**5 Years Integrated M.Sc. (IT)**
**060010302 -Fundamentals of Computer Networks**

**Course objective:**
After completion of this course students must have understanding of concepts related to networking and they are able to design a small computer network.

**Course outcome:** Upon completion of the course students shall be able to
CO1: shall have brief knowledge of types of computer networks and its topologies.
CO2: describe about wireless transmission and transmission media.
CO3: compare and contrast techniques of error correction and detection.
CO4: analyze protocol controls.
CO5: aware about LAN and its use.
CO6: describe WAN and wireless configurations.

| Unit | Sub Unit | No. of Lecture(s) | Topics | Reference | Teaching Methodology to be used | Date of Conduction | Evaluation Parameters |
|---|---|---|---|---|---|---|---|
| **Introduction** | | | | | | | **[08 Hrs.]** |
| 1 | 1.1 | 1 | Data Communication, Communication systems, Applications | (BS)#1-Page No.1-4 | Chalk & talk &, Power Point Presentation | 7.7.2014 | |
| | 1.2 | 2 | Computer network: Topologies | (BS)#1-Page No.4-10 | Power Point Presentation | 9.7.2014 to 10.7.2014 | |
| | 1.3 | 2 | Categories of networks: LAN, MAN, WAN | (BS)#1-Page No.11-13 | Power Point Presentation | 11.7.2014 to 12.7.2014 | |
| | 1.4 | 2 | Network Architecture, The OSI Model: Layers of OSI model, Functionalities of each layers | (BS)#1-Page No.17-21 | Power Point Presentation | 14.7.2014 to 15.7.2014 | |
| | 1.5 | 1 | Standards & Standard Organizations | (BS)#1-Page No.13-17 | Power Point Presentation | 16.7.2014 | Quiz-1 |
| **Communication media & data transmission** | | | | | | | **[08 Hrs.]** |
| 2 | 2.1 | 1 | Analog & Digital Transmission: analog, Digital signals | (BS)#2-Page No.36-40 | Power Point Presentation | *18.7.2014* | Assigment-1 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 2.2 | 1 | Modulation - Demodulation | (BS)#2-Page No.40-44 | Power Point Presentation | 19.7.2014 | |
| | 2.3 | 1 | Transmission Media: Twisted Pair, Baseband Coaxial cable, Broadband Coaxial cable | (BS)#2-Page No.44-49 | Power Point Presentation and Demonstration | 21.7.2014 | |
| | 2.4 | 1 | Wireless Communication: Radio Waves, Microwaves, Infrared | (BS)#2-Page No.49-52 | Power Point Presentation | 22.7.2014 | |
| | 2.5 | 1 | Data transmission Basics : Parallel, Serial transmission | (BS)#2-Page No.52-55 | Power Point Presentation | 23.7.2014 | |
| | 2.6 | 1 | Interfacing | (BS)#2-Page No.56-58 | Power Point Presentation | 24.7.2014 | |
| | 2.7 | 2 | Multiplexing : FDM.TDM,WDM | (BS)#2-Page No.59-62 | Power Point Presentation | 30.7.2014 | |
| **Error Detection & Correction** | | | | | | | **[08 Hrs.]** |
| 3 | 3.1 | 1 | Types of Error | (BS)#3-Page No.64 | Power Point Presentation | 1.8.2014 | |
| | 3.2 | 4 | Error detection methods: Parity check, Longitudinal redundancy Check, Cyclic redundancy, Checksum | (BS)#3-Page No.64-71 | Power Point Presentation | 4.8.2014 to 12.8.2014 | |
| | 3.3 | 3 | Error correction: hamming code | (BS)#3-Page No.72 | Power Point Presentation | 18.8.2014 to 20.8.2014 | |
| Unit Test-1 is based on unit 1 to 3 | | | | | | 8-9.2014 | Unit Test-1 |
| **Data Link Control & Protocol Concepts** | | | | | | | **[08 Hrs.]** |
| 4 | 4.1 | 4 | Flow Control : Stop & wait Flow Control, Sliding window flow control | (BS)#5-Page No.88-89 | Power Point Presentation | 25.8.2014 to 28.8.2014 | |
| | 4.2 | 4 | Error Control : Stop & Wait ARQ, Go-Back-N ARQ, Selective Repeat | (BS)#5-Page No.89-95 | Power Point Presentation | 29.8.2014 to 3.9.2014 | Quiz-2 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | ARQ | | | | |
| **Local Area Network** | | | | | | | **[10 Hrs.]** |
| 5 | 5.1 | 2 | Types of Network & topology | (BS)#6-Page No.107-108 | Chalk & talk &, Power Point Presentation | 6.9.2014 to 7.9.2014 | |
| | 5.2 | 2 | Network Hardware : Network Interface Card, Repeater, Hub, Bridge, Router, Brouter, Switches, Gateways | (BS)#6-Page No.110-120 | Chalk & talk &, Power Point Presentation & Demonstration | 8.9..2014 to 9.9.2014 | |
| | 5.3 | 2 | Ethernet: IEEE Standard 802.3 – Carrier Sense Multiple Access Protocols, CSMA/CD | (BS)#6-Page No.125-126 | Power Point Presentation | 13.9.2014 to 15.9.2014 | Assigment-2 |
| | 5.4 | 2 | Token Bus, Token Ring, FDDI,DQDB,LAN Operating System & Protocols | (BS)#6-Page No.126-128 | Power Point Presentation | 16.9.2014 to 17.9.2014 | |
| | 5.5 | 2 | Ethernet Technologies: 10Base-2 Ethernet, Base-5 Thick Ethernet, 10 Base –T and 100 base-T, Gigabit Ethernet | (BS)#6-Page No.132-135 | Power Point Presentation | 21.9.2014 to 22.9.2014 | |
| **Wide Area Network & Wireless LAN's** | | | | | | | **[06 Hrs.]** |
| 6 | 6.1 | 2 | WAN, Transmission Methods: Time Division Multiple Access, Frequency Division Multiple Access, Statistical Multiple Access, Circuit Switching, Message Switching, Packet Switching | (BS)#7-Page No.137-140 | Power Point Presentation | 27.9.2014 to 28.9.2014 | |
| | 6.2 | 2 | WAN Carrier Types : Point to Point , T-carrier, SONET, ISDN, Wireless | (BS)#7-Page No.142-145 | Power Point Presentation | 1.10.2014 to 3.10.2014 | |
| | 6.3 | 1 | Wireless LAN, Configuration & Technology | (BS)#7-Page No.177-182 | Power Point Presentation | 6.10.2014 | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 6.4 | 1 | Wireless LAN Applications | (BS)#7-Page No.185 | Power Point Presentation | 8.10.2014 | |
| Unit test-2 is based on unit-4 to unit-6 | | | | | | 5.11.2014 | Unit Test-2 |
| Internal exam based on unit-1 to unit-6 | | | | | | 28.11.2014 | Internal Exam |

