

Course Specification Document

Title	LAN & WAN Protocols
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Credits	5 ECTS
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Aims	This course aims to provide the student with advanced concepts in local networks, such as transport control protocols, software-defined networks (SDN), wide area networks, switching concepts, and various types of wide area networks, contributing later to his work practice.
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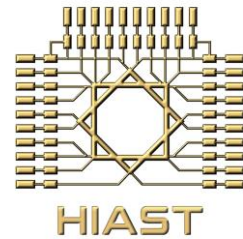
Intended learning outcomes

On successful completion of this course, the student will be able to:

- Classify different switching techniques.
- Classify Medium Access Control (MAC) protocols.
- Understand the principles of Software Defined Networks (SDN) and their operation.
- Understand Synchronous Digital Hierarchy (SDH).
- Familiarize himself with Asynchronous Transfer Mode (ATM) protocol and master MPLS protocol.
- Understand the basic principles of mobile networks and industrial satellite networks.
- Analyze and evaluate routing protocols used in Mobile Ad-Hoc Networks (MANET).
- Compare different types of Wireless Sensor Networks (WSNs).
- Design, integrate, and operate specialized data transmission protocols for wide area networks.
- Perform local and wide area networks troubleshooting, analyze their performance, and assist in improvement.
- Develop solutions based on Software Defined Networking (SDN) concepts.

Syllabus

- **Switching** Introduction, circuit-switched networks, packet-switched networks, internal structure of the switch.
- **Data link layer control:** Data link layer control services, HDLC Protocol, PPP protocol.
- **Medium access control:** Random access protocols, controlled access protocols, channel partitioning protocols.
- **SONET/SDH:** Architecture, physical configuration and layers, frame format, multiplexing, SONET networks.
- **ATM:** Cell concept, ATM multiplexing, network structure, virtual connection concept, ATM frame format, switching and routing in ATM.



- **Software Defined Networks (SDN):** Introduction to SDN, functions of SDN switches, openflow protocol.
- **Mobile Networks and Industrial Satellite Networks:** Mobile phone networks, satellite networks.
- **MPLS protocol:** Overview of MPLS, MPLS operation, Label Distribution Protocol (LDP), traffic engineering.
- **Mobile Ad-Hoc Networks (MANETs):** Introduction and basic definitions, single-destination routing in MANETs, flooding, DSR protocol, LAR protocol, GEDIR protocol, AODV protocol, link reversal algorithm, RORA protocol, OLSR protocol, DSDV protocol, ZRP protocol, LANMAR protocol.
- **Wireless Sensor Networks (WSNs):** Introduction to WSNs, access control in WSNs, routing in WSNs