Course description:

The lecture is an introduction to a wide range of topics of computer networks. They will be presented on the basic principles of computer networks, with particular emphasis on networks based on TCP / IP, and an overview of common network applications on the Internet. The emphasis will be on presenting the listener mechanisms, protocols and algorithmic foundations behind the problems in communication networks, as well as the practical use of this knowledge elements.

Program:

1. Basic concepts, models layered, RFCs.
2. LAN technology, Ethernet CSMA / CD, switches and bridges, total
   CRC.
3. The network layer protocol IP CIDR addressing, static routing, collaboration with a layer
   Data Link (ARP, DHCP), NAT, ICMP control protocol.
4. The transport layer (TCP and UDP) ports, basics of programming network services
   (BSD sockets), the flow control algorithm.
5. Wireless networks.
6. Application layer: DNS, FTP, HTTP proxy servers, peer-to-peer network.
7. Dynamic Routing: algorithms based on distance vectors (RIP) and the status of the links (OSPF)
   hierarchical routing.
8. Elements of cryptography: encryption, digital signatures, certificates, SSL, PGP.
9. E-mail: SMTP, MIME, spam filters.
10. Fundamentals of Network Security: attacks, firewall tunnels.

Prerequisites:

- Algebra
- Programming in C
- Support Linux (command line, simple scripts)

Literature:

- James F. Kuros, Keith W. Ross, Computer Networking. From the general to the specific to the Internet in the background, Helion 2006.
- Andrew S. Tanenbaum, Computer Networks, Helion 2004.
- W. Richard Stevens, Unix programming network services, Volume 1, WNT 2000.