| Week | Objectives/Learning outcomes   | Content   | Instructional<br>Strategy/Teac<br>hing Method/<br>Activity  |   | Helping<br>Material  |
|------|--|---|---|---|--|
| 1    | <ul> <li>To provide students with a comprehensive introduction to fundamental concepts of data communication and computer networks for building a sound foundation for subsequent courses in the field of networking.</li> <li>To introduce the layered architecture approach with reference to OSI Model.</li> <li>To examine the characteristics of different transmission media.</li> <li>To understand the basic encoding and modulation techniques.</li> <li>To understand various error detection, flow and error control techniques.</li> <li>To introduce basic network devices and LAN technologies.</li> <li>To provide fundamental concepts of switched networks.</li> <li>To provide the IP addressing concepts and subnetting skills.</li> <li>To provide the necessary skills for LAN implementation.</li> <li>To provide basic introduction on Network Simulation and Analysis Tools (Opnet, NS2)</li> <li>To provide basic concepts of System and Network Programming</li> </ul> | Introduction to Data Communications and Computer Networks:  | visualization  Cooperative learning  Technology in the classroom  Behavior management  Professional development | Assignment(s ): 10% Quizzes: 5% Project: 10% Midterm Exam 25% | Data Communications and Networking by Behrouz A. Forouzan, Fifth Edition, Tata McGraw-Hill companies |
| 2    | <ul> <li>To provide students with a comprehensive introduction to fundamental concepts of data communication and computer networks for building a sound foundation for subsequent courses in the field of networking.</li> <li>To introduce the layered architecture approach with reference to OSI Model.</li> <li>To examine the characteristics of different transmission media.</li> <li>To understand the basic encoding and modulation techniques.</li> <li>To understand various error detection, flow and error control techniques.</li> <li>To introduce basic network devices</li> </ul>   | Protocol Layering: Principles of protocol layering, Logical Connections, Layered Architecture  TCP/IP Protocol Suite: Overview of TCP/IP Protocol Suite and Addressing, OSI model | visualization  Cooperative learning  Technology in the classroom  Behavior management  Professional             | Assignment(s ): 10% Quizzes: 5% Project: 10% Midterm Exam 25% | Data Communications and Networking by Behrouz A. Forouzan, Fifth Edition, Tata McGraw-Hill companies |

|   | <ul> <li>and LAN technologies.</li> <li>To provide fundamental concepts of switched networks.</li> <li>To provide the IP addressing concepts and subnetting skills.</li> <li>To provide hands on experience of basic Computer Utility Tools</li> <li>To provide the necessary skills for LAN implementation.</li> <li>To provide basic introduction on Network Simulation and Analysis Tools (Opnet, NS2)</li> <li>To provide basic concepts of System and Network Programming</li> </ul>  |   | development   |   |  |
|---|--|---|---|---|--|
| 3 | <ul> <li>To provide students with a comprehensive introduction to fundamental concepts of data communication and computer networks for building a sound foundation for subsequent courses in the field of networking.</li> <li>To introduce the layered architecture approach with reference to OSI Model.</li> <li>To examine the characteristics of different transmission media.</li> <li>To understand the basic encoding and modulation techniques.</li> <li>To understand various error detection, flow and error control techniques.</li> <li>To introduce basic network devices and LAN technologies.</li> <li>To provide fundamental concepts of switched networks.</li> <li>To provide the IP addressing concepts and subnetting skills.</li> <li>To provide the necessary skills for LAN implementation.</li> <li>To provide basic introduction on Network Simulation and Analysis Tools (Opnet, NS2)</li> <li>To provide basic concepts of System and Network Programming</li> </ul> | Fundamentals of Data and signals:  Analog and Digital Data, Periodic and A periodic Signals, Analog Signals, Sine Wave, Peak Amplitude, Period and Frequency, Phase, Time and Frequency Domains, Composite Signals  Digital Signals:  Digital Signals, Bit Interval and Bit Rate, Analog and digital transmission, Treatment of Signals, Comparison of Digital and Analog Signals | visualization  Cooperative learning  Technology in the classroom  Behavior management  Professional development | Assignment(s ): 10% Quizzes: 5% Project: 10% Midterm Exam 25% | Data Communications and Networking by Behrouz A. Forouzan, Fifth Edition, Tata McGraw-Hill companies |
| 4 | To provide students with a comprehensive introduction to fundamental concepts of data communication and computer networks for building a sound foundation for subsequent courses in the field of networking.      To introduce the layered   |   | visualization<br>Cooperative<br>learning  | Assignment(s ): 10% Quizzes: 5% Project:                      | Data Communications and Networking by Behrouz A. Forouzan, Fifth Edition, Tata McGraw-Hill companies |

