

# CS1231S Discrete Structures

AY2025/26 Semester 1



**NUS**  
National University  
of Singapore

School of  
Computing

## 1. Coordinator/Lecturer



A/P Tan Tuck Choy, **Aaron**

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Email: tantc@comp.nus.edu.sg

*Admin appointment:*

Assistant Dean

(Undergraduate Studies)

Running



Used to have weekly runs with students every week (pre-Covid days)



Full marathon

Cantonese opera



Choir



Joy Chorale

Singing



SoC Gala Dinner 2018



SoC 25<sup>th</sup> Anniversary  
July 2023

Wing Chun



Computing 50<sup>th</sup> Anniversary  
1<sup>st</sup> August 2025

## 1. Lecturers



Weekly  
Jogging



Board  
Games



Cycling



Dr **Ashish** Deepak Dandekar

Office: COM2-03-58

Email: [dcsashi@nus.edu.sg](mailto:dcsashi@nus.edu.sg)

Classical  
Music



Hiking



Traveling





# Welcome to CS1231S

## 1. Lecturer (CS1231R)



Dr **Maciej** Lukasz Obremski

Office: COM2-02-16

Email: [cqtmlo@nus.edu.sg](mailto:cqtmlo@nus.edu.sg)

Stabbing  
people



Meerkats!!!!



Professional  
first aid model



Happiest day of  
my life



Amateur pirate



# CS1231R

- For students who find CS1231S too easy and are looking for more challenges!
- CS1231R – 1 unit, credited in the NEXT semester if you complete it.
- Additional lectures will be conducted by Dr Maciej Lukasz Obremski. (Time slot to be decided later – we will do a poll.)
- Additional assignments will be given out.
- Some possible topics (may subject to changes): Analysis of algorithms (recurrences); Cryptography (fields/groups (mod arithmetics), polynomials, Chinese reminder theorem, encryption, secret sharing); Randomness (union bounds, probabilistics proofs).



**Dr Maciej Obremski**  
Research Assistant Professor  
Works on theoretical CS,  
mostly cryptography.

- **Limited spots, thus there might be an entrance test!**
- **Plan:**
  - Sign-up (+ test): week 3, details to be announced.
  - Lectures start in week 4.

## 1. Tutors



**Dr Eldon  
Chung**



**Prof Frank  
Stephan**



**Theodore  
(lead TA)**



**Chayapol  
(co-lead TA)**



**Axel  
Giovanni**



**Chin  
Herng**



**Alden  
Chua**



**Craigton  
Lian**



**Simpson  
Eng**



**Gabriel  
Tan**



**Gary  
Axel**



**Ivan  
Adrian**



**Jhaharia  
Arnav**



**Brian  
Leng**



**Li  
Zihan**



**Darren  
Lim**



**Lim  
Haoyue**



**Ryan  
Low**



**Mu  
Junrong**



**Tuan  
Duong**



**Rishav  
Gupta**



**Saswata  
Mukherjee**



**Shinezul  
Bilguudei**



**Terry  
Si**



**Ramasamy**



**Suhail  
Loya**



**Tan  
Jay**



**Camlin  
Tan**



**Shearer  
Tang**



**Tze Tzun  
(Joseph)**



**Man  
Tseung**



**Zwe  
Zeya**

## 2. Objectives

1. To develop **mathematical maturity** – the ability to formalize concepts, work from definitions, think rigorously, reason concisely, and construct a theory.
2. To provide basic mathematical prerequisites relevant to **Computer Science**.

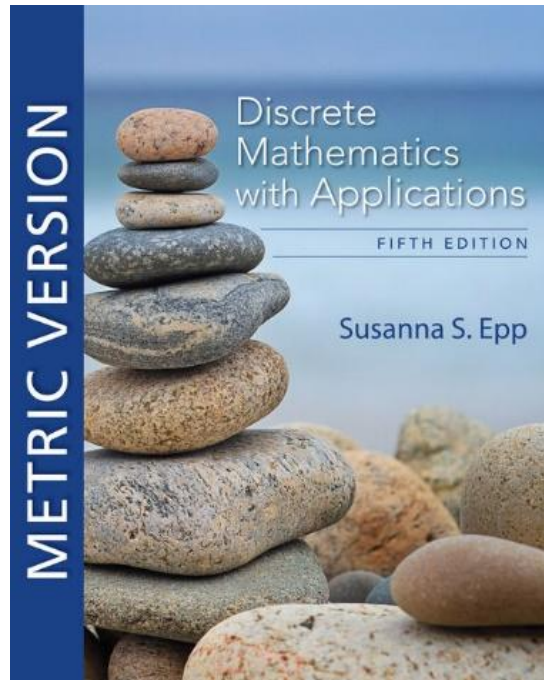
## 3. Topics

Topics include:

