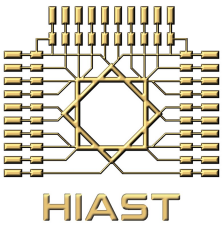
Syrian Arab Republic

Higher Institute for Applied Sciences and Technology



Course Specification Document

Title	Network Basics

Credits	3.5 ECTS

Aims	This course aims to familiarize the student with the essential principles, protocols, and applications used in computer networks and the Internet. It also describes the reference models for networks, the general function of each layer, and the most important applications used in networks, enabling the student to pursue further studies in the field of network engineering.

Intended learning outcomes

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

- Understand the OSI and TCP/IP models and describing the layered architecture.
- Understand the fundamental applications of networks.
- Understand the basic principles related to the physical layer, such as transmission media, encoding, and framing.
- Distinguish access control methods and classify error detection and correction techniques.
- Discuss TCP, UDP, and IP protocols.
- Perform network troubleshooting.
- Design a computer network and defining IP addresses.

Syllabus

- **Introduction to data communication networks:** Historical overview of network evolution, basic definitions of networks, types of networks, network models, layer functions, and the concept of addressing.
- **Application layer:** HTTP protocol, SMTP protocol, brief overview of other applications.
- **Physical layer:** Concept of circuits and their types, multiplexing concept, transmission media, digital data transmission (encoding).
- **Data link layer:** Media Access Control (MAC), error control, data link layer protocols.
- **Transport and network layers:** Transport layer functions, TCP protocol, network layer functions, IP protocol, IP addressing, Network Address Translation (NAT), Subnetting, overview of ARP & DNS addressing solutions, routing and switching.
- **Local Area Networks (LANs):** Ethernet standards, different generations of Ethernet, physical addresses, Ethernet replacement.