

Formal Software Engineering - Course Outline

SWEN 421: 2015 Trimester 2

This document sets out the workload and assessment requirements for SWEN 421. 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 in lectures and/or on the course web site. A printed copy of this document is held in the School Office.

Objectives

The principal objective of the course is to develop the students' ability to **think rigorously about software development** and to use mathematical techniques to describe and reason about software systems. The students will be introduced to the Rodin toolkit where they will be expected to use Z notation to input **machine readable mathematical specifications**.

This is an introductory paper to an approach that has been used in industry. By the end of the course, students should be able to:

1. Use mathematical structures such as sets, bags, functions and relations to formally specify software systems, and to state desired properties of such systems.
2. Check their formal specification by animation, model checking and proving some simple properties of the specification.
3. Use mathematical reasoning to prove simple properties of software models.
4. Gain some understanding of what it means to refine specifications towards code and in simple cases produce verified refinements of their specifications.

This is an introductory course and, in the time available, can not go into a lot of detail.

Textbook

Students will be directed to online material and handouts will be provided. In the practical session we will be following the exercises in "Modelling in Event-B System and Software Engineering" by Jean-Raymond Abrial but you do not need to buy a copy.

Students will need to download the Rodin toolkit from <http://www.event-b.org/install.html> and install the plugins for SMT prover, Pro-B and the Atelier B Provers plugin from the Atelier B Provers Update site. For instructions how to install eclipse plugins (Rodin is based on eclipse) see <http://ecs.victoria.ac.nz/Support/TechnicalNotes>

Course Delivery

Where helpful the course will follow a **problem based learning** approach.

Assignments will be set that require the student to develop required skills. These assignments will largely be practical but occasionally will be directed reading.

Lectures will cover material that needs to be understood in order to complete the assignments - not just remembered for the exam. Mostly the Friday lecture will consist of demonstration of tool use.

The course is based on lectures and assignments. It is essential that students attempt all assignments and be able to reflect on the strengths and weaknesses of their solutions.

Initially each week comprises of two lectures, and one practical session per week.

Tuesday 15:10-16:00 : Von Zedlitz 101 Lecture

Thursday 15:10-16:00 : Von Zedlitz 101 Lecture

Friday 15:10-16:00 : Von Zedlitz 101 Tool use

Assignments

Marked assignments will be returned via email or during lecture or discussion sessions.

Assignments 1 and 3 will involve the construction of Event-B models. Assignment 2 will be a group project that requires

reading recent papers and presenting your understanding to the group. **Every one is required to attend all presentations and provide feedback - ask questions.**

Taken together the assignments contributes 70% to the final grade. Their due dates are:

Assignment 1: 20% : Monday 3rd August 2015

Assignment 2: 20% : Presentations Weeks 5,6 and 7 (Final presentations Tuesday 8th,Thursday 10th and Friday 11th September 2015).

Assignment 3: 30% : Monday 12th October 2015

Assignments will be accepted up to noon on the above mentioned days, with a 25% penalty for delay of less than one week. Assignments will only be accepted for marking later than this in exceptional circumstances and by prior arrangement. If you have difficulties in completing the assignments, it is your responsibility to contact the course organiser as early as possible to discuss alternative arrangements.

Marked assignments will be returned via email or during lecture or discussion

Workload

In order to maintain satisfactory progress in SWEN 421, you should plan to spend an average of at least 10 hours per week on this paper. A plausible and approximate breakdown for these hours would be:

- Lectures and tutorials: 3 hours
- Readings: 2 hours
- Assignments: 5 hours

School of Engineering and Computer Science

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

Staff

The course organiser for SWEN 421 is David Streader. His contact details are:

- *David Streader*
- Cotton 260
- +64 4 463 5655
- David.Streader@ecs.vuw.ac.nz

Announcements and Communication

The main means of communication outside of lectures will be the SWEN 421 web area at http://ecs.victoria.ac.nz/Courses/SWEN421_2015T2/. There you will find, among other things, this document, the lecture schedule and assignment handouts, and the SWEN 421 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 SWEN 421 will be determined based on the following assessment weightings:

<u>Item</u>	<u>Weight</u>
Assignments	70%
Final Examination	30%

Exam

The timetable for final examinations will be available from the University web site and will be posted on a notice board outside the faculty office. The final examination will be three hours long. No computers, electronic calculators or similar device will be allowed in the final examination. Paper non-English to English dictionaries will be permitted. The examination period for trimester 2 is 23 October - 14 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

1. Submit a good attempt at required course summary
2. at least 40% average in assignments,
3. at least 40% in the final exam, and
4. at least 50% overall.

Passing SWEN 421

To pass SWEN 421, a student must satisfy mandatory requirements and gain at least a **C-** grade overall.

Withdrawal

The last date for withdrawal from SWEN 421 with entitlement to a refund of tuition fees is Friday 24 July 2015. The last date for withdrawal without being regarded as having failed the course is Friday 25 September 2015 -- 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](#)
