

# ICS 141: Discrete Mathematics for Computer Science I

## Fall 2024

### Instructor Information

Name: Andrey A. Popov  
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Office Hours: 9:00–10:30 Tuesdays  
Website: <https://www2.hawaii.edu/~apopov/>

### Teaching Assistant Information

Name: Moseli Mots'oezli  
Office: POST 314-6  
Email: [moselim@hawaii.edu](mailto:moselim@hawaii.edu)  
Office Hours: Monday, Wednesday 13:30-15:00

### Learning Assistance Information

Name: ICS Learning Emporium  
Website: <https://natsci.manoa.hawaii.edu/learningemporium/>

### Class Information

Days: Tuesday and Thursday  
Time: 13:30–14:45  
Classroom: MSB 114

### Recitation Information, 72618

Day: Fridays  
Time: 9:00–10:15  
Classroom: CR 115

### Recitation Information, 72619

Day: Fridays  
Time: 10:30–11:45  
Classroom: ART 101

## 1 Course Description

**Prerequisites.** MATH 215 or 241 or 251A.

This course covers logic, set theory, functions, probability theory, mathematical reasoning, counting, and combinatorics. This is largely a foundational course on which a large portion of CS education is built, and is essential for understanding algorithms, data structures, computer architecture, among others.

### Student Learning Outcomes:

- Be capable of logical thinking including formalizing an argument from human language into mathematical language. Be able to construct a valid argument, and prove the validity of an existing argument.
- Be capable of handling arguments involving induction and integer sequences.
- Be able to handle functions and sets.
- Be able to compute the complexity of a computer algorithm.

## 2 Course Information, Policies and Resources

**Syllabus disclaimer.** This syllabus is not a contract. All the information herein is subject to change at the whim of the instructor. You will be notified of all syllabus changes.

**Email policy.** If you intend to email either the instructor or the TA, you **MUST** include **ICS 141** in the subject line, or else your email **will be ignored**. Do not expect a swift reply, especially after work hours and during weekends.

**Course website** The course website is <https://www2.hawaii.edu/~apopov/fall24/ics141.html>. Laulima will be used to assign and hand in homework. The Syllabus is also available there.

**Questions policy.** Questions about the exams should be directed to the instructor. Questions about homeworks and recitations should be directed to the TA.

**Attendance policy.** Students who are enrolled in this course, but never attend will be flagged by the course instructor for non-participation before the last day to add/drop (for 100% tuition refund) deadline. Flagged students will be administratively dropped by the Office of the Registrar. Any changes to a student's enrollment status may affect financial aid eligibility and can result in the return of some of all of federal student financial aid. **This will be enforced through recitation attendance and participation. If you do not come to recitation you will be dropped from the course.**

**Use of Internet, mobile devices, and social media.** All electronic devices should be turned off and put away during class. Electronic note-taking devices are permitted. If you require the use of non-note-taking devices, please discuss it with the instructor.

**Statement on Disability.** If you have a disability and related access needs, please contact the KOKUA Program (Office for Students with Disabilities) at 956-7511, [KOKUA@hawaii.edu](mailto:KOKUA@hawaii.edu), or go to Room 013 in the Queen Lili'uokalani Center for Student Services. Please know that I will work with you and KOKUA to meet your access needs based on disability documentation. Koku'a's services are confidential and offered free of charge.

**Academic Integrity and Ethical Behavior.** Cheating, plagiarism, or other forms of academic dishonesty are not permitted within this course and are prohibited within the System-wide Student Conduct Code (EP 7.208). Examples include: fabrication, falsification, cheating, plagiarism, and use of improper materials. Any incident of suspected academic dishonesty will be reported to the Office of Student Conduct for review and possible adjudication. Additionally, the instructor may take action in regards to the grade for the deliverable or course as they see fit.

**Office of Title IX.** (808) 956-2299 [t9uhm@hawaii.edu](mailto:t9uhm@hawaii.edu) | [Website](#)

UHM is committed to providing a learning, working and living environment that promotes personal integrity, civility, and mutual respect and is free of all forms of sex discrimination and gender-based violence, including sexual assault, sexual harassment, gender-based harassment, domestic violence, dating violence, and stalking. If you or someone you know experiences any of these, UHM has staff and resources on campus to support and assist you. Staff also can direct you to resources in the community. Here are some:  
If you wish to remain ANONYMOUS, speak with someone CONFIDENTIALLY, or would like to receive information and support in a CONFIDENTIAL setting, contact:

