MASENO UNIVERSITY
SCHOOL OF COMPUTING AND INFORMATCS
DEPARTMENET OF INFORMATION TECHNOLOGY

CIM 116: DATA COMMUNICATION
SEMESTER II SEPTEMBER-DECEMBER (2019/2020)

COURSE OBJECTIVES

On completion of this course the student should be able to:

- Explain the key data communication concepts
- Explain the theoretical concepts of data communication.
- Describe key techniques of congestion management in data networks.
- Explain the flow control mechanisms in data networks.
- Describe the concept of modulation in data communication.
- Describe the concept of multiplexing and application in data networks.
- Describe the Circuit and Packet Switching technologies.

COURSE DESCRIPTION

Introduction to data communication. Frequency response, bandwidth, filtering and noise. Information theory concepts: Nyquist's theorem, Shannon's and Sampling theorems, Data signals (timing, codes); simple data communications: simplex duplex, semi-duplex; Duplex, telephone lines, transmission line theory, modulation techniques; Analog and digital modulation techniques, Pulse Code Modulation (PCM), Communication systems circuits and devices, Data encoding and signaling, Physical layer protocols, Data link control (point to point communication, design issues, link management, error control, flow control, Multiplexing and. multiplexers and concentrators, switching; circuit switching, message switching; packet switching

Detailed Course content

Week	Subject area	Discussion topics
Week 1	An Introduction to Data Communications and Computer Networks	• Components • Data Representation • Data Flow • Simplex, Half-duplex and Duplex • Networks & Protocols
Week 2	Protocols and Architecture	• The OSI Model

		• TCP/IP Protocol Suite • Basics of IP Addressing • Data Protocol Unit - Addressing
Week 3	Data Transmission	• Analogue & Digital transmission • Transmission Impairments • Performance
Week 4	Transmission Media	• Guided Media • Unguided Media
Week 5	Data/Signal Encoding	• Digital data, digital signal • Analog data, digital signal • Digital data, analog signal • Analog data, analog signal
Week 6	Data Communication Interfaces	• Asynchronous Transmission • Synchronous Transmission • Isochronous Transmission
Week 7	Errors in Data Communication	• Causes of Errors in data communication • Types of Errors in Data Communication • Dealing with errors in Data Communication
Week 8	Data Link Control Multiplexing	• Flow Control & Error Control • Data Framing • Frequency Division Multiplexing • Time Division Multiplexing • Wavelength Division Multiplexing
Week 9	Wide Area Networks	• Congestion in Data Networks • Causes of congestion • Managing & Controlling Congestion
Week 10	Switching & signaling (Circuit Switching)	• Circuit switching Concepts • Control signaling • Application of Circuit Switching
Week 11	Switching & signaling (Packet Switching)	• Packet switching Principles • Application of Packet Switching • Circuit Switching Vs Packet Switching
Week 12	Term Paper Presentation	
Week 13	Course summary	Course Outline Syllabus

TEACHING METHODOLOGY
The course will be taught by way of Lectures, class discussions, group research and presentations.

COURSE TEXT AND RECOMMENDED READING
Core Text:
1) Forouzan Behrouz A. *Data Communications and Networking*. 4th Ed. Tata McGraw-Hill Publishing Company Limited: New Delhi, 2005

2) Stallings William. *Data and Computer Communications*. 7th Ed. Pearson Education, Inc. : New Delhi, 2004

3) Lynn A.DeNoia. *Data Communication: Fundamentals and Applications*. Merrill Publishing Co: New York, 1987

WEBSITES
http://williamstallings.com/StudentSupport.html

GROUND RULES
The course will involve Research work, Assignments, Discussions and CATs, among others.

Each activity should be taken seriously.

   i.   PLAGIARIZED work will not be assessed

  ii.   All research work/ assignments MUST be properly REFERENCED (Harvard style)

 iii.   Deadlines SHALL apply uniformly to all students. Late submissions shall be severely penalized

  iv.   Students who do not attend at least 2/3 of all the sessions SHALL NOT be allowed to sit for exams