Syrian Arab Republic

Higher Institute for Applied Sciences and Technology

HIAST

Course Specification Document

Title	Voice Over IP - VOIP

Credits	2.5 ECTS

Aims	This course aims to provide the student with knowledge related to some of the protocols used on the Internet that facilitate the establishment of calls and voice communication over the Internet according to various standards related to this technology. This will enable the student to use online calling applications.

Intended learning outcomes

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

- Grasp the operation of fundamental protocols for voice transmission over the Internet, including the Session Initiation Protocol (SIP), SIP extensions, Real-Time Protocol (RTP), and Signaling protocols, and review the essential functions provided by these protocols.
- Understand the general description of Internet calling protocols and comprehend their operational mechanisms.
- Identify the data exchanged between the client and the server for each protocol.
- Grasp the technical aspects of concepts and terminologies related to Internet calling applications and their configurations.
- Understand the framework of the telephony communication system, its underlying fundamental concepts, and the global standards utilized.
- Utilize Internet calling applications such as Ekiga, Asterisk, Open SIP, and others.

Syllabus

- **Introduction to Fixed Telecommunications:** Basic elements of PSTN, routing and signaling, hierarchical network elements, compatibility with internet access.
- **Overview of the Queuing Theory.**
- **Codification:** Sound coding, encoding quality, transmission quality, RTP and RTCP, Erlang concept.
- **Signaling Protocols:** Principles in signaling, H323, H225, H245, SCTP, MGCP.
- **SIP Protocol:** Protocol structure and operation, SIP URI, Messages, Methods, Request-response model, Headers.
- **Extensions and Use Cases:** DTMF, Call transfer, Conferencing, Call back, Terminal mobility.
- **QoS in IP Network:** Architecture, Intserv implementation, RSVP tunneling, Diffserv implementation, Queuing and Marking Techniques, Token bucket.
- **IP Multimedia Subsystem:** 3GPP, IMS.
- **Preparation for Practical Exercises:** Setting up the virtual machine, Ekiga.
- **SIP Practical Session:** Open SIP.