UNIVERSITY OF DEBRECEN
Doctoral School of Informatics

Complex exam minor subject	Communication Networks and Protocols
Syllabus	The working mechanisms of the different switching technologies (packet-, circuit-, cell switching). Classification criteria and types of the data networks. Communication media types and their characteristics. Signal coding and modulation technics. Network node types and functions provided by them. Medium access and control mechanisms. Addressing technics. Structure and functions of the datagram protocol data unit. Types and characteristics of the topologies. Mobile and broadcasting networks. Elements and execution of the communication protocol. Technologies of the new generation mobile communication. Computer networks, protocol technology, protocol graphs, finite state machines. Protocol specification languages (SDL, MSC, ASN1, TTCN). Protocol validation and verification. TCP/IP and OSI networking. Reference models and comparison, IP/TCP/UDP protocols, interfaces, services. System analysis and planning for communication networks. Multiple paths communication technologies. Named networking. Address conversion mechanisms. Routing, flow control, error management and quality of service solutions. Internet based application level mechanisms. Next generation and Software Defined Networks, Network Function Virtualization. Network management solutions (SNMP, RMON, OpneFlow).
Bibliography	1. Richard Lai, Ajin Jirachiefpattana: Communication Protocol Specification and Verification (The Springer International Series in Engineering and Computer Science), ISBN-13: 978-1461375371, 2013. 2. Hartmut König: Protocol Engineering, Springer, ISBN-13: 978-3642440939, 2014. 3. Andrew S. Tanenbaum, David J. Wetherall: Computer Networks (5th Edition), Pearson, ISBN-13: 978-0132126953, 2010. 4. Regis "Bud" Bates, Donald Gregory: Voice & Data Communications Handbook, Fifth Edition (McGraw-Hill Communication Series), ISBN-13: 978-0072263350, 2006. 5. RFC and RFC Draft documents; http://www.ietf.org/ 6. IEEE Communications Society, Standards and Specifications http://www.comsoc.org/
Compulsory subjects for this minor subject	Routing and Switching
Recommended subjects for this minor subject	