Course Outline Public

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Course Code	COMP9020
Course Title	Foundations of Computer Science
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 official 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

Course Timetable

Day	Start Time	End Time	Room	Who
Thursday	12:00	14:00	Room CLB7 (Central Lecture Block, E19)	Michael Thielscher (https://webcms3.cse.unsw.edu.au/users/z3343107)
Friday	14:00	16:00	Room CLB7 (Central Lecture Block, E19)	Michael Thielscher (https://webcms3.cse.unsw.edu.au/users/z3343107)

Course Aims and 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 test 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. Weekly problem sets and assignments in the form of short quizzes aim to deepen analysis and understanding via additional examples and problems.

Assessment

Component	Maximum Mark
Assignment 1 (weekly; weeks 2-5, 7-10)	20
Assignment 2 (mid-term; week 6)	20
Final Exam (exam period)	60

Each of the 8 weekly assignments is worth 2.5 marks (8 * 2.5 = 20).

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

- weekly + mid-term + final
- weekly + 80*(final/60)
- mid-term + 80*(final/60)
- 100*(final/60)

In other words: *If you do better in the final exam, then your result for the weekly assignments and/or your mid-term assignment result 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

Numbers, Sets, Formal Languages	week 1
Logic, Proofs, Boolean Algebra	week 2
Functions and Relations	week 3
Equivalence and Order Relations	week 4
Graphs and Trees	week 5
Mid-term	**week 6** (Friday)
Induction, Recursion, Big-Oh Notation	week 7
Counting	week 8
Probability	week 9
Random Variables, Expectation, Course Review	week 10

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) , Grievance Officer (mailto:grievance-officer@cse.unsw.edu.au) , or one of the student representatives.

Academic Integrity and Plagiarism

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 integrity and plagiarism (https://student.unsw.edu.au/plagiarism)

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

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

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 a tighter connection between the problem set and the quiz in each week, which we will endeavour to achieve in this offering.

Resource created about a month ago (Tuesday 04 February 2020, 02:58:15 PM), last modified about a month ago (Tuesday 04 February 2020, 07:20:40 PM).

Comments

(/COMP9020/20T1/forums/search?forum_choice=resource/41567)

(/COMP9020/20T1/forums/resource/41567)



Ahmad El Majzoub (/users/z5292964) 13 days ago (Thu Feb 27 2020 10:38:37 GMT+1100 (Australian Eastern Daylight Time)), last modified 13 days ago (Thu Feb 27 2020 10:39:12 GMT+1100 (Australian Eastern Daylight Time))

Hello Professor,

Can we find anywhere the solutions for the exercises and the supplementary exercises? I could only find every other solution for the exercises in the book and none for the supplementary ex. Therefore, solving them without checking the solutions might be counterproductive

Thanks,

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Sahil Punchhi (/users/z5204256) 13 days ago (Thu Feb 27 2020 16:51:22 GMT+1100 (Australian Eastern Daylight Time))

Hi Ahmad,

The solutions for problem sets and challenge questions are released every week and should be visible to you. I am not sure about the solutions for exercises in the textbook (if you are referring to the same) and Michael would be able to answer that for you.

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Ahmad El Majzoub (/users/z5292964) 13 days ago (Thu Feb 27 2020 19:11:09 GMT+1100 (Australian Eastern Daylight Time))

Hello Sahil,

Yea sorry I forgot to mention, I meant the book exercises/supplementary ex.

Thanks,

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Michael Thielscher (/users/z3343107) 12 days ago (Fri Feb 28 2020 11:22:48 GMT+1100 (Australian Eastern Daylight Time))

This is on purpose. Self-guided study also means that you learn to become competent and confident in judging your own answers.

You're most welcome to use the course forum to post and discuss your sample solution to any of the exercises from the textbook on any topic that we are covering in this course.

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Ahmad El Majzoub (/users/z5292964) 17 days ago (Sun Feb 23 2020 13:54:04 GMT+1100 (Australian Eastern Daylight Time))

Hello Professor,

Can I get the 4th edition of the book (I found a used one for sale) or there's many differences?

Thanks,

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Michael Thielscher (/users/z3343107) 17 days ago (Sun Feb 23 2020 16:20:05 GMT+1100 (Australian Eastern Daylight Time))

Yes. The 4th edition does not include the supplementary exercises but there are still enough example problems for self-guided study, and all the topics from our course are covered. The material in some chapters has been rearranged in the newer edition so the references to individual sections and exercises from the slides may not always match.

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Carolina Ibacache Astudillo (/users/z5026882) 26 days ago (Fri Feb 14 2020 13:31:34 GMT+1100 (Australian Eastern Daylight Time))

Hi Professor, I am in the same situation as Yuan and looking forward to this answer.

Kind regards,

Carolina

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Sahil Punchhi (/users/z5204256) 25 days ago (Sun Feb 16 2020 00:20:27 GMT+1100 (Australian Eastern Daylight Time))

Hi Carolina, please refer to Michael's answer in Yuan's post.

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Yuan Tao (/users/z5001734) 27 days ago (Thu Feb 13 2020 09:25:05 GMT+1100 (Australian Eastern Daylight Time))

Hi dear professor, wondering if there is a difference between Distance Delivery and In Person lecturing? I am a full time employee and none of the lecture time works for me - should I choose Distance Delivery instead?

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Michael Thielscher (/users/z3343107) 26 days ago (Fri Feb 14 2020 14:02:42 GMT+1100 (Australian Eastern Daylight Time))

Please see the course notice and email that was sent today. Even if you are not enrolled in the web stream, attendance is not mandatory.

Still I always advise and encourage everyone to try to attend in person as many lectures as possible for a much better learning experience.

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