1. Propositional logic and predicate logic
2. Proof techniques
3. Sets
4. Relations
5. Mathematical Induction
6. Functions
7. Cardinality
8. Counting and Probability
9. Graphs and Trees



## 4. Reference Books



### Discrete Mathematics with Applications

5<sup>th</sup> Edition

Author: Susanna S. Epp

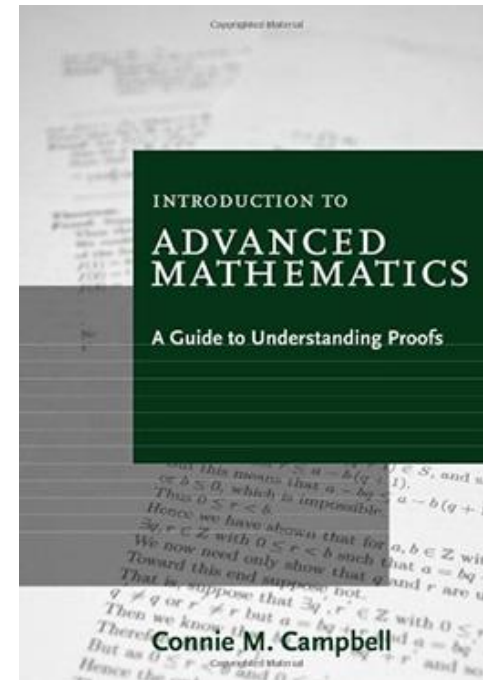
Publisher: Cengage Asia

ISBN-13: 9780357114087

ISBN-10: 0357114086

[Online resource](#)

It's ok if you get  
the 4<sup>th</sup> edition.



### Introduction to Advanced Mathematics:

*A Guide to Understanding Proofs*

Author: Connie M. Campbell

Publisher: Cengage Asia

ISBN-13: 9780547165387

ISBN-10: 0547165382

## 5. Online Resources (1/3)

Canvas: <https://canvas.nus.edu.sg>

The screenshot displays the Canvas LMS interface for the CS1231S course. The left sidebar contains navigation links: Account, Dashboard, Courses (highlighted), Calendar, Inbox, History, Commons, Studio, and Help. The main content area shows the course navigation menu with links to Home, Announcements, Modules, Files, People, Assignments, Quizzes, Discussions, Collaborations, Chat, Grades, Pages, Item Banks, New Analytics, and Rubrics. The 'Modules' section is expanded, showing a list of modules under the 'WELCOME' heading: Welcome to CS1231S, Zoom and QnA links, Meet the Teaching Team, Schedules, Important Dates, and Assessments. Each module has a green checkmark and a plus icon. The right sidebar shows the 'Course status' section with 'Unpublish' and 'Published' buttons, and a list of actions: Import Existing Content, Import from Commons, Choose home page, View Course Stream, New Announcement, New Analytics, and View Course Notifications. Below this is the 'Coming up' section with a 'View calendar' link and the text 'Nothing for the next week'. At the bottom right, there is a 'Course chat' section with a question mark icon.

CS1231S > Modules

[2210] 2022/2023 Semes...