| detection, flow and error control techniques.  To introduce basic network devices and LAN technologies.  To provide fundamental concepts of switched networks.  To provide the IP addressing concepts and subnetting skills.  To provide hands on experience of basic Computer Utility Tools  To provide the necessary skills for LAN implementation.  |  | Technology in the classroom  Behavior management  Professional development | 10%<br>Midterm<br>Exam 25%                                   |  |
|--|--|--|--|--|
| <ul> <li>To provide students with a comprehensive introduction to fundamental concepts of data communication and computer networks for building a sound foundation for subsequent courses in the field of networking.</li> <li>To introduce the layered architecture approach with reference to OSI Model.</li> <li>To examine the characteristics of different transmission media.</li> <li>To understand the basic encoding and modulation techniques.</li> <li>To understand various error detection, flow and error control techniques.</li> </ul> | Guided Transmission Media:  Twisted Pair, Coaxial Cable, Physical Structure, Connector Types, Applications  Fiber Optic physical structure  Guided and Unguided Transmission media:  Fiber Optic Propagation Modes, Connector Types, Applications,  Ground Propagation, Unguided Propagation, Line of sight Propagation, Wireless Transmission Waves, Radio Waves, |  | Assignment(s): 10% Quizzes: 5% Project: 10% Midterm Exam 25% | Data Communications and Networking by Behrouz A. Forouzan, Fifth Edition, Tata McGraw-Hill companies |

|   | System and Network Programming  |  |   |   |  |
|---|---|--|---|---|--|
| 6 | <ul> <li>To provide students with a comprehensive introduction to fundamental concepts of data communication and computer networks for building a sound foundation for subsequent courses in the field of networking.</li> <li>To introduce the layered architecture approach with reference to OSI Model.</li> <li>To examine the characteristics of different transmission media.</li> <li>To understand the basic encoding and modulation techniques.</li> <li>To understand various error detection, flow and error control techniques.</li> <li>To introduce basic network devices and LAN technologies.</li> <li>To provide fundamental concepts of switched networks.</li> <li>To provide the IP addressing concepts and subnetting skills.</li> <li>To provide hands on experience of basic Computer Utility Tools</li> <li>To provide basic introduction on Network Simulation and Analysis Tools (Opnet, NS2)</li> <li>To provide basic concepts of System and Network Programming</li> </ul> | Unguided Transmission media:  Microwaves, Infrared, Omni directional Antenna, Unidirectional Antenna  Digital to Digital Conversion:  Digital Data, Digital Signals, Line Coding, Unipolar, Polar, Bipolar, Techniques  NRZ-L, NRZI, Bipolar-AMI, Pseudoternary, Manchester, Differential Manchester | visualization  Cooperative learning  Technology in the classroom  Behavior management  Professional development | Assignment(s ): 10% Quizzes: 5% Project: 10% Midterm Exam 25% | Data Communications and Networking by Behrouz A. Forouzan, Fifth Edition, Tata McGraw-Hill companies |
| 7 | <ul> <li>To provide students with a comprehensive introduction to fundamental concepts of data communication and computer networks for building a sound foundation for subsequent courses in the field of networking.</li> <li>To introduce the layered architecture approach with reference to OSI Model.</li> <li>To examine the characteristics of different transmission media.</li> <li>To understand the basic encoding and modulation techniques.</li> <li>To understand various error detection, flow and error control techniques.</li> <li>To introduce basic network devices and LAN technologies.</li> <li>To provide fundamental concepts of switched networks.</li> </ul>   | Analog to Digital Conversion:  Analog Data, Digital Signals, Sampling, Pulse Amplitude Modulation (PAM), Pulse Code Modulation (PCM), Delta Modulation (DM)  Transmission Modes:  Parallel Transmission, Serial Transmission, Asynchronous and synchronous transmission                              | visualization  Cooperative learning  Technology in the classroom  Behavior management  Professional development | Assignment(s ): 10% Quizzes: 5% Project: 10% Midterm Exam 25% | Data Communications and Networking by Behrouz A. Forouzan, Fifth Edition, Tata McGraw-Hill companies |

