Course Outline

Contents

- Course Details
- Course Summary
- Assumed Knowledge
- Student Learning Outcomes
- Teaching Strategies
- Teaching Rationale
- Student Conduct
- Assessment
- Course Schedule
- Resources for Students
- Course Evaluation and Development

Course Details

Course Code	COMP9020
Course Title	Foundations of Computer Science
Convenor	Michael Thielscher (/users/z3343107)
Admin	Michael Schofield (/users/z3227235)
Classes	

Day	Start Time	End Time	Room	Who
Tuesday	12:00	14:00	Ainsworth G03 (Building K-J17)	Michael Thielscher (/users/z3343107)
Thursday	12:00	14:00	Ainsworth G03 (Building K-J17)	Michael Thielscher (/users/z3343107)

Consultations

Day	Start Time	End Time	Room	Who
Tuesday (from week 2)	11:00	12:00	G034 Quad (Bldg E15) + Online	Connie Cheng (/users/z5224313)
Friday	13:00	14:00	Online	Michael Thielscher (/users/z3343107)

Units of Credit	6

Course Website	http://www.cse.unsw.edu.au/~cs9020 (http://www.cse.unsw.edu.au/~cs9020)
Handbook Entry	http://www.handbook.unsw.edu.au/postgraduate/courses/current/COMP9020.html (http://www.handbook.unsw.edu.au/postgraduate/courses/current/COMP9020.html)

Course Summary

The scope is: mathematical methods for designing correct and efficient programs; mathematics for algorithm analysis; logic for proving and verification.

The actual content is taken from a list of subjects that constitute the basis of the tool box of every serious practitioner of computing: set, function and relation theory; propositional logic and boolean algebras; graph theory and trees for algorithmic applications; induction, recursion and recurrence relations; order of growth of functions; structured counting (combinatorics); discrete probability.

Assumed Knowledge

None

Student Learning Outcomes

After successfully completing this course, students will have developed an increased level of mathematical maturity to assist with the fundamental problem of

1. finding and formulating properties of programs, especially their correctness w.r.t. given requirements and specifications
2. analysing and proving properties of programs, in particular their correctness and runtime behaviour

Online quizzes, mid-term assignment and final exam will ensure that students have acquired this level of mathematical maturity.

This course contributes to the development of the following graduate capabilities:

Graduate Capability	Acquired in
Scholars capable of independent and collaborative enquiry, rigorous in their analysis, critique and reflection, and able to innovate by applying their knowledge and skills to the solution of novel as well as routine problems	lectures, in-class exercises, problem sets, quizzes
Professionals capable of ethical, self-directed practice and independent lifelong learning	problem sets, quizzes
Global citizens who are culturally adept and capable of respecting diversity and acting in a socially just and responsible way	interaction with your lecturer and fellow students

Teaching Strategies

- **Lectures** introduce concepts and show examples
- **Problem sets** reinforce concepts, provide additional examples and allow students to solve problems
- **Quizzes** allow students to demonstrate their problem-solving skills

Teaching Rationale

Lectures will include exercises where we examine the practice of formulating and proving mathematical properties of relevance to Computer Science. Problem sets and quizzes aim to deepen analysis and understanding via additional examples and problems.

Student Conduct

The **Student Code of Conduct** (Information (https://student.unsw.edu.au/conduct) , Policy (https://www.gs.unsw.edu.au/policy/documents/studentcodepolicy.pdf)) sets out what the University expects from students as members of the UNSW community. As well as the learning, teaching and research environment, the University aims to provide an environment that enables students to achieve their full potential and to provide an experience consistent with the University's values and guiding principles. A condition of enrolment is that students *inform themselves* of the University's rules and policies affecting them, and conduct themselves accordingly.

In particular, students have the responsibility to observe standards of equity and respect in dealing with every member of the University community. This applies to all activities on UNSW premises and all external activities related to study and research. This includes behaviour in person as well as behaviour on social media, for example Facebook groups set up for the purpose of discussing UNSW courses or course work. Behaviour that is considered in breach of the Student Code Policy as discriminatory, sexually inappropriate, bullying, harassing, invading another one's privacy or causing any person to fear for their personal safety is serious misconduct and can lead to severe penalties, including suspension or exclusion from UNSW.

If you have any concerns, you may raise them with your lecturer, or approach the School Ethics Officer (mailto:ethics-officer@cse.unsw.edu.au) , a Grievance Officer (https://www.engineering.unsw.edu.au/computer-science-engineering/about-us/organisational-structure/student-services/grievances) , or one of the

Student Representatives (https://www.cse.unsw.edu.au/~stureps/)

Plagiarism is defined as (https://student.unsw.edu.au/plagiarism) using the words or ideas of others and presenting them as your own. UNSW and CSE treat plagiarism as academic misconduct, which means that it carries penalties as severe as being excluded from further study at UNSW. There are several on-line sources to help you understand what plagiarism is and how it is dealt with at UNSW:

- Plagiarism and Academic Integrity (https://student.unsw.edu.au/plagiarism)
- UNSW Plagiarism Management Procedure (https://www.gs.unsw.edu.au/policy/documents/plagiarismprocedure.pdf)

Make sure that you read and understand these. Ignorance is not accepted as an excuse for plagiarism. In particular, you are also responsible that your assignment files are not accessible by anyone but you by setting the correct permissions in your CSE directory and code repository, if using. Note also that plagiarism includes paying or asking another person to do a piece of work for you and then submitting it as your own work.