Collapse all View progress Export Course Content + Module

Course status

Unpublish Published

Import Existing Content

Import from Commons

Choose home page

View Course Stream

New Announcement

New Analytics

View Course Notifications

Coming up View calendar

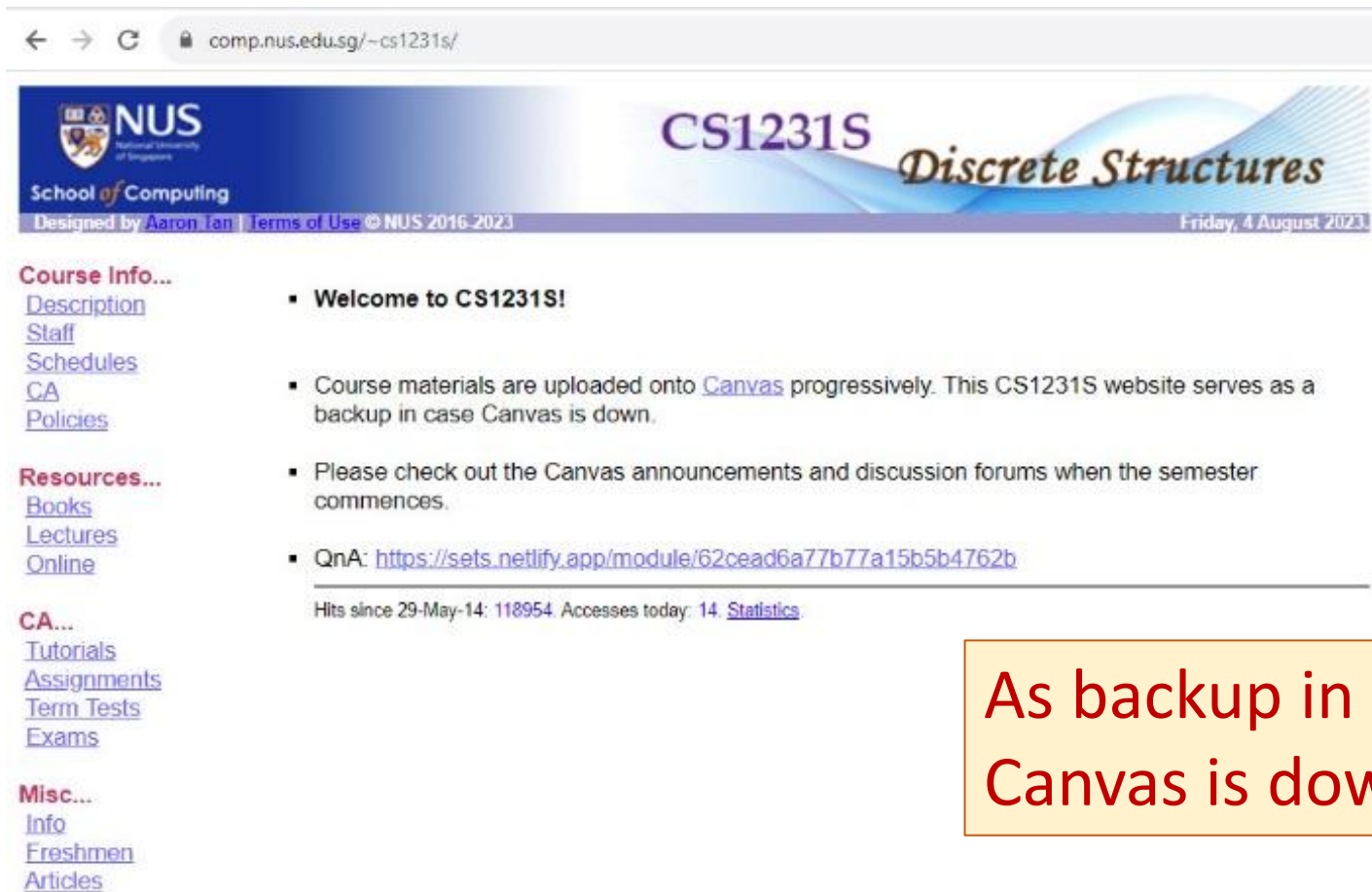
Nothing for the next week

Course chat

## 5. Online Resources (2/3)

CS1231S module website:

<https://www.comp.nus.edu.sg/~cs1231s>



← → ↻ 🔒 comp.nus.edu.sg/~cs1231s/

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National University of Singapore  
School of Computing  
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**CS1231S**  
*Discrete Structures*  
Friday, 4 August 2023

**Course Info...**  
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[Schedules](#)  
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- **Welcome to CS1231S!**
- Course materials are uploaded onto [Canvas](#) progressively. This CS1231S website serves as a backup in case Canvas is down.
- Please check out the Canvas announcements and discussion forums when the semester commences.
- QnA: <https://sets.netlify.app/module/62cead6a77b77a15b5b4762b>

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Hits since 29-May-14: 118954. Accesses today: 14. [Statistics](#)