- Counseling & Student Development Center | (808) 956-7927 | [manoa.hawaii.edu/counseling/](http://manoa.hawaii.edu/counseling/)
- Office of Gender Equity | (808) 956-9499 | [manoaadv@hawaii.edu](mailto:manoaadv@hawaii.edu)
- Lesbian, Gay, Bisexual, Transgender, Queer (LGBTQ+) Center | (808) 956-9250 | [manoa.hawaii.edu/lgbt](http://manoa.hawaii.edu/lgbt)
- Respondent Support | (808) 956-4392 | [PAUrs@hawaii.edu](mailto:PAUrs@hawaii.edu)
- Student Parents at Mānoa (SP@M) | (808) 956-8059 | [manoa.hawaii.edu/studentparents/](http://manoa.hawaii.edu/studentparents/)
- UH Confidential Advocacy | [advocate@hawaii.edu](mailto:advocate@hawaii.edu)
- University Health Services Mānoa | (808) 956-8965 | [hawaii.edu/shs/](http://hawaii.edu/shs/)

If you wish to REPORT an incident of sex discrimination or gender-based violence including sexual assault, sexual harassment, gender-based harassment, domestic violence, dating violence or stalking as well as receive information and support, contact:

Director and Title IX Coordinator  
Hawai'i Hall 124  
2500 Campus Road  
Honolulu, HI 96822  
(808) 956-2299  
t9uhm@hawaii.edu

As a member of the University faculty, I am required to immediately report any incident of sex discrimination or gender-based violence to the campus Title IX Coordinator. Although the Title IX Coordinator and I cannot guarantee confidentiality, you will still have options about how your case will be handled. My goal is to make sure you are aware of the range of options available to you and have access to the resources and support you need. For more information regarding sex discrimination and gender-based violence, the University's Title IX resources and the University's Policy, EP 1.204, go to: <http://www.manoa.hawaii.edu/titleix/>

**Department of Public Safety** (808)956-6911 (Emergency) | (808)956-8211 (Non-Emergency) [Website](#)

**UH System Basic Needs** include food and housing, childcare, mental health, financial resources and transportation, among others. Student basic needs security is critical for ensuring strong academic performance, persistence and graduation and overall student well being. If you or someone you know are experiencing basic needs insecurity, please see the following resources: [UH System Basic Needs](#)

### 3 Course Content and Learning Objectives

#### Tentative Schedule

The following is a *tentative* schedule for the course.

Week	Topics	Recommended Reading
1	Propositional Logic	1.1
2	Rules of Inference, Proofs	1.2–1.3
3	Predicates and Quantifiers, Proofs	1.4 – 1.7
4	Sets and functions	2.1–2.3
5	Integers and Induction, <b>Exam I: Sep. 26th</b>	4.3, 5.1
6	Sequences, Summations	2.3–2.6
7	Probability Part I	7.1–7.2
8	Algorithms, Growth of Functions	3.1–3.2
9	Complexity of Algorithms, Modular Arithmetic, Integers and Algorithms	3.3–4.2
10	Primes and GCD, <b>Exam II: Oct. 31th</b>	4.3, 5.1
11	<b>Tuesday is a holiday</b> , Strong Induction, Recursion I	5.2–5.3
12	Recursion II	5.3–5.4
13	Basics of Counting, Permutations and Combinations	6.1–6.5
14	Probability Part II, <b>Thursday is a holiday</b>	7.1–7.4
15	Probability Part III	7.1–7.4
16	Matrices	2.6

### 4 Required Texts and Readings

K. H. Rosen, Discrete Mathematics and Its Applications, 8th Edition, McGraw Hill.

The text is required for this class.

**Important:** There will be times when the lecture notes conflict with the text. The lecture notes **always** take precedence over the text.

## 5 Course Assignments, Evaluation and Grading

### 5.1 Assignments

**Recitation (10% of grade).** Recitation is mandatory to attend. There will be graded recitation activities.

**Homework (15% of grade).** Homework is to be handed in through Laulima and will be due end of day Thursdays (23:59). The homework will contain both theoretical problems and practical python programming assignments. You will generally have two weeks for your homework.

**Midterms (40% of grade)** There will be two **mandatory, closed book, in-person** midterms.

- Midterm one will be TBA and will cover **all** of the material up to that point.
- Midterm two will be TBA and will cover **all** of the material up to that point, **including all the material that was covered in midterm one.**

**Final (35% of grade)** There will be a **mandatory, closed book, in-person** final exam during the finals week **12:00–14:00 Tuesday 17th of December 2024.**

Recitation Participation	10%
Homework	15%
Midterm Exam 1	20%
Midterm Exam 2	20%
Final Exam	35%
Total	100%

### 5.2 Attendance

Attendance to both the lecture and **your recitation section is mandatory**. If you do not show up to recitation, you **will be dropped from the class**. Your recitation participation is **10% of your grade**.

### 5.3 Grading.

The following grade chart will be used:

Grade Point Average (%)	Letter Grade	Grade Point Average (%)	Letter Grade
100	A+	73–76	C
93–99	A	70–72	C–
90–92	A–	67–69	D+
87–89	B+	63–66	D
83–86	B	60–62	D–
80–82	B–	<i>sonst</i>	F
77–79	C+		

Your grade point average will be rounded to the nearest whole number percent.

There will be no individual extra credit.