

# Data Communication BLM3051



Furkan ÇAKMAK

1

## Lecture Information

BLM3051  
Data  
Communication  
Week 1

- Course Hours: **Tuesday 09:00 - 11:50**
- All courses will be face 2 face.
- For announcements: <https://avesis.yildiz.edu.tr/fcakmak/dokumanlar>
  - USIS Course/Bulk Messaging System
  - Google Classroom Class Code: **7pdfuwv**
  - You can ask your questions via Google Classroom
  - Zoom Personal Room:
  - <https://us04web.zoom.us/j/3752287039?pwd=TTFKNittZWJTUEhHREovckl0VTVYUT09>
  - Meeting ID: 375 228 7039
  - Passcode: 5AXMNd
- For your questions and consultations about the course, make an appointment **AT LEAST 1 (ONE) DAY BEFORE** via the link below.
  - <https://fcakmak.simplybook.it/v2/>
  - No appointment will be made by e-mail.
  - Please be at the above mentioned Zoom room at the appointment time.

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2

## Lecture Information Form - Weekly Subjects

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Week	Date	Subjects
1	04.10.2022	Introduction to Data Communication Standards Used on Data Communication, Architectural models
2	11.10.2022	OSI Reference Model , Layers and Their Functions
3	18.10.2022	Signaling and Signal Encoding
4	25.10.2022	Parallel and Serial Transmission, Communication Media and Their Technical Specs., Multiplexing (TDM, FDM)
5	01.11.2022	Error Detection and Error Correction Techniques
6	08.11.2022	Data Link Control Techniques, Flow Control
7	15.11.2022	Asynchronous and Synchronous Data Link Protocols (BSC, HDLC)
8	22.11.2022	1. Vize Haftası
9	29.11.2022	LAN Technologies Continued, IEEE 802.4, 802.5, 802.11
10	06.12.2022	Connectionless and Connection Oriented Services, Switching
11	13.12.2022	Wide Area Networking Technologies (X.25, ISDN, FR, ATM, xDSL.)
12	20.12.2022	Communications Equipment's, TCP/IP Model, Security Issues
13	27.12.2022	Research Presentation 1
14	03.01.2022	Research Presentation 2

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4

## Lecture Information Form- Coursebook

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	Coursebooks
1	Introduction to Data Communications & Networking, Behrouz Foruzan
2	Computer Networks 2e, Andrew S. Tanenbaum
3	Data Networks: Concepts, Theory and Practice, Uyles D.Black
4	Routing & Switching: Time of convergence, Puzmanova

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5

## Lecture Information Form - Evaluation

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Evaluation System	Method	#	Impact (%)
	Midterms	1	30
	Quizzes	-	-
	Homeworks	1 (+1)	30
	Projects	-	-
	Semester Project	-	-
	Laboratory	-	-
	Other	-	-
	Final Exam	1	40

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6

## Lecture Information Form - Program Outcomes

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1c	Bilgisayar Mühendisliği alanında yeterli bilgi birikimi alma
1d	Bilgisayar Mühendisliği alanında aldığı bilgi birikimini karmaşık mühendislik problemlerine uygulayabilme becerisi
4b	Bilişim teknolojilerini etkin bir şekilde kullanma becerisi
9b	Mühendislik uygulamalarında kullanılan standartlar hakkında bilgi kazanması
12b	Veri Yapıları hakkında bilgi kazanılması
12c	Algoritmalar hakkında bilgi kazanılması
12d	İstatistik ve Olasılık hakkında bilgi kazanması

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7

## What is Communication?

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- Sharing information/data
- Telecommunication (Tele -> far \*Greek)
- Communication Aim: Traffic data
- Telephone, Television, vb.
  - Ses, video, resim
- Computer
  - Medium/Media -> 0/1
- Protocol Stack: Software and Hardware

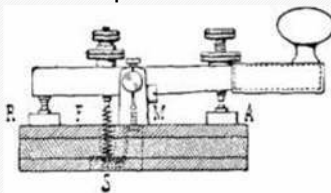
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8

## What is Communication? - Con't

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- Humanity History: 200k
- Sumerians: B.C 4000
- «*Verba volant, scripta manent*»
- Copper Cable
  - Telegraph: 1837-1838
  - Telephone: 1876



