COSC366/COSC486* - Computer Science Research Project

Course Outline (Summer 2015–2016)

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***Note 1**: COSC366 and COSC486 are almost identical in structure, only their contents are adjusted at two different levels. This document is the course outline for both COSC366 and COSC486. Where there is a difference between the two, it has been explicitly indicated.

Note 2: COSC366 cannot be counted as part of the 60 300-level points in a single (major) subject required by the BSc regulations (It can however be credited towards the 360 points total required for the degree and the 90 points required at 300 level and can also be credited towards the 90 points of 300-level COSC for Honours) BE(Hons) students wishing to include COSc366 as part of their Second Professional Year should discuss their plans with the Director of the Software Engineering Programme.

Note 3: The summer semester runs from 16 November 2015 – 14 February 2016.

1. Course Aims

This is a 15-point course which is based on a small research project involving at least 150 hours of research work. The project gives students the opportunity to obtain, develop and demonstrate research skills in Computer Science and Software Engineering. Different projects will require and develop different research skills, so it is important to talk to members of the Computer Science & Software Engineering academic staff and develop a research plan before committing to a particular project. A UC Summer Scholarship project cannot be used for this course. Examples of research skills acquired and used in the projects include:

- Formulating a detailed statement of the problem and objectives.
- Bibliographic searches to obtain information about relevant work by others and develop an appreciation of appropriate citation and attribution in research
- Analysing research literature to obtain relevant information, identify trends, and produce annotated bibliographies.
- Selection of an appropriate method of solution.
- System design and implementation.
- Use of appropriate tools for data capture and analysis.
- Design and conduct of experiments.
- Evaluation of work done.
- Technical writing and presentation of results for publication.

Having successfully completed this course, students will be better prepared to undertake research projects at higher levels and to apply their research skills in an industry context. All students produce a written report at the end of the course, and this is a major component of the course assessment.

2. Admission

Further information is available at http://www.canterbury.ac.nz/future-students/qualifications-and-courses/.

2.1. Pre-requisites and requirements for COSC366

1) 45 points (or more) of 200-level COSC or SENG courses.

2) 30 points from Mathematics, Statistics or Engineering Mathematics or 15 points of MATH/STAT (MATH120 recommended) and COSC262. MATH101 is not acceptable.

3) Approval of Head of Department (includes evaluation of research plan).

2.2 Pre-requisites and requirements for COSC486

1) Eligibility to enrol in Computer Science 400-level courses.

2) Approval of Head of Department (includes evaluation of research plan).

2.3 The process

Your project will be supervised by a continuing CSSE academic staff member. Thus, to seek approval for entry to the course, you should begin by discussing available projects with potential supervisors and develop a research plan. Browsing the web pages of staff members and of CSSE research groups will give you some idea of the major areas of research activity in the department. Not every project will be suitable for every student. Some projects may require particular prior knowledge or may be suitable only for students who have already passed certain courses. The supervisor will assess whether the student has the required background for a project. Once agreed on a research topic, you should complete the application form available on the CIS page (i.e., COSC366, COSC486).

Your research plan should provide a brief (1–2 pages) description of the work that will be done, the research skills involved and the research outcomes by which the success of the project will be measured. This information will help us allocate an appropriate examiner. Your research plan will be developed into a more detailed research proposal during the course.

The form must be co-signed by the academic staff member who will supervise your work, and then handed in, together with your research plan, at CSSE Reception on Level 2, Erskine Building by **5pm 9 November 2015**.

Admission will not be offered to students whose GPA indicates that they do not have a sufficiently high potential to successfully complete the course.

3. Assessment

The assessment items are due dates are:

Item(s)	Weight	Due Date
Project Proposal	10%	Fri 30 Nov 2016 (at 5pm)
Progress reports and midway deliverables	0%	Weekly (or as required by supervisor)
Oral presentation / project demonstration	20%	11–18 Feb 2016 (exact date TBA)
Work log and performance evaluation	20%	Wed 10 Feb 2016 (at 5pm)
Final report	50%	Wed 10 Feb 2016 (at 5pm)

3.1 Project Proposal

Shortly after enrolment in the course, you must prepare a project proposal (at least 3-4 pages). The proposal should clearly define the research, and also outline the research methodology. Changes from the initial research plan should be noted clearly. A draft project proposal will typically contain at least:

- The names of the supervisor and student.
- The title of the project.
- Abstract: This provides an outline of the project in about 200 words.
- Background, Research Objectives: This describes the context of the proposed research work.
- Research Methodology: This section explains the theoretical or algorithmic framework you will use, experiments you will conduct etc.
- Timeline: List the important tasks in the research project, and provide either an estimate of the time needed or the expected completion dates for the tasks.
- Bibliography

The proposal should be submitted online through Learn.

