UNSW Course Outline

COMP9020 Foundations of Computer Science - 2024

Published on the 04 Sep 2024

General Course Information

Course Code : COMP9020
Year : 2024
Term : Term 3
Teaching Period : T3
Is a multi-term course? : No
Faculty : Faculty of Engineering
Academic Unit : School of Computer Science and Engineering
Delivery Mode : Multimodal
Delivery Format : Standard
Delivery Location : Kensington
Campus : Sydney
Study Level : Postgraduate
Units of Credit : 6

Useful Links

Handbook Class Timetable

Course Details & Outcomes

Course Description

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 and relation theory; induction, recursion and recurrence relations; order of growth of functions; structured counting (combinatorics); discrete probability; graph theory and trees for algorithmic applications; propositional logic and boolean algebras.

Course Aims

This course is typically taken early in the Masters program and provides a foundation for the formal reasoning that is required in subsequent courses.

After successfully completing this course, you will have developed an increased level of mathematical maturity to assist with the fundamental problem of *finding, formulating, and proving properties* of programs.

Course Learning Outcomes

Course Learning Outcomes
CLO1 : Explain the foundational structures used in discrete mathematics
CLO2 : Explain basic number theory concepts and definitions
CLO3 : Explain the fundamental Computer Science concepts of recursion and induction
CLO4 : Analyze the correctness and efficiency of algorithms
CLO5 : Explain Boolean and propositional logic
CLO6 : Explain simple combinatorics, probability and statistics
CLO7 : Apply mathematical tools to formulate and prove problems in Computer Science
CLO8 : Explore additional approaches to problem solving by identifying broader abstract connections between concepts

Course Learning Outcomes	Assessment Item
CLO1 : Explain the foundational structures used in discrete mathematics	• Weekly assessments • Final exam
CLO2 : Explain basic number theory concepts and definitions	• Final exam
CLO3 : Explain the fundamental Computer Science concepts of recursion and induction	• Weekly assessments • Final exam
CLO4 : Analyze the correctness and efficiency of algorithms	• Final exam
CLO5 : Explain Boolean and propositional logic	• Final exam
CLO6 : Explain simple combinatorics, probability and statistics	• Weekly assessments • Final exam
CLO7 : Apply mathematical tools to formulate and prove problems in Computer Science	• Weekly assessments • Final exam
CLO8 : Explore additional approaches to problem solving by identifying broader abstract connections between concepts	• Weekly assessments • Final exam

Learning and Teaching Technologies

Moodle - Learning Management System | WebCMS3

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates
Weekly assessments Assessment Format: Individual	40%	
Final exam Assessment Format: Individual	60%	

Assessment Details

Weekly assessments

Assessment Overview

Weekly assessments reinforce the concepts covered in the previous lectures and provide feedback for students to self-assess progress on the Course Learning Outcomes

Course Learning Outcomes

- CLO1 : Explain the foundational structures used in discrete mathematics
- CLO3 : Explain the fundamental Computer Science concepts of recursion and induction
- CLO6 : Explain simple combinatorics, probability and statistics
- CLO7 : Apply mathematical tools to formulate and prove problems in Computer Science
- CLO8 : Explore additional approaches to problem solving by identifying broader abstract connections between concepts

Detailed Assessment Description

Details will be available on the course website.

Assignment submission Turnitin type

Not Applicable

Generative AI Permission Level

No Assistance

This assessment is designed for you to complete without the use of any generative AI. You are not permitted to use any generative AI tools, software or service to search for or generate information or answers.
For more information on Generative AI and permitted use please see here.

Final exam

Assessment Overview

The final exam, held in the UNSW exam period, will contain questions that students should be able to answer in 2 or 3 hours if they know the material well. The final exam will be manually marked. In order to pass the course, students must achieve a minimum of 40% in this component.