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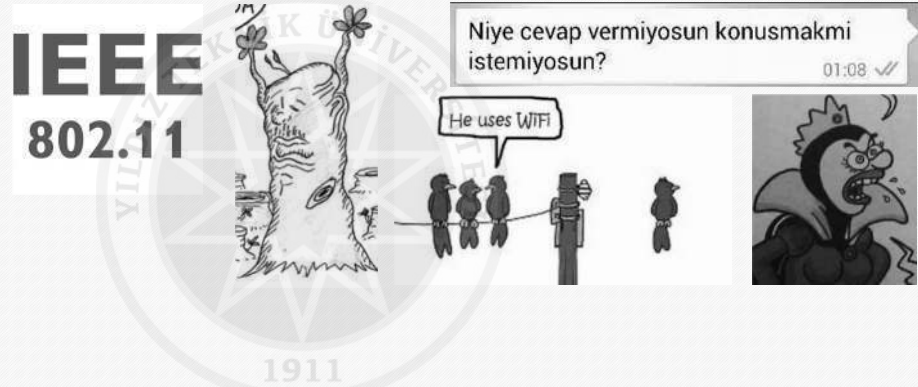
9

# Essentials of Data Communication

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- Message
- Sender
- Receiver
- Medium
- Protocol



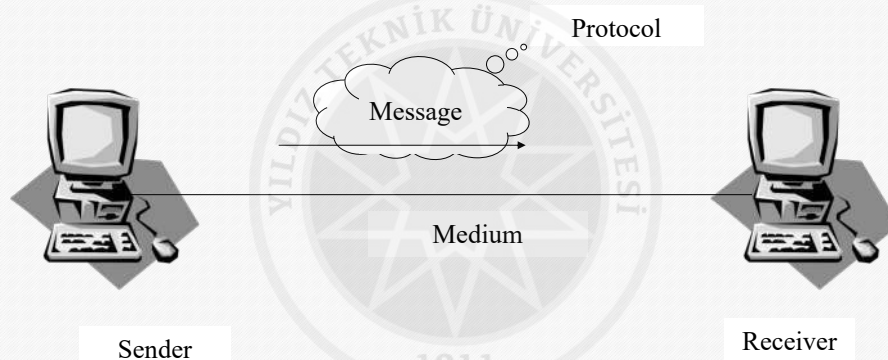
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10

# Data Communication

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11



## Data Comm. Features

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- Delivery
- Accuracy
- Timeliness



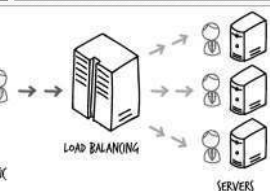
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12

## Pros of Computer Network

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- Resource Sharing
- Info/Data Sharing
- Load Sharing / Balancing
- Reliability
- Economy
- Efficient communication between in different places



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13

## Evaluation Criteria for Computer Networks

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- Performance
  - Transmit time
  - Response time
- QoS
  - Circuit-switched (Synchronous) → Bit rate, Min Error Rate, Transmission Rate
  - Packet-switched (Asynchronous) → Maximum Packet Size, Mean Packet Transfer Rate, Mean Packet Error Rate, Jitter, Mean Packet Transmit Delay
- Reliability/Availability
  - MTBF - Mean Time Between Failure
  - Restoring Time
  - 5-9 → 99,999%
- Security
- Scaleable
- Adaptable
  - Software, Hardware

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14

## Network Standards

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- De Jure
  - ISO (International Organization for Standardization)
  - ITU (The **I**nternational Telegraph and **T**elephone Consultative Committee)
  - IEEE (The Institute of Electrical and Electronics Engineers)
  - ETSI (The European Telecommunications Standards Institute)
  - EIA (Energy Information Administration)
  - TIA (Telecommunications Industry Association)
  - ANSI (American National Standards Institute)
  - TSE (Türk Standartları Enstitüsü)
  - IETF (Internet Engineering Task Force)
- De Facto
  - QWERTY keyboards
  - VHS video format
  - PDF document type
  - Buttons on men's shirts are on the right, buttons on women's shirts are on the left.

