CM-201

(Core – Skill and Knowledge)

COURSE DESCRIPTION

Course code number	CM-201	Course Title	Discrete Mathematics
Semester hours	3 hours	No. of Credit Units	3
Prerequisite	None	Course Coordinator	

Course Description

An introduction to discrete mathematical concepts including the foundations: logic and proofs, mathematical induction and recursion, sets, functions, sequences and summations, matrices, complexity of algorithms, number theory, permutations and combinations, an introduction to discrete probability and graphs.

Course Outcomes

Students who complete the course will be able to

1. Define and precisely use standard mathematical terminology and concepts.
2. Identify and apply appropriate methods of proof.
3. Understand the basic principles of sets and operations in sets and manipulate sets, relations, functions and their associated concepts, and apply these to solve problems in mathematics and computer science.
4. Understand the principles of elementary probability theory
5. Understand basic terminology and operations for graphs
6. Use graphs to solve problems in computer science.

Major Topics Covered in the Course

1. Propositional and Predicate Logic
2. Proof Techniques
3. Sets
4. Functions
5. Sequences and Summations
6. Matrices
7. The Growth of Functions and Complexity of Algorithms
8. Number Theory
9. Counting
10. Introduction to Discrete Probability
11. Introduction to Graph Theory

Assessment Plan for the Course

Class Attendance and Participation   -   10%

Quizzes	-	10%
Assignment	-	20%
Test	-	10%
Final Exam	-	50%

Grading System

UCSY follows a letter grade system comprising of grades A, A-, B+, B, B-, C+, C, C-, D and F. All marks obtained by students during the semester will be used in the grading process. A grade of "D" is considered a passing grade for undergraduate courses. For undergraduate students, a grade of "C" or better is required in this course because it is a prerequisite for other courses in the program. **The student who gets the grade point less than 2 must do Re-Exam.**

The grading scale for this course is:

Marks obtained	Letter Grade	Grade Point
>=90	A	4
85 – 89	A-	3.75
80 – 84	B+	3.25
75 – 79	B	3
70 – 74	B-	2.75
65 – 69	C+	2.25
60 – 64	C	2
55 – 59	C-	1.75
50 – 54	D	1
0 – 49	F	0

Fail Grade and Re-Exam: C-,D,F (Grade point <2)

Class Attendance and Participation Policy:

- **Attendance**

Class attendance is **mandatory**. Most of the material you will learn will be covered in the lectures, so it is important that you not miss any of them. You are expected to show up on time for class, and stay for the whole lecture. Students are expected to attend each class, to complete any required preparatory work (including assigned reading) and to participate actively in lectures, discussions and exercises.

• Mobile phones **must** be silenced and put away for the entire lecture unless use is specified by the instructor. You may not make or receive calls on your cell phone, or send or receive text messages during lectures.

• You are responsible for all material sent as email. Ignorance of such material is no excuse. You are responsible for all materials presented in the lectures.

• Your conduct in class should be conducive towards a positive learning environment for your class mates as well as yourself.

- **Quizzes, assignments, tests and Exam**

    Your performance in this class will be evaluated using your scores for attendance, quizzes, homework assignments, two tests and one final examination. There are no planned extra credit projects or assignments to improve your grade.

    We will take a short quiz for every lecture.

    There will be 11 homework assignments, roughly one per week. Please show all your work and write or type your assignments neatly. Credit cannot be given for answers without work (except on true-false, always-sometimes-never, or other multiple choice questions).

    Test will start after two or three chapters finished and the coordinator will announce the date for the test.

    Any assignment or quiz or test is simply missed, regardless of the reason why (e.g. illness, work, traffic, car trouble, computer problems, death, etc.), and **earns a grade of zero**. You are strongly encouraged to complete all assignments and attend all quizzes so that you can check that you understand the material and can throw out bad grades, or grades for which you had to miss an assignment or quiz for a valid reason. **Late submissions will not be accepted for any graded activity for any reason.**

- **There are no extra credit opportunities.**

    Students may not do additional work nor resubmit any graded activity to raise a final grade.

