



Republic of the Philippines
SULTAN KUDARAT STATE UNIVERSITY
Isulan, Sultan Kudarat
College of Computer Studies
S.Y. 2024 - 2025



CS 122

Discrete Structures

Syllabus

2nd Semester
School Year 2024 – 2025



Republic of the Philippines
SULTAN KUDARAT STATE UNIVERSITY
Isulan, Sultan Kudarat
College of Computer Studies
S.Y. 2024 - 2025



UNIVERSITY VISION

A leading University in advancing scholarly innovation, multi-cultural convergence, and responsive public service in a borderless Region.

UNIVERSITY MISSION

The University shall primarily provide advance instruction and professional training in science and technology, agriculture, fisheries, education and other related field of study. It shall also undertake research and extension services, and provide progressive leadership in its areas of specialization.

CORE VALUES

P – Patriotism
R – Respect
I – Integrity
Z – Zeal
E – Excellence in Public Service

STRATEGIC GOALS

- a. Deliver quality services to stakeholders to address current and future needs in instruction, research, extension, and production.
- b. Observe strict implementation of the laws as well as the policies and regulations of the University.
- c. Acquire with urgency state-of-the-art resources for its service areas.
- d. Bolster the relationship of the University with its local and international customers and partners.
- e. Leverage the qualifications and competence in personnel action and staffing.
- f. Evaluate the efficiency and responsiveness of the University systems and processes.

Program Objectives and its relationship to University Goals:

PROGRAM OBJECTIVES (PO)	OBJECTIVES						
	a	b	c	d	e	f	g
A graduate of BS in Computer Science can:							
a. Design and implement effectively the innovative researches.	/	/			/		/
b. Apply proficiently the algorithmic theories and related computational system in conducting researches	/	/	/	/	/	/	/
c. Solve societal problems through producing sustainable research outputs; and	/	/	/	/	/	/	/
d. Demonstrate professionalism in the social, environmental, and legal aspects of computer science.	/	/	/	/	/	/	/

- 1. Course Code** : CS 122
2. Course Title : Discrete Structures I
3. Prerequisite : None
4. Credits : 3 UNITS

5. Course Description:

This course is an introduction to Discrete Structures, which is an integral part of the computer science curriculum. The purpose of this course is to understand and use (abstract) discrete structures that are backbones of computer science. In particular, this course will cover topics on sets, relations and functions, number theory, and counting and discrete probability.

6. Course Learning Outcomes and Relationships to Program Educational Objectives

Course Learning Outcomes	Program Objectives			
At the end of the semester, the students can:	a	b	c	d
a. Perform operations associated with sets, functions and relations.	✓	✓	✓	✓
b. Apply formal methods of symbolic propositional and predicate logic, and discuss which kind of proof is best for a given problem.	✓	✓	✓	✓
c. Count objects using the counting principle, permutation, combinations, and	✓	✓	✓	✓
d. Compute probabilities of discrete events.				

7. Course Content

Course Objectives, Topics, Time Allotment	Desired Student Learning Objectives	Outcome-Based Assessment (OBA) Activities	Evidence of Outcomes	Course Objectives	Program Outcomes	Values Integration
Topic: VGMO, Classroom Policies, Course Overview, Course Requirements, Grading System (3 hour)						
1. Discuss the VGMO of the University, Classroom Policies, scope of the course, course requirements, and grading system	1. Students can be aware of the VGMO of the University, Classroom Policies, scope of the course, course requirements, and grading system	<ul style="list-style-type: none"> ➤ Online class orientation ➤ Orientation module through Google Form ➤ Individual consultation through SMS or other messaging apps 	<ul style="list-style-type: none"> ● Submitted Google form 	a	a, c, d	Value of appreciation
Topic 1: Sets and Set Operations (9 hours)						
1. Discuss sets and subsets. 2. Discuss set operations and illustrate it using different set notations and diagrams. 3. Discuss ordered pairs and set product	<ul style="list-style-type: none"> ● Students can define and distinguish sets subsets. ● Students can apply set operations and illustrate it using different set notations and diagrams. ● Students can define what is ordered pair as well as set product. ● Students can distinguish between sets and ordered pair 	<ul style="list-style-type: none"> ➤ Online class/video lecture ➤ Module engagement ➤ Video viewing ➤ Boardwork exercises ➤ Problem Set ➤ Long Quiz 	<ul style="list-style-type: none"> ➤ Boardwork scores ➤ Solutions to Problem Set ➤ Long Quiz scores 	a, b	a, b, c, d	Value of Self-learning Value of participation Value of problem-solving

