

Course Specification Document

Title	Protocols of Internet Services
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Credits	5 ECTS
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Aims	This course aims to study some of the protocols used on the Internet belonging to the Application Layer of the TCP/IP network model. It involves understanding the basic Internet services built on these protocols, all of which utilize the client/server technology. This includes email service, web service, file transfer service, identity verification service and remote access service, in addition to studying network management systems.
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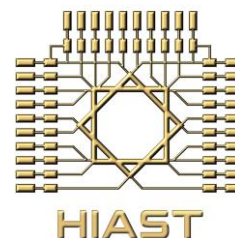
Intended learning outcomes

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

- Understand the operational mechanism of basic Internet services, including email service, web service, file transfer service, identity verification service, and remote access service, and review the key functions provided by these services.
- Familiarize himself with the general description of Internet protocols and understand their operational methods.
- Understand the data exchange structure between the client and server for each service.
- Grasp the technical dimension of concepts and terminologies related to Internet applications and their configurations.
- Understand the framework for network management systems, the underlying basic concepts, and the global standards used.
- Understand the general description of the SNMP protocol and the operational mechanism of supported commands.
- Analyze the data passing through the network and identify the service or protocol it corresponds to.
- Use Internet applications (Outlook, browsers, FTP, etc.).
- Utilize testing tools and query name servers such as nslookup, dig, and others.
- Test network services using telnet.
- Navigate through the Management Information Base (MIB) tree.

Syllabus

- **Fundamental concepts:** Definition of protocol, review of the OSI model and TCP/IP model, understanding the concept of network port, client/server concept, and Request for Comments (RFCs) documents.
- **TELNET protocol:** Protocol structure and operational mechanism.
- **Domain Name System (DNS):** Naming and the DNS domain system, DNS protocol.



- **Email system (E-Mail):** Components of the email system and how it works, email message structure.
- **Multipurpose Internet Mail Extensions (MIME):** General structure, types, encoding.
- **Simple Mail Transfer Protocol (SMTP):** Protocol structure and operational mechanism.
- **Post Office Protocol version 3 (POP3):** Protocol structure and operational mechanism.
- **Internet Message Access Protocol version 4 (IMAP4):** Protocol structure and operational mechanism.
- **File Transfer Protocol (FTP):** File transfer service, protocol structure and operational mechanism.
- **Trivial File Transfer Protocol (TFTP):** Protocol structure and operational mechanism.
- **Web and Hypertext Transfer Protocol (HTTP):** Web service, protocol structure, and operational mechanism.
- **Remote Authentication Dial-In User Service (RADIUS):** Remote user authentication service, protocol structure, and operational mechanism.
- **Network management system:** General introduction to network management and major global standards, an overview of the Simple Network Management Protocol (SNMP) framework, Management Information Base (MIB), Structure of Management Information (SMI) language, SNMP protocol.
- **Practical Sessions:**
 - **Setting up an environment for practical exercises:** Configuring the virtual machine, practicing with the Wireshark program.
 - **Setting up a local network with its services:**
 - Configuring name servers and linking them.
 - Configuring email servers and linking them.
 - Configuring a web server with hosting service.
 - **Learn about the network management system.**
 - **Building small network and equipping it with a management system.**