- **Exam**

    The exam will be conducted on-campus, in a classroom. The dates/times/locations will be posted on Board as soon as possible.

For this course, the following additional requirements are specified:

All work submitted for a grade must have been prepared by the individual student. Students are expressly prohibited from sharing any work that has been or will be submitted for a grade, in progress or completed, for this course in any manner with a person other than the instructor and teaching assistant(s) assigned to this course). Specifically, students may not do the following, including but not limited to:

- Discuss questions, example problems, or example work with another person that leads to a similar solution to work submitted for a grade.
- Give to, show, or receive from another person (intentionally, or accidentally because the work was not protected) a partial, completed, or graded solution.
- Ask another person about the completion or correctness of an assignment.
- Post questions or a partial, completed, or graded solution electronically (e.g. a Web site).
- All work must be newly created by the individual student for this course. Any usage of work developed for another course, or for this course in a prior semester, is strictly prohibited without prior approval from the instructor.
- Posting or sharing course content (e.g. instructor provided lecture notes, assignment directions, assignment questions, or anything not created solely by the student), using any non-electronic or electronic medium (e.g. web site, FTP site, any location where it is accessible to someone other than the individual student, instructor and/or teaching assistant(s)) constitutes copyright infringement and is strictly prohibited without prior approval from the instructor.

Tentative Lesson

No	Topics	Week	Remark
I	**1 The Foundations: Logic and Proofs**		
1	1.1 Propositional Logic	Week 1	
2	1.2 Applications of Propositional Logic		Assignment 1
3	1.3 Propositional Equivalences	Week 2	
4	1.4 Predicates and Quantifiers		Assignment 2
5	1.5 Nested Quantifiers	Week 3	
6	1.6 Rules of Inference		
7	1.7 Introduction to Proofs		Assignment 3
II	**2 Basic Structures: Sets, Functions, Sequences, Sums, and Matrices**		
8	2.1 Sets	Week 4	Assignment 4

No	Topics	Week	Remark
9	2.2 Set Operations		
10	2.3 Functions		
11	2.4 Sequences and Summations	Week 5	
12	2.6 Matrices		Assignment 5
III	**3 Algorithms**		
13	3.2 The Growth of Functions	Week 6	
14	3.3 Complexity of Algorithms		Assignment 6
IV	**4 Number Theory**		
15	4.1 Divisibility and Modular Arithmetic	Week 7	
16	4.2 Integer Representations and Algorithms		
17	4.3 Primes and Greatest Common Divisors		Assignment 7
18	4.4 Solving Congruences		
	Test I		**Test I**
V	**5 Induction and Recursion**		
19	5.1 Mathematical Induction	Week 8+ 9	
20	5.2 Strong Induction and Well-Ordering		
21	5.3 Recursive Definitions and Structural Induction		Assignment 8
22	1.8 Proof Methods and Strategy		Assignment 5
VI	**6 Counting**		
23	6.1 The Basics of Counting	Week 10	
24	6.2 The Pigeonhole Principle		
25	6.3 Permutations and Combinations	Week 11	Assignment 9
VII	**7 Discrete Probability**		
26	7.1 An Introduction to Discrete Probability	Week 12+13	
27	7.2 Probability Theory		
28	7.3 Bayes' Theorem		
29	7.4 Expected Value and Variance		Assignment 10
VIII	**10 Graphs**		
30	10.1 Graphs and Graph Models	Week 14	
31	10.2 Graph Terminology and Special Types of Graphs		Assignment 11
32	10.3 Representing Graphs and Graph Isomorphism	Week 15	
33	10.4 Connectivity		
	Test II		**Test II**
	Revision		

Textbook

Discrete mathematics and its applications, 8th Edition, Kenneth H. Rosen. McGraw-Hill 2012.

University of Computer Studies, Yangon

B.C.Sc. / B.C.Tech