



**East West University**  
**Department of Computer Science and Engineering**  
**Course Outline**  
**Fall 2025 Semester**

**Course: CSE106 Discrete Mathematics (Sections 4)**

**Credits and Teaching Scheme**

|               | Theory                                                              | Laboratory | Total                                                               |
|---------------|---------------------------------------------------------------------|------------|---------------------------------------------------------------------|
| Credits       | 3                                                                   | 0          | 3                                                                   |
| Contact Hours | 3 Hours/Week for 13 Weeks + Final Exam in the 14 <sup>th</sup> Week |            | 3 Hours/Week for 13 Weeks + Final Exam in the 14 <sup>th</sup> Week |

**Prerequisite**

CSE103 Structured Programming

**Instructor Information**

**Instructor:** Dr. Mohammad Salah Uddin  
Associate Professor, Department of Computer Science and Engineering  
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**URL:** www.banglarbot.com/discrete  
**GTA:** TBA

**Class Routine and Office Hour**

| Day       | 08:30-10:00 | 10:10-11:40                            | 11:50-01:20                            | 01:30-03:00 | 03:10-04:40                          | 04:50-06:20                          |
|-----------|-------------|----------------------------------------|----------------------------------------|-------------|--------------------------------------|--------------------------------------|
| Sunday    |             |                                        |                                        | Office Hour | CSE227 (1) LAB<br>Room#436 (HCI Lab) | CSE227 (1) LAB<br>Room#436 (HCI Lab) |
| Monday    |             |                                        | Office Hour                            | Office Hour | CSE106 (4)<br>Room#430               |                                      |
| Tuesday   |             |                                        | CSE227 (1)<br>Room#FUB-203             | Office Hour | CSE110 (3)<br>Room#217               | CSE110 (15)<br>Room#226              |
| Wednesday |             | CSE110 (3) LAB<br>Room#435 (VR/AR Lab) | CSE110 (3) LAB<br>Room#435 (VR/AR Lab) | Office Hour | CSE106 (4)<br>Room#430               |                                      |
| Thursday  |             | Office Hour                            | CSE227 (1)<br>Room#FUB-203             | Office Hour | CSE110 (3)<br>Room#217               | CSE110 (15)<br>Room#358              |

**Course Objective**

This course builds up the students' ability to think and express logically and mathematically. The course will address mathematical reasoning, combinatorial analysis, algorithmic thinking, and discrete structures. Knowledge of this course will be needed as prerequisite knowledge for future courses such as CSE110 Objected Oriented Programming, CSE207 Data Structures, CSE246 Algorithms, CSE302 Database Systems, CSE366 Artificial Intelligence, and CSE405 Computer Networks.

**Knowledge Profile**

K2: Conceptually-based mathematics, numerical analysis, statistics, and formal aspects of computer and information science

K3: Theory-based engineering fundamentals

### Learning Domains

Cognitive - C2: Understanding, C3: Applying

Psychomotor - P3: Precision

Affective - A2: Responding

### Program Outcomes (POs)

PO1: Engineering Knowledge

### Complex Engineering Problem Solution

None

### Complex Engineering Activities

None

### Course Outcomes (COs) with Mappings

After completion of this course students will be able to:

| CO  | CO Description                                                                                                                                                                                                                          | PO  | Learning Domains   | Knowledge Profile | Complex Engineering Problem Solving/ Engineering Activities |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|--------------------|-------------------|-------------------------------------------------------------|
| CO1 | <b>Interpret</b> and <b>apply</b> propositional logic, predicate logic, and theorem proving for mathematical reasoning.                                                                                                                 | PO1 | C2, C3             | K2                | -                                                           |
| CO2 | <b>Interpret</b> and <b>apply</b> counting principles for combinatorial analysis.                                                                                                                                                       | PO1 | C2, C3             | K2                | -                                                           |
| CO3 | <b>Interpret</b> and <b>apply</b> the growth of functions, complexity analysis of algorithms, and integer algorithms for algorithmic thinking; <b>demonstrate</b> this knowledge and <b>write</b> report for realistic problem solving. | PO1 | C2, C3<br>P3<br>A2 | K2, K3            | -                                                           |
| CO4 | <b>Interpret</b> and <b>apply</b> discrete structures such as sets, functions, relations, graphs, and trees for modeling discrete objects; <b>demonstrate</b> this knowledge and <b>write</b> report for realistic problem solving.     | PO1 | C2, C3<br>P3<br>A2 | K2, K3            | -                                                           |

