SCIT

School of Computing and Information Technology

Faculty of Engineering & Information Sciences

Head of School Professor Willy Susilo, Student Resource Centre,

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CSCI131 Introduction to Computer Systems

Subject Outline

Spring Session 2015

Consultation Times:

Subject Coordinator	Associate Professor Neil Gray
Telephone Number:	4221 3812
Email:	nabg@uow.edu.au
Location:	3.206

A/Prof. Gray's consultation times during session:

Day	Time
Monday	9.30-11.30
Friday	13.30-15.30

Session:	Spring Session 2015, Wollongong Campus
Credit Points	6 credit points
Contact hours per week:	3hr lect; 2hr computer lab
Lecture Times & Location:	Tue 10:30-12:30; 35-G45 Wed 9:30-10:30; 67-303
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 Moodle space

http://www.uow.edu.au/student/ . Any information posted to the web site is deemed to have been notified

to all students.

Subject Description:

The subject explores how programs written in high level languages such as C/C++ actually run on a

computer. The first part covers the basics of machine architecture, instruction sets, addressing modes, and

assembly language. The richer programming environment provided by an operating system is then

examined. Finally, the compilation process is reviewed.

Subject Objectives:

On successful completion of this subject, students will be able to:

1. Specify how data of different types are represented.

2. Describe the structure of a simple computer and extensions for performance.

3. Explain how data are manipulated.

4. Explain how standard programming constructs - loops, conditionals, function calls - are realised in

hardware.

5. Implement simple programs in assembly language for a simulated system.

6. Explain how I/O is performed.

7. Explain the distinct "supervisor" and "user" mode operations of a CPU.

8. Explain the role of an operating system and specific responsibilities such as support of a file system.

9. Have an understanding of assemblers, linkers, loaders; use of libraries; the program build process.

10. Explain the workings of lexical scanners, parsers, code-generators, code-optimisers; implement simple versions of some components.

Graduate Qualities:

"Graduate Qualities" are the aspirational qualities that students will progressively develop through their learning experiences at UOW. These Graduate Qualities are not achieved in a single subject - their development is an ongoing process across an entire program of study. This subject will contribute to the following Graduate Qualities:

Innovation and design

Informed

Independent learners

Problem solvers

Effective communicators

Further information can be found at:

 http://eis.uow.edu.au/future-students/graduate-qualities/index.html

Graduate Qualities Explained:

Graduate Qualities	Covered in	Assessed in
Innovation and design	Assignments, and lectures	Assignments
Informed	Exercises, lectures, and assignments	Exam
Independent Learners	Exercises, and assignments	Assignments and exam
Problem Solvers	Assignments	Assignments
Effective Communicators	Assignments and lectures	Assignments and exam

Recent Improvements:

CSCI131 has not been on offer at our Wollongong campus for a number of years. This year (2015) we have

a trial of a totally new version of the subject.

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.

Optional Attendence Statement:

Attendance rolls may be kept for lectures, and laboratories. If you are present for less than 80% and would

have otherwise passed you need to apply for student academic consideration, otherwise a TF (technical fail)

grade will be recorded. Students MUST attend their allocated tutorial unless they have the written

permission of the subject coordinator.

Method of Presentation:

In order to maximize learning outcomes, it is strongly recommended that students attend all lectures.

Lecture Schedule:

Week	Topic
1-4	Introduction, and basic machine principles
5-7	Assembly language programming
8-10	OS, libraries, and packages
11-13	Assemblers, loaders, and compilers

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.

Suggested supplementary readings will appear as references in some lecture slides.

 There are course related materials used in the laboratories that can be downloaded to your own computers

Textbook(s):

There is no recommended textbook. The following books are references that provide *much more detailed*

coverage of topics that form part of CSCI131.

Computer Organization

These two text books are widely used in universities and colleges that have a "computer organization"

subject in their CS or Computer Engineering degrees. These books both have extensive coverage of

computer hardware (though much is more relevant to a computer engineering degree than a CS degree).

"The Essentials of Computer Organization and Architecture", Linda Null and Julia Lobur

(The Null/Lobur text is used for the old version of CSCI131 that is still running at our Dubai campus).

"Computer Organization and Design", David Patterson and John Hennessy

OS level

Kerrisk's guide to Linux provides much more than you will need to know for CSCI131 (but you will need to

know most of it by the time you get a job!)

"The Linux Programming Interface", Michael Kerrisk.

You can get John Lion's "Commentary on Unix 6th Edition" free on-line. It is more of historical interest presenting the first widely used version of Unix. But any student with ambitions of contributing to the development of Linux might find this a useful starting point (Unix V6 was a lot simpler than the current Linux). There are many web-resources explaining aspects of the Linux OS.