**Text Book:**

1. Brijendra Singh, Data Communications & Computer Networks, Third Edition, PHI.-[BS]

**Reference Books:**

1. Behrouz A Forouzan, Data Communications & Networking,4th edition, McGraw-Hill
2. Andrew S Tanenbaum, Computer Networks, 4th edition, prentice Hall

**Note : # denotes chapter number.**

**Course Units and Course Outcomes Mapping:**

| Unit No. | Unit | Course Outcome | | | | | |
|---|---|---|---|---|---|---|---|
| | | CO1 | CO2 | CO3 | CO4 | CO5 | CO6 |
| 1 | Introduction | ✓ | ✓ | | | | ✓ |
| 2 | Communication media & data transmission | | ✓ | ✓ | | | ✓ |
| 3 | Error Detection & Correction | | | ✓ | ✓ | | |
| 4 | Data Link Control & Protocol Concepts | ✓ | ✓ | ✓ | | | ✓ |
| 5 | Local Area Network | ✓ | | | | ✓ | |
| 6 | Wide Area Network & Wireless LAN's | ✓ | ✓ | | | ✓ | ✓ |

**Course Outcomes and Programme Outcomes Mapping**

| Course Outcomes | Programme Outcomes | | | | | |
|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 |
| CO1 | | | | | | |
| CO2 | | | | | | |
| CO3 | | | | ✓ | | |
| CO4 | | | | | | |
| CO5 | | | | | ✓ | |
| CO6 | | ✓ | ✓ | | ✓ | |

**Activities/Practicum:**

**The following activities shall be carried out by the students.**

Self-study of following topics shall be done by the students:

- Wireless LAN, Configuration & Technology
- Wireless LAN Applications
- Wireless carrier types

This activity shall not be considered as a part of assessment.

