

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 | Hussein Mohamed Mohamed Ali Harb | 4 |
| Assistant Lecturer | MAHMOUD MAGDY MOHAMED ABDO | |
| Teaching Assistant | Debaj Shady Mahmoud Talha Mohamed Elmaghraby | |

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 :

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| 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: :

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|-----|---|
| 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: :

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| 1 - | Apply effective information to implement some network security algorithms such as AES algorithm |
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| 2 - | Deploy OPNET or NS2 simulation tool to simulate routing protocols and evaluate congestion control methods |
| 3 - | Apply different soft skills by oral, written, presentations in discussing the network applications |

d.General and Transferable Skills :

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

ABET Course outcomes :

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| 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 :

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| 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>