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15

## Computer Network (CN)

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- ARPANET (1970s)
- Classification of CN
  - Technique of Transmission
    - Broadcast
    - Peer to peer - P2P
  - Network Dimension
    - PAN-Personal Area Network (< 10m)
    - LAN-Local Area Network (< 100m-200m)
    - CAN-Campus Area Network (< 1-5km)
    - MAN-Metropolitan Area Network (< 10-50km)
    - RAN-Regional Area Network (< 100-200km)
    - WAN- Wide Area Network (< 1000km)
  - Bit Rate

10Gbps	Çok yüksek hızlı LAN				
1Gbps	Yüksek hızlı LAN	MAN	Yüksek hızlı WAN		
100Mbps	Hızlı LAN				
10Mbps	Düşük hızlı LAN			WAN	
1Mbps					
100kbps					
10kbps					
		10m	100m	1Km	10Km
				100Km	1Mm

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16

## Topology

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- Bus
- Star
- Tree
- Ring
- Mesh
- Hybrid

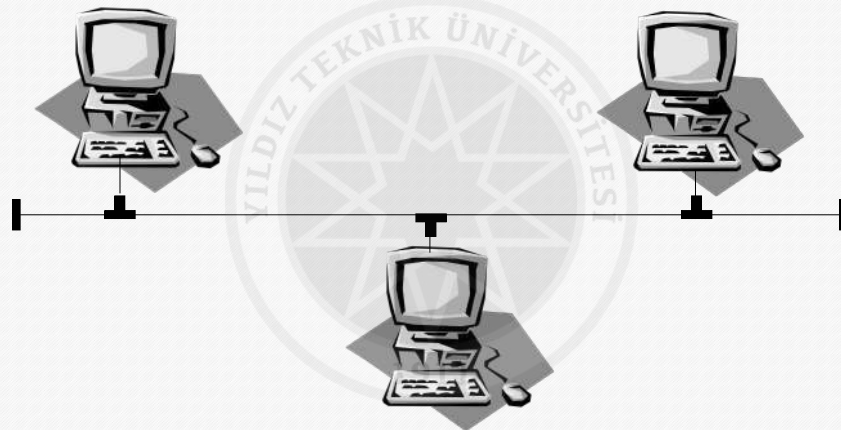
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17



## Bus Topology

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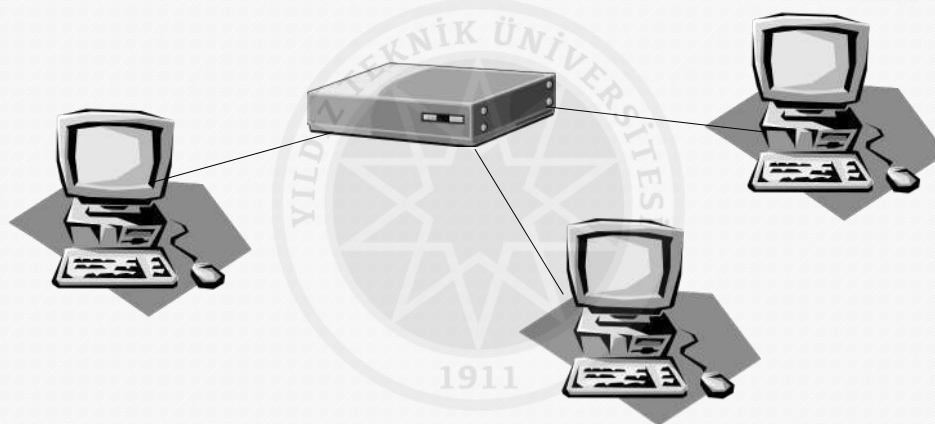


