

**Faculty of Computers and Information Technology**

**Data Communication**

**Information :**

**Course Code :** CS221

**Level :** Undergraduate

**Course Hours :** 3.00- Hours

**Department :** Faculty of Computers and Information Technology

**Area Of Study :**

Apply the basic concepts of data communications.  
Combine and evaluate different methods for data transmission.  
Analyze the requirements of guided and wireless communication and design a solution for these requirements.  
Compare and evaluate methodologies from range of techniques to implement signal encoding and digital data communication.  
Show a complete understanding of multiplexing such as frequency, time and statistical division multiplexing and enhances data link control for data error and data flow.

**Description :**

Data transmission concepts, Terminology and techniques, Types and sources of data, communication models, Standards. Data Transmission techniques, Transmission media and characteristics. Information theory, Information sources, Information measure, entropy, Source codes: return-to-zero and non-return-to-zero signaling, Analog and digital transmission, Optical fiber systems, Modems, modulation; Transmission impairments, Data encoding techniques, Multiplexing techniques.

**Course outcomes :**

**a.Knowledge and Understanding: :**

1 -	Explain the types of channel multiplexing
2 -	Identify the up to date techniques used in signal encoding and digital data communication.
3 -	Describe fundamental concepts related to data transmission.

**b.Intellectual Skills: :**

1 -	Compare and differentiate between methods used in channel multiplexing.
2 -	Propose a set of alternative solutions for error detection and correction, and flow control.
3 -	Analyze different problems in data communications

**c.Professional and Practical Skills: :**

1 -	Acquire and manage different information about wireless transmission using scientific literature and web sources.
2 -	Apply, design different techniques for signal encoding.
3 -	Analyze different types of network transmission media.

**d.General and Transferable Skills: :**

1 -	Apply communications skills in presentation and report writing for signal encoding techniques and channel multiplexing.
2 -	Work on a team to develop solutions for data transmission problems.

**Course Topic And Contents :**

Topic	No. of hours	Lecture	Tutorial / Practical
Data Communication and Network Overview	4	2	2
Protocol Architecture	4	2	2
Data Transmission: Concepts and Terminology, Analog and Digital Data Transmission	4	2	2
Data Transmission: Transmission Impairments, Channel Capacity	4	2	2
Guided and Wireless Transmission: Guided Transmission Media, Wireless Transmission	4	2	2
Guided and Wireless Transmission: Wireless Propagation, Line-of-Sight Transmission	4	2	2
Signal Encoding Techniques	4	2	2
Digital Data Communication Techniques: Asynchronous and Synchronous Transmission	4	2	2
Mid Term Exam	2		
Digital Data Communication Techniques: Types of Errors, Error Detection, Error Correction, Line Configurations	4	2	2
Data Link Control: Flow Control, Error Control, High-Level Data Link Control (HDLC)	4	2	2
Multiplexing: Frequency-Division Multiplexing, Synchronous Time-Division Multiplexing	4	2	2
Multiplexing: Statistical Time-Division Multiplexing, Asymmetric Digital Subscriber Line, xDSL			
Final Exam	2		

**Teaching And Learning Methodologies :**

Interactive Lectures including Discussions
Tutorials
Practical Lab Sessions
Self-Study (Project / Reading Materials / Online Material / Presentations)
Case Studies
Problem Solving

**Course Assessment :**

Methods of assessment	Relative weight %	Week No	Assess What
Assignments	8.00	4	
Final Exam	40.00	14	

Midterm Exam (s)	20.00	9	
Presentations	8.00	12	
Quizzes	10.00	5	
Research and Reporting	7.00		
Team Work Projects	7.00		

**Course Notes :**

An Electronic form of the Course Notes and all the slides of the Lectures is available on the Students Learning Management System (Moodle)

**Web Sites :**

Computer Communications - Journal - Elsevier  
<https://www.journals.elsevier.com/computer-communications>