SCSSE
School of Computer Science and Software Engineering
Faculty of Informatics

CSCI910  Formal Methods in Software Engineering
Subject Outline
Autumn Session 2009

Acting Head of School – Professor John Fulcher, Student Resource Centre, Tel: (02) 4221 3606

GENERAL INFORMATION

Subject Coordinator
Associate Professor Minjie Zhang
Telephone Number: 02 4221 4745
Email: minjie@uow.edu.au
Location: 3.213

Associate Professor Zhang’s consultation times during session:
Day       Time
Tuesday   09:30-11:30
Thursday  13:30-15:30

Lecturer
Professor Aditya Ghose
Telephone Number: 02 4221 4051
Email: aditya@uow.edu.au
Location: 3.105

Professor Ghose’s consultation times during session:
Day       Time
Tuesday   08:30-11:30
Thursday  12:30-13:30

Subject Organisation
Session: Autumn Session, Wollongong Campus
Credit Points: 6 credit points
Contact hours per week: 2 hours lectures, 1 hour tutorial
Lecture Times & Location: 11:30 – 13:30, Tuesday, 67.102
Tutorial Day, Time and Location can be found at: http://www.uow.edu.au/student/timetables/index.html

Students should check the subject's web site regularly as important information, including details of unavoidable changes in assessment requirements will be posted from time to time via e-Learning space http://www.uow.edu.au/student/lol. Any information posted to the web site is deemed to have been notified to all students.

Subject Description
This subject introduces students to formal methods for software specification. The role of formal methods in the software development process is explained and investigated. The subject uses the Z notation as an example of a formal specification technique and introduces software tools for the creation and manipulation of Z specifications. Case studies of safety-critical and real-time systems are
used as a basis for a study of the application of formal specification techniques. Topics will include: Introduction to formal approaches to design and specification, Review of mathematical foundation for formal methods, use of assertions and proof, analysis and verification of specification and design, disciplined approaches to design change, Z notation and its related software tools.

**Objectives**
On completion of this subject the student should be able to:
1. Analyse a representative software engineering problem and develop an appropriate formal specification using Z notation
2. Identify circumstances requiring formal SE techniques
3. Verify the correctness of a formal specification

**Graduate Qualities**
This subject will contribute to the following graduate qualities:
- Informed
- Problem Solvers
- Effective Communicators
- Team work

Further information can be found at http://www.uow.edu.au/informatics/scsse/current/SubjectInformation/UOW049401.

**Attendance Requirements:**
It is the responsibility of students to attend all lectures/tutorials/labs/seminars/ practical work for subjects for which you are enrolled. It should be noted that the amount of time spent on each 6 credit point subject should be at least 12 hours per week, which includes lectures/tutorials/labs etc.

Satisfactory attendance is deemed by the University, to be attendance at approximately 80% of the allocated contact hours.

**Method of Presentation:**
In order to maximize learning outcomes, it is strongly recommended that students attend all lectures.

**Lecture Schedule:**
A proposed Lecture schedule for the subject is as follows:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction to the Role of Formal Methods in Software Engineering and Introduction to Z notation</td>
<td>MZ &amp; AG (no tutorial)</td>
</tr>
<tr>
<td>2</td>
<td>Understanding Formal Specifications</td>
<td>MZ</td>
</tr>
<tr>
<td>3</td>
<td>Understanding Formal Specifications</td>
<td>MZ</td>
</tr>
<tr>
<td>4</td>
<td>Understanding Formal Specifications by Z.</td>
<td>MZ, Assignment 1 Due 5%</td>
</tr>
<tr>
<td>5</td>
<td>Writing Formal Specifications by Z</td>
<td>MZ</td>
</tr>
<tr>
<td>6</td>
<td>Writing Formal Specifications by Z</td>
<td>MZ</td>
</tr>
<tr>
<td>7</td>
<td>Case Study</td>
<td>MZ, Assignment 2 Due (15%)</td>
</tr>
<tr>
<td>8</td>
<td>Other techniques in Formal Methods</td>
<td>AG</td>
</tr>
<tr>
<td>9</td>
<td>Other techniques in Formal Methods</td>
<td>AG</td>
</tr>
<tr>
<td>10</td>
<td>Other techniques in Formal Methods</td>
<td>AG</td>
</tr>
<tr>
<td>11</td>
<td>Other techniques in Formal Methods</td>
<td>AG</td>
</tr>
<tr>
<td>12</td>
<td>Other techniques in Formal Methods</td>
<td>AG, Project Due (20%)</td>
</tr>
<tr>
<td>13</td>
<td>Other techniques in Formal Methods</td>
<td>AG (no tutorial)</td>
</tr>
</tbody>
</table>
Changes to the above schedule will be posted via e-Learning space http://www.uow.edu.au/student/lot. Any information posted to the web site is deemed to have been notified to all students.

