

**Faculty of Computers and Information Technology**

**Computer Networks-2**

**Information :**

**Course Code :** DM323

**Level :** Undergraduate

**Course Hours :** 3.00- Hours

**Department :** Digital Media Technology

**Instructor Information :**

Title	Name	Office hours
Lecturer	Mahmoud Abdel Moneam Mahdi Mahmoud	1
Teaching Assistant	Nadia Alaa Talaat Tawfik	

**Area Of Study :**

- "Understand knowledge that enhances skills to learn different types of routing protocols.
- "Use and adopt fundamental of data multicast and broadcast routing and internetworking.
- "Solve problems of congestion for TCP and real time transport layer protocols.
- "Show a complete understanding of main network applications such as E-Mail, Web browsing, and streaming audio/video.
- "Evaluate different algorithms for network security such as private, public key algorithms and digital signature.
- "Comprehend deeply the basic concepts of hot topics in computer networks such as cellular, ad-hoc, vehicular and sensor networks.

**Description :**

Difference between LANs/MANs and WANs; Transmission media; LAN/MANs topologies: Bus; Tree; Ring; Star Protocol Architecture; Logical link control (LLC); Medium access control (MAC)-LLC Services; LLC Protocols; Flow control; Error control; Ethernet (IEEE 802.11, CSMA/CD); Frame Component . MAC protocol . 10Mbps Ethernet . 100Mbps Ethernet . Gigabit Ethernet; Token ring; Token priority . Token Maintenance;. FDDI: Frame component . Ring Maintenance; Internetworking: Bridge, Router

**Course outcomes :**

**a.Knowledge and Understanding: :**

- 1 - Discuss fundamental concepts related to routing mechanisms and congestion control
- 2 - Identify different services used in Application Layer such as E-mail, browsing and audio/video streaming
- 3 - Explain the principles and techniques of network security

**b.Intellectual Skills: :**

- 1 - Analyze different problems in static routing techniques and how dynamic routing solves these problems
- 2 - Propose a set of alternative solutions for congestion in TCP and real time transport layer protocols
- 3 - Select appropriate quality of service parameters for different network applications
- 4 - Classify wireless technologies used in cellular and ad-hoc networks.

**c.Professional and Practical Skills: :**

- 1 - Apply effective information to implement some network security algorithms such as AES algorithm
- 2 - Apply different soft skills by oral, written, presentations in discussing the network applications

- 3 - Deploy OPNET or NS2 simulation tool to simulate routing protocols and evaluate congestion control methods

**d.General and Transferable Skills :**

- 1 - Apply communications skills in presentation and report writing for network applications
- 2 - Work on a team to simulate routing protocols and congestion control methods

**ABET Course outcomes :**

- 1 - Demonstrate adequate understanding of basic concepts of different types of routing protocols.
- 2 - Use and adopt fundamental of data multicast and broadcast routing and internetworking.
- 3 - Solve problems of congestion for TCP and real time transport layer protocols.
- 4 - Demonstrate adequate understanding of main network applications such as E-Mail, Web browsing, and streaming audio/video.
- 5 - Evaluate different algorithms for network security such as private, public key algorithms and digital signature.
- 6 - Demonstrate adequate understanding of the basic concepts of emerging advances in computer networks such as cellular, ad-hoc, vehicular and sensor networks.

**Course Topic And Contents :**

Topic	No. of hours	Lecture	Tutorial / Practical
Advanced Routing Algorithms: Flooding, Distance Vector and Link State Routing	4	2	2
Advanced Routing Algorithms: Hierarchical, Broadcast and Multicast Routing, and Internetworking	4	2	2
Congestion Control in Transport Layer: TCP Congestion Control and Real Time Transport Protocols	4	2	2
Application Layer: Electronic Mail and World Wide Web	4	2	2
Application Layer: Streaming audio and video	4	2	2
Network Security: Private, Public Key Algorithms and Digital Signature	4	2	2
Communication Security and Authentication Protocols	4	2	2
E-mail and Web security	4	2	2
Mid Term Exam	2		
Overview on Cellular Networks	4	2	2
Overview on Mobile Ad-Hoc Networks	4	2	2
Mobile IP and Vehicular Networks	4	2	2
Wireless Sensor Networks	4	2	2
Final Exam	2		

**Teaching And Learning Methodologies :**

- Interactive Lectures including Discussions
- Practical Lab Sessions
- Self-Study (Project / Reading Materials / Online Material / Presentations)
- Case Studies

Problem Solving

**Course Assessment :**

Methods of assessment	Relative weight %	Week No	Assess What
Assignments	5.00	4	
Final Exam	40.00	14	
Midterm Exam (s)	20.00	9	
Practical Exam	10.00		
Presentations	5.00	12	
Quizzes	10.00	5	
Research and Reporting	5.00		
Team Work Projects	5.00		

**Course Notes :**

An Electronic form of the Course Notes and all the slides of the Lectures is available on the Students Learning Management System (Moodle)

**Recommended books :**

W. Stallings, Wireless Communications and Networks, Pearson, last edition. ISBN: 978-0131918351

**Web Sites :**

Computer Networks - Journal . Elsevier  
<https://www.journals.elsevier.com/computer-networks>