Macao Polytechnic University

Faculty of Applied Sciences

Bachelor of Science in Computing

Module Outline

Academic Year 2022 / 2023 Semester 2

Learning Module	Data Communications			**Class Code**	COMP123
Pre-requisite(s)	Nil				
Medium of Instruction	English			**Credit**	3
Lecture Hours	45 hrs	**Lab/Practice Hours**	0 hrs	**Total Hours**	45 hrs
Instructor	Dr. Yue Liu		**E-mail**	yue.liu@mpu.edu.mo	
Office	A313, Chi Un Building, Main Campus		**Telephone**	8599-6433	

Description

The aim of this module is to introduce the terminology and concepts of data communication systems design and operation, and to introduce the knowledge on different components in data communication systems. Topics include Data Transmission, Data Encoding, Data Link Control, Multiplexing, and LAN Technology.

Learning Outcomes

After completing the learning module, students will be able to:

1. Demonstrate an understanding of the fundamental concepts and components in data communications; (SM1p)
2. Compute digital transmission over different types of communication media; (SM2p)
3. Explain the principle of layered protocol architecture and how different layers interact; (EA1p)
4. Describe the system functions in the correct protocol layer; (EA4p)
5. Compare and contrast different technologies used in data communication. (EP2p)

Content

1. Data Transmission Theory (6 hours)
    1.1. Concepts and Terminology
    1.2. Bandwidth
    1.3. Analog and Digital Data Transmission
    1.4. Shannon's Equation
2. Basic Data Communication Concepts (6 hours)
    2.1. Asynchronous and Synchronous Transmission
    2.2. Parallel vs. Serial Transmission
    2.3. Simplex, Half Duplex, and Full Duplex Communication mode
3. Transmission Media (3 hours)
    3.1. Guided Transmission Media
    3.2. Unguided Transmission Media
4. Data Encoding and Modulating (6 hours)
    4.1. Data Modulating Techniques
    4.2. Data Encoding Techniques
5. Multiplexing (6 hours)
    5.1. Character and Bit Interleaving
    5.2. Synchronous Time-Division Multiplexing
    5.3. Statistical Time-Division Multiplexing
    5.4. Frequency-Division Multiplexing
6. Data Link Control (6 hours)
    6.1. Flow Control
    6.2. Error Detection and Control
7. Architectures and Protocols (6 hours)
    7.1. Communications Model
    7.2. Protocols
    7.3. Protocol Architecture

8. Data Transport Networks (6 hours)
    8.1. Circuit Switching
    8.2. Packet Switching
    8.3. LAN Technologies

Teaching Method

Lectures/tutorials/quizzes and assignments

Attendance

Attendance requirements are governed by the "Academic Regulations Governing Bachelor's Degree Programmes" of Macao Polytechnic University. Students who do not meet the attendance requirements for the module will not be permitted to sit the final or re-sit examination and shall be awarded an 'F' grade.

Assessment

This learning module is graded on a 100 point scale, with 100 being the highest possible score and 50 being the passing score.

	Item	Description	AHEP3 LO	Percentage
1.	Assignments	Home-based exercises	SM1p, EA1p, EA4p, EP2p	30%
2.	Test(s)	Knowledge assessment	SM1p, SMP2p, EA1p	20%
3.	Examination	3-hour written examination	SM1p, SMP2p, EA1p	50%
			Total Percentage:	100%

Students with an overall score of less than 35 in the coursework must take the re-sit examination even if the overall score for the module is 50 or above.

Students with a score of less than 35 in the final examination must take the re-sit examination even if the overall score for the module is 50 or above.

Students with an overall final grade of less than 35 are NOT allowed to take the re-sit examination.

Teaching Material

Textbook(s)

1. William Stallings, 2014, Data and Computer Communications, 10th Edition, Pearson Education Limited

Reference

Reference book(s)

1. Behrouz A. Forouzan, 2012, Data Communications and Networking, Global Edition, McGraw-Hill
2. Curt M. White, 2022, Fundamentals of Networking and Data Communications, 9th Edition, Cengage Learning