3.2 Progress reports

Every week (or more frequently if required by your supervisor) you must send a short progress report (up to one page) to your project supervisor and course supervisor. The report should include:

- Project-related activities that you have done in that period and the number of hours you have spent on each.
- The progress made so far.
- Difficulties that you are facing (if any).
- What needs to be done next.
- The total number of hours spent on the project from the start of the project.

This short report can be sent in plain text as an email. Your supervisor will assess your progress at regular intervals. You must also keep these reports in the form of a work log (see the next section).

3.3 Work Log and Performance Evaluation

The work log document is the collection of all your progress reports (as described above) in chronological order. Individual progress reports in the log must be dated and start in a new page. If you have followed the guidelines for the progress report, there must be a running total for the number of hours spent on the project at the end of each individual progress report in the log with grand total at the end of log. No additional formatting or structuring needs to be done on the work log.

Submission of the log: Your log must be submitted as an electronic document through Learn.

Performance evaluation: Your performance and progress throughout the project (as recorded in the work log) is assessed by the supervisor according to the following criteria:

- Punctuality in giving brief progress reports at regular intervals
- Spending enough time on the required activities
- Being proactive and enthusiastic in the activities

- Attending meetings (as required by the supervisor) and maintaining communication
- Following the feedback given by your supervisor
- Being on time in delivering the required work

3.4 Final Report

Your supervisor will advise you on the appropriate form for your report. It will be similar in style to a COSC460 Honours Project report. It should be written to the standards expected for publication in journals or conferences. The University Library contains many relevant books on technical writing. Examples of CSSE technical reports, honours projects and theses are available at:
http://www.cosc.canterbury.ac.nz/research/reports.

Structure. A typical report might be structured like this:

- An abstract which states the key objectives and achievements.
- An introduction that provides research background, aims and objectives of the project, and an analysis of the literature to date.
- An account of the work (design, implementation, experiments, *etc.*) which has been achieved and which will make up the bulk of the report.
- Conclusions, that is, a summary of the major findings and results as well as an indication on what further work is desirable.
- A list of all the references you have used.
- Appendices containing resources such as program listings. It is likely that you will also provide URLs to the location of additional relevant resources such as data files or source code.

Note that there might be some variation in the structure depending on the project. Your supervisor will be able to suggest more specific guidelines as necessary.

Submission.

- You must submit a PDF version of your report through Learn by the due date.

Evaluation criteria. Your report will be assessed by your supervisor and at least one other CSSE academic staff member (the examiner). Assessment criteria will include:

- Motivations (why carrying out this research was important)
- Clarity of the objectives (what were your research goals)
- Review and evaluation of related work
- Justification for research approach (e.g. quality of research design)
- Significance of work reported (e.g. level of originality, quality of solution)
- Extent of work (complexity of topic, level of programming required, *etc.*)
- Own contributions made clear
- Soundness of conclusions drawn.
- Quality of the report (e.g., clarity of presentation and organisation of report)

- Content of log (progress reports)
- The quality of presentation

3.5 Oral Presentation

Towards the end of the project, you must give an oral presentation to an audience which will include your supervisor and examiner, together with other staff, students and stakeholders. Assessment will include both the content and delivery of your presentation. Presentations will be marked using criteria such as the following:

- Problem identification
- Research process
- Level of detail
- Preparation
- Holding audience's attention
- Communicating enthusiasm
- Clear explanation
- Use of visual aids, equipment
- Finishing on time
- Handling questions

'Problem identification', 'Research process', and 'Level of detail' concern the technical content of your presentation. The other categories are largely concerned with the style and manner of your presentation. You should seek your supervisor's advice on how to prepare for the presentation.

4. Resources

There is no set textbook for the course. Your supervisor will refer you to a selection of relevant resources. Typically, these will include material held in the UC Library and research literature. Course announcements will be made on Learn.

5. Other Important Information

Health and Safety procedures and information related to CSSE staff and students are available at http://www.cosc.canterbury.ac.nz/policy/health+safety.

CSSE policies are available at http://www.cosc.canterbury.ac.nz/policy/.

These Links are also available on the course page on Learn. We would like emphasise that it is very important that you are familiar with this information.