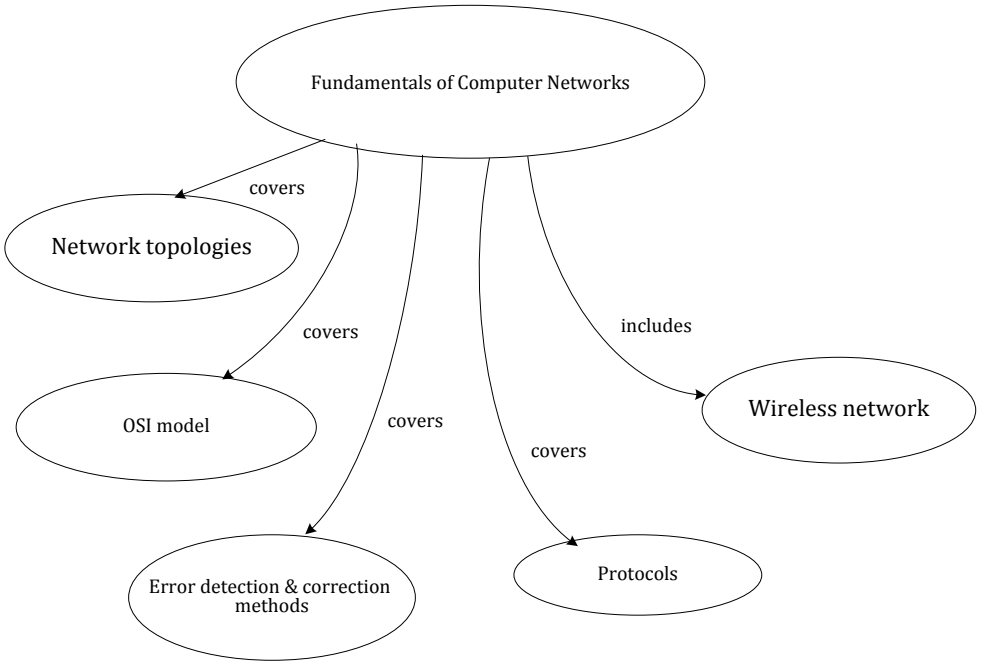
**The following activities shall be carried out by the teacher.**

- Demonstration of networking devices like router, hub, cables to the students.
- Show demonstration of how small network can be established by using three computers.

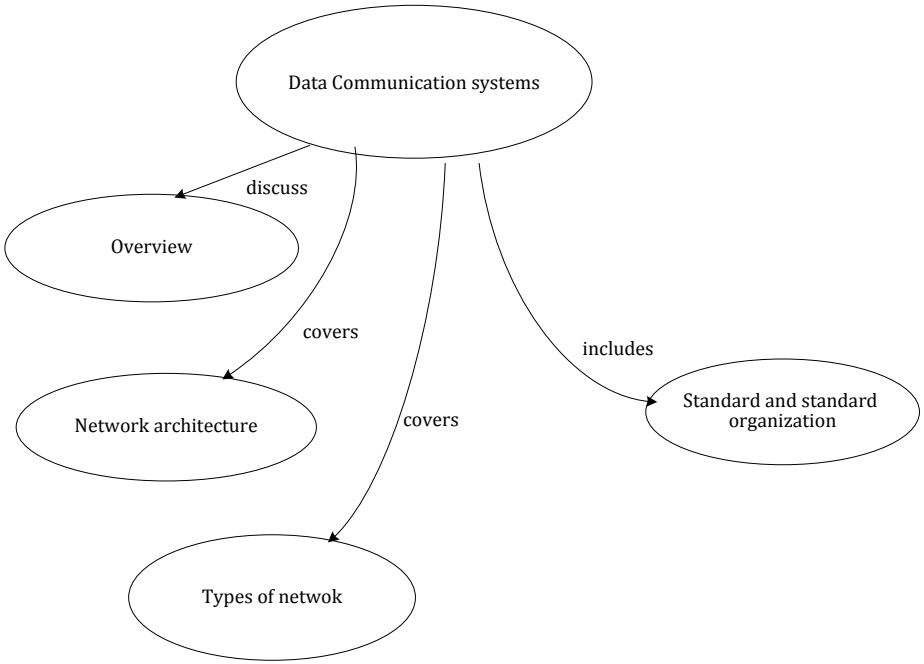
## Modes of transaction (i.e. Delivery)

- Lecture method for all the units shall be supplemented with audio-visual aids.
- Demonstration of networking devices like cables, hub, and router will be used for unit-2 and unit-5.