Compilers

In the last few weeks, the lectures in CSCI131 will focus on assemblers, loaders, and compilers. There are numerous compiler text books (the most popular as university texts are the one by Aho, Lam, Sethi and Ullman and that by Cooper and Torczon). Unfortunately, most are far too hard for 100-level students. Wirth (the guy who created the Pascal language) has a short relatively easy text available free on-line. (Wirth's argument is that compilers are simple to understand; his book supports his argument but it uses the little known "Oberon" language both for implentation and as the target language that is to be compiled. The current g++ and clang compilers are built using the "recursive descent" approach espoused by Wirth.)

CSCI131's coverage of compilers is quite limited just introducing the principles of compilation and using some simple tools to create a "compiler". There is a reference text for the tools used:

"flex and bison", John Levine

Assessment:

This subject has the following assessment components.

ASSESSMENT ITEMS	% OF FINAL MARK	GROUP/ INDIVIDUAL	DUE DATE
Exercise 1: Using an IDE for C/C++ development	7	Individual	In a laboratory class in week 2 or 3
Assignment 1: bit manipulation in C	5	Individual	Friday August 21st
Exercise 2: Assembly language programming	8	Individual	In a laboratory class before the end of week 5
Assignment 2: Assembly language programming	8	Individual	Friday September 4th
Exercise 3: Linux OS interface and OS services	7	Individual	In a laboratory class before the end of week 7
Assignment 3: Linux OS interface and OS services	7	Individual	Friday September 18th
Exercise 4: Libraries and the build process	6	Individual	In a laboratory class before the end of week 9
Assignment 4: Libraries and the build process	6	Individual	Friday October 9th (week after session break)
Exercise 5: Compilers	8	Individual	In a laboratory class before the end of week 12
Assignment 5: Compilers	8	Individual	Friday October 30th
Exam	30	Individual	As scheduled by University

The subject has a small examination component. The focus is on being able to exploit tools to build software systems rather than to remember facts for regurgitation in an exam.

The exercises and assignments are closely related. You MUST complete the exercise before trying to get too deeply into the related assignment.

The exercises are "easy marks" - you just follow the detailed instructions and learn how tools work and get to understand some aspect of computer systems. The assignments exploit your experience with the tools and test your understanding of the technology.

For the assignments, you submit a report (as a PDF file) that contains your annotated code and evidence, such as screen shots, showing that it works. The turnin submission closes a little after midnight (an assignment submitted at 1.30 am on Saturday September 5th would just make the deadline for Assignment 2).

Apart from the assembly language programming exercise and assignment, most of the work will use C. C is still more common in low level system code than C++. You can treat C as a subset of the C++ that you are learning in the CS core. Apart from all the things that C leaves out (like classes) the main differences that you will see are the use of a different I/O library, and a somewhat clumsier syntax for function arguments that are passed by reference (there used to be lots more differences, but the last revision for the C standard adopted many minor syntactic features that had been introduced during the development of C++).

Notes on Assessment:

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

Electronic Submission of Assessment Items:

Assignments are submitted electronically, using the "turnin" program that runs on the banshee server.

Details of how to submit work are included in the assignments.

Assessment General:

Delete the following if not applicable:

Submission of assessment items via email will not be accepted.

All assignments will be returned within 3 weeks of their submission.

Technical Fail

To be eligible for a Pass in this subject a student must achieve a mark of at least 12 in the final exam (which is only worth 30). Students who fail to achieve this minimum mark & would have otherwise passed may be given a TF (Technical Fail) for this subject.

Supplementary Exams

1. A student whose overall performance results in a TF will only be granted a supplementary assessment task (e.g. a supplementary exam or a supplementary assignment) if approved by the school assessment committee.

2. A student who achieves a mark of 48-49% will normally be eligible for a grade of WS and a supplementary exam organised by the University. In this case, the maximum grade attainable is PS (Pass Supplementary) and a mark of 50%.

3. A student who has successfully applied for academic consideration will receive either:

   a. A WD - Withheld Deferred Exam - and be allowed to sit only a supplementary exam, which will be supervised by the University or

b. A WH ? Withheld ? and be allowed to sit a supplementary exam not supervised by the University or complete some other supplementary task

4. If a student is being investigated for misconduct and the investigation cannot be completed before the grades are released the student will receive a grade of WH until a mark is declared.

Calculators will/will not be allowed in the final exam.

Procedure for the return of assessment items:

Marker reports will be emailed to students; marks will appear on SOLS.

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 10% per day of the assessment mark. The "turnin" assignment submission system is configured to support late submission; you do not have to request the right to submit late. Details of how to use late submission are included in the assignments. There is no late submission for assignment 5 because it is due on the last day of session.

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

Exercises must be demonstrated in the laboratory by their deadlines in order to gain marks.

