

<b>Course Name: Computer Networks</b>		
<b>Course Code: COMP 311</b>	<b>Course Type: Core</b>	<b>Course Credits: 3</b>
<b>Class Timings: MF 9:00-1050</b>	<b>Section: A</b>	<b>Student Meeting Hours/ Office Hours:</b> M 11-12:30 TR 10-11
<b>Instructor Name: Asma Basharat</b>		
<b>A Note from the Instructor:</b> <ul style="list-style-type: none"> <li>• All lectures and related material will be uploaded on the Moodle Course Page.</li> <li>• Assignments / homework will be uploaded on Moodle and students will submit them on Moodle.</li> <li>• All emails regarding the course should be sent through the official FCC student email account and should have subject line starting as "COMP 311 " followed by the Section.</li> </ul>		
<b>Instructor Contact Details</b> Email: <a href="mailto:asmabasharat@fccollege.edu.pk">asmabasharat@fccollege.edu.pk</a> WhatsApp Group: TBD <div style="text-align: right;">Office Hours: M 11-12:30 TR 10-11</div> Guidelines for contacting instructor: you can appointment for some other day via email		
<b>Course Description:</b> <b>Pre-requisites if any:</b> COMP 301 Engineering concepts underlying computer communication, including analog and digital transmission, circuit switching and packet switching, logical network structure and operation including network layers, network models (OSI, TCP/IP) and protocol standards, understanding of modern network concepts.		
<b>Main Mode of Instruction:</b> In person <b>Technology Requirements</b> Check Moodle on daily basis, internet is required to access material. <b>Considerations for Students with Limited Internet/Technology Access:</b> Student can access/download all the course material during the university timings from computer labs.		
<b>Course TA: NA</b>		
<b>Course Objectives or <u>Student Learning Outcomes (SLOs)</u></b> <ol style="list-style-type: none"> <li>To introduce the fundamental concepts and theory of computer networking i.e. layered network architecture, protocols, service models</li> <li>To provide an insight of the technology to understand modern networking issues</li> <li>To empower students to investigate and analyze underlying network traffic and protocols</li> <li>To enable students to design and implement networking applications using network API programming and exploit networking tools</li> </ol>		

## Course Content, Learning Material & Activities Schedule

WEEK	TOPICS	READING & Activities
<b>1-3</b>	<b>1. Overview of Computer Networks and the Internet</b> <ul style="list-style-type: none"> <li>• What is the Internet?</li> <li>• The Network Edge</li> <li>• The Network Core</li> <li>• Delay, Loss, and Throughput in Packet-Switched Networks</li> <li>• Protocol Layers and Their Service Models</li> <li>• Networks Under Attack</li> <li>• History of Computer Networking and the Internet</li> </ul>	Ch. 01 [Textbook]  <i>Problem Set 01</i>  <i>Quiz 01</i>  Lab 01 – Network Topologies and Devices  Lab 02 – Basic Network Utilities
<b>4-7</b>	<b>2. Application Layer</b> <ul style="list-style-type: none"> <li>• Principles of Network Applications</li> <li>• The Web and HTTP</li> <li>• Electronic Mail in the Internet</li> <li>• DNS—The Internet’s Directory Service</li> <li>• Peer-to-Peer File Distribution</li> <li>• Video Streaming and Content Distribution Networks</li> <li>• Socket Programming: Creating Network Applications</li> </ul>	Ch. 02 [Textbook]  <i>Problem Set 02</i>  <i>Quiz 02</i>  Lab 03 – Basic HTTP Server  Lab 04 – Analysis of HTTP Protocol using Wireshark  Lab 05 – UDP Socket Programming  Lab 06 – TCP Socket Programming
<b>8</b>	<b>Midterm Exam</b>	
<b>9-10</b>	<b>3. Transport Layer</b> <ul style="list-style-type: none"> <li>• Introduction and Transport-Layer Services</li> <li>• Multiplexing and Demultiplexing</li> <li>• Principles of Reliable Data Transfer</li> <li>• Connection-Oriented Transport: TCP</li> <li>• Principles of Congestion Control</li> <li>• TCP Congestion Control</li> </ul>	Ch. 03 [Textbook]  <i>Problem Set 03</i>  <i>Quiz 03</i>  Lab 07 – Analysis of TCP Protocol using Wireshark  Lab 08 – Analysis of UDP Protocol using Wireshark
<b>11-12</b>	<b>4. The Network Layer: Data Plane</b> <ul style="list-style-type: none"> <li>• Overview of Network Layer</li> <li>• What’s Inside a Router?</li> </ul>	Ch. 04 [Textbook]  <i>Problem Set 04</i>

