
70-74%	Good understanding of what has been done, and has described theoretical basis, albeit with understanding of theory limited to that used directly.
75-84%	Thorough understanding of the subject and has applied this understanding to the solution of unfamiliar problems or application area.

85-95%	Deep and comprehensive understanding of the subject. Applied understanding to the solution of unfamiliar and difficult problems or reinterpreting theory to apply in a different problem domain
95%+	The student has evident mastery of difficult material, has explained it fluently, and has demonstrated original thought.

5.3 Experiment Design and Execution

This category is intended for those projects which use experimental or field testing methods: either quantitative or qualitative. Note that *results* and their analysis are evaluated in Section 5.5, not here.

The table of criteria below are orientated towards quantitative methods. Where a qualitative investigation is required, the grading requirements should be adjusted appropriately. Since qualitative research comes in many different forms, it is not possible to include them in this summary. Supervisors must clarify the evaluation criteria of the particular method of qualitative research adopted with both the student and the second reader at the start of the project. Experimental projects may include supporting supplementary information such as tables of experimental results in online appendices.

Questions to ask of qualitative work:

1. Is there an important and well-formulated question?
2. Was the researcher's perspective taken into account?
3. What were the quality control measures on the data collection and analysis?
4. Is the research methodology sound?
5. Is there enough depth and evidence to be credible and induce trust?
6. Is there evidence of triangulation of research?

Questions to ask of quantitative work:

1. Is there a well-formulated hypothesis?
2. Were the experiments designed to confirm/refute the hypothesis (i.e. are they appropriate)?
3. Is the research methodology sound?
4. Can the experimental testbed be systematically modified to check the effects predicted by the hypothesis?
5. Is the work reported in such a way that the results can be replicated?

0-29%	Little or no evidence of any experiments (where experiments were required).
39-40%	No evidence of any design of experiments. Almost no data from experiments.
40-49%	Some evidence of experiment design. Some data collected but of limited use.
50-59%	Some appropriate experiments carried out, but with poor results. Limited attempt to analyse the results.
60-69%	Evidence of experimental design. Some success with experiments, but reliability uncertain and little attempt to account for errors. Problems, that could have been solved, not overcome. Appropriate ethical clearance obtained
70-74%	Work properly planned, carried out carefully and fully documented. Method reliability discussed adequately. Problems overcome by developing equipment or method. Ethical issues discussed and clearance obtained if needed.
75-84%	Experiments designed and either piloted or replicated. Theory applied and experiment compared with theory and deviations examined and explained. Ethical issues discussed and clearance obtained if needed.
85-95%	As above: experiments very carefully designed, and ingenuity demonstrated in this design. Every reasonable step has been taken to produce reliable results.
95%+	Original techniques applied and/or theory developed and novel tests designed.

5.4 System Development and Implementation

This category is intended for those projects where actual system creation plays an important role. Questions to be addressed are:

1. How the design was implemented. For example, was a good language chosen to do the project in? Are the algorithms chosen the best ones available?
2. Are the data structures which have been selected appropriate for the objects and stores which were identified during analysis?

Software engineering projects may include supporting supplementary information in online appendices. If a motivated and structured account of the software development process cannot fit into a 10-page paper, supplementary information must appear on the website. For example, all the artefacts of the software analysis and design process followed should be presented on a dedicated website. In addition, documents produced for the ongoing maintenance and support of the system should also appear on the same website. The ACM formatted paper must include a note about any supplementary material as well as a direct URL link to http://pubs.cs.uct.ac.za and a reference to the project abbreviation in the block provided on the first page, bottom right corner.

0-39%	Little or no functioning software has been produced. No useful documentation.
40-49%	Some code produced and it does do something but does not work properly and there is very poor documentation No evidence of any thought given to a proper implementation process.
50-59%	Code basically working but poorly documented, System not particularly reliable Has not followed a proper implementation process based on design. Student shows limited knowledge of standard algorithms and appropriate data structures. User interface difficult to understand and use.
60-69%	Working code produced and documented. It does most of what it is supposed to do most of the time. Some evidence of a proper implementation process. Standard algorithms and data structures employed, although they might not be optimal for the task at hand. User interface can be used with just a little guidance from the student.
70-74%	Working code produced and thoroughly documented. It meets most specifications reliably. The programming techniques used are highly professional, particularly in terms of structure and testing. Correct and efficient algorithms and data structures used. A proper implementation process has been clearly followed and documented. User interface usable without help from the student.
75-84%	Working code produced and thoroughly documented. It meets all specs reliably. Fully documented. The programming techniques used are highly professional and issues of maintainability, portability etc. were addressed. The student exhibits an excellent knowledge of the computer language concerned. User interface user friendly.
85-94%	A good example of software engineering carried out properly. A rigorous implementation process has been followed in writing of an impressive piece of software That is robust and reliable and fully meets or exceeds demanding specifications. Full documentation, issues of maintainability, portability etc. fully addressed and The user interface is very clear and easy to use.
95%+	As above and work is original and / or ingenious and shows imaginative invention.

