Network Design and Management

Module name	Network Design and Management
Module level	Undergraduate
Code	IF221211
Courses (if applicable)	Network Design and Management
Semester	5/6
Lecturer	Yisti Vita Via, S.ST, M.Kom (PIC) Achmad Junaidi, S.Kom, M.Kom Henni Endah Wahanani, S.T, M.Kom
Language	Bahasa Indonesia and English
Relation to curriculum	Elective; 5th or 6th semester
Type of teaching, contact hours	Lectures, < 60 students,
Teaching Methods	simulation, case study, project-based learning, problem-based learning
Workload	1. Lectures: 3 sks x 50 = 150 minutes (2 hours 30 minutes) per week. 2. Exercises and Assignments: 3 x 60 = 180 minutes (3 hours) per week. 3. Private study: 3 x 60 = 180 minutes (3 hours) per week
Credit points	3 credit points (sks)
Requirements according to the examination regulations	A student must have attended at least 80% of the lectures to sit in the exams.
Mandatory prerequisites	Software Engineering
Courses description	A case-based method course that covers the fundamental concepts of network analysis, architecture and design processes, service description for networks, and the identification and/or derivation of network requirements from systems. The discussed concepts are derived into various user, application, and device requirements, and the development of both requirements, namely application specifications and maps. It involves determining variables for measurement (service metrics) and how to conduct measurements, introducing modeling and simulation, and exploring other techniques to describe user and application behavior. It encompasses the development of performance requirements for capacity, delay, and RMA, including the establishment of performance thresholds and limits, flow specifications, where performance requirements are consolidated for flows or flow groups (peer-peer, client-server, distributed networks). It also involves determining data rate estimates occurring in computer networks, addressing and routing architecture, network architecture models, security architecture, optimization of computer network architecture, addressing mechanisms, routing mechanisms, routing analysis, network management definitions and characteristics, network management mechanisms, network traffic control management, security development and privacy plan, security and privacy administration, rules and procedures, network design concept, network product design, and network simulation.
Learning outcomes and their corresponding PLOs	After completing this module, a student is expected to:	
	CO1 Students are able to specifically analyze the process of developing the required prerequisites for constructing networks, understanding traffic flow, and conducting risk analysis.	PLO9, PLO10
	CO2 Students are able to delineate the method for creating preferred	PLO9,

	technologies and topologies for network construction, comprehend the interrelations among various functions within the network, and apply this information to develop architecture.	PLO10
	CO3 Students can explain the network architecture employed as input for the design process, where informations on location, equipment, and vendor selection are utilized to specify network design	PLO9, PLO10
Content	Definition and concept of network analysis, requirements for network construction; how to analyze traffic flows that can be used to determine performance requirements for various network traffic flows; network architecture process (introduction to network architecture, the development of internal and external relationships within and between core functions (addressing and routing, security, network management, and performance) in the network; detailing each of these core functions, developing components and reference architectures that depict their internal and external relationships; the design process (applying it to make design decisions, including how to evaluate and select vendors and service providers, and design diagrams).	
Media employed	LCD, whiteboard, websites, books (as references), online meeting, etc.	
Assessments and Evaluation	The final grade in the module is composed of: • Two short computer-based quizzes: 15% x 2 = 30% • Take-home written assignments : 15% • Written Midterm assessment: 25% • Final oral exam: 30% Students must have a final grade of 55.6% or higher to pass.	
Study and examination requirements and forms of examination	The final grade in the module is composed of: • Two short computer-based quizzes: 15% x 2 = 30% • Take-home written assignments : 15% • Take-home written assignments : 15% • Written Midterm assessment: 25% • Final oral exam: 30% Students must have a final grade of 55.6% or higher to pass.	
Reading List	● Tanenbaum, A. S., & Wetherall, D. J. (2021). *Computer Networks* (6th ed.). Pearson. ● Odom, W., & Barnes, R. (2020). *Network Programmability and Automation: Skills for the Next-Generation Network Engineer*. Cisco Press. ● Kurose, J., & Ross, K. (2021). *Computer Networking: A Top-Down Approach* (8th ed.). Pearson. ● Oppliger, R. (2020). *Network Security: A Practical Approach*. CRC Press. ● D'Souza, D. (2023). *Network Programming and Architecture: A Hands-On Approach*. Cengage Learning.	