Course Learning Outcomes

- CLO1 : Explain the foundational structures used in discrete mathematics
- CLO2 : Explain basic number theory concepts and definitions
- CLO3 : Explain the fundamental Computer Science concepts of recursion and induction
- CLO4 : Analyze the correctness and efficiency of algorithms
- CLO5 : Explain Boolean and propositional logic
- CLO6 : Explain simple combinatorics, probability and statistics
- CLO7 : Apply mathematical tools to formulate and prove problems in Computer Science
- CLO8 : Explore additional approaches to problem solving by identifying broader abstract connections between concepts

Detailed Assessment Description

Details will be available on the course website.

Assignment submission Turnitin type

Not Applicable

Hurdle rules

You must achieve 40% on this assessment to pass the course.

Generative AI Permission Level

No Assistance

This assessment is designed for you to complete without the use of any generative AI. You are not permitted to use any generative AI tools, software or service to search for or generate information or answers.
For more information on Generative AI and permitted use please see here.

General Assessment Information

Please refer to WebCMS for the correct Assessment Name and Weighting

Grading Basis

Standard

Requirements to pass course

Achieve a minimum of 50% overall, and a minimum of 40% in the final exam.

Course Schedule

Teaching Week/Module	Activity Type	Content
Week 1 : 9 September - 15 September	Lecture	L1 - Introduction & Number Theory 1 L2 - Number Theory 2
Week 2 : 16 September - 22 September	Lecture	L1 - Set Theory 1 L2 - Set Theory 2
Week 3 : 23 September - 29 September	Lecture	L1 - Relation 1 L2 - Relation 2
Week 4 : 30 September - 6 October	Lecture	L1 - Function L2 - Logic 1: Boolean
Week 5 : 7 October - 13 October	Lecture	L1 - Logic 2: Propositional L2 - Sequence & Induction
Week 6 : 14 October - 20 October	Assessment	Mid-term Exam
Week 7 : 21 October - 27 October	Lecture	L1 - Recursion L2 - Counting
Week 8 : 28 October - 3 November	Lecture	L1 - Probability and Statistics 1 L2 - Probability and Statistics 1
Week 9 : 4 November - 10 November	Lecture	L1 - Graph 1 L2 - Graph 2
Week 10 : 11 November - 17 November	Lecture	L1 - Algorithm Analysis & Formal Languages L2 - Course Revision & Exam Information

Attendance Requirements

Students are strongly encouraged to attend all classes and review lecture recordings.

Course Resources

Recommended Resources

No compulsory textbooks. The following resources may be helpful

- [RW] KA Ross and CR Wright, 5th edition, Pearson, 2003.
- [LLM] E Lehman, FT Leighton and A Meyer, Creative Commons 2015.

Course Evaluation and Development

This course is evaluated each session using the myExperience system 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.

Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
Convenor	Jiaojiao Jiang		501J K17			Yes	Yes
Administrator	Hao Ren					No	No

Other Useful Information

Academic Information

I. Special consideration and supplementary assessment

If you have experienced an illness or misadventure beyond your control that will interfere with your assessment performance, you are eligible to apply for Special Consideration prior to, or within 3 working days of, submitting an assessment or sitting an exam.

Please note that UNSW has a Fit to Sit rule, which means that if you sit an exam, you are declaring yourself fit enough to do so and cannot later apply for Special Consideration.

For details of applying for Special Consideration and conditions for the award of supplementary assessment, please see the information on UNSW's Special Consideration page.

II. Administrative matters and links

All students are expected to read and be familiar with UNSW guidelines and polices. In particular, students should be familiar with the following:

- Attendance
- UNSW Email Address
- Special Consideration
- Exams
- Approved Calculators
- Academic Honesty and Plagiarism
- Equitable Learning Services

III. Equity and diversity

Those students who have a disability that requires some adjustment in their teaching or learning environment are encouraged to discuss their study needs with the course convener prior to, or at

the commencement of, their course, or with the Equity Officer (Disability) in the Equitable Learning Services. Issues to be discussed may include access to materials, signers or note-takers, the provision of services and additional exam and assessment arrangements. Early notification is essential to enable any necessary adjustments to be made.