|   | <ul> <li>To provide the IP addressing concepts and subnetting skills.</li> <li>To provide hands on experience of basic Computer Utility Tools</li> <li>To provide the necessary skills for LAN implementation.</li> <li>To provide basic introduction on Network Simulation and Analysis Tools (Opnet, NS2)</li> <li>To provide basic concepts of System and Network Programming</li> </ul>  |   |   |   |  |
|---|--|---|---|---|--|
| 8 | <ul> <li>To provide students with a comprehensive introduction to fundamental concepts of data communication and computer networks for building a sound foundation for subsequent courses in the field of networking.</li> <li>To introduce the layered architecture approach with reference to OSI Model.</li> <li>To examine the characteristics of different transmission media.</li> <li>To understand the basic encoding and modulation techniques.</li> <li>To understand various error detection, flow and error control techniques.</li> <li>To introduce basic network devices and LAN technologies.</li> <li>To provide fundamental concepts of switched networks.</li> <li>To provide the IP addressing concepts and subnetting skills.</li> <li>To provide the necessary skills for LAN implementation.</li> <li>To provide basic introduction on Network Simulation and Analysis Tools (Opnet, NS2)</li> <li>To provide basic concepts of System and Network Programming</li> </ul> | Digital to Analog Conversion:  Digital Data, Analog Signals, Bit Rate and Baud Rate, Techniques, Amplitude Shift Keying (ASK), Frequency Shift Keying (FSK), Phase Shift Keying (PSK), Quadrature Amplitude Modulation (QAM)  Analog to Analog Conversion:  Analog Data, Analog Signals, Amplitude Modulation, Frequency Modulation, Phase Modulation | 1 ecnnology in  | Assignment(s ): 10% Quizzes: 5% Project: 10% Midterm Exam 25% | Data Communications and Networking by Behrouz A. Forouzan, Fifth Edition, Tata McGraw-Hill companies |
| 9 | <ul> <li>To provide students with a comprehensive introduction to fundamental concepts of data communication and computer networks for building a sound foundation for subsequent courses in the field of networking.</li> <li>To introduce the layered architecture approach with reference to OSI Model.</li> <li>To examine the characteristics of</li> </ul>   | Multiplexing and its Types:  Frequency Division Multiplexing, Time Division Multiplexing, Interleaving and Bit Padding  | visualization<br>Cooperative<br>learning<br>Technology in | Assignment(s ): 10% Quizzes: 5% Project: 10% Midterm          | Data Communications and Networking by Behrouz A. Forouzan, Fifth Edition, Tata McGraw-Hill companies |

|    |   |  |  |   | ,  |
|----|---|--|--|---|--|
|    | <ul> <li>different transmission media.</li> <li>To understand the basic encoding and modulation techniques.</li> <li>To understand various error detection, flow and error control techniques.</li> <li>To introduce basic network devices and LAN technologies.</li> <li>To provide fundamental concepts of switched networks.</li> <li>To provide the IP addressing concepts and subnetting skills.</li> <li>To provide hands on experience of basic Computer Utility Tools</li> <li>To provide the necessary skills for LAN implementation.</li> <li>To provide basic introduction on Network Simulation and Analysis Tools (Opnet, NS2)</li> <li>To provide basic concepts of System and Network Programming</li> </ul>   |  | the classroom  Behavior management  Professional development | Exam 25%  |  |
|    |   |  |  |   |  |
| 10 | <ul> <li>To provide students with a comprehensive introduction to fundamental concepts of data communication and computer networks for building a sound foundation for subsequent courses in the field of networking.</li> <li>To introduce the layered architecture approach with reference to OSI Model.</li> <li>To examine the characteristics of different transmission media.</li> <li>To understand the basic encoding and modulation techniques.</li> <li>To understand various error detection, flow and error control techniques.</li> <li>To introduce basic network devices and LAN technologies.</li> <li>To provide fundamental concepts of switched networks.</li> <li>To provide the IP addressing concepts and subnetting skills.</li> <li>To provide the necessary skills for LAN implementation.</li> <li>To provide basic introduction on Network Simulation and Analysis Tools (Opnet, NS2)</li> <li>To provide basic concepts of</li> </ul> | Switching Circuit-Switched Networks Datagram Networks Virtual Circuit Networks Error Detection: Types of Errors, Single bit and Burst Error, Parity Check (Single and Block Parity), Cyclic Redundancy Check (CRC) | D.L  | Assignment(s ): 10% Quizzes: 5% Project: 10% Midterm Exam 25% | Data Communications and Networking by Behrouz A. Forouzan, Fifth Edition, Tata McGraw-Hill companies |