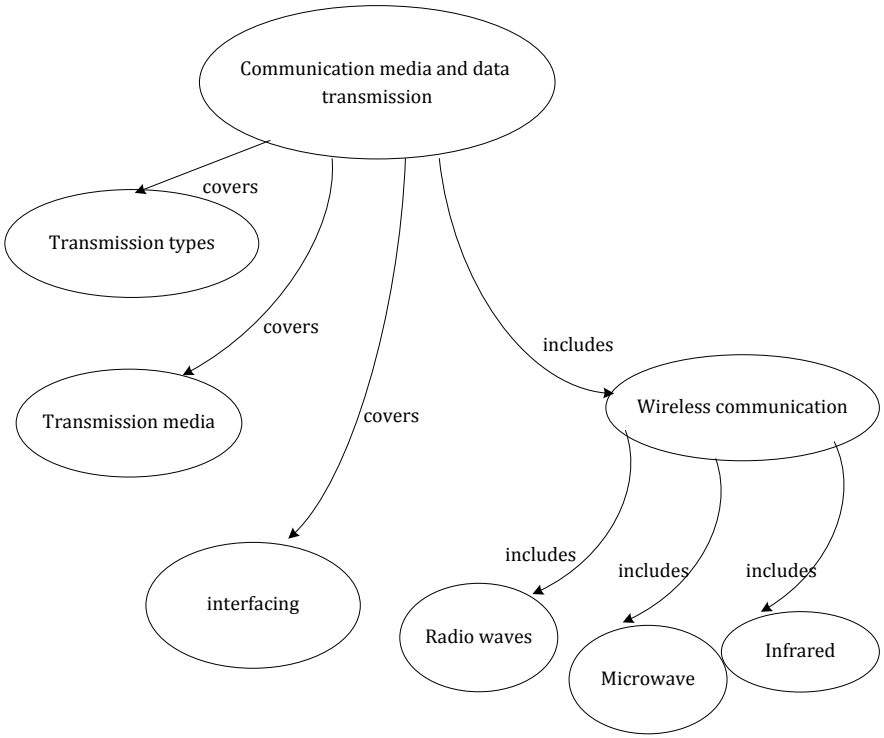
Overall


Fundamentals of Computer Networks
covers
Network topologies
covers
OSI model
covers
Error detection & correction methods
covers
Protocols
includes
Wireless network

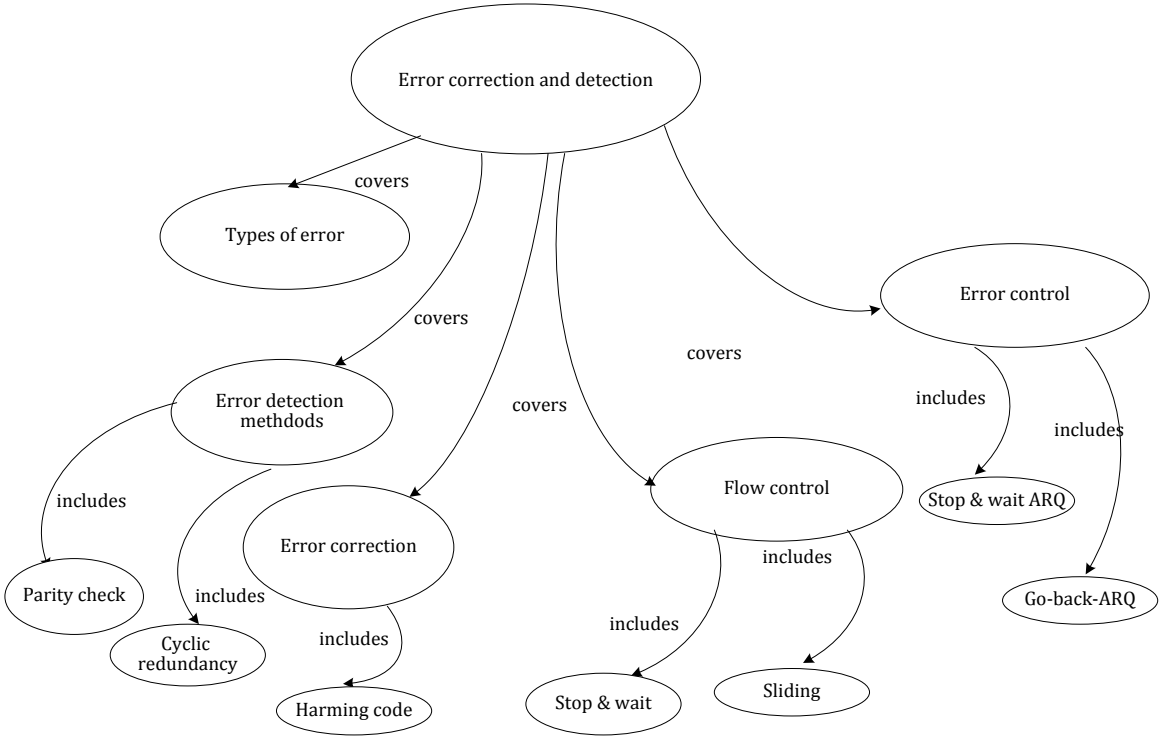
Unit-1


Data Communication systems
discuss
Overview
covers
Network architecture
covers
Types of netwok
includes
Standard and standard organization