IV. Professional Outcomes and Program Design

Students are able to review the relevant professional outcomes and program designs for their streams by going to the following link: https://www.unsw.edu.au/engineering/student-life/student-resources/program-design.

Note: This course outline sets out the description of classes at the date the Course Outline is published. The nature of classes may change during the Term after the Course Outline is published. Moodle or your primary learning management system (LMS) should be consulted for the up-to-date class descriptions. If there is any inconsistency in the description of activities between the University timetable and the Course Outline/Moodle/LMS, the description in the Course Outline/Moodle/LMS applies.

Academic Honesty and Plagarism

UNSW has an ongoing commitment to fostering a culture of learning informed by academic integrity. All UNSW 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.*

Plagiarism is a type of intellectual theft. It can take many forms, from deliberate cheating to accidentally copying from a source without acknowledgement. UNSW has produced a website with a wealth of resources to support students to understand and avoid plagiarism, visit: student.unsw.edu.au/plagiarism. The Learning Centre assists students with understanding academic integrity and how not to plagiarise. They also hold workshops and can help students one-on-one.

You are also reminded that careful time management is an important part of study and one of the identified causes of plagiarism is poor time management. Students should allow sufficient time for research, drafting and the proper referencing of sources in preparing all assessment tasks.

Repeated plagiarism (even in first year), plagiarism after first year, or serious instances, may also

be investigated under the Student Misconduct Procedures. The penalties under the procedures can include a reduction in marks, failing a course or for the most serious matters (like plagiarism in an honours thesis or contract cheating) even suspension from the university. The Student Misconduct Procedures are available here:

www.gs.unsw.edu.au/policy/documents/studentmisconductprocedures.pdf

Submission of Assessment Tasks

Work submitted late without an approved extension by the course coordinator or delegated authority is subject to a late penalty of five percent (5%) of the maximum mark possible for that assessment item, per calendar day.

The late penalty is applied per calendar day (including weekends and public holidays) that the assessment is overdue. There is no pro-rata of the late penalty for submissions made part way through a day. This is for all assessments where a penalty applies.

Work submitted after five days (120 hours) will not be accepted and a mark of zero will be awarded for that assessment item.

For some assessment items, a late penalty may not be appropriate. These will be clearly indicated in the course outline, and such assessments will receive a mark of zero if not completed by the specified date. Examples include:

- Weekly online tests or laboratory work worth a small proportion of the subject mark;
- Exams, peer feedback and team evaluation surveys;
- Online quizzes where answers are released to students on completion;
- Professional assessment tasks, where the intention is to create an authentic assessment that has an absolute submission date; and,
- Pass/Fail assessment tasks.

Faculty-specific Information

Engineering Student Support Services – The Nucleus - enrolment, progression checks, clash requests, course issues or program-related queries

Engineering Industrial Training – Industrial training questions

UNSW Study Abroad – study abroad student enquiries (for inbound students)

UNSW Exchange – student exchange enquiries (for inbound students)

UNSW Future Students – potential student enquiries e.g. admissions, fees, programs, credit transfer

Phone

(+61 2) 9385 8500 – Nucleus Student Hub

(+61 2) 9385 7661 – Engineering Industrial Training

(+61 2) 9385 3179 – UNSW Study Abroad and UNSW Exchange (for inbound students)

School Contact Information

CSE Help! - on the Ground Floor of K17

- For assistance with coursework assessments.

The Nucleus Student Hub - https://nucleus.unsw.edu.au/en/contact-us

- Course enrolment queries.

Grievance Officer - grievance-officer@cse.unsw.edu.au

- If the course convenor gives an inadequate response to a query or when the courses convenor does not respond to a query about assessment.

Student Reps - stureps@cse.unsw.edu.au

- If some aspect of a course needs urgent improvement. (e.g. Nobody responding to forum queries, cannot understand the lecturer)

You should **never** contact any of the following people directly:

- Vice Chancellor

- Pro-vice Chancellor Education (PVCE)

- Head of School

- CSE administrative staff

- CSE teaching support staff

They will simply bounce the email to one of the above, thereby creating an unnecessary level of indirection and a delay in the response.