Republic of the Philippines
SULTAN KUDARAT STATE UNIVERSITY
Isulan, Sultan Kudarat
College of Computer Studies
S.Y. 2022-2023

CC114
DATA STRUCTURE AND ALGORITHM

2nd Semester
School Year 2024 – 2025

Prepared by:

ZIUS D. APRESTO, MIT

Republic of the Philippines
SULTAN KUDARAT STATE UNIVERSITY
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UNIVERSITY VISION

A trailblazer in arts, science and technology in the 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 undertake research and extension services, and provide progressive leadership in its area of specialization.

UNIVERSITY GOAL

To produce graduates with excellence and dignity in arts, science and technology.

UNIVERSITY OBJECTIVES

a. Enhance competency development, commitment, professionalism, unity and true spirit of service for public accountability, transparency and delivery of quality services;
b. Provide relevant programs and professional trainings that will respond to the development needs of the region;
c. Strengthen local and international collaborations and partnerships for borderless programs;
d. Develop a research culture among faculty and students;
e. Develop and promote environmentally-sound and market-driven knowledge and technologies at par with international standards;
f. Promote research-based information and technologies for sustainable development;
g. Enhance resource generation and mobilization to sustain financial viability of the university.

Program Objectives and its relationship to University Goals:

PROGRAM OBJECTIVES (PO)	OBJECTIVES						
A graduate of BS in Information Science can:	a	b	c	d	e	f	g
a. Innovate technological concepts and ideas underpinning desired Information System solutions;	/	/			/		/
b. Administer r competently the Computer Networks, System Development, Software Applications operations, Hardware Servicing and Maintenance;	/	/	/	/	/	/	/
c. promote the advancement of the industry-based applications, infrastructures and technology that contributes to the development of the community; and	/	/	/	/	/	/	/
d. demonstrate the code of conduct as well as social and legal aspects of Information Technology.	/	/	/	/	/	/	/

1. Course Code : CC114
2. Course Title : Data Structure and Algorithms
3. Prerequisite : CC112
4. Credits : 3 UNITS

5. Course Description:

This course introduces the student to the design and implementation of basic and advanced data structure and algorithm. Topics include basic data structure, algorithms and sorting and searching techniques.

6. Course Learning Outcomes and Relationships to Program Educational Objectives

Course Learning Outcomes	Program Objectives						
At the end of Semester the student can:	a	b	c	d	e	f	g
a. Discuss and explain the fundamental concepts, principles, and technologies of computer networks, including network classification, geographical span, inter-connectivity, administration, architecture, and applications.	/	/	/	/	/	/	/
b. Identify and differentiate various types of computer networks such as LANs, WANs, MANs, PANs, SANs, CANs, WLANs, VPNs, P2P networks, and cloud networks based on their characteristics, uses, and design principles.	/	/	/	/	/	/	/
c. Describe and analyze Local Area Network (LAN) technologies, including Ethernet, Fast Ethernet, Gigabit Ethernet, and Virtual LANs, and demonstrate basic VLAN configuration.	/	/	/	/	/	/	/
d. Illustrate, construct, and analyze different network topologies such as Point-to-Point, Bus, Star, Ring, Mesh, Tree, Daisy Chain, and Hybrid, for appropriate network designs.	/	/	/	/	/	/	/
e. Apply IP addressing and subnetting concepts, including IPv4 and IPv6, by calculating subnet masks, determining network and broadcast addresses, and designing IP addressing schemes suited for various network environments.	/	/	/	/	/	/	/

7. Course Content

Course Objectives, Topics, Time Allotment	Desired Student Learning Outcomes	Outcomes-Based Assessment (OBA) Activities	Evidence of Outcomes	Course Objectives	Program Outcomes	Values Integration
1. Topic: SKSU VMGO, Classroom Policies, Course Overview, Course Requirements, Grading System (2 hour)						
1.1 Discuss the VMGO of the university, classroom policies, scope of the course, course requirements and grading system	1.1 Student can be aware of and appreciate of the university's VMGO, classroom policies, course overview, requirements and grading system.	Individual participation in class discussion and group presentation	Group and individual discussions			Value of appreciation

