

**LAGUARDIA COMMUNITY COLLEGE
CITY UNIVERSITY OF NEW YORK
DEPARTMENT OF MATHEMATICS, ENGINEERING, AND COMPUTER SCIENCE**

MAC 245 – DATA COMMUNICATION AND NETWORK SECURITY

4 hours (2h lecture, 2h lab), 3 credits

**Prerequisite: MAC108 – INTRODUCTION TO PROGRAMMING WITH PYTHON
OR MAC101 – INTRODUCTION TO COMPUTER SCIENCE**

Instructor:

Contact:

Office:

Office hours:

Description

This course provides an introduction to data communications and networking technologies. Topics covered include fundamentals of networks, OSI model, networking protocols, signaling, cables, connectors and networking devices. It will also cover multiplexing, circuit and packet switching, IP configuration, network design, switching, routing, firewalls, network security and port configuration. This course prepares students to pass the CompTIA Network+ exam.

Instructional Objectives:

1. Introduce networking concepts and fundamentals of topologies.
2. Familiarize students with client server and peer-to-peer networks.
3. Introduce the OSI model and functions of each layer, network signaling and protocols.
4. Familiarize students with TCP/IP models and addressing schemes.
5. Familiarize students with network cables, connectors and networking devices.
6. Introduce students to the properties and purpose of the Ethernet, IP configuration and wireless networking.
7. Provide students with knowledge of WAN transmission, switching and routing.
8. Introduce students to network security fundamentals and management.
9. Familiarize students with troubleshooting and problem solving in a real-world environment.

Performance Objectives:

1. Describe the fundamentals of networking and topologies.
2. Compare and contrast client server and peer-to-peer networks.
3. Describe the OSI model and layer functions, network signaling and different network protocols.
4. Illustrate networks using TCP/IP and addressing schemes.

5. Illustrate how to set up networks using different cables, connectors and network devices.
6. Explain the properties and the purpose of the Ethernet, IP configuration and wireless networking.
7. Describe WAN transmission and connections; explain switching and routing.
8. Describe network security challenges, vulnerabilities, threats and remote access security.
9. Troubleshoot and solve real-world problems using course skills; communicate the results in an oral presentation.

Required Textbook :

West, Jill; Dean, Tamara and Andrews, Jean, *Network+ Guide to Network*, Cengage Learning, 7th Ed. 2016.

ISBN: 13: 9781305090941

Grading Standards:

Project		10%
Homework	(4 @2.5% each)	10%
Laboratory	(10 @3% each)	30%
Midterm Exam		20%
Final Exam		30%
Total		100%

Comments:

The grading standards listed above and the suggested homework problems listed in the course outline are both subject to modification by the instructor.

Course Outline

Week 1

Introduction to course, networking architecture, signaling protocols, cables and connectors.

Lab 1: Networking devices and connectors

Week 2

Networking devices, IP configuration, OSI model: client server and peer-to-peer networks, purpose of the OSI model, layers.

Lab 2: Introduction to software, identifying client server and peer-to-peer networks

HW1

Week 3

Transmission basics and networking media, data transmission techniques, limitations of various networking media.

Lab 3: Data transmission

Week 4

Introduction to TCP/IP protocols: addressing schemes, ports, DNS, application layer TCP/IP and troubleshooting.

Lab 4: Addressing schemes, set-up ports and DNS

Project discussion

HW2

Week 5

Ethernet: LAN topologies, switching, ethernet standards, NIC and ethernet interfaces.

Lab 5: Connecting LAN devices

Week 6

Network and Hardware: LAN hardware, switching techniques, hubs, bridges and VLAN management.

Lab 6: Setting up LANs and VLANs

Week 7

WANs: WAN topologies and techniques, PSTN, ISDN and DSL.

Lab 7: Midterm exam

Week 8

WANs: WAN topologies and techniques, PSTN, ISDN and DSL continued.

Lab 8: Routers and configuring WAN connections

HW3

Week 9

Wireless networking: WLAN architecture, wireless standards, wireless WAN technologies.

Lab 9: WLAN architecture, using WLAN technologies

Week 10

Virtual networks and remote access: characteristics, OS virtual network, configuring virtual servers, VPNs.

Lab 10: Setting up VPNs and configuring VPNs

HW4

Week 11

Network security, firewalls, intrusion detection.

Lab 11: Setting up firewalls and identifying intrusion.

Week 12

Security measures, troubleshooting.

Lab12: Project due oral presentations

Week 13

Final examination

Note: Your labs will be graded according the following rubric:

1	2	3	4	5
The student cannot set up the experiment correctly.	The student can set up the physical environment for the experiment but cannot execute it.	The student sets up the experiment correctly but configures it incorrectly.	The student sets up the experiment well, runs it well, but does not comprehend the results and cannot relate the meaning of what he or she has accomplished. Essentially, they followed the recipe but show a lack of understanding.	The student successfully sets up and runs the experiment, documents his or her results and shows a clear understanding of the process.

Letter Grade Assignment

Final grades assigned for this course will be based on the percentage of total points earned and are assigned as follows:

Letter Grade	Percentage	Performance
A	91-100%	Excellent Work
A-	87-90%	Nearly Excellent Work
B+	84-86%	Very Good Work
B	81-83%	Good Work
B-	78-82%	Mostly Good Work
C+	75-77%	Above Average Work
C	72-74%	Average Work
C-	69-71%	Mostly Average Work
D+	66-68%	Below Average Work
D	60-65%	Poor Work

Letter Grade	Percentage	Performance
F	0-59%	Failing Work

Course Policies

Attendance

Students are expected to attend all class sessions as listed on the course calendar. The maximum number of unexcused absences allowed is 15% of the total class meetings (about 7 hours). Unexcused absences beyond this maximum will result in a grade of WU or F.

Late Work Policy

Be sure to pay close attention to deadlines—there will be no makeup assignments or quizzes, or late work accepted without a serious and compelling reason and instructor approval.

Most online activities will have an automated deadline. Past the due date the activities will not be visible on Blackboard.

For handed on assignments, there will be 20% reduction of the grade for every three days late. The assignment won't be accepted after one week late.

Understand When You May Drop This Course

It is the student's responsibility to understand when they need to consider drop from a course. Refer to the official calendar at LaGuardia's website.

Incomplete Policy

The INC (incomplete) grade will be given to **ONLY** students who pass both midterm and final exams and did not complete lab work, or special emergency cases with a prior agreement of the instructor. All incomplete course assignments must be completed within one semester otherwise the grade will turn into F.

Inform Your Instructor of Any Accommodations Needed

If you have a documented disability, and wish to discuss academic accommodations, please contact your instructor as soon as possible. It is the student's responsibility to provide documentation of disability to the office for Students with Disabilities (OSD) at LaGuardia Community College. For more information visit: www.lagcc.cuny.edu/osd

Commit to Integrity

As a student in this course (and at this college) you are expected to maintain high degrees of professionalism, commitment to active learning and participation in this class and also integrity in your behavior in and out of the classroom.

LaGuardia Community College Academic Honesty Policy & Procedures

Cheating and plagiarism are extremely serious offenses in all academic areas (consult the College's Catalog for the **definition** of Academic Dishonesty). **Any form of academic dishonesty, including cheating and plagiarism, may be reported to the office of student affairs**