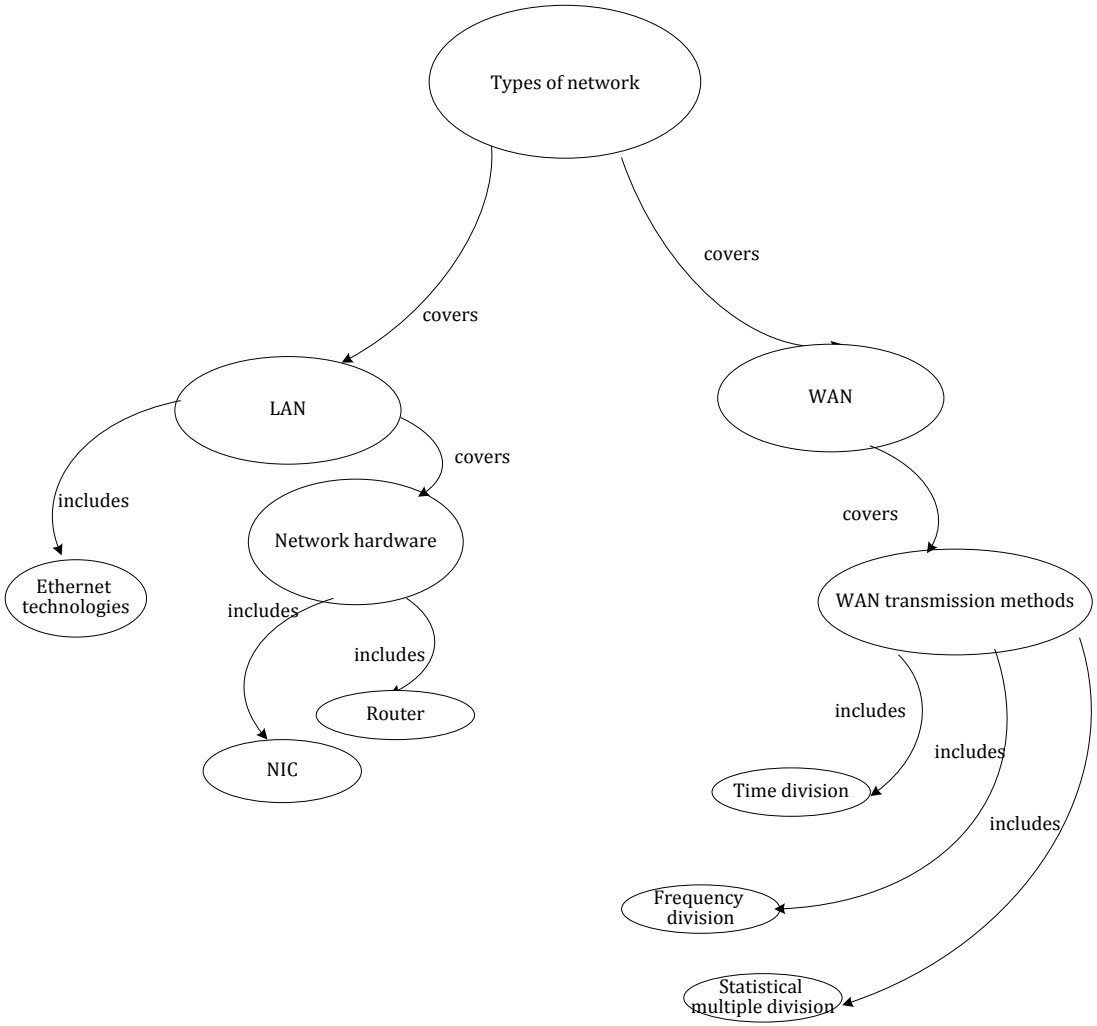
Unit 2


Communication media and data transmission
covers
Transmission types
covers
Transmission media
covers
interfacing
includes
Wireless communication
includes
Radio waves
includes
Microwave
includes
Infrared

Unit 3 & 4


Error correction and detection
covers
Types of error
covers
Error detection methdods
covers
Error correction
covers
Flow control
covers
Error control
includes
Stop & wait ARQ
includes
Go-back-ARQ
includes
Parity check
includes
Cyclic redundancy
includes
Harming code
includes
Stop & wait
includes
Sliding

Unit 5 & 6


Types of network
covers
covers
LAN
WAN
covers
includes
Network hardware
covers
Ethernet technologies
WAN transmission methods
includes
includes
includes
Router
NIC
includes
includes
Time division
Frequency division
Statistical multiple division