2. **Computer Network Overview (16 hours)**						
2.1 Discuss and provides an introduction to computer networks, covering the fundamental concepts, principles, and technologies underlying networked computing. The course will cover topics such as network classification, geographical span, inter-connectivity, administration, network architecture, and network applications. • Classification of Computer Networks • Geographical Span • Inter-Connectivity • Administration • Network Architecture • Network Applications	Define and classify computer networks based on their scope and characteristics. Explain the fundamental concepts of network inter-connectivity and data transmission. Describe the roles and responsibilities involved in network administration and management. Identify the various types of network architectures and their respective advantages and disadvantages. Understand the various network applications and their requirements.	a. Lectures, b. Slide-Presentation, c. Discussion d. Think-pair-share e. Diagramming	Presentation Rubrics Group and individual discussions Quiz / Class Exercise Results	a,b	a,b	• Value of participation • Hard work • Appreciation • Discipline • Exploration • Challenge • Creativity • Understanding
3. TYPES OF COMPUTER NETWORKS (18 hours)						
3.1 explore of the different types of computer networks, including their characteristics, uses,	• Define and classify different types of computer networks based on their	a. Lectures b. Group discussion c. Laboratory hands-on d. Slide-Presentation	Rubrics for Hands-on Presentation Rubrics Discussion Rubrics	a,b,c,f	a,b,d,e	• Value of participation • Hard work • Appreciation • Discipline

and design principles. The course will cover topics such as LANs, WANs, MANs, PANs, SANs, CANs, WLANs, VPNs, P2P networks, and cloud networks.	characteristics and scope. • Explain the design principles and components of different types of computer networks. • Evaluate the advantages and disadvantages of different types of computer networks. • Identify the applications and uses of different types of computer networks.	e. Diagramming f. Simulation g. Problem Solving	Quiz / Class Exercise Results			• Resourcefulness • Accomplishment • Exploration • Challenge • Creativity • Understanding
4. NETWORK LAN TECHNOLOGIES (18 hours)						
4.1. explore of the Local Area Network Technologies. The course will cover topics such as Ethernet, Fast-Ethernet, Giga-Ethernet, and Virtual LAN	Students be able to • Explain the principles, standards, and functions of Local Area Network (LAN) technologies, including Ethernet, Fast Ethernet, and Gigabit Ethernet. • Differentiate the specifications and applications of Ethernet, Fast Ethernet, and	a. Lectures b. Slide-Presentation c. Pair/think/Share d. Discussion e. Question and Answer f. Board-Work g. Diagramming h. Simulation i. Problem Solving	Quiz / Class Exercise Results	b,c,d,f	a,b,d,e,f,	• Hard work • Appreciation • Resourcefulness • Accomplishment • Teamwork • Value of participation • Exploration • Challenge • Creativity • Understanding

	Gigabit Ethernet in network design. • Demonstrate basic VLAN configuration and explain how VLANs enhance network performance, security, and management. • Analyze and troubleshoot simple LAN setups incorporating Ethernet technologies and VLANs.					
5. COMPUTER NETWORK TOPOLOGIES (18 hours)						
5.1 Aims to provide students with comprehensive knowledge and practical skills in understanding, differentiating, and demonstrating various computer network topologies, preparing them to design and analyze	students will be able to: • Explain the structure, characteristics, advantages, and disadvantages of various network topologies including Point-to-Point, Bus, Star, Ring, Mesh, Tree, Daisy Chain,	a. Lectures b. Discussion c. presentation d. pair hands-on laboratory e. Diagramming f. Simulation g. Problem Solving	Rubrics for Hands-on Discussion Rubrics Quiz / Class Exercise Results	d,e,f	a,b,d,e	• Value of participation • Hard work • Appreciation • Discipline • Resourcefulness • Accomplishment • Exploration • Challenge • Creativity • Understanding