5.5 Results, Findings and Conclusion

This category applies to all projects. It assesses the extent to which the results of the project were analysed and related to the aims. Questions to ask:

1. Was an evaluation of the output attempted against the stated aims (or research questions, as appropriate)? For theoretical work, this equates to a satisfactory proof mechanism. Experimental systems will usually have statistical verification and analysis.
2. Did the work evaluate the correct questions? Were the conclusions drawn appropriate/reasonable?
3. Are the results / findings / conclusions presented clearly?
4. Are the results / findings discussed in a mature manner, worthy of honours level study? If the results are contrary to expectations is there an explanation of why this is so?
5. Is insight in the interpretation of the results clearly shown? Are there gaps, or obvious oversights? Was the evaluation technique used appropriate for the problem?

0-39%	Little or no evidence, results and no proper conclusion.
40-49%	Some very poor results presented but no effective attempt to analyse them/draw useful conclusions.
50-59%	Some poor results. Almost no attempt to analyse the results. Conclusions do not relate to project aims.
60-69%	Some results, but reliability uncertain and little attempt to analyse them. Conclusions drawn and related to aims.
70-74%	Results fully documented and reliability or unreliability discussed adequately, some use of statics. Importance of results discussed. Conclusions supported by results and all related to project aims.
75-84%	Experiments replicated and errors estimated (statistically where possible). Results fully documented and examined for reliability. Importance discussed and significance pointed out. Conclusions supported by results and related to project aims and research questions. Contributions highlighted, future extensions sketched.
85-95%	As above: Every reasonable step has been taken to verify the results, and a thorough error analysis has been completed. Discussion of results is comprehensive and convincing with interesting implications pointed out. Conclusion shows to what extent aims were realized and is frank about possible shortcomings. Novel insights pointed out, future valid extensions sketched.
95%+	Results may be publishable.

5.6 Aim Formulation and Background Work

The research question or system requirements must be clearly stated in the introduction and placed in a context that shows the importance of the project. The reader should gain a sufficient understanding of what the student proposes in order to follow their arguments and understand their work.

Although the students have already handed in a literature survey, that is regarded as a first draft of the background section and it should be evaluated here as a component of the whole project paper.

1. Is the research question well motivated or justified?
2. Does the student shows an appreciation for the importance of their project in the overall context of Computer science?
3. Was the background research thoroughly done? Was a classification of the surveyed work attempted?

0-39%	Little or no evidence of research or background investigation.
40-49%	Very few sources (probably books, Wikipedia, web pages) read. Vague statement of problem area.
50-59%	Several sources of information used, but research naïve and not systematic. Aims stated in general terms. Some major gaps in the background research.

60-69%	Systematic literature survey attempted, but incomplete or inconsistent. Aims clearly stated. Ethical, professional and Intellectual Property issues raised as appropriate.
70-74%	Competent literature survey carried out, that is, all important material has been covered. Aims well formulated and testable (falsifiable). Ethical, professional and Intellectual Property issues discussed as appropriate.
75-84%	Comprehensive literature survey, sound base for project and further work. Aims clearly stated, and for a research project stated as research questions. Ethical, professional and Intellectual Property issues investigated and addressed as appropriate.
85%-95%	Literature survey very systematic and comprehensive (including all key papers). Importance of project aims clear and for a research project the aims are presented as testable hypotheses. Ethical, professional and Intellectual Property issues investigated and comprehensively addressed, as appropriate.
95%+	As above. Student produced a classification of work in the field.

5.7 Quality of Paper Writing and Presentation

Among the elements that should be considered when arriving at a mark:

1. the succinctness and clarity of whole work, especially **the abstract**;
2. the clarity with which the student introduced their project and explained their objectives;
3. the presentation of their arguments/rationale for pursuing their particular solution;
4. the structure of the conclusions: conclusions should revisit the issues addressed and recap the major results/contribution;
5. the use of sufficient and correct references in the ACM style.

0-39%	The submission cannot be accepted as representing an Honours paper. The writing is so poor that the document is difficult to comprehend.
40-49%	Quality is low, with little or no structure. Reads like an expanded second-year project paper.
50-59%	Required components present in recognisable form. Possible to see what has been done from the paper. Flawed, but has some results, some explanations and description of work which indicates that, with some additional application something worthwhile could be produced.
60-69%	The paper is properly structured and the required components are properly presented, but there are significant flaws. E.g.: references, diagrams, and calculations show errors or omissions.
70-74%	The layout of the paper follows the guidance given. It is easy to read with few grammatical or spelling mistakes and gives a clear account of the project.
75-84%	The paper is coherent, follows the guidance given strictly, well structured, easy to read, and few corrections are required. It gives a very clear account of the work that has been done and sets this in the context of other work.
85-94%	The paper is excellent in every way. It needs no corrections, or only a few very minor corrections.
95%+	As above and the writing is of publishable quality.

