



## COSC 221 - Introduction to Discrete Structures

(W2022/2023 – Term 2)

Dr. Yong Gao

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### Course Information

**Textbook:** David Liben-Nowell. *Connecting Discrete Mathematics and Computer Science*. Cambridge Univ. Press, 2022.

**Lecture:** MWF (10:00am – 11:00am)

**Location:** ART 103

**Office Hrs:** 0.5 hour after each lecture

**Seminar:** S1A (Thu, 1:00pm – 2:00pm), S1B (Wed, 3:00pm – 4:00pm), S1C (Fri, 2:00pm – 3:00pm),  
S1E (Wed, 1:00pm - 2:00pm), S1F (Fri, 11:00am – 12:00pm)

### Calendar Course Descriptions

#### COSC 221 (3) Introduction to Discrete Structures

Introduction to sets, logic, combinatorics, and graph theory, as applied in computing: sets and propositions, permutations and combinations, graphs and trees, Boolean algebra, algorithms, and applications. [3-1-0]

**Pre-reqs:** One of MATH 101, MATH 142, APSC 173. **Co-reqs:** COSC 121.

### Important Dates

**Monday, 09 January 2023:** First Class

**Friday, 20 January 2023:** Last day for early withdrawal

**Monday, 20 February 2023:** Midterm break, no class (one week)

**Friday, 24 March 2023:** Last day for withdrawal

**Friday, 07 April:** Good Friday

**Monday, 10 April, 2023:** Easter Monday

**Thursday, 13 April 2023:** Last class

**Monday 17 – Friday 28 April 2023:** Final exam period

### Evaluations

Your overall grade will be the weighted average percentage of those achieved in the evaluation component listed below. **To pass the class, you need to have an overall grade of 50% or higher.** A letter grade will be assigned according to the standardized grading system outlined in the UBC Okanagan Calendar. Attendance is required to complete in-class quizzes and to participate in group activities in the seminar sessions.

1. Individual Written Assignments (3 - 5 Problem Sets, 20%)
2. Team-Based Problem Solving (Seminar Sessions, 20%)
3. iClicker Quizzes (In-Class, 20%)
4. Two Surprise Written Quizzes (In-Class, 5% each)
5. One Midterm (In-Class, 0%)
5. Final Exam (In-Person, 30%)



## Objectives

This course introduces students to the basic theories and methodologies in discrete mathematics that are indispensable to working with discrete structures and related computing problems in computer science, data science, and mathematics. Class activities include online lectures and online seminars. Upon successful completion of this course, students are expected to

- feel comfortable using the language of logic to model (discrete) computing problems;
- be able to write (simple, clean, yet nontrivial) mathematical proofs of claims;
- be familiar with the fundamental concepts and ideas in graph theory, combinatorics, and discrete probability; and
- be able to apply the acquired knowledge in other courses.

Topics to be covered include, but not limited to,

- Logic and Logic Inference: Propositional Logic and Predicate Logic
- Proof Techniques and Models of Computation
- Graph Theory: Concepts, Basic Properties, and Algorithmic Problems
- Combinatorics: Counting Principles
- Discrete Probability in Computing

## Policies and Practices

### Submission and Late Policy

For individual written assignments, you are required to submit a **digital copy** of your solution in on Canvas. Late submissions are acceptable with the following penalty: 1 to 24 hours late (20% mark deduction); 25 to 48 hours late (40% mark deduction); more than 48 hours: no mark. All appeals to marks, except to that of the final exam, must be registered with the instructor before the scheduled date of the final examination. Students who miss a class examination or assignment due to short-term illness or other legitimate reasons should contact the instructor immediately to make an alternate arrangement.

### Collaboration Policy

The assignments are designed to help students solidify their understanding of the course material. You are encouraged to collaborate with your peers on the assignment problems; even more desirable is to form your own study group of two to three people. However, **the write-up has to be in your own words**. You are also required to identify your collaborators and acknowledge any help from the TA, the instructor, and the Web. You should also be able to explain to the instructor the details of any solution you have submitted.

Note: Any requests for changes to final exams must be sent to the office of the Associate Dean of Students ([bsasdeansoffice.ubco@ubc.ca](mailto:bsasdeansoffice.ubco@ubc.ca)).