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18

## Star Topology

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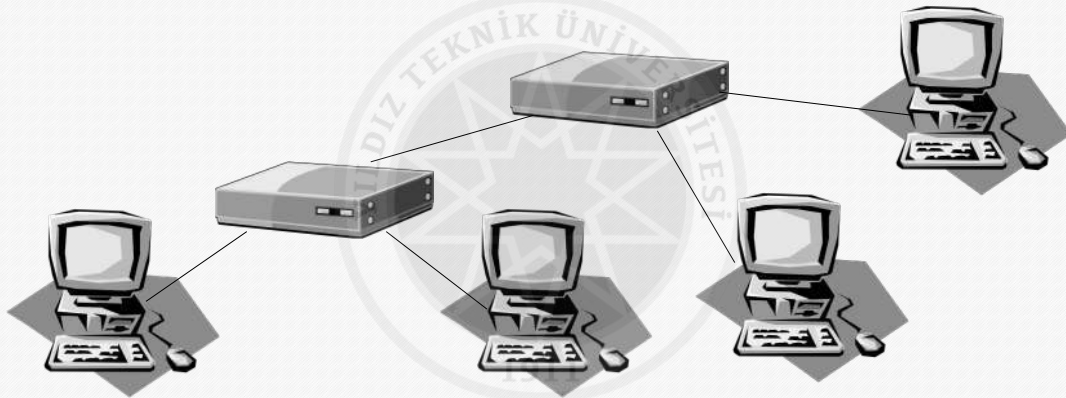


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19

## Tree Topology

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20

## Ring Topology

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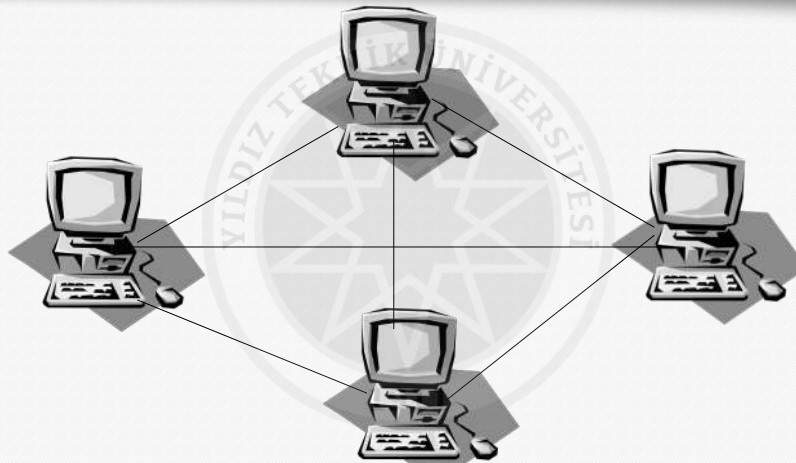


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21

## Mesh Topology

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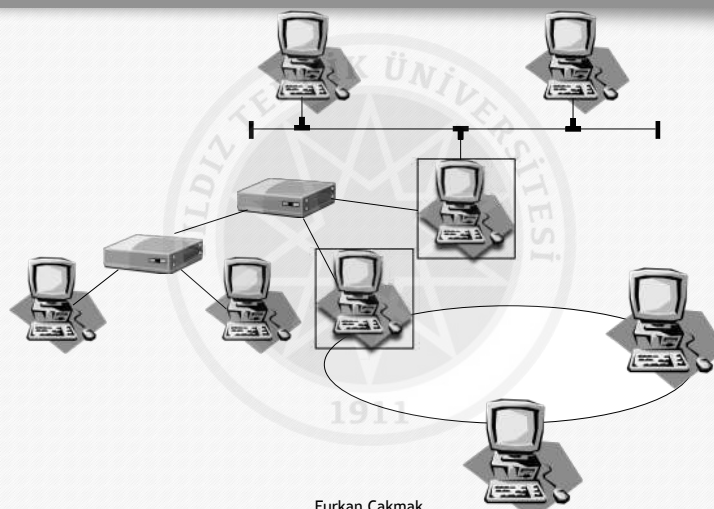


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22

## Hybrid Topology

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23

## Transmission Model

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- Simplex
  - Mouse
  - Bar Code Reader
- Half-Duplex
  - Radio
- Duplex
  - LAN



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24

## Addressing Model

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- Broadcast
  - TV
- Multicast
  - Stream Video
- Anycast
  - DNS
- Unicast
  - Letter



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25

## Data Flow Density, Bit Rate, Throughput

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- Symmetric
- Asymmetric
- bps (bit-ps), Bps (Byte-ps)
  - Kilo (k), Mega (M), Giga (G), Tera (T), Peta (P), Exa (E), Zetta (Z) ve Yotta (Y)
- Throughput
- Response time
- Jitter

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26

Thank you for your listening.

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28