Reasonable Adjustment to Assessment

A student with a disability may be entitled to reasonable adjustment to assessment.

A reasonable adjustment document is a recommendation that needs to be discussed and ratified by subject coordinators. Normal subject assessment requirements can only be adjusted with explicit written permission of the subject coordinator. In particular students cannot assume that a reasonable adjustment document bestows a right to deferred or supplementary exams**.**

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.

Exams

Exams will be run in accordance with UOW Exam rules, please refer to changes to exams and grades at:

http://www.uow.edu.au/student/exams/UOW115867.html

Supplementary Exams

The School does not offer a supplementary exam to a student who has sat a scheduled exam.

Supplementary Exams will be dealt with in accordance with student academic consideration policy (

http://www.uow.edu.au/about/policy/UOW060110.html) 9.2 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/UOW058721.html

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 to 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 Academic Integrity and Plagiarism Policy as set out in the University Handbook, the University's online Policy Directory and in Faculty handbooks and subject guides. Re-using any of your own work (either in part or in full) which you have submitted previously for assessment is not permitted without appropriate acknowledgement - Plagiarism has led to the expulsion from the University.

Coursework Student Academic Complaints Policy

The School aims to provide a fair, equitable and productive learning environment for all its students. The

Coursework Student Academic Complaints Policy (http://www.uow.edu.au/about/policy/UOW058653.html

) seeks to support the achievement of this goal by providing a transparent and consistent process for

resolving student academic complaints.

Any student who has a complaint over a result should obtain a Faculty of Engineering and Information

Sciences Coursework Student Academic Review/Complaint form (

http://www.uow.edu.au/student/complaints/UOW008298.html) from the EIS Central. 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 complaint has been considered by the Faculty, if the student still feels the situation has not been

fully resolved s/he may refer the matter to the Student Ombudsman.

Relevant University Policies, procedures and students services:

For more information students must refer to the Course Handbook, relevant online references or consult the

UOW General Course Rules in full http://www.uow.edu.au/about/policy/UOW058680.html   which

contains a range of policies on educational issues and student matters.

This outline should be read in conjunction with the following:

Code of Practice - Teaching and Assessment: http://www.uow.edu.au/about/policy/UOW058666.html

Code of Practice-Honours: http://www.uow.edu.au/about/policy/UOW058661.html

Key Dates: http://www.uow.edu.au/student/dates/index.html

Course Progress Requirements: http://www.uow.edu.au/student/cp/index.html

Academic Grievance Policy (Coursework and honours students):

 http://www.uow.edu.au/about/policy/UOW058653.html

Student Charter: www.uow.edu.au/student/charter/

Occupational Health and Safety: http://www.uow.edu.au/about/policy/UOW016894.html

Human Research Ethics Committee: http://www.uow.edu.au/research/ethics/human/index.html

General Enquires: EIS Central Build 4, Ground floor, Room 12 Phone: 4221 3491

Faculty of Engineering & Information Sciences current students website: http://eis.uow.edu.au/current-

students/

Student Support Services: http://www.uow.edu.au/student/services/index.html

Faculty SEDLO (Student Support & Peer Learning Officer)

Mitz Perez - Build 4 Room 105 Phone 4221 3833 Mon - Wed, mitz-perez@uow.edu.au

Information Technology Services and Policies: http://www.uow.edu.au/its/accounts/index.html

Student Representatives: http://eis.uow.edu.au/current-students/get-involved/studentreps/index.html

Academic Integrity and Plagiarism Policy: http://www.uow.edu.au/about/policy/UOW058648.html

Student Academic Consideration Policy: http://www.uow.edu.au/about/policy/UOW058721.html

Rules for student conduct: http://www.uow.edu.au/about/policy/UOW058723.html

Code of Practice - Research: http://www.uow.edu.au/about/policy/UOW058663.html

Code of Practice? Student Professional Experience: http://www.uow.edu.au/about/policy/UOW058662

IP Student Assignment of Intellectual Property Policy:

 http://www.uow.edu.au/about/policy/UOW058690.html

Research Misconduct Policy: http://www.uow.edu.au/about/policy/UOW058715.html

Non-Discriminatory Language Practice and Presentation:

 http://www.uow.edu.au/about/policy/UOW058706.html

Ownership of Work & Intellectual Property Policy:

 http://www.uow.edu.au/handbook/generalcourserules/UOW028651.html

Netiquette Guide: http://www.uow.edu.au/student/elearning/netiquette/index.html

Library Services: http://www.library.uow.edu.au   Bulding 16, Phone: 4221 3548

Complete Start Smart: http://www.uow.edu.au/student/services/fye/resources/startsmart/

Subject Outlines:

 https://ssl.informatics.uow.edu.au/subjectoutlines/CSCI/Current/