



SCHOOL OF COMPUTING

Theory of Computing
COS341

COURSE OUTLINE

Semester 1
2026

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1 Paper Description and Aims

This paper covers the fundamental topics of Computer Science as a discipline. Topics include models of computation such as finite state machines, Turing machines and formal grammars, classes of language, and notions of computability and complexity.

COSC 341 is a theoretical paper, but there are many practical implications of the theory, including, but not limited to, categorising problems as easy, hard or impossible.

Points: 18

Prerequisites:

(COSC 201 or COSC 242) and (MATH 130 or MATH 140)

MATH requirement prior to 2022: MATH 160 or MATH 170)

2 Learning Outcomes

Students will gain an understanding of:

- The theoretical foundations of computer science.
- Fundamental descriptions of machines and their capabilities.
- The hierarchy of languages and the type of machine required to recognise them.
- The limits of computation.
- The computational classes P and NP.
- Common proof methods for classifying a problem in P, NP or NP-complete.
- Basic concepts of approximation algorithms for hard problems.

3 Teaching Staff

Stephen Cranefield
Room: 2.23, Ōwheo Building
Email: stephen.cranefield@otago.ac.nz

Lena Collienne
(new staff member – details to come)

4 Times and Rooms

There are **two lectures** each week (with recordings available afterwards via Otago Capture). The rooms will be available on the paper's web site and in your timetable in the Aoroa learning management system once the university timetable has been finalised.

Monday 10:00–10:50 am
Wednesday 11:00–11:50 am

There is a **two-hour tutorial** each week on **Thursday** from **2:00–3:50 pm**.

5 Course Materials and Communication

There is *no* textbook for COSC341.

Course materials (lecture notes, assignment details, and any other resources that we think you will find useful) will be made available via the paper's website at <https://cosc341.cspages.otago.ac.nz>.

A COSC341 site on Aoroa will be used only for announcements, access to lecture recordings in EchoVideo and the submission of assignments.

Course-related announcements will be made regularly at lectures and on Aoroa. You should regularly check Aoroa and your student email account for notices. We reserve the right to change assignment deadlines if necessary (but will give a reasonable amount of warning).

Individual students' assignment and test results and feedback (where applicable) will be made available (privately) via Aoroa. Please check your results regularly and notify the course coordinator of any discrepancies.

6 Assessment

There are three assignments, each worth 10% of your final mark. See the paper's website at <https://cosc341.cspages.otago.ac.nz> for details.

There will be a final exam worth 70% of your final mark.

6.1 Extensions and Special Consideration

In cases of sickness or other special circumstances, we may offer individual students extensions to assignment deadlines or alternative forms of assessment to replace tests that have been missed. To be eligible for this, an affected student should inform the course coordinator as soon as possible and before the deadline has passed.

If there is any way in which we can help students with disabilities please let us know. We are happy to offer whatever assistance we can, but need to know in advance of any potential problems that might arise.

6.2 Grading System

The grading scheme used at Otago is:

A+	90–100	C+	60–64
A	85–89	C	55–59
A-	80–84	C-	50–54
B+	75–79	D	40–49
B	70–74	E	<40
B-	65–69		

A final grade of D or E means that you have failed the paper.

6.3 Academic Integrity

Academic integrity means being honest in your studying and assessments. It is the basis for ethical decision-making and behaviour in an academic context. Academic integrity is informed by the values of honesty, trust, responsibility, fairness, respect and courage. Students are expected to be aware of, and act in accordance with, the University’s Academic Integrity Policy.

Academic Misconduct, such as plagiarism or cheating, is a breach of Academic Integrity and is taken very seriously by the University. Types of misconduct include plagiarism, copying, unauthorised collaboration, taking unauthorised material into a test or exam, impersonation, and assisting someone else’s misconduct. A more extensive list of the types of academic misconduct and associated processes and penalties is available in the University’s Student Academic Misconduct Procedures.

It is your responsibility to be aware of and use acceptable academic practices when completing your assessments. To access the information in the Academic Integrity Policy and learn more, please visit the University’s Academic Integrity website (see the third URL below) or ask at the Student Learning Centre or Library. If you have any questions, ask the teaching staff.

Further information about the Academic Integrity Policy, the Student Academic Misconduct Procedures and the Academic Integrity can be found through the links below. The Academic Integrity website in particular has a number of useful links and suggestions as to where students can get help with referencing issues.

- <http://www.otago.ac.nz/study/academicintegrity>
- <https://www.otago.ac.nz/administration/policies/academic-integrity-policy>
- <https://www.otago.ac.nz/administration/policies/policy-collection/student-academic-misconduct-procedures>

6.4 Use of Generative AI

In COSC341, generative AI may only be used for editorial assistance, such as checking spelling and grammar, and creating diagrams—not for generating solution ideas. Any use of generative AI must be disclosed in your assignment submission.

For COSC341, we expect that all work submitted by students is their own, or (for assignment 3) the work of an approved group working together on the assignment.

7 Course Schedule

Details of the lecture and tutorial topics, assessments and deadlines are available on the paper's website at <https://cosc341.cspages.otago.ac.nz>.

8 Disclaimer

While every effort is made to ensure that the information contained in this document is accurate, it is subject to change. Changes will be notified in class and via Aoroa. Students are encouraged to check Aoroa and their student email accounts regularly. It is each student's responsibility to keep themselves informed about the paper.