**Subject Materials:**
Any readings/references are recommended only and are not intended to be an exhaustive list. Students are encouraged to use the library catalogue and databases to locate additional readings.

**Textbook(s):**
There is no particular textbook in this subject.

**Other Resources:**
*The Z Notation: A Reference Manual,* J M Spivey, Prentice Hall International (1992). This is now out of print, but another edition (1998) has been published by the author and made available. Please find it on the WebCT of this subject. Additional reading materials will be distributed during the session.

**Other references**
The Z Notation web page, available at http://www.comlab.ox.ac.uk/archive/z.html is a very useful source of information about Z and formal methods. The use of other material will be explained in Lectures, and material will be made available from the CSCI910 subject web pages.

**Assessment:**
This subject has the following assessment components.

<table>
<thead>
<tr>
<th>ASSESSMENT ITEMS &amp; FORMAT</th>
<th>% OF FINAL MARK</th>
<th>GROUP/INDIVIDUAL</th>
<th>DUE DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignment 1</td>
<td>5%</td>
<td>Individual work or 2-person in a pair</td>
<td>24th March, Lecture time in Week 4, submit in Hardcopy only</td>
</tr>
<tr>
<td>Assignment 2</td>
<td>15%</td>
<td>Individual work or 2-person in a pair</td>
<td>21 April, lecture time in Week 7, submit in Hardcopy only</td>
</tr>
<tr>
<td>Project</td>
<td>20%</td>
<td>Group work</td>
<td>26 May, lecture time in Week 12, submit in Hardcopy only</td>
</tr>
<tr>
<td>Final Examination</td>
<td>60%</td>
<td>Individual</td>
<td>During Exam Period</td>
</tr>
</tbody>
</table>

**Notes on Assessment:**
All assignments are expected to be completed independently. Plagiarism may result in a FAIL grade being recorded for that assignment.

**Email**

Given the large number of malicious computer viruses that are spread via email please adhere to the following when contacting your lecturer by email.

- Supply a subject heading commencing with CSCI910 together with some indication of the
reason for contact e.g. CSCI910: Assignment help;

- Send your email from your UOW mail account;

Failure to do so may result in your email being deleted without being read.

- Assignments **should be submitted personally to your lecturer during class time in the week that the assignment is due for submission**. Penalties will apply to all late work, except in the case of protracted (and certified) illness. 25% will be deducted for work for each day it is overdue. Any submission submitted more than 4 days after the due date will score 0 (zero) mark.
- No assessment work will be accepted solely in electronic form. Hard copy must be submitted. All hard copy assignments must be submitted with a School Assignment Cover Sheet.
- Plagiarism may result in a **FAIL** grade being recorded for an assessment task.
- There are no class tests in this subject.
- Assignments will be returned during lectures.

**Electronic Submission of Assessment Items:**
Unless otherwise notified by the subject coordinator, all written assignments must be submitted electronically.

Submission of assessment items via email will not be accepted.

**Other Procedures for the submission of assessment items:**
In addition to electronic submission students are required to submit assignments in hard copy to their tutor.
All assignments will be returned within 2 weeks of their submission.

**To be eligible for a Pass in this subject a student must achieve a mark of at least 40% in the final exam. Students who fail to achieve this minimum mark & would have otherwise passed will be given a TF (Technical Fail) for this subject.**

**Procedures for the return of assessment items:**
Assignments will be returned to students during lecture time or can be picked up from the lecture’s office.

**Penalties for late submission of assessment items:**
Penalties apply to all late work, except if student academic consideration has been granted. Late submissions will attract a penalty of 25% of deduction of the assessment mark.

This amount is per day including weekends.

Work more than 4 days late will be awarded a mark of zero.

**Tutorial/Lab Closure Policy**
If for any reason, the number of students in a tutorial or lab falls below a sustainable enrolment level, as determined by the Head of School, tutorials/labs offered for that subject may be collapsed or deleted.
You will have to attend the new tutorials/lab if this closure affects the one you are attending.

We will endeavour to make this decision no later than Week 4 of session.

