Title: Telecommunication Networks

Lecturer: Prof. Dr. Drago Hercog

Aim of the course:
To explain the basics of telecommunication networks operation and to present some characteristic network examples

Required (pre)knowledge:
Basic physics, basic computer science

Contents:
Basics of information transfer: types of information; modes of information transfer (analog and digital, circuit- and packet-oriented, synchronous and asynchronous, connection oriented and connectionless, signaling); communication traffic and efficiency; quality of service (errors, losses, delays, delay variation); information type versus transfer mode; circuit emulation; communication systems architecture (network, topology, protocol stack, communication planes); message synchronisation (with synchronous and asynchronous transfer); multiplexing/demultiplexing (SDM, FDM, TDM, CDM, statistical multiplexing, packet multiplexing); addressing; routing (principles, routing tables, routing algorithms, examples of routing algorithms); switching (principles, control, circuit switching, packet switching); medium acces control (principles, classification of methods); flow/congestion control; service integration.

Examples of telecommunication networks: telephone networks (services, structure, access networks, multiplexing in transport networks, signaling and SS7, data transfer); Internet; ATM; Voice over IP.

Selected references:
1. Stallings, W., Data and Computer Communications, 9th Ed., Pearson Prentice Hall, Upper Saddle River, N.J., 2011
2. Olifer, N., Olifer, V., Computer Networks: Principles, Technologies, and Protocols for Network Design, John WIley & Sons, 2006
3. Stevens, W. R., TCP/IP Illustrated, Volume I.: The Protocols, Addison Wesley, Reading, MA., 1994
4. Gibson, J. D., The Communications Handbook, CRC Press and IEEE Press, 1997