| 11 | <ul> <li>To provide students with a comprehensive introduction to fundamental concepts of data communication and computer networks for building a sound foundation for subsequent courses in the field of networking.</li> <li>To introduce the layered architecture approach with reference to OSI Model.</li> <li>To examine the characteristics of different transmission media.</li> <li>To understand the basic encoding and modulation techniques.</li> <li>To understand various error detection, flow and error control techniques.</li> <li>To introduce basic network devices and LAN technologies.</li> <li>To provide fundamental concepts of switched networks.</li> <li>To provide the IP addressing concepts and subnetting skills.</li> <li>To provide the necessary skills for LAN implementation.</li> <li>To provide basic introduction on Network Simulation and Analysis Tools (Opnet, NS2)</li> <li>To provide basic concepts of System and Network Programming</li> </ul> | Cyclic Redundancy Check (CRC), Checksum  Flow and Error Control:  Protocols of Noiseless and Noisy Channels    | visualization  Cooperative learning  Technology in the classroom  Behavior management  Professional development | Assignment(s): 10% Quizzes: 5% Project: 10% Midterm Exam 25%  | Data Communications and Networking by Behrouz A. Forouzan, Fifth Edition, Tata McGraw-Hill companies |
|----|--|--|---|---|--|
| 12 | <ul> <li>To provide students with a comprehensive introduction to fundamental concepts of data communication and computer networks for building a sound foundation for subsequent courses in the field of networking.</li> <li>To introduce the layered architecture approach with reference to OSI Model.</li> <li>To examine the characteristics of different transmission media.</li> <li>To understand the basic encoding and modulation techniques.</li> <li>To understand various error detection, flow and error control techniques.</li> <li>To introduce basic network devices and LAN technologies.</li> <li>To provide fundamental concepts of switched networks.</li> <li>To provide the IP addressing concepts and subnetting skills.</li> </ul>  | Internetworking Devices: Hubs, Bridges, Switches, Routers Internetworking Devices: Routers, Overview of TCP/IP | visualization  Cooperative learning  Technology in the classroom  Behavior management  Professional development | Assignment(s ): 10% Quizzes: 5% Project: 10% Midterm Exam 25% | Data Communications and Networking by Behrouz A. Forouzan, Fifth Edition, Tata McGraw-Hill companies |

