Distributed Computing in Grids and Clouds - Course Outline
NWEN 406: 2016 Trimester 2

This document sets out the workload and assessment requirements for NWEN 406. It also provides contact information for staff involved in the course. If the contents of this document are altered during the course, you will be advised of the change by an announcement during our meetings and/or on the course web site. A printed copy of this document is held in the School Office.

Introduction

This course focuses on the principles, techniques and infrastructure needed to support computation in which elements of that computation experience distribution over a set of computing resources. The course will include detailed study of current approaches such as grids, clouds, and service oriented computing. This is a research-oriented reading course, as such students will need to be self directed and prepared to present a their response to papers that they have read to a class. The course is internally assessed and as such will have no final exam. The project work will be largely self selected, and involve a tech-fair at the end of the course during the exam period in place of a formal exam.

Learning Objectives

Distributed Computing in Grids and Clouds is part of the Engineering program at Victoria University of Wellington. BE graduates are expected to exhbit a number of graduate attributes at the completion of the program. This course contributes to the graduate attributes (GA) as indicated below. A full table of these attributes is available at Graduate Attributes.

By the end of Distributed Computing in Grids and Clouds students should be able to explain (GA 3(a) & 3(b)):

1. *What a large scale distributed computing system is, what it does, and how it is designed and constructed,*
2. *eScience, how large scale distributed systems are leveraged to enable science in a range of fields,*
3. *alternative management paradigms for large scale distributed systems,*
4. *alternative programming models for large scale distributed systems,*
5. *basic mechanisms for protection and system security.*

In addition to these objectives and graduate outcomes, the seminar presentations & essays and project presentations fulfill GA 2(b) and the essays directly address GA 3(d).In addition to these objectives and graduate outcomes, the seminar presentations and project presentations fulfill GA 2(b) and the essays directly address GA 3(d).

The programming projects have been selected to emphasise these important high performance distributed systems concepts, resulting in:

1. *experience in writing distributed code in a production Grid (GA 3(d) & 3(e) 3(f)),*
2. *an appreciation of design in the selection of parallel algorithms (GA 3(b) & 3(c)),*
3. *an appreciation of the user experience (critical in eScience) (GA 2(b)*
4. *familiarity with UNIX/Linux; C or Java programming, Grid APIs (GA 3(f)).*

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Textbook

There is no text book for this course, rather readings will be set from published scientific papers.

Trimester Dates and Examination Period Dates

NWEN 406 is a trimester 2 course. The trimester starts on Monday 13th July. The examination period at the end of the course is 21 October - 12 November.

Meetings, Tutorials, Laboratories, and Practical work

Please note, not all timetabled sessions are used in this course. Please refer to the schedule of course topics, readings, and assignment due dates. We will establish a seminar schedule in week 2.

The University timetable has a 1 hour slot on a Monday and a 2 hour slot on a Friday.

We will only use the Friday slot unless otherwise notified.

These slots will be used for meetings and your seminar presentations.

All meetings are in 83 Fairlie Terrace, room 201.

The Networking lab Co 246 is booked on Wednesdays 1-3pm for use by students in this course.

Assessment

Seminar Presentations

There are 4 x 10 minute seminar presentations per student. Each of these is worth 5% towards your final grade.

Seminars will on allocated papers and will be useful for your essays.

Delivery of an adequate seminar will mean you have achieved learning objectives 1-5.

A rubric for grading is provided on the Seminars page, this is used to assign a holistic grade using the standard VUW grade letters and will reflect the quality of the slides, organisation, ability to speak and answer questions as well as depth of knowledge.

Essays

There will be two comparative essays, worth 15% each.

Each essay will compare at least two papers discussed previously in seminars and should be up to 2,500 words excluding figures and bibliography.

A rubric for grading is provided on the Essays page, this is used to assign a holistic grade using the standard VUW grade letters and will reflect the essay's content, structure, analysis and presentation.

Grading is based upon Essays handed in without prior renegotiation of a due date will be penalised one grade.

Please look at the statute on plagiarism. All essays will be checked for plagiarism. Essays that are deemed to contain plagiarized material will not be marked. I will give a document in class on how to reference, quote and properly credit source material. This includes, text, images, graphs, figures etc.

The work you do to research and write the essay will deepen your understanding of the concepts covered by learning objectives 1-5.

Assignments and Projects

The programming projects have been selected to emphasise these important high performance distributed systems concepts, resulting in:

1. *experience in writing distributed code in a production Grid (GA 3(d) & 3(e) 3(f)),*
2. *an appreciation of design in the selection of parallel algorithms (GA 3(b) & 3(c)),*
3. *an appreciation of the user experience (critical in eScience) (GA 2(b)*
4. *familiarity with UNIX/Linux; C or Java programming, Grid APIs (GA 3(f)).*

There will be two small and one large programming project. The final details of these projects are TBC, however - the following will give an indication of what I am intending. The projects are available on the Projects page.