efficient network structures Of the following topics • Point-to-Point • Bus Topology • Star Topology • Ring Topology • Mesh Topology • Tree Topology • Daisy Chain • Hybrid Topology	and Hybrid topologies. • Illustrate different types of network topologies through diagrams and models. • Demonstrate the setup of basic network topologies in a simulated or real-world environment. • Analyze and evaluate appropriate network topologies for different organizational needs and technical scenarios.					
5. COMPUTER NETWORK TOPOLOGIES (18 hours)						
5.1 equip students with the knowledge and skills to understand, apply, and analyze IP addressing concepts, including IPv4, IPv6, and subnetting techniques for efficient network design and management.	students will be able to: • Explain the principles of IP addressing, including the structure and differences between IPv4 and IPv6. • Identify and classify IP address types	h. Lectures i. Discussion j. presentation k. pair hands-on laboratory l. Diagramming m. Simulation n. Problem Solving	Rubrics for Hands-on Discussion Rubrics Quiz / Class Exercise Results	d,e,f	a,b,d,e	• Value of participation • Hard work • Appreciation • Discipline • Resourcefulness • Accomplishment • Exploration • Challenge • Creativity • Understanding

	(public, private, reserved, and special addresses) and subnet classes. • Perform subnetting operations, including calculating subnet masks, network addresses, broadcast addresses, and available hosts. • Design and apply appropriate IP addressing and subnetting schemes based on given network requirements.					•

Lecture – 36 hours
Laboratory - 54 hours
Examination - 4 hours
Total - 94 hours

Course Evaluation
Course Requirements: Individual Project
Grading System:

MIDTERM		**FINAL TERM**	
Exam	-50%	Exam	-50%
Course Requirement	-30%	Course Requirements	- 30%
Attendance	-10%	Attendance	- 10%
Quizzes	-10%	Quizzes	- 10%

MTG+FTG/2=FG

References:

1. Kurose, J. F., & Ross, K. W. (2017). Computer Networking: A Top-Down Approach (7th ed.). Boston, MA: Pearson Education. ISBN: 978-0-13-359414-0.
2. Roberts, R. M. (2017). Networking Fundamentals. Hoboken, NJ: Wiley. ISBN: 978-1-119-40803-0.
3. Tomsho, G. (2021). Guide to Networking Essentials (8th ed.). Boston, MA: Cengage Learning. ISBN: 978-0-357-12876-9.
4. West, J., Dean, T., & Andrews, J. (2021). Network+ Guide to Networks (8th ed.). Boston, MA: Cengage Learning. ISBN: 978-0-357-12206-4.
5. Odom, W. (2011). Subnetting Secrets. Indianapolis, IN: Cisco Press. ISBN: 978-1-58720-283-4.

Textbook:

1. Forouzan, B. A. (2012). Data Communications and Networking (5th ed.). New York, NY: McGraw-Hill Education. ISBN: 978-0-07-337622-6.
2. Kurose, J. F., & Ross, K. W. (2017). Computer Networking: A Top-Down Approach (7th ed.). Boston, MA: Pearson Education. ISBN: 978-0-13-359414-0.
3. West, J., Dean, T., & Andrews, J. (2021). Network+ Guide to Networks (8th ed.). Boston, MA: Cengage Learning. ISBN: 978-0-357-12206-4.
4. Odom, W. (2017). CCNA Routing and Switching 200-125 Official Cert Guide Library (1st ed.). Indianapolis, IN: Cisco Press. ISBN: 978-1-58720-581-1.
5. Tanenbaum, A. S., & Wetherall, D. J. (2010). Computer Networks (5th ed.). Boston, MA: Pearson. ISBN: 978-0-13-212695-4.

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