## Course Topics, Teaching-Learning Method, and Assessment Scheme

| Course Topic                                                                                                                                       | Teaching-Learning Method                              | CO  | Class Tests |    |    | Mid Semester Exam |            | Project | Final Exam  |             | PO1 Mark |
|----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|-----|-------------|----|----|-------------------|------------|---------|-------------|-------------|----------|
|                                                                                                                                                    |                                                       |     | 1           | 2  | 3  |                   |            |         |             |             |          |
|                                                                                                                                                    |                                                       |     | C2          | C2 | C2 | C2                | C3         |         | C2          | C3          |          |
| Propositional Logic, Propositional Equivalences, Predicates and Quantifiers, Nested Quantifiers                                                    | Lectures and discussions inside and outside the class | CO1 | 5           |    |    | 7<br>[3+4]        | 8<br>[4+4] |         |             |             | 20       |
| Introduction to Proofs, Mathematical Induction                                                                                                     | Do                                                    | CO1 |             |    |    |                   | 5<br>[2+3] |         |             |             | 5        |
| Sets, Set Operations, Functions, Recursive Functions, Relations and Their Properties                                                               | Do                                                    | CO4 |             |    |    | 5<br>[2+3]        | 5<br>[2+3] |         |             |             | 10       |
| The Basics of Counting, The Pigeonhole Principle                                                                                                   | Do                                                    | CO2 |             | 5  |    |                   |            |         | 10<br>[5+5] | 5<br>[5]    | 20       |
| Algorithms, The Growth of Functions, Complexity of Algorithms, The Integers and Division, Primes, Greatest Common Divisor, Least Common Multiplier | Do                                                    | CO3 |             |    | 5  |                   |            | 5       | 6<br>[6]    | 11<br>[6+5] | 27       |
| Graphs, Graph Terminologies and Special Types of Graphs, Representing Graphs, Introduction to Trees                                                | Do                                                    | CO4 |             |    |    |                   |            | 5       | 6<br>[3+3]  | 7<br>[3+4]  | 18       |
|                                                                                                                                                    |                                                       |     | 15          |    |    | 30                |            | 10      | 45          |             | 100      |

## Mini Projects

| Mini Project                                                                                                                                     | Teaching-Learning Method                                                                 | CO    | EP/EA | Mark of Cognitive Learning Level | Mark of Psycho-motor Learning Level | Mark of Affective Learning Level | CO Mark | PO1 Mark |
|--------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-------|-------|----------------------------------|-------------------------------------|----------------------------------|---------|----------|
|                                                                                                                                                  |                                                                                          |       |       | C3                               | P3                                  | A2                               |         |          |
| Mini Project with reports and presentation                                                                                                       | Group-based moderately complex programming projects with report writing and presentation | CO3   | -     | 4                                | 0.5                                 | 0.5                              | 5       | 10       |
|                                                                                                                                                  |                                                                                          | CO4   | -     | 4                                | 0.5                                 | 0.5                              | 5       |          |
|                                                                                                                                                  |                                                                                          | Total |       | 8                                | 1                                   | 1                                | 10      | 10       |
| <b>Dates of report submission and presentation will be announced in the class.</b><br><b>Use of AI generated content is strictly prohibited.</b> |                                                                                          |       |       |                                  |                                     |                                  |         |          |