## Grading Practices

Faculties, departments, and schools reserve the right to scale grades in order to maintain equity among sections and conformity to the university, faculty, department, or school norms. Students should therefore note that an unofficial grade given by an instructor might be changed by the faculty, department, or school. Grades are not official until they appear on a student's academic record. <http://www.calendar.ubc.ca/okanagan/index.cfm?tree=3,41,90,1014>

## Final Examinations

The examination period for **W2022 T-2 is April 17 – April 28, 2023**. Except in the case of examination clashes and hardships (three or more formal examinations scheduled within a 24-hour period) or unforeseen events, students will be permitted to apply for out-of-time final examinations only if they are representing the University, the province, or the country in a competition or performance; serving in the Canadian military; observing a religious rite; working to support themselves or their family; or caring for a family member. Unforeseen events include (but may not be limited to) the following: ill health or other personal challenges that arise during a term and changes in the requirements of an ongoing job.

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Further information on **Academic Concession** can be found under **Policies and Regulation in the *Okanagan Academic Calendar*** <http://www.calendar.ubc.ca/okanagan/index.cfm?tree=3,48,0,0>

## Academic Integrity

The academic enterprise is founded on honesty, civility, and integrity. As members of this enterprise, all students are expected to know, understand, and follow the codes of conduct regarding academic integrity. At the most basic level, this means submitting only original work done by you and acknowledging all sources of information or ideas and attributing them to others as required. This also means you should not cheat, copy, or mislead others about what is your work. Violations of academic integrity (i.e., misconduct) lead to the breakdown of the academic enterprise, and therefore serious consequences arise and harsh sanctions are imposed. For example, incidences of plagiarism or cheating may result in a mark of zero on the assignment or exam and more serious consequences may apply if the matter is referred to the President's Advisory Committee on Student Discipline. Careful records are kept in order to monitor and prevent recurrences.

A more detailed description of academic integrity, including the University's policies and procedures, may be found in the Academic Calendar at: <http://okanagan.students.ubc.ca/calendar/index.cfm?tree=3,54,111,0>.



## Cooperation vs.

**Cheating** Working with others on assignments is a good way to learn the material and we encourage it. However, there are limits to the degree of cooperation that we will permit. Any level of cooperation beyond what is permitted is considered cheating. You must limit collaboration to a high-level discussion of solution strategies, and stop short of actually writing down a group answer. Anything that you hand in, whether it is a written problem or a computer program, must be written by you, from scratch, in your own words. If you base your solution on any other written solution, you are cheating. If you provide your solution for others to use, you are also cheating.

## Copyright Disclaimer

Diagrams and figures included in lecture presentations adhere to Copyright Guidelines for UBC Faculty, Staff and Students <http://copyright.ubc.ca/requirements/copyright-guidelines/> and UBC Fair Dealing Requirements for Faculty and Staff <http://copyright.ubc.ca/requirements/fair-dealing/>. Some of these figures and images are subject to copyright and will not be posted to **Canvas**. All material uploaded to **Canvas** that contain diagrams and figures are used with permission of the publisher; are in the public domain; are licensed by Creative Commons; meet the permitted terms of use of UBC's library license agreements for electronic items; and/or adhere to the UBC Fair Dealing Requirements for Faculty and Staff. Access to the **Canvas** course site is limited to students currently registered in this course. Under no circumstance are students permitted to provide any other person with means to access this material. Anyone violating these restrictions may be subject to legal action. Permission to electronically record any course materials must be granted by the instructor. Distribution of this material to a third party is forbidden.

## Grievances and Complaints Procedures

A student who has a complaint related to this course should follow the procedures summarized below:

- The student should attempt to resolve the matter with the instructor first. Students may talk first to someone other than the instructor if they do not feel, for whatever reason, that they can directly approach the instructor.
- If the complaint is not resolved to the student's satisfaction, the student should e-mail the Associate Head, Dr. Yves Lucet at [yves.lucet@ubc.ca](mailto:yves.lucet@ubc.ca) or the Department Head, Dr. John Braun at [john.braun@ubc.ca](mailto:john.braun@ubc.ca)



## Student Service Resources

### Disability Assistance

The Disability Resource Centre ensures educational equity for students with disabilities, injuries or illness. If you are disabled, have an injury or illness and require academic accommodations to meet the course objectives, e-mail us or visit our website for more information.

