

# Introduction to Discrete Structures

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“Computer Science is no more about computers than astronomy is about telescopes.”

– Edsger Dijkstra

## Course Information

<b>Prerequisites</b>	A grade of 'P' or 'C' or better in CSCE 155 (A, E, H, N, T) / SOFT 160 (H) / RAIK 183H and MATH 106.
<b>Lectures</b>	Tuesday and Thursday (12:30:PM to 1:45:PM) Brace Lab-206
<b>Instructor</b>	Dr. Shruti Bolman <i>née</i> Daggumati <a href="mailto:sdaggumati@unl.edu">sdaggumati@unl.edu</a> Avery Hall 369
<b>Office Hours</b>	Please check “Syllabus” on Canvas for updates and details
<b>Textbook (suggested)</b>	<i>Discrete Mathematics and Its Applications</i> Kenneth H. Rosen, McGraw Hill (7 <sup>th</sup> Edition)
<b>TAs</b>	Please check “Syllabus” on Canvas for updates and details
<b>Homepage</b>	We will use Canvas ( <a href="http://canvas.unl.edu">http://canvas.unl.edu</a> ) to: <ul style="list-style-type: none"><li>• send out announcements</li><li>• post lecture notes</li><li>• assign homework</li></ul>

## Course Details

Computer Science is *not programming*. Rather, Computer Science is the mathematical modeling and study of what computation is – that is, what problems have a computational solution and how efficient that solution can be. Thus, a strong foundation in mathematics is essential to your success as a computer scientist. At the heart of computer science are fundamental discrete structures that we will study in this course. Specifically, you will learn many of the mathematical definitions, techniques, and ways of thinking that will be useful in Computer Science.

## Catalog Description

Survey of elementary discrete mathematics. Elementary graph and tree theories, set theory, relations and functions, propositional and predicate logic, methods of proof, induction, recurrence relations, principles of counting, elementary combinatorics, and asymptotic notations.

## Tentative Schedule of Topics

Below is a list of topics I intend to cover along with the relevant sections of the text. This schedule is tentative and may be changed or topics added/removed as time dictates. Furthermore, though we will follow the book, additional material may be introduced (with sufficient resources) while the depth of each topic may vary. A complete schedule of topics as well as the associated required reading is available on the course webpage. The topic outline is roughly as follows.

- Propositional Logic, Predicate Logic
- Proofs
- Sets
- Functions
- Relations
- Algorithms & Algorithm Analysis
- Induction
- Recurrence Relations
- Combinatorics
- Graphs & Trees

## Teaching Style

I teach using power point slides, white board and class discussions. Handouts of the slides are available, but you are ultimately responsible for the material, thus regular attendance is strongly encouraged. Furthermore, you will be expected to read the relevant sections of the textbook before coming to class. Several pop quizzes (though not necessarily announced) will also be given in the lecture and recitation class. Since make-up quizzes will not be given, attendance is highly recommended.

The text offers good examples of the materials and numerous opportunities to work out examples. The answers to all odd numbered questions are in the back of the book and provide a good opportunity to work problems on your own. Homework and exams are used to assess your progress in this course and should be considered the *minimal* amount of work required to learn the material. You should work additional examples and exercises from the book in order to master the material.

## Discussion Through Piazza

We will be using Piazza for class discussion. The system is highly catered to provide you help fast and efficiently from classmates, TAs, and myself. Rather than emailing questions to the teaching staff, I encourage you to post your questions on Piazza. Please note that posted questions or discussion will be moderated if appeared to be inappropriate or irrelevant. Also, if you have a **question for a specific instructor (me or a TA)**, you must send an email to that person, otherwise don't expect to receive a quick response. Sign up for the class page at: <https://piazza.com/unl/spring2020/csce235>

## Grading

Grading will be based on homework, quizzes, and exams with the following contributions.

Category	Weight
Homework	45%
Quizzes	20%
Midterm Exam	15%
Final Exam	20%

## Scale

Letter grades will be awarded based on the following scale. I will use an **absolute grading policy**. For example, scores within the range between 89.00 and 89.49 will be rounded to 89.00 while scores within the range between 89.50 and 89.99 will be rounded to 90.00. Therefore, a score of 89.49 will earn you a B+ grade but 89.50 will earn an A-(minus) grade.

A+	>= 97	B+	>= 87	C+	>= 77	D+	>= 67	F	<60
A	>= 93	B	>= 83	C	>= 73	D	>= 63		
A-	>= 90	B-	>= 80	C-	>= 70	D-	>= 60		

## Homework

There will be 6 homework assignments, about one every other week. Homework will consist of selected exercises from the text as well as original problems. You will be expected to follow all instructions on the homework assignments. Clarity and legibility are of great importance. If homework is sloppy or unclear, points may be deducted. Each assignment will have a fixed deadline (beginning of class). Homework can be completed in pairs, if students choose to do so. The responsibility to learn and understand the material falls on the student.

## Quizzes

There will be several pop quizzes (i.e., they may or may not be announced in advance) given during the lecture/recitation. They will generally be short and will cover recent topics.

## Exams

There will be one midterm exam (in class) and one final exam. These will be closed notes/book exams and comprehensive.

## Grading Policy

If you have questions about grading or believe that points were deducted unfairly, you must first address the one who graded it to see if it can be resolved. Such questions should be made within a reasonable amount of time after the graded assignment has been returned. **No further consideration will be given to any assignment a week after it has been graded and returned (regardless of whether you fail to pick it up when handed back).** It is your responsibility to **check Canvas regularly** and report missing/incorrect entry **within one week of submission** of your assignment or exam. You need to report questions related to grading **before I post your final grade** in Canvas.