## Overall Assessment Scheme

| Assessment Area                            | CO        |           |           |           | PO Marks   |
|--------------------------------------------|-----------|-----------|-----------|-----------|------------|
|                                            | CO1       | CO2       | CO3       | CO4       | PO1        |
| Class Test                                 | 5         | 5         | 5         |           | 15         |
| Mid Semester Exam                          | 20        |           |           | 10        | 30         |
| Final Exam                                 |           | 15        | 17        | 13        | 45         |
| Mini Projects with report and presentation |           |           | 5         | 5         | 10         |
| <b>Total Mark</b>                          | <b>25</b> | <b>20</b> | <b>27</b> | <b>28</b> | <b>100</b> |

## Teaching Materials/Equipment

### Textbook:

Kenneth H. Rosen, *Discrete Mathematics and Its Applications with Combinatorics and Graph Theory*, Tata McGraw-Hill Publishing Company Limited, New Delhi.

Presentation Slides will be provided. ([www.banglarbot.com/discrete](http://www.banglarbot.com/discrete))

### Mini Projects:

Mini Project description will be provided in the class.

## Grading System

| Marks (%)            | Letter Grade | Grade Point |
|----------------------|--------------|-------------|
| 80% and above        | A+           | 4.00        |
| 75% to less than 80% | A            | 3.75        |
| 70% to less than 75% | A-           | 3.50        |
| 65% to less than 70% | B+           | 3.25        |
| 60% to less than 65% | B            | 3.00        |
| 55% to less than 60% | B-           | 2.75        |
| 50% to less than 55% | C+           | 2.50        |
| 45% to less than 50% | C            | 2.25        |
| 40% to less than 45% | D            | 2.00        |
| Less than 40%        | F            | 0.00        |

## Exam Dates

| Section | Class Slot | Mid Semester | Final            |
|---------|------------|--------------|------------------|
| 4       | MW         | TBA          | 24 December 2025 |

## Academic Code of Conduct

### Academic Integrity:

Any form of cheating, plagiarism, personification, falsification of a document as well as any other form of dishonest behavior related to obtaining academic gain or the avoidance of evaluative exercises committed by a student is an academic offence under the Academic Code of Conduct and **may lead to severe penalties as decided by the Disciplinary Committee of the university.**

### Special Instructions:

- Students are expected to attend all classes and examinations. A student **MUST** have at least 80% class attendance to sit for the final exam.
- Students will not be allowed to enter into the classroom after 20 minutes of the starting time.
- For plagiarism, the grade will automatically become zero for that exam/assignment.
- Normally there will be **NO make-up exam**. However, in case of **severe illness, death of any family member, any family emergency, or any humanitarian ground**, if a student miss the **mid-semester exam**, the student **MUST** get approval of makeup exam by written application to the Chairperson through the Course Instructor **within 48 hours** of the exam time. Proper supporting documents in favor of the reason of missing the exam have to be presented with the application. **It is the responsibility of the student to arrange a Makeup Exam in consultation with the Course Instructor.**
- For **final exam**, there will be **NO** make-up exam. However, in case of **severe illness, death of any family member, any family emergency, or any humanitarian ground**, if a student miss the final exam, the student **MUST** get approval of **Incomplete Grade** by written application to the Chairperson through the Course Instructor **within 48 hours** of the final exam time. Proper supporting documents in favor of the reason of missing the final exam have to be presented with the application. **It is the responsibility of the student to arrange**

**an Incomplete Exam within the deadline mentioned in the Academic Calendar in consultation with the Course Instructor.**

- All mobile phones MUST be turned to silent mode during class and exam period.
- There is **zero tolerance for cheating** in exam. Students caught with cheat sheets in their possession, whether used or not; writing on the palm of hand, back of calculators, chairs or nearby walls; copying from cheat sheets or other cheat sources; copying from other examinees, etc. would be treated as cheating in the exam hall. The only penalty for cheating is **expulsion for several semesters as decided by the Disciplinary Committee of the university.**