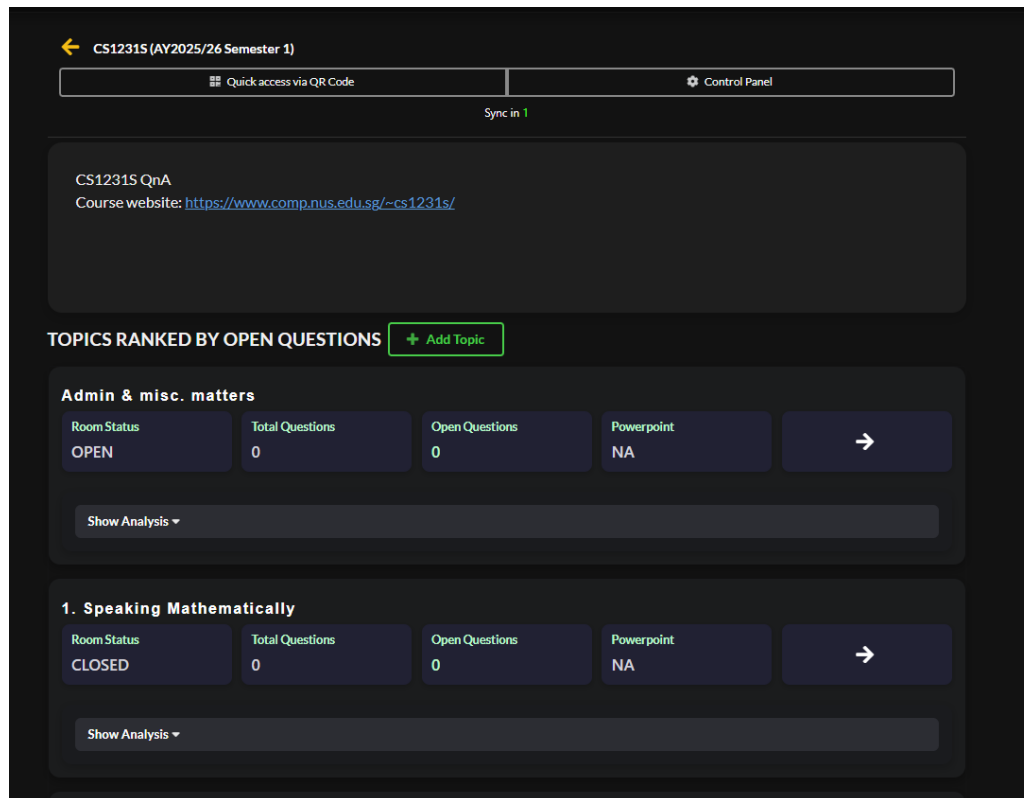
As backup in case  
Canvas is down.

## 5. Online Resources (3/3)

We will call it **QnA** for simplicity

<https://sets.netlify.app/space/6889bcd16c91077d344e44ab>

Post your questions here. More rooms will be created as we progress.



The screenshot displays the CS1231S QnA interface. At the top, it shows the course name 'CS1231S (AY2025/26 Semester 1)' and a 'Sync in 1' indicator. Below this, there are buttons for 'Quick access via QR Code' and 'Control Panel'. The main content area is titled 'CS1231S QnA' and includes the course website URL: <https://www.comp.nus.edu.sg/~cs1231s/>. A section titled 'TOPICS RANKED BY OPEN QUESTIONS' features a '+ Add Topic' button. Below this, there are two topic cards. The first card, 'Admin & misc. matters', shows 'Room Status' as 'OPEN', 'Total Questions' as '0', 'Open Questions' as '0', and 'Powerpoint' as 'NA'. The second card, '1. Speaking Mathematically', shows 'Room Status' as 'CLOSED', 'Total Questions' as '0', 'Open Questions' as '0', and 'Powerpoint' as 'NA'. Both cards have a 'Show Analysis' dropdown menu and a right arrow button.





## 6. Assessments

| CA component        | Date                     | Weightage |
|---------------------|--------------------------|-----------|
| Tutorial attendance | -                        | 5%        |
| Two assignments     | Due: weeks 6 & 12        | 20%       |
| Midterm test        | 8 Oct (Wed) 6:30-8:00pm  | 25%       |
| Final exam          | 28 Nov (Fri) 2:30-4:30pm | 50%       |

- Midterm test and final exam are open book and face-to-face. More details will be given out later.
- Please post on “Canvas > Discussions > Midterm Test” by end of August if the CS1231S midterm test clashes with your other test. Please provide details (such as the other module code and timing).