Topic 2: Functions and Relations (6 hours)						
1. Define functions and relations	<ul style="list-style-type: none"> Students can explain what are functions, and relations. 	<ul style="list-style-type: none"> Online class/video lecture 				Value of Self-learning
2. Distinguish functions from relations	<ul style="list-style-type: none"> Students can distinguish between functions from relations. 	<ul style="list-style-type: none"> Module engagement 	a, b, d	a, b, c, d		
3. Graph different kinds of functions.	<ul style="list-style-type: none"> Students can graph common functions and relations 	<ul style="list-style-type: none"> Video viewing Boardwork exercises Problem Set Long Quiz 	<ul style="list-style-type: none"> Boardwork scores Solutions to Problem Set Long Quiz scores 			Value of problem-solving

Topic 3: Logic (9 hours)						
1. Explain what is logic.	<ul style="list-style-type: none"> Students can define the different properties of set. 	<ul style="list-style-type: none"> Online class/video lecture 				Value of Self-learning
2. Discuss propositional logic.		<ul style="list-style-type: none"> Module engagement 	a, b, c	a, b, c, d		Value of problem-solving
3. Identify the Proposition, Conditional Propositions and Logical Equivalence and can apply the equivalent truth table.	<ul style="list-style-type: none"> Students can also identify and use the truth table to evaluate the proposition. 	<ul style="list-style-type: none"> Video viewing Boardwork exercises 				Value of using logical reasoning
4. Discuss the Arguments and Rules of Interference.	<ul style="list-style-type: none"> Student can understand the different rules and arguments. 	<ul style="list-style-type: none"> Problem Set 				Value of self-evaluation using logic
5. Evaluate the Quantifiers and its statements.	<ul style="list-style-type: none"> Students can translate the statement into quantified statement. 	<ul style="list-style-type: none"> Long Quiz 	<ul style="list-style-type: none"> Boardwork scores Solutions to Problem Set Long Quiz scores 			

Topic 5: Counting (12 hours)						
<p>1. Discuss how to count objects or group of objects using permutation.</p> <p>2. Discuss how to count objects or group of objects using and combination.</p>	<ul style="list-style-type: none"> Students can count groups of objects using permutation. Students can count groups of objects using permutation. 	<ul style="list-style-type: none"> ➤ Online class/video lecture ➤ Module engagement ➤ Video viewing ➤ Boardwork exercises ➤ Problem Set ➤ Long Quiz 		a, b, c	a, b, c, d	<p>Value of Self-learning</p> <p>Value of discovery and learning</p>

Topic 6: Discrete Probability (12 hours)						
<p>1. Basic Concepts in Discrete Probability</p> <p>2. Compute Discrete Probabilities of events</p> <p>3. Discrete Probability Distributions</p>	<ul style="list-style-type: none"> Students can define and illustrate concepts in discrete probability Students can compute probability of discrete events Students can define and simulate probability distributions 	<ul style="list-style-type: none"> ➤ Online class/video lecture ➤ Module engagement ➤ Video viewing ➤ Boardwork exercises ➤ Problem Set ➤ Long Quiz 		a, b, c	a, b, c, d	<p>Value of Self-learning</p> <p>Value of discovery and learning</p>

TOTAL HOURS: 54 hours
Class/Lecture (51 hours)
Exams (3 hours)

8. Course Evaluation

Course Requirements:

Midterm and Final Exams
At least 80% of Problem Sets and Activity Outputs

Grading System:

Long Quiz/Problem Sets/Activity Outputs	50%
<u>Midterm/Final Exam</u>	<u>50%</u>
TOTAL	100%

- equivalent scores will be computing using the 0 = 0% base.

Textbook:

- Johnsonbaugh, Richard. *Discrete Mathematics* 7th ed, Pearson Education, Inc. 2009

References:

1. Epp, Susanna, *Discrete Mathematics with Applications* 4th ed. Brooks/Cole Cengage Learning, 2011
2. Gallier, Jean, *Discrete Mathematics*, 2nd ed. Springer, 2017
3. Leighman, Eric, et al, *Mathematics for Computer Science*, Creative Commons Attribution-ShareAlike 3.0 license, 2017
4. Rosen, Kenneth H, *Discrete Mathematics and Its Applications*, 7th ed. McGraw-Hill, 2012

Supplemental:

1. Discrete Math 1, YouTube Playlist, <https://www.youtube.com/watch?v=tyDKR4FG3Yw&list=PLDDGPdw7e6Ag1ElznZ-m-qXu4XX3A0clz>
2. Four Basic Proof Techniques used in Mathematics, <https://www.youtube.com/watch?v=V5tUc-J124s>
3. Functions and Relations, <https://www.youtube.com/watch?v=OxZ0JL4Bjzk>
4. Introduction to Propositional Logic, <https://www.youtube.com/watch?v=itrXYq41-V0>
5. Set Operations, https://www.youtube.com/watch?v=nI7h8_7Cj_E

Prepared by:

KYRENE L. DIZON, MIT, MSc
Faculty

Reviewed by:

CYRUS B. RAEI, PhD
Program Chairperson, BSCS

Approved by:

ELBREN O. ANTONIO DIT
College Dean, Computer Studies