**Web:** <http://students.ok.ubc.ca/drc/welcome.html> **E-mail** DRC at: [drc.questions@ubc.ca](mailto:drc.questions@ubc.ca)

### Equity and Inclusion Office

Through leadership, vision, and collaborative action, the Equity & Inclusion Office (EIO) develops action strategies in support of efforts to embed equity and inclusion in the daily operations across the campus. The EIO provides education and training from cultivating respectful, inclusive spaces and communities to understanding unconscious/implicit bias and its operation within campus environments. UBC Policy 3 prohibits discrimination and harassment on the basis of BC's Human Rights Code. If you require assistance related to an issue of equity, educational programs, discrimination or harassment please contact the EIO. **UBC Okanagan Equity Advisor: ph. 250-807-9291**

**Web:** <https://equity.ok.ubc.ca/> **E-mail:** [equity.ubco@ubc.ca](mailto:equity.ubco@ubc.ca)

### Office of the Ombudsperson for Students

The Office of the Ombudsperson for Students is an independent, confidential and impartial resource to ensure students are treated fairly. The Ombuds Office helps students navigate campus-related fairness concerns. They work with UBC community members individually and at the systemic level to ensure students are treated fairly and can learn, work and live in a fair, equitable and respectful environment. Ombuds helps students gain clarity on UBC policies and procedures, explore options, identify next steps, recommend resources, plan strategies and receive objective feedback to promote constructive problem solving. If you require assistance, please feel free to reach out for more information or to arrange an appointment. **UNC 328** 250.807.9818 email: [ombuds.office.ok@ubc.ca](mailto:ombuds.office.ok@ubc.ca) Web: [www.ombudsoffice.ubc.ca](http://www.ombudsoffice.ubc.ca)

### Health & Wellness - UNC 337

At UBC Okanagan health services to students are provided by Health and Wellness. Nurses, physicians and counsellors provide health care and counselling related to physical health, emotional/mental health and sexual/reproductive health concerns. As well, health promotion, education and research activities are provided to the campus community. If you require assistance with your health, please contact Health and Wellness for more information or to book an appointment.

**Web:** [www.students.ok.ubc.ca/health-wellness](http://www.students.ok.ubc.ca/health-wellness) **Email:** [healthwellness.okanagan@ubc.ca](mailto:healthwellness.okanagan@ubc.ca)



### **(SVPRO)**

A safe and confidential place for UBC students, staff and faculty who have experienced sexual violence regardless of when or where it took place. Just want to talk? We are here to listen and help you explore your options. We can help you find a safe place to stay, explain your reporting options (UBC or police), accompany you to the hospital, or support you with academic accommodations. You have the right to choose what happens next. We support your decision, whatever you decide. Visit [sypro.ok.ubc.ca](https://sypro.ok.ubc.ca) or call us at 250-807-9640

### **Independent Investigations Office (IIO)**

If you or someone you know has experienced sexual assault or some other form of sexual misconduct by a UBC community member and you want the Independent Investigations Office (IIO) at UBC to investigate, please contact the IIO. Investigations are conducted in a trauma informed, confidential and respectful manner in accordance with the principles of procedural fairness. You can report your experience directly to the IIO by calling 604-827-2060.

**Web:** <https://investigationsoffice.ubc.ca/>

**E-mail:** [director.of.investigations@ubc.ca](mailto:director.of.investigations@ubc.ca)

### **The Hub**

The Student Learning Hub (LIB 237) is your go-to resource for free math, science, writing, and language learning support. The Hub welcomes undergraduate students from all disciplines and year levels to access a range of supports that include **tutoring in math, sciences, languages, and writing, as well as help with study skills and learning strategies.** **Web:** (<https://students.ok.ubc.ca/student-learning-hub/>) **Ph:** 250-807-9185.

**SAFEWALK** - Download the UBC SAFE – Okanagan app.

Don't want to walk alone at night? Not too sure how to get somewhere on campus?

**Call Safewalk at 250-807-8076** For more information: <https://security.ok.ubc.ca/safewalk/>