## Late Work Policy

Homework assignments have a strict *in-class* (at the beginning) due date.

It is understandable that unforeseen events may interfere with your ability to hand in all homework assignments on time. As such, I've adopted a policy of allowing **one late homework**. You may turn in a single assignment **up to** a week late. Any submissions after a week will not be considered. Any late submissions after using your one "free pass" will not be considered.

**Exceptions: You are NOT ALLOWED to use a late pass on either the first or the last homework assignments.**

In general, there will be no make-up exams or quizzes. Exceptions may be made in certain circumstances such as health or emergency, but you must make every effort to get prior permission. Documentation may also be required.

## University and Departmental Policies

### Dead Week Policy

In conformance with UNL's 15<sup>th</sup> Week Policy (see Registration and Records main webpage, <http://www.unl.edu/regrec/>), be aware that the final homework may be due during the final week of classes. Finally, all assignments, homework, labs or otherwise, will have a strict final due date during the final week of classes. This supersedes any unused late or screw-up passes that you may have (that is, such passes cannot be used to extend the due date of any assignment past the last week of classes). Also, please be aware that there may be quizzes during the final week of semester.

### Academic Integrity

All homework assignments, quizzes, exams, etc. must be your own work. No direct collaboration with fellow students, past or current, is allowed unless otherwise stated. The Computer Science & Engineering department has an [Academic Integrity Policy](#). All students enrolled in any computer science course are bound by this policy. You are expected to read, understand, and follow this policy. Violations will be dealt with on a case by case basis and may result in a failing assignment or a failing grade for the course itself. **If any student performs academic dishonesty (complete or partial)**, as defined by the UNL academic integrity policy, following actions will be taken.

- 1) For a first offense where the student actions were isolated and/or they are remorseful, they will receive no credit for the assignment in question.
- 2) For a first offense that is considered egregious, e.g., their actions impacted many others, they persist in making untruthful statements in light of overwhelming evidence, etc., they will receive a failing grade for the class and will not be permitted to drop the class or change to pass/no-pass grading.
- 3) For a second offense, they will receive a failing grade for the class and will not be permitted to drop the class.

- 4) For a third offense, they will be expelled from their CSCE major or minor and will not be permitted to subsequently enroll in any CSCE course.

It is acceptable to discuss the meaning of assignments with fellow students. Discussing general approaches and strategies for solutions may be permissible, but unless specifically allowed, such communications should not include written material or code and should not transmit substantive or specific elements of a solution. Any cooperation beyond discussing general approaches and general strategies is not allowed unless specifically permitted by the instructor. You may not develop joint solutions, share work, or copy anything. You are also responsible for safeguarding your own work. All external contributions must be acknowledged, including help from others or from non-course materials such as websites. If in doubt, ask.

### **Accommodations for Students with Disabilities**

Students with disabilities are encouraged to contact the instructor for a confidential discussion of their individual needs for academic accommodation. It is the policy of the University of Nebraska-Lincoln to provide flexible and individualized accommodations to students with documented disabilities that may affect their ability to fully participate in course activities or to meet course requirements. To receive accommodation services, students must be registered with the Services for Students with Disabilities (SSD) office, 232 Canfield Administration, 472-3787 voice or TTY.

### **Sources for Help and Assistance**

UNL offers a variety of options to students to aid them in dealing with stress and adversity. Counseling and Psychological Services (CAPS) (<https://caps.unl.edu>) is a multidisciplinary team of psychologists and counselors that works collaboratively with Nebraska students to help them explore their feelings and thoughts and learn helpful ways to improve their mental, psychological, and emotional well-being when issues arise. CAPS can be reached by calling 402-472-7450.

Big Red Resilience & Well-Being (<https://resilience.unl.edu/big-red-resilience-well-being>) provides fun events, innovative education, and dynamic services to help students understand emotions, manage stress, build strength, connect with others, develop grit, and navigate transitions

### **CSE Department**

The CSE Department has an anonymous contact form (<http://cse.unl.edu/contact-form>) that you may use to voice your concerns about any problems in the course or department if you do not wish to be identified.

It is CSE Department policy that all students in CSE courses are expected to regularly check their email so they do not miss important announcements. You are ultimately responsible for your success in this course.

If you have questions on material covered or assigned in class, it is up to you to seek out assistance from the course instructors or TAs. Staff in the CSE Student Resource Center may also be able to assist you with general questions. The CSE Student Resource Center (<http://cse.unl.edu/src>) is located at Avery 12. The CSE Department also maintains a Frequently Asked Questions page (<https://cse.unl.edu/faq>).

Finally, I will hold regular office hours and will make myself available by appointment; please email me to set one up. **However, note that you may not receive any response during weekends/holidays and after office hours.**

## Help

Your success in this course is ultimately your responsibility. That said, there are several outlets for you to seek help and assistance.

1. Your Instructor – Attend lecture regularly and engage in class discussions, ask questions in class, visit me during my office hours or setup a meeting time to see me
2. Your TAs – TAs hold regular weekly office hours, visit with them and ask questions, ask for examples, etc.
3. Student Resource Center – Though they may not be your direct TA, all Graduate Teaching Assistants (and some advanced undergraduates) hold regular office hours in the Student Resource Center (<http://cse.unl.edu/src/index.shtml>) open Monday thru Friday 9AM to 7PM and should be staffed most hours. Ask for help from anyone in the SRC.
4. Course materials – start on assignments early, attend lectures and labs, work extra problems from the book, read all required (and optional!) materials.
5. Your colleagues – Chances are, if you are having problems, your classmates are having them too. Discussion and dialog among students is encouraged (within the parameters set by CSE's academic integrity policy, this course's policy, and policies set for individual assignments).