5.8 Quality of Deliverables

Here we consider the evidence presented in the Project Paper: we wish to establish whether the project achieved the quality outcomes. This section also tries to answer the question: What is the quality of the deliverables as evidenced in the paper? The deliverables can be concrete (e.g., software) or a theoretical result (new proof, useful extension of theory etc).

1. Does the product/solution work well?
2. Does it demonstrate or achieve what it set out to do, is there sufficient evidence for this?
3. Is the deliverable of a high enough level for an Honour's project?

0-39%	Almost nothing to show for any work that has been put in. No evidence of planning. Little or nothing recognisable has been made as a deliverable.
40-49%	Aims not met. No evidence of following planning procedures. Amount of work insufficient. The deliverable may be recognisable but it doesn't work.
50-59%	Progress towards meeting many aims. Met some deliverables and gave some indication of deviations. The deliverable is unlikely to work very well.
60-69%	Aims mostly met. Delivered according to plan and indicated where and why deviations were made. The deliverable works satisfactorily.
70-74%	Reasonably ambitious aims met fully or less ambitious aims exceeded. Evidence of difficulties anticipated and planned for. Tests were reported that showed that the deliverable works well.
75-84%	Clear evidence of problems anticipated and dealt with in a way that was coherent with overall objectives. Ambitious aims / success factors met fully or reasonably ambitious aims exceeded. Tests were reported that convincingly showed that the deliverable works well/perfectly and shows real care and craftsmanship.
85-94%	As above and the tests show the deliverable works perfectly / beyond expectation and the paper shows that it demonstrates state of the art techniques. A member of staff could be proud of this work.
95%+	As above and the product/solution design extends existing design knowledge (or complex proof only understood by one other person and perhaps by supervisor :-).

5.9 Overall General Project Evaluation

Note that evaluation will mean different things for different kinds of projects. These points are therefore suitably non-specific. This is the one case where marker can go beyond the paper itself and try to evaluate the project as a whole.

Note Well: This has to be based on *concrete and reproducible evidence* such as notes on demonstrations, minutes of meetings recorded by the students and a supervisor's report on the project supported by a written record of a *critical* interview of the supervisor by the second reader. This evidence must be included in online appendices.

If a student is allowed to choose this category the supervisor *must* provide a supervisor's report stating why this non-paper related category was needed and then provide an analysis of relevant issues including performance under the following headings: Met milestones; Tracked progress against project plan; Demonstrated ability to manage own work & Contact with supervisor.

0-39%	Failure: Likely that the student has effectively dropped out of honours.
40-49%	Unsatisfactory. No evidence of any real progress nor of following initial plans. Nothing worthwhile produced, although evidence of some work, albeit unsuccessful. Supervisor has given clear guidance but student has failed to follow it.
50-59%	Satisfactory. Project planning attempted. No evidence of independent thought or much initiative. Could readily be completed by any student. Student needed very clear guidance from supervisor, and has taken advantage of most, but not all, of this guidance. Generally not worked as hard as required.
60-69%	Good. Mostly met project milestones and kept project plan up to date. A competent technician could have done most of the work. Evident that fairly regular contact was maintained with supervisor. Student worked hard and good progress was made.

70-74%	Very good. Regularly met milestones and tracked progress against project plan. Demonstrated ability to manage own work. Project required both ability and application to complete. Regular contact with supervisor, needed some advice, and worked hard.
75-84%	Excellent. Creatively managed project planning and risk assessment. Only a few students could have completed. Contains "something extra". Meetings with the supervisor productive. Worked consistently and appropriately, almost totally self-motivating and self-managing.
85-95%	Outstanding. No student could reasonably be expected to achieve much more or present it better with the time and resources available. In top 5% of projects. Meetings with the supervisor very productive and involved a two-way exchange of ideas. The work could be presented at a conference / easily extended to an MSc.
95%+	As above but candidate for best project.

6. Project Failure

It is sometimes instructive to define success in terms of what should be avoided. Note that overall project failure (which includes the marks for the additional components that do not depend on the paper itself) is equivalent to failing honours. Here is a definition of failure:

A failure means that at least three of the following are true:

- The student is incompetent / never really knows what comes next / is lost.
- The work is not presentable anywhere (including in private!) and / or is an embarrassment.
- The work achieves nothing at all.
- There were significant mistakes in the final implementation of the work and the student could not / did not correct them or never realised they were there!
- The student has very little knowledge of the literature in the area of the research.
- The student cannot self-start and needs constant prodding.
- The student is unwilling and unable to devise plans of action on his / her own initiative.

Bibliography

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