| 13 | <ul> <li>To provide hands on experience of basic Computer Utility Tools</li> <li>To provide the necessary skills for LAN implementation.</li> <li>To provide basic introduction on Network Simulation and Analysis Tools (Opnet, NS2)</li> <li>To provide basic concepts of System and Network Programming</li> <li>To provide students with a comprehensive introduction to</li> </ul>  | IP Addressing: Internet Address, Class full   |  | A :   | Data<br>Communications   |
|----|--|---|--|---|--|
|    | fundamental concepts of data communication and computer networks for building a sound foundation for subsequent courses in the field of networking.  To introduce the layered architecture approach with reference to OSI Model.  To examine the characteristics of different transmission media.  To understand the basic encoding and modulation techniques.  To understand various error detection, flow and error control techniques.  To introduce basic network devices and LAN technologies.  To provide fundamental concepts of switched networks.  To provide the IP addressing concepts and subnetting skills.  To provide hands on experience of basic Computer Utility Tools  To provide basic introduction on Network Simulation and Analysis Tools (Opnet, NS2)  To provide basic concepts of System and Network Programming | Addressing, Classes and Blocks, Masking   | Cooperative learning  Technology in the classroom  Behavior management  Professional development | Assignment(s ): 10% Quizzes: 5% Project: 10% Midterm Exam 25% | and Networking by Behrouz A. Forouzan, Fifth Edition, Tata McGraw-Hill companies                     |
| 14 | <ul> <li>To provide students with a comprehensive introduction to fundamental concepts of data communication and computer networks for building a sound foundation for subsequent courses in the field of networking.</li> <li>To introduce the layered architecture approach with reference to OSI Model.</li> <li>To examine the characteristics of different transmission media.</li> <li>To understand the basic encoding</li> </ul>   | Subnetting: Process-to- Process Communication: Addressing at Transport Layer, Connection Oriented Vs Connectionless Service, Reliable Vs Unreliable, User Datagram Protocol (UDP) | visualization  Cooperative learning  Technology in the classroom  Behavior                       | Assignment(s ): 10% Quizzes: 5% Project: 10% Midterm Exam 25% | Data Communications and Networking by Behrouz A. Forouzan, Fifth Edition, Tata McGraw-Hill companies |

| 15 | <ul> <li>and modulation techniques.</li> <li>To understand various error detection, flow and error control techniques.</li> <li>To introduce basic network devices and LAN technologies.</li> <li>To provide fundamental concepts of switched networks.</li> <li>To provide the IP addressing concepts and subnetting skills.</li> <li>To provide hands on experience of basic Computer Utility Tools</li> <li>To provide the necessary skills for LAN implementation.</li> <li>To provide basic introduction on Network Simulation and Analysis Tools (Opnet, NS2)</li> <li>To provide basic concepts of System and Network Programming</li> <li>To provide students with a comprehensive introduction to fundamental concepts of data communication and computer networks for building a sound foundation for subsequent courses in the field of networking.</li> <li>To introduce the layered architecture approach with reference to OSI Model.</li> <li>To examine the characteristics of different transmission media.</li> <li>To understand the basic encoding and modulation techniques.</li> <li>To understand various error detection, flow and error control</li> </ul> |                    | management Professional development  visualization  Cooperative learning  Technology in the classroom  Behavior management | Assignment(s): 10% Quizzes: 5% Project: 10% Midterm Exam 25% | Data Communications and Networking by Behrouz A. Forouzan, Fifth Edition, Tata McGraw-Hill companies |
|----|---|--------------------|--|--|--|
|    | detection, flow and error control techniques.  To introduce basic network devices and LAN technologies.  To provide fundamental concepts of switched networks.  To provide the IP addressing concepts and subnetting skills.  To provide hands on experience of basic Computer Utility Tools  To provide the necessary skills for LAN implementation.  To provide basic introduction on Network Simulation and Analysis Tools (Opnet, NS2)  To provide basic concepts of System and Network Programming   |                    | Professional<br>development  |  |  |
| 16 | To provide students with a comprehensive introduction to fundamental concepts of data   | Application Layer: | visualization  | Assignment(s): 10%   | Data<br>Communications<br>and Networking by  |

|   | communication and computer<br>networks for building a sound<br>foundation for subsequent courses<br>in the field of networking.   | Network Security Issues:                                | Cooperative learning        | Quizzes: 5%                            | Behrouz A.<br>Forouzan, Fifth<br>Edition,<br>Tata McGraw-Hill |
|---|---|---|-----------------------------|--|---|
| • | in the field of networking.  To introduce the layered architecture approach with reference to OSI Model.  To examine the characteristics of different transmission media.  To understand the basic encoding and modulation techniques.  To understand various error detection, flow and error control techniques.  To introduce basic network devices and LAN technologies.  To provide fundamental concepts of switched networks.  To provide the IP addressing concepts and subnetting skills.  To provide hands on experience of basic Computer Utility Tools  To provide the necessary skills for LAN implementation.  To provide basic introduction on Network Simulation and Analysis | Basic overview of Cryptography and Security in Internet | Technology in the classroom | Project:<br>10%<br>Midterm<br>Exam 25% |   |
| • | Tools (Opnet, NS2) To provide basic concepts of System and Network Programming  |   |                             |  |   |