UNSW has an ongoing commitment to fostering a culture of learning informed by academic integrity. All UNSW staff and students have a responsibility to adhere to this principle of academic integrity. Plagiarism undermines academic integrity and is not tolerated at UNSW. Plagiarism at UNSW is defined as using the words or ideas of others and passing them off as your own.

If you haven't done so yet, please take the time to read the full text of

- UNSW's policy regarding academic honesty and plagiarism (https://student.unsw.edu.au/plagiarism)

The pages below describe the policies and procedures in more detail:

- Student Code Policy (https://www.gs.unsw.edu.au/policy/documents/studentcodepolicy.pdf)
- Student Misconduct Procedure (https://www.gs.unsw.edu.au/policy/documents/studentmisconductprocedures.pdf)
- Plagiarism Policy Statement (https://www.gs.unsw.edu.au/policy/documents/plagiarismpolicy.pdf)

- Plagiarism Management Procedure (https://www.gs.unsw.edu.au/policy/documents/plagiarismprocedure.pdf)

You should also read the following page which describes your rights and responsibilities in the CSE context:

- Essential Advice for CSE Students (https://www.engineering.unsw.edu.au/computer-science-engineering/about-us/organisational-structure/student-services/policies/essential-advice-for-cse-students)

Assessment

Item	Topics	Due	Marks
Online Quizzes	All topics	Weeks 3-6, 8-10	14%
Online Mid-term Assignment	All topics from week 1-5	Week 6	26%
Online Final Exam	All topics from week 1-9	Exam period	60%

Each of the 7 weekly assignments is worth 2 marks (7 * 2 = 14).

Your overall score in the course will be the **maximum** of:

- weekly marks + mid-term + exam
- weekly marks + exam * (86/60)
- mid-term + exam * (74/60)
- exam * (100/60)

In other words: *if you do better in the final exam, then the weekly quizzes and/or your mid-term assignment will be ignored.*

To pass the course, your overall score must be 50 or higher **and** your mark for the final exam must be 25 or higher. If you meet both conditions, your overall score will be your mark for this course.

Course Schedule

Week	Lectures	Assessments
1	Numbers, Sets, Formal Languages	–
2	Logic, Proofs, Boolean Algebra	Quiz
3	Functions and Relations	Quiz
4	Equivalence and Order Relations	Quiz
5	Graphs	Quiz
6	**–**	**Mid-term online assignment**
7	Induction, Recursion, Big-Oh Notation	Quiz
8	Counting and Probability	Quiz
9	Conditional Probability and Expectation	Quiz
10	Course Review	–

Resources for Students

The primary textbook associated with this course is

- [RW] KA Ross and CR Wright, *Discrete Mathematics,* (https://booko.com.au//9780130652478/Discrete-Mathematics) 5th edition, Pearson, 2003.

This has been the recommended textbook for the course for the last 10 or more years. The following comprehensive lecture notes, which are from a similar course at MIT, provide supplementary material:

- [LLM] E Lehman, FT Leighton and A Meyer, *Mathematics for Computer Science,* (http://people.csail.mit.edu/meyer/mcs.pdf) Creative Commons 2015.

Course Evaluation and Development

This course is being continuously improved and we will conduct a survey through UNSW's myExperience process at the end of session to obtain feedback on the quality of the various course components. Your participation in the survey will be greatly appreciated. Students are also encouraged to provide informal feedback during the session, and to notify the lecturer-in-charge of any problems as soon as they arise.

Student feedback from last offerings indicated that students were very satisfied with the course, but suggested additional "warming up" exercises at the beginning of each problem set. We will endeavour to add these in this offering.

Resource created 4 months ago (Wednesday 03 February 2021, 04:06:52 PM), last modified 4 months ago (Thursday 11 February 2021, 02:01:29 PM).

Comments

(/COMP9020/21T1/forums/search?forum_choice=resource/57334)

(/COMP9020/21T1/forums/resource/57334)



Chenming Yuan (/users/z5355419) about a month ago (Mon May 10 2021 16:46:19 GMT+1000 (Australian Eastern Standard Time))

Hi Micheal,

I have a question about the overall score of the subject.

- weekly marks + mid-term + exam
- weekly marks + exam * (86/60)
- mid-term + exam * (74/60)
- exam * (100/60)

Is that mean our score will be calculated in these four ways and the highest one will be chosen as our final score.