**Supplementary Exams**
Supplementary Exams will be dealt with in accordance with student academic consideration policy (http://www.uow.edu.au/about/policy/studentacademicconsiderationpolicy.pdf) 6.2 Timing of Supplementary Exams.
While the School normally grants supplementary exams when the student does not sit the standard exam for an acceptable reason, each case will be assessed on its own merit and there is no guarantee a supplementary exam will be granted. If a supplementary exam is granted, you will normally be notified via SOLS Mail the time and date of this supplementary exam. You must follow the instructions given in the email message.

Please note that if this is your last session and you are granted a supplementary exam, be aware that your results will not be processed in time to meet the graduation deadline.

Student Academic Consideration Policy
The School recognises that it has a responsibility to ensure equity and consistency across its subjects for all students. Sometimes, in exceptional circumstances, students need to apply for student academic consideration in order to complete all assessable work.

The University applies strict criteria to the granting of student academic consideration. Before applying for student academic consideration, students should carefully read the University’s policy which can be found at: http://www.uow.edu.au/about/policy/studentacademicconsiderationpolicy.pdf.

Plagiarism
When you submit an assessment task, you are declaring the following
1. It is your own work and you did not collaborate with or copy from others.
2. You have read and understand your responsibilities under the University of Wollongong's policy on plagiarism.
3. You have not plagiarised from published work (including the internet). Where you have used the work from others, you have referenced it in the text and provided a reference list at the end of the assignment.

Students must remember that:
- Plagiarism will not be tolerated.
- Students are responsible for submitting original work for assessment, without plagiarising or cheating, abiding by the University’s policies on Plagiarism as set out in the University Handbook under University Policy Directory and in Faculty handbooks and subject guides.
- Plagiarism has led to the expulsion from the University.

Student Academic Grievance Policy
The School aims to provide a fair, equitable and productive learning environment for all its students. The Student Academic Grievance Policy seeks to support the achievement of this goal by providing a transparent and consistent process for resolving student academic grievances.

Any student who has a grievance over a result should obtain a Faculty of Informatics Appeal Against Decision or Action Affecting Academic Experience form from the Informatics Student Enquiry Centre. (http://www.uow.edu.au/content/groups/public/@web/@inf/@faculty/documents/doc/uow017433.pdf) The student should firstly take the form to the marker/lecturer to discuss the matter and, if the student is still not satisfied, s/he should take the next step as outlined on the form.

Once the grievance has been considered by the Faculty, if the student still feels the situation has not been fully resolved s/he may consult the Dean of Students. However, the Dean of Students can have no input into the academic judgment of the lecturer and can only review the grievance to ensure proper procedure has been followed.

Relevant University Policies, procedures and students services:
For more information students must refer to the Faculty handbook, online references or consult the UOW policy in full at http://www.uow.edu.au/handbook/courserules/studacgrievpol.html which contains a range of policies on educational issues and student matters.
This outline should be read in conjunction with the following documents:

<table>
<thead>
<tr>
<th>Code of Practice - Teaching and Assessment</th>
<th>Code of Practice - Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code of Practice-Honours</td>
<td>Acknowledgement Practice Plagiarism will not be tolerated:</td>
</tr>
<tr>
<td>Key Dates</td>
<td>Student Academic Consideration Policy:</td>
</tr>
<tr>
<td>Course Progress Requirements:</td>
<td>Graduate Qualities Policy:</td>
</tr>
<tr>
<td>Academic Grievance Policy (Coursework and honours students)</td>
<td>Non-Discriminatory Language Practice and Presentation</td>
</tr>
<tr>
<td>Occupational Health and Safety</td>
<td>Ownership of Work &amp; Intellectual Property Policy:</td>
</tr>
<tr>
<td>Human Research Ethics Committee:</td>
<td>InformaticsFaculty Librarian, Ms Annette Meldrum, phone: 4221 4637, email: <a href="mailto:ameldrum@uow.edu.au">ameldrum@uow.edu.au</a></td>
</tr>
<tr>
<td>Student Support Services:</td>
<td>SCSE Internet Access &amp; Student Resource Centre</td>
</tr>
<tr>
<td><a href="http://www.uow.edu.au/student/services/Informatics">http://www.uow.edu.au/student/services/Informatics</a> Faculty SEDLO (Student Equity and Diversity Liaison Officers) Virginie Schmelitschek, phone 4221 3833, <a href="mailto:virginie@uow.edu.au">virginie@uow.edu.au</a></td>
<td><a href="http://www.uow.edu.au/informatics/common/uow024466.html">http://www.uow.edu.au/informatics/common/uow024466.html</a></td>
</tr>
<tr>
<td>SCSE Computer Usage Rules</td>
<td>SCSE Subject Outlines</td>
</tr>
</tbody>
</table>