1. In the first project you construct a small coordinated cloud application with your classmates,
2. In the second project you will configure an AWS Auto Scaling group (default VPC) and use this to elastically scale an embarrassingly parallel application.
3. In the final capstone project you will create an application that uses AWS Lambda to create an event driven, micro-charged, application of your choice.

In the exam period we will hold a 'tech fair', in which all final capstone projects will be demonstrated and marked. The demonstration will include the final project report and evaluation, a poster, and the demonstration and oral presentation. Attendance is compulsory and should be treated in the same manner you would an exam.

Successful completion of the project work will mean that you are able to meet learning objectives 6-9.

Workload

In order to maintain satisfactory progress in NWEN 406, you should plan to spend an average of 10 hours per week on this paper. A plausible and approximate breakdown for these hours would be:

- Meetings: 2
- Readings: 4
- Project: 4

School of Engineering and Computer Science

The School office is located on level three of the Cotton Building (Cotton 358).

The notice board for NWEN 406is located on the second floor of the Cotton Building.

Staff

The course organiser for NWEN 406is Ian Welch, my contact details are:

- *Ian Welch*
- AM 403
- +64 4 463 5664
- ian.welch@ecs.vuw.ac.nz

Office hours are Mondays 5-6pm and Thursdays 4-6pm.

Class Rep

The class representative is Gerard Ryan (gerard.ryan@ecs.vuw.ac.nz).

Announcements and Communication

The main means of communication outside of meetings will be the NWEN 406 web area at http://ecs.victoria.ac.nz/Courses/NWEN406_2016T2/. There you will find, among other things, this document, the lecture schedule and assignment handouts, and the NWEN 406 Forum. The forum is a web-based bulletin board system. Questions and comments can be posted to the forum, and staff will read these posts and frequently respond to them.

Assessment

Your grade for NWEN 406will be determined based on the following assessment weightings:

Item	Weight	Due
Essays (x2)	30%	Weeks 6, 11
Seminar (x4)	20%	Four of: Weeks 3-10
Project 1	10%	midnight Sunday week 5
Project 2	15%	midnight Sunday week 8
Project 3	25%	During exam period

Please see the submissions page for exact details Submissions

Late submissions will be penalised at a rate of 10% per day, and will not be accepted more than five days after the due date. Late submissions will be accepted by prior arrangement with the course coordinator for valid reasons such as medical and family emergencies.

Tests and Exams

There is no exam in NWEN 406, but we will have a Tech-fair scheduled during the exam break in lieu of an exam - attendance is compulsory. The examination period for trimester 2 is 21 October - 12 November.

Plagiarism

Working Together and Plagiarism

We encourage you to discuss the principles of the course and assignments with other students, to help and seek help with programming details, problems involving the lab machines. However, any work you hand in must be your own work.

The School policy on Plagiarism(claiming other people's work as your own) is available from the course home page. Please read it. We will penalise anyone we find plagiarising, whether from students currently doing the course, or from other sources. Students who knowingly allow other students to copy their work may also be penalised. If you have had help from someone else (other than a tutor), it is always safe to state the help that you got. For example, if you had help from someone else in writing a component of your code, it is not plagiarism as long as you state (eg, as a comment in the code) who helped you in writing the method.

Mandatory Requirements

The mandatory requirements for NWEN 406 are that you must give your final project presentation and achieve at least a D grade.

Passing NWEN 406

To pass NWEN 406, a student must satisfy mandatory requirements and gain at least a **C-**grade overall.

Withdrawal

The last date for withdrawal from NWEN 406 with entitlement to a refund of tuition fees is Friday 22 July 2016. The last date for withdrawal without being regarded as having failed the course is Friday 23 September 2016-- though later withdrawals may be approved by the Dean in special circumstances.

Rules & Policies

Find key dates, explanations of grades and other useful information at http://www.victoria.ac.nz/home/study.

Find out about academic progress and restricted enrolment at http://www.victoria.ac.nz/home/study/academic-progress.

The University's statutes and policies are available at http://www.victoria.ac.nz/home/about/policy, except qualification statutes, which are available via the Calendar webpage at http://www.victoria.ac.nz/home/study/calendar (See Section C).

Further information about the University's academic processes can be found on the website of the Assistant Vice-Chancellor (Academic) at http://www.victoria.ac.nz/home/about/avcacademic

All students are expected to be familiar with the following regulations and policies, which are available from the school web site:

Grievances
Student and Staff Conduct
Meeting the Needs of Students with Disabilities
Student Support
Academic Integrity and Plagiarism
Dates and Deadlines including Withdrawal dates
School Laboratory Hours and Rules
Printing Allocations
Expectations of Students in ECS courses

The School of Engineering and Computer Science strives to anticipate all problems associated with its courses, laboratories and equipment. We hope you will find that your courses meet your expectations of a quality learning experience.

If you think we have overlooked something or would like to make a suggestion feel free to talk to your course organiser or lecturer.

Course Outline as PDF