Objectives of the Course:

The main objectives of the course are to:

- Discuss the basic computer networking and existing connectivity technologies and the required infrastructure which comprises the key steps involved in the communication process. Basically to understand the LAN/WAN/MAN network architectures and the hybridized existing form in the business environment.

- Explain the layered approach that makes design, implementation and operation of extensive networks possible. To learn the 7-layer OSI network model (each layer and its responsibilities) and understand the TCP/IP suite of protocols and the networked applications supported by it.

- Discuss the basic protocols involved in wired/wireless communication process. These include the characteristics of the required infrastructure for Local Area Networks (MAC-CSMA-CD/Ethernet, Token Ring, FDDI, and others), and for Wide Area Networks using the TCP/IP (Visualizing TCP/IP mechanisms and variations), UDP/IP. Additionally to learn the VoIP technology in the business communication world.
• Link different network performance concepts and traffic issues for Quality of Service (QoS) in broadband communication as well to link the above concepts with the network economics of the enterprise.

• Discuss the basic design principles of broadband wired and wireless communication networks (802.11x) in the business environment. Moreover to gain the ability to design reliable wireless networks and model and analyze the structural performance for some commonly used in business network architectures.

**Learning Outcomes:**

After completion of the course students are expected to be able to:

- Explain the physical and logical as well as the electrical characteristics of digital signals and the basic methods of data transmission.
- Acknowledge the importance of the ISO 7-layer reference model.
- Discuss the concepts and requirements hosted in communication protocols and give an overview of Data Communication Standards, how these standards were developed and under which assumptions were adopted.
- Figure the area of computer networks in terms of connectivity, mobility and the role of metrics, with emphasis on the range of communication protocols utilized.
- Identify the basic protocols involved in wired/wireless communication process. Local Area Networks (MAC-CSMA-CD/Ethernet, Token Ring, FDDI, and others), and for Wide Area Networks using the TCP/IP, UDP/IP.
- Apply the basic design principles of wired and wireless communication networks. Moreover, to model and analyze the structural performance for some commonly used network architectures and discuss the functions and architectures of LAN and WAN.
- Analyze and design LAN architecture and the design and deployment requirements.
- Discuss the electrical interface and the basics of digital data transmission.
- Appreciate the need for Data Communication standards and the underlying technology used in wired and wireless communication models.
- Compare the protocols used in various types of computer networks.
- Discuss the principles of Open Systems and the Transport/Application
protocols, which facilitate them.

- Link different network performance concepts and traffic issues for Quality of Service (QoS) in broadband communication as well to link the above concepts with the network economics of the enterprise.
- Gain the ability to design reliable wireless networks and to model and analyze the structural performance for some commonly used in business network architectures.
- Explain fundamentals and technologies of physical, data-link and network layers.

Course Contents:


4. Principles of Medium Access Control. Ethernet (802.3), Token Ring (802.5), FDDI, Wireless (802.11).


9. Network performance concepts and traffic issues for Quality of Service (QoS) in broadband communication. Association of all the subsequent metrics with the network economics of an enterprise.
10. Network Simulation tools and experimentation-Exercises on NetSim.

**Teaching Methods:**
Lectures, Lab Presentations, Lab Tutorials, Theoretical Exercises and Assignments.

**Assessment Methods:**
Tests/Quizes, Design project, Homework, Project, Mid-Term, Final Exam.

**Required Textbooks:**

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<th>Authors</th>
<th>Title</th>
<th>Publisher</th>
<th>Year</th>
<th>ISBN</th>
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<tbody>
<tr>
<td>William Stallings</td>
<td>Business Data Communications 5/E</td>
<td>Prentice</td>
<td>2005</td>
<td>0131442570</td>
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<tr>
<td>Allen Dooley</td>
<td>Business Data Communications</td>
<td>Prentice</td>
<td>2005</td>
<td>0131424297</td>
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**Recommended Textbooks/Reading:**

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<th>ISBN</th>
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<tbody>
<tr>
<td>B.A. Forouzan</td>
<td>Data Communications and Networking</td>
<td>McGraw-Hill</td>
<td>2003</td>
<td>0072515848</td>
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