	<ul style="list-style-type: none"> <li>The Internet Protocol (IP): IPv4, Addressing, IPv6, and More</li> <li>Generalized Forwarding and SDN</li> </ul>	<i>Quiz 04</i>  Lab 09 – Analysis of IP Protocol using Wireshark  Lab 10 – Ipv4 Addressing (Exercise)
<b>13</b>	<b>5. The Network Layer: Control Plane</b> <ul style="list-style-type: none"> <li>Introduction</li> <li>Routing Algorithms</li> </ul>	Ch. 05 [Textbook]  Lab 11 – Analysis of DHCP Protocol using Wireshark
<b>14-15</b>	<b>6. The Link Layer and LANs</b> <ul style="list-style-type: none"> <li>Introduction to the Link Layer</li> <li>Error-Detection and -Correction Techniques</li> <li>Multiple Access Links and Protocols</li> <li>Switched Local Area Networks</li> <li>Link Virtualization: A Network as a Link Layer</li> <li>Data Center Networking</li> <li>Retrospective: A Day in the Life of a Web Page Request</li> </ul> <b>7. Wireless and Mobile Networks</b> <ul style="list-style-type: none"> <li>Introduction</li> <li>Wireless Links and Network Characteristics</li> <li>Overview of WiFi: 802.11 Wireless LANs</li> </ul>	Ch. 06 [Textbook] Ch. 07 [Textbook]  <i>Quiz 05</i>  Lab 12 – Analysis of ARP Protocol using Wireshark  Lab 13 – Analysis of ARP Protocol using Wireshark
<b>16</b>	<b>Final Exam</b>	

**‘Out-of-class’ Study Required:**

- See lecture slides before the class
- Check Moodle course page regularly
- At least spend 3 hours at home for reading from book
- Do all assignments and homeworks yourself

**Textbooks, Materials, Supplies, and other Resources**

**Textbook:** 1. James F. Kurose, Keith W. Ross, “Computer Networks- A Top-Down Approach”, Pearson, 8th Edition, 2020

**Reference Books:**

- Andrew S. Tanenbaum, David J. Wetherall, “Computer Networks”, Prentice Hall, 5th Edition, 2010
- Larry L. Peterson, Bruce S. Davie, “Computer Networks- A Systems Approach”, Morgan Kaufman, 5th Edition, 2011
- Behrouz A. Forouzan, “Data Communications and Networking”, Prentice Hall, 5th Edition, 2013

**Course Requirements:**

**Class Participation**

Attend the lectures and participate in discussions.

## Quizzes

There would be 5 quizzes, with N-1 policy. The quizzes would be announced. Check the Moodle course page for such announcements.

The breakup is as follows:

<b>Problem Sets / Assignments:</b>	10%
<b>Quizzes:</b>	15%
<b>Labs and Programming Tasks:</b>	20%
<b>Midterm exam:</b>	20%
<b>Final term exam:</b>	35%
<b>TOTAL</b>	<b>100%</b>

## Missed Assignments/ Make-Ups/ Extra Credit

- No retake of quiz or exam unless approved.
- Late assignments/Lab work will be accepted with 25% deduction per day

## Attendance Policy:

*-You are encouraged to attend all lectures. Students will be responsible to catch up with any missed announcement/lecture/content.*

## Classroom Participation:

*-Participate in the class discussions. Try to ask relevant questions and clear doubts within class. Its okay to answer wrongly.*

## Grade Determination & Course Assessment as per FCC Policy:

- *Relative grading policy will be adapted*
- *25% penalty per day will be imposed on late assignment submissions*
- *0 credit will be given for plagiarized submissions.*

## Changes to the Syllabus:

This syllabus was designed to convey course information and requirements as accurately as possible. It is important to note however that it **may** be subject to change during the course depending on the needs of the class and other situational factors. Such changes would be for your benefit and you will be notified of them as soon as possible.

## Student Support Services

[Student Counseling Services](#). Students can contact the [Campus Counseling Center](#) at 0331-444-1518 or email [ccc@fccollege.edu.pk](mailto:ccc@fccollege.edu.pk).

[Writing Center](#)

[Mercy Health Center](#)

## Other Useful FCCU Policy Documents:

[Sexual Harassment Policy](#)

[Anti-Corruption Policy](#)

[Academic integrity](#)

[Plagiarism Policy](#)

[Academic Calendar](#)