## 7. Lecture Plan (See CS1231S website for latest updates)

[https://www.comp.nus.edu.sg/~cs1231s/1\\_module\\_info/sched.html](https://www.comp.nus.edu.sg/~cs1231s/1_module_info/sched.html)

| Week   | Lecture topics                                            |
|--------|-----------------------------------------------------------|
| 1      | Speaking Mathematically; The Logic of Compound Statements |
| 2      | The Logic of Quantified Statements                        |
| 3      | Methods of Proofs                                         |
| 4      | Sets                                                      |
| 5      | Relations                                                 |
| 6      | Modular Arithmetic and Partial Orders                     |
| Recess |                                                           |
| 7      | Mathematical Induction and Recursion                      |
| 8      | Functions                                                 |
| 9      | Cardinality                                               |
| 10     | Counting and Probability                                  |
| 11     | Counting and Probability (cont'd); Graphs                 |
| 12     | Graphs (cont'd); Trees                                    |
| 13     | Filler                                                    |

Lectures are webcast; recording will be published on Canvas.

## 8. Tutorial Schedule (Refer to ModReg site)

- Tutorials start in **week 3** (25 August) and are face-to-face.
- See tutorial schedule as at 14 August (this is dynamic and subject to changes) on the following CS1231S web page: [https://www.comp.nus.edu.sg/~cs1231s/1\\_module\\_info/sched.html](https://www.comp.nus.edu.sg/~cs1231s/1_module_info/sched.html) or refer to NUSMODS for the most up-to-date schedule.
- Please do **NOT email us** (acad staff) on requests such as adding you to a group or moving you to a different group. We are not permitted to do this. All requests/appeals should be sent to the ModReg where dedicated admin staff will handle and process your requests. Sending your requests to us will just cause further delay as we could at most forward your request to the admin.
- I will be monitoring the situation on my side and will post updates via **Canvas announcements**.

## 9. Blended Learning

- CS1231S has been selected to go semi-Blended Learning mode.
  - Students are to view the lecture slides and previous semester's lecture recordings before the lecture.
  - Students are to post questions on the topics to be discussed in the coming week.
  - The process will evolve over time as we experiment.

## 10. Why is Discrete Mathematics Important?

Discrete Math (DM) is important, especially for Computer Science.

**It is the backbone of CS.**

Concepts and notations from DM are useful in studying the describing objects and problems in all branches of CS, such as algorithms, programming languages, theorem proving and software development

Every field in CS is related to discrete objects – databases, neural networks, automata, etc.

**Modeling with DM is an extremely important problem solving skill.**

**Useful for algorithms modules:**

CS2040 (Data Structures and Algorithms), CS3230 (Design and Analysis of Algorithms), etc.

Logic part is useful in CS2100 (Computer Organisation).



## 11. Plagiarism

- Use or close **imitation** of the **language** and **thoughts** of another author and the representation of them as one's own original work.
- Plagiarism by students, professors, or researchers is considered **academic dishonesty** or **academic fraud**, and offenders are subject to **academic censure**, up to and including **expulsion**.
- Do **not plagiarise** or **commit any acts of dishonesty**.
- Further information:
  - <https://www.comp.nus.edu.sg/cug/plagiarism/>
  - <http://nus.edu.sg/celc/programmes/plagiarism.html>

## 12. CS1231S Policy on Assignments

- You are to do the assignments on your own.
- No AI tools are allowed.
- No discussion with anybody else is allowed.
- If you have queries about the assignment questions, post them on QnA. Do not post your answers or partial answers there.



Every semester, many students were caught committing academic offence and were reported to the school. Depending on the severity, penalty includes awarding zero mark for the assignment, failing the whole course, and harsher penalty.

Note that academic offence is not limited to direct copying or sharing of answers.

In programming courses, there were many instances when students claimed that they merely discussed their ideas/algorithms (which was allowed) but ended up with highly similar code due to the detail level of discussion. There were instances when two students were detected with similar answers, even though they do not know each other, but separately used AI tool (which gave the same answer). All these reasons would not vindicate you of the offence.

## 13. CS1231S Tagline



What have you heard about CS1231S  
from those who have taken it before?

Challenging

Boring

Interesting

Depressing

Killer module

Prepare to S/U

I can do it!

Heard nothing

END OF FILE