I mean if I did a bad job at quizs and mid-term, but i got 30 in final, then my final score will be calculated as 50?



Michael Thielscher (/users/z3343107) about a month ago (Mon May 10 2021 16:56:36 GMT+1000 (Australian Eastern Standard Time))

Yes, we will take the highest of all 4 scores to be your overall mark and grade in this course. Provided you scored ≥ 25 in the final exam.



Christian Daniel (/users/z5091162) about a month ago (Mon May 10 2021 15:38:57 GMT+1000 (Australian Eastern Standard Time))

Hi Professor.

I'm sorry if this is not the correct way to contact you regarding the exam.

In question 9, are phi and psi different or is this a typo?



Michael Thielscher (/users/z3343107) about a month ago (Mon May 10 2021 16:02:28 GMT+1000 (Australian Eastern Standard Time))

This is correct and intended. Please answer to the best of your understanding of the question.



Arnold Cheung (/users/z5146709) 3 months ago (Thu Apr 01 2021 16:15:10 GMT+1100 (Australian Eastern Daylight Time))

Final Exam:

Hi Michael,

1. Will the final exam question difficulty be similar to mid-semester exam difficulty?

2. As the mid-sem only covered W1-W5 content, and the final exam will cover everything. Will the final exam have more of an emphasis on the latter half of the content (W7-W10)?

Regards,

Arnold



Michael Thielscher (/users/z3343107) 3 months ago (Thu Apr 01 2021 18:23:53 GMT+1100 (Australian Eastern Daylight Time))

The midterm was meant for you to solve exam-like problems under exam conditions, so the questions in the final exam will not be harder.

The final exam will put an equal focus on all the topics from the course. This is what allows me to scale up your exam result in case you score higher than at the midterm.



Arnold Cheung (/users/z5146709) 3 months ago (Fri Apr 02 2021 12:47:55 GMT+1100 (Australian Eastern Daylight Time))

Multiple choice statistics:

Just to confirm if a question is worth 5 marks and there are 5 possible answers with 2 being correct. For each correct answer chosen is it 2.5 marks? How about the 3 incorrect answers, how much are they worth?

Is it statistically better to "choose" more answers (assuming you pick the correct answer) than not choosing an answer at all? (even if you also pick a wrong answer) E.g There are 5 possible answers with 2 being correct, you have chosen 2 answers (one right and one wrong). Is it better to also pick another one than not picking one (assuming that answer is correct)?

Arnold



Jason Liu (/users/z5353807) 3 months ago (Fri Apr 02 2021 14:08:43 GMT+1100 (Australian Eastern Daylight Time))

My understanding is the incorrect answers add up to the total mark as well, so someone simply choosing all answers will get exactly 0. Michael please correct if I'm wrong.



Laurence Yik Lok Leung (/users/z5355177) 3 months ago (Tue Mar 16 2021 15:18:59 GMT+1100 (Australian Eastern Daylight Time))

Hi Professor Thielscher,

I was wondering if you could confirm the scope of the midterm? In particular, will it include the whole of Chapter 5 (graphs), even if we won't be able to go over all of it the coming Thursday?

Thank you!



Arnold Cheung (/users/z5146709) 3 months ago (Tue Mar 09 2021 12:01:31 GMT+1100 (Australian Eastern Daylight Time))

Mid-sem and Final Exam:

Hi Michael,

Will the difficulty of the mid-sem and final exam questions be similar/easier/harder than the problem-sets and quizzes?

Arnold



Michael Thielscher (/users/z3343107) 3 months ago (Tue Mar 09 2021 17:22:16 GMT+1100 (Australian Eastern Daylight Time))

The answer is: Yes and no. Working under time restrictions is always harder than solving exercises without time pressure. On the other hand this is of course taken into account, so the questions themselves tend not be as difficult as some of the (harder) homework exercises and quiz questions.



Weiguan Xiao (/users/z5330331) 4 months ago (Mon Mar 01 2021 21:31:39 GMT+1100 (Australian Eastern Daylight Time))

Hi Sir. I'm kind of curious about what we will be examined in the following mid-term and final exams.

I mean I have found the textbook (Discrete Mathematics. Ross&Wright.) covers much more content than what you have presented in the lectures during the first two weeks.

I wonder what are the exams based on, either what you have just mentioned in the classes or the textbook?

Is it enough for us to crack all the questions including the challenging one in weekly problem sets if we want to get a HD



Michael Thielscher (/users/z3343107) 4 months ago (Tue Mar 02 2021 09:43:47 GMT+1100 (Australian Eastern Daylight Time))

Only the contents that we covered in the lectures will be examinable. The challenge questions on the weekly problem sets go *beyond* the requirements of this course.



Weiguan Xiao (/users/z5330331) 4 months ago (Tue Mar 02 2021 13:38:03 GMT+1100 (Australian Eastern Daylight Time))

Thanks very much!