Complex exam	Structure and modelling of infocommunication- and
major subject	complex networks

Construction and performance of infocommunication **Syllabus** systems, design of networks, wired and wireless networks. The routing and switching mechanisms of the next generation computer networks. Computer science aspects of measuring systems. Modeling of info-communication systems, performance evaluation tools. Basic queueing systems: concepts, notations, Little-law, Poisson-process and its properties. Birth-death processes, existence of steadystate distribution, derivation of transient and stationary distribution. Queueing systems based on birth-death processes. M/M/1 queueing systems and its properties, Erlang-loss formulas, Markov-type arrival and service processes. Basic concepts of networks, basics of graph theory. Quantities characterizing networks. The small-world property. Scale-free networks. Networks models (Erdős-Rényi model, Watts-Strogatz model, Barabási-Albert model, etc.) and their implementation by computer. Properties of in our natural-, social-and technological networks environment. Processes on networks and their simulation.

Bibliography

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- 4. **J.F. Hayes, T.V.J. Babu:** Modeling and Analysis of Telecommunication Networks, Wiley-Interscience, Hoboken, 2004
- 5. L. L. Peterson, B. S. Davie: Computer Networks: A Systems Approach, The Morgan Kaufmann, 2012.
- 6. L. Lakatos, L. Szeidl, M. Telek: Introduction to Queueing Systems with Telecommunication Applications, Springer, New York, 2013.
- 7. **M. Newman**: Networks: An Introduction, Oxford University Press, 2010

Routing and Switching Network Science Queueing Theory Stochastic Modeling of Informatics Systems Tools for Network Modeling Agent-based models and simulation methods

Compulsory subjects for this major subject

Recommended subjects for this major subject