

MAKERERE UNIVERSITY BUSINESS SCHOOL
Faculty of Computing and Informatics
Department of Computer Science & Engineering

MASTER OF BUSINESS ADMINISTRATION

Course Name : Computer Network
Course Code : MBA8171
Course Level : 2
Credit Units : 3
Credit Hours : 45

Course Description

This course provides an analysis of the fundamental aspects of computer networking. Students will learn the theoretical and practical aspects of designing, analyzing and evaluating modern computer networks. The course will cover the basic networking concepts such as the OSI model, protocols, network types, topologies, and standards to advanced levels of computer networking including configuration and troubleshooting networking hardware such as routers, switches, and wireless access points. Students will discuss managerial level aspects like network performance evaluation and optimization techniques in addition to gaining hands-on experience through labs and assignments using networking simulation tools and actual networking hardware.

Course Objectives

The course aims at achieving the following objectives:

- To provide students with a broad understanding of fundamental networking technologies like OSI model, protocols, standards, configuration and troubleshooting among others
- To equip students with the necessary skills of implementing network security measures using technologies like firewalls, encryption, and authentication.
- To develop students' skills of designing computer networks based on requirements and specifications.
- To enhance students' capacities to analyze network performance and recommend optimization techniques.
- To equip students with skills of applying layer protocols like HTTP, FTP, DNS, and email, and networking simulation tools

Learning Outcomes

By the end of this course, students will be in position to:

- Apply networking technologies like OSI model, protocols, standards, configuration and troubleshooting among others.
- Implement network security measures using technologies like firewalls, encryption, and authentication.
- Design computer networks based on requirements and specifications.
- Analyze network performance and recommend optimization techniques.
- Apply layer protocols like HTTP, FTP, DNS, and email, and networking simulation tools

Detailed Course Content

Topic	Details	Duration	Week No.
Networking fundamentals	<ul style="list-style-type: none"> • The OSI model • Protocols • Network topologies • Network types • Network standards 	3.5 Hrs	1
Network hardware	<ul style="list-style-type: none"> • Routers • Switches • Bridges • Hubs • Gateways 	3.5 Hrs	2
IP addressing	<ul style="list-style-type: none"> • IP classes • Subnetting • Private vs public IP • Network addressing • Supernetting 	3.5 Hrs	3
Network security	<ul style="list-style-type: none"> • Authentication • Encryption • Firewalls • Intrusion detection • Vulnerability assessment 	7.0 Hrs	4 & 5
Application layer protocols	<ul style="list-style-type: none"> • HTTP, FTP, DNS, SMTP, POP3 	3.5 Hrs	6
Network troubleshooting	<ul style="list-style-type: none"> • Layer 1 issues • Layer 2 issues • Layer 3 issues • Performance issues • Configuration issues 	7.0 Hrs	7 & 8
Network design	<ul style="list-style-type: none"> • Requirements analysis 	7.0 Hrs	9 & 10

	<ul style="list-style-type: none"> • Network planning • Choosing hardware • Prototyping • Documentation 		
Network management	<ul style="list-style-type: none"> • Monitoring • Configuration management • Performance management • Fault management • Security management • Communicating network information 	7.0 Hrs	11 & 12
Emerging technologies	<ul style="list-style-type: none"> • SDN • NFV • Cloud networking • Fog computing • IoT networking 	3.0 Hrs	13
Total		45	13

Mode of Delivery

This course will be offered using both physical and online classes. The course will mainly be conducted using appropriate case studies. Other methods to be used include;

- Discussions and presentations.
- Lectures
- Workshops
- Demonstration

Mode of Assessment

- | | |
|-------------------------------|-------------|
| • Course work | 40% |
| • End of semester examination | 60% |
| Total | 100% |

Reading List

1. Ramezanpour, K., Jagannath, J., & Jagannath, A. (2023). Security and privacy vulnerabilities of 5G/6G and WiFi 6: Survey and research directions from a coexistence perspective. *Computer Networks*, 221, 109515.
2. Mehmood, K., Kravetska, K., & Palma, D. (2023). Intent-driven autonomous network and service management in future cellular networks: A structured literature review. *Computer Networks*, 220, 109477.

3. Monfared, S. K., & Shokrollahi, S. (2023). DARVAN: A fully decentralized anonymous and reliable routing for VANets. *Computer Networks*, 223, 109561.
4. Li, J., Li, D., Jiang, H., Lin, D., Geng, J., Huang, Y., ... & Zheng, K. (2023). Light: A Compatible, high-performance and scalable user-level network stack. *Computer Networks*, 229, 109756.
5. Mekdad, Y., Aris, A., Babun, L., El Fergougui, A., Conti, M., Lazzeretti, R., & Uluagac, A. S. (2023). A survey on security and privacy issues of UAVs. *Computer Networks*, 224, 109626
6. *Computer Networking: A Top-Down Approach*, 8th Edition, James Kulrose and Keith Ross, January, 2022
7. *Data Communications and Networking with TCP/IP Protocol Suite* 6th Edition, by Behrouz A. Forouzan, January, 2021
8. *CompTIA Network+ Study Guide, Exam N10-008*, 5th Edition by Todd Lammle, October, 2021
9. *Introduction to Networks Companion Guide*, CISCO Networking Academy, 1st Edition, July, 2020
10. *Computer Networks*, 6th Edition by Andrew Tanenbaum, Nick and Wetherall, July 2021
11. *Elements of Computer Networking, An integrated approach*, by Narasimha Karumanchi, 2017