

## **FDA050**

# **TCP/IP Architecture and Protocols (ECSEL)**

### **Lectures:**

24 h.

### **Recommended for**

All ECSEL students.

### **The course was last given:**

Fall 2000.

### **Goals**

The goal of the course is to provide an overview of the numerous communication protocols and services that comprise the core functionality of the TCP/IP Internet. After the course a student should have an understanding, based on knowledge of the underlying technologies, of the possibilities and limitations present in the current Internet. The student should also be familiar with ongoing development and its possible impact on the kind of services that will be available to the end user in the future.

### **Prerequisites**

Undergraduate network technology course TDTS41.

In case many participants are uncertain about their background prerequisite knowledge, there is a possibility to arrange an introduction half-day to computer networks. We assume that the participants would be complementing by self-study.

Basic knowledge in computer security (see Ecsel's course in Basic Computer Security)

### **Organization**

Lectures (8 lectures of 3 hours each) Seminars for presentation of implementation exercises and/or term papers.

### **Contents**

The course touches upon many areas as shown below. The focus is on the protocols from the network layer and upwards, although some physical and link layer concepts are discussed in the beginning.

As well as giving information about the specific protocols, the course also aims to convey the architecture and philosophies behind the Internet protocols. Also, while future extensions and emerging protocols are discussed, the focus is on the currently deployed protocols.

The following preliminary lecture plan shows the topics covered:

#### **Lecture 1**

- Course organization

- Introduction

- Basic principles, terminology, layering

- The physical layer (brief discussion of media and topologies)

- The link layer (e.g. Ethernet, PPP)

- Internet organization and standards

## Lecture 2

- The network layer (IP, ICMP)
- Link layer address resolution (ARP)
- Host auto-configuration (BOOTP, DHCP)
- Routing

## Lecture 3

- The connection-less transport layer (UDP)
- The connection-oriented transport layer (TCP)

## Lecture 4

- Remote login protocols (telnet, rsh, SSH, X)
- File transfer protocols (FTP, HTTP)
- E-mail protocols (SMTP, POP, IMAP, MIME)
- News protocols (NNTP)

## Lecture 5

- API to the transport layer: sockets
- Data representation and remote procedure calls: XDR, RPC, ASN.1
- Distributed file systems (NFS)

## Lecture 6

- Dmain Name System (DNS)
- Network Time Protocol (NTP)
- Network management (SNMP)

## Lecture 7

- Security issues in TCP/IP
- Firewalls
- IPsec

## Lecture 8

- Multicast
- QoS
- IPv6
- Emerging application protocols

## **Related Courses**

- Basic Computer Security
- Cryptology
- Applied Network Security
- Network Services and Protocols with new themes

## **Literature**

Stevens, W. Richard, TCP/IP Illustrated, Volume 1, The Protocols, ISBN 0-201-66346-9, Addison-Wesley.

Request For Comments (RFC) documents and other information available on the Internet

**Teachers**

Kent Engström, UNIT. Some parts of the lectures may be given by invited speakers.

**Examiner**

Nahid Shahmehri.

**Schedule**

Fall 2002.

**Examination**

Open-book written exam. During the exam any written material is allowed.

For additional practice and credits, the participants can choose to do an implementation exercise or write a term paper for extra credits.

**Credit**

5+2 credits.

**Comments**

Related Courses:

Basic Computer Security.

Cryptology.

Applied Network Security.

Network Services and Protocols with new themes.