# Coursework reports 2014–2015

## CO3320 Project; the Final Project Report

## Introduction

The individual Project component of the course is probably the most important aspect of the course you will undertake. It is important, not only because it carries a large number of marks, but also because potential employers will typically place a great significance on the contributions and quality of your report.

The Project is a chance to show what you are capable of doing as an individual scholar, scientist and engineer. There are many different kinds of Project report, since there are many different kinds of achievement. However, all of the very best Project report submissions share some of the characteristics listed below.

## Examples of common characteristics of exemplary Projects

It is important to have a **clear literature review**, which explains the connection your work has to related work in the context of previous attempts to solve problems such as the one you tackle, and closely related problems. The best kind of literature review is one that establishes exactly what the current state-of-the-art offers in terms of effectiveness, efficiency and usefulness.

This sets the scene for your Project to make a **contribution**, ideally that either replicates or goes beyond the state-of-the-art. A Project worthy of an A grade will typically achieve results at least as good as the state-of-the-art, and for higher marks, above 80 per cent, one might hope that there was some contribution beyond the state-of-the-art.

Therefore, students who performed particularly well would achieve this, but in so-doing, would have a literature review that clearly establishes where the state-of-the-art lies; without this, there can be no scientific claims to have **improved** on the state-of-the-art.

The very best Project submissions contained work that is publishable (such reports typically attract marks in the high 80s and even 90s). In order to be publishable, a Project report would need to, not only advance the state-of-the-art, but also to present compelling scientific evidence to **demonstrate** that the students' contribution has gone beyond the state-of-the-art.

Therefore, the very best Project submissions had an extremely **thorough and compelling evaluation section**. Such an evaluation will typically present results for the performance of the proposed approach (which would, of course, have been carefully implemented and compared with current techniques available). A good evaluation will compare against multiple different alternatives, and will attempt to set demanding goals for itself.

Projects that contain a very strong evaluation, by definition, also contain an **implementation that is sufficiently robust to support the evaluation**. Marks are awarded for the quality of the implementation, but also for the **quality of the documentation** that explains the implementation.

Many students lost marks unnecessarily, because, although they may have implemented a system, the evaluation and documentation was insufficient for the examiners to be clear about what had been achieved. Students should ensure that they allow sufficient time for the write-up of their Project as well as for the implementation and ground work required to collect data upon which they make scientific claims in the report.

It is important to understand the **difference between testing and evaluation**. A good Project needs both. Testing establishes that the implementation performs as expected. Essentially, it aims to answer the question: 'is the system correct?' However, an evaluation goes beyond this, asking about the **performance of the system**. Typically, the system has been implemented in order to evaluate a particular claim to some scientific contribution. It is the scientific contribution that is addressed during the evaluation stage of the Project.

Hitherto, we have been discussing the attributes of exemplary Projects. Naturally, the examiners hope that all students will aim to submit such excellent Projects. Nevertheless, the examiners also understand that students like to have guidance on where, roughly, the line is drawn between a pass and a fail for a Project submission.

## What distinguishes a pass from a fail

Projects that barely manage to contain enough information to pass, but which do, fortunately, contain **sufficient** information to just scrape past the threshold for a pass can be characterised as follows. These Projects may have no evaluation, and very little testing. However, in order to pass, a Project does need to make **some contribution**. Several students submitted Projects that were nicely presented, and contained a reasonable account of the literature on the topic they chose to study, but which made no contribution beyond this and, therefore, did not meet the threshold required for a pass.

To pass, the Project has to make a **contribution**, albeit a modest one, in order to simply cross the threshold for a pass. This contribution might take the form of a rudimentary implementation, perhaps of a prototype, not a fully working system. In order to achieve a pass, the Project also needs to contain **sufficient documentation** in order to **clearly state what has been implemented and achieved**.

Projects can achieve a pass without having an implementation of a system, but in this case, the report has to include some other kind of contribution. Often, students choose to include either a questionnaire, or some form of interviews/survey. Students should be aware that such a Project **can** obtain the highest marks if done exceptionally well. However, the examiners were often disappointed that students who chose to follow this path, though tending to pass overall, tended to arrive at a very sub-standard Project report (and so failed to attract marks much higher than those required simply to pass).

In order to do exceptionally well with a Project aimed at answering a question through a survey of stakeholders, a questionnaire, or interviews, the student needs to **follow best scientific practice** in the **conduct of the interviews/questionnaire**, and the **evaluation of** the **scientific contributions**.

Many Projects in this genre, simply report raw statistics, but do not attempt to evaluate any scientific hypotheses. Such Projects could be improved by including more detailed statistical analysis and a clear understanding of the scientific hypotheses being investigated. Necessarily, such Projects would require some understanding and deployment of relevant statistical analysis techniques for investigation of hypotheses.

Students who simply include a well-written literature survey, and rudimentary contributions in terms of either a prototype implementation or a survey with only shallow analysis, typically would achieve a mark between a mid D grade and a mid C grade. The precise mark will often depend upon **completeness**, and upon the **quality of presentation** and **adherence to standards as set out in the CO3320 Project guide**.

Examiners were encouraged that this year, students had followed advice from the Project guide and from previous years, by avoiding the inclusion of copyright material, unnecessary padding, and scanned images. These are types of content that are not only deprecated, but will actively work to reduce the marks awarded to the Project if they are present. Despite the fact that there has been a reduction in this kind of transgression, there are still a few students who do not seem to have received this message and so it is repeated here.

Students can further improve their mark by paying attention to the following pitfalls, which were found to be prevalent this year, and which tend to contribute to a reduction in the marks awarded.

## Common pitfalls to be avoided

1. The inclusion of code in the report without proper formatting, documentation and layout.
2. The inclusion of code in the report, without adequate delineation of the code that has been written by the student and that which has been reused from other sources. Reusing code is **not** deprecated, but clarity about which code is reused and which code is original to the student is essential. For example, using another colour for the re-used code and stating that it has been re-used.
3. The inclusion of design documentation without adequate textual explanation. UML diagrams, on their own, are insufficient to describe the design of a system.
4. Sloppy presentation of references, with missing information and/or messy layout. Such examples of sloppy scholarship often catch the eye of the examiner and cause a reduction in marks awarded. Avoiding this pitfall takes a relatively small amount time.