Blended Intensive Programme (BIP)

Main topic:

Network Technologies

BIP number:

Date:

Virtual activities (online): 17. 8. 2026

Physical activities: 24. 8. – 28. 8. 2026

Preliminary schedule

Day	Group	Morning	Afternoon
Monday 17. 8.	1 + 2	9:00 – 11:00 Virtual activity (online via Microsoft Teams)	
Monday 24. 8.	1	9:00 – 12:30 Computer Networks (Lab EB215)	14:30 Excursion in National Supercomputing Center 17:00 Minigolf + refreshment
	2	9:00 – 12:30 Cyber Security in Communications (Lab EB210)	
Tuesday 25. 8.	1	9:00 – 12:30 Cyber Security in Communications (Lab EB210)	15:00 Excursion in Dolní Vítkovice (technical national cultural heritage)
	2	9:00 – 12:30 Computer Networks (Lab EB215)	

Wednesday 26. 8.	1	9:00 – 12:30 Wireless Networks (Lab EB209)	15:00 Excursion in mobile base station
	2	9:00 – 12:30 Optical Networks (Lab EB316)	
Thursday 27. 8.	1	9:00 – 12:30 Optical Networks (Lab EB316)	14:30 Esport (Lab EB317)
	2	9:00 – 12:30 Access Networks (Lab EB211)	14:30 Multimedia laboratory (Lab N315)
Friday 28. 8.	1	9:00 – 12:30 Access Networks (Lab EB211)	14:30 Multimedia laboratory (Lab N315)
	2	9:00 – 12:30 Wireless Networks (Lab EB209)	14:30 Esport (Lab EB317)

The topic of **computer networks** is focused on IP-based communication networks which are currently the most widespread. Attention is paid to the TCP/IP protocol model, IPv4 and IPv6 addressing, UDP and TCP protocols. The emphasis is also placed on the practical aspects of building such computer networks. In the practical part, students will measure throughput and delay in various types of computer networks using metallic and optical transmission media. The measurement will be carried out using the Iperf tool.

The topic of **cyber security in communications** is devoted to the evolution of the cyber security from historical milestones, through modern cryptographic methods and technologies that we use every day without even knowing it, to an outline of the future of cryptography in the form of quantum key distribution and risks in the form of using a quantum computer for cryptanalysis of current algorithms. As part of the topic, specific examples of historical, current, and future communication security techniques will be presented, both in the field of authentication, authorization, and encryption. In the practical part, students will implement digital signature and encryption of e-mail using S/MIME and PGP.

Students will learn the basic aspects of **wireless networks**, with the theoretical part focusing on a detailed description of current 5G technology and the emerging concepts of future 6G networks. As part of the course, students will carry out practical exercises, including the simulation of 5G base station coverage using a dedicated simulation tool. They will also gain insight into the functioning and use of a 5G private campus network (https://5g-campus.vsb.cz/). The program further includes a visit to the antenna anechoic chamber located in the faculty building (https://labek.vsb.cz/en), a facility designed for precise measurements in the field of electromagnetic wave propagation. On Wednesday, an excursion is planned to a real base station in Ostrava, where students will have the opportunity to see actual mobile network infrastructure such as radio units, antennas, and optical backbone connections. This excursion will complement the individual tasks and provide professional commentary to link theory with real-world applications.

The topic of **optical networks** focuses on GPON (Gigabit Passive Optical Network) technology, which allows users to connect to the Internet at multigigabit speeds using optical fiber. This technology is gradually becoming the dominant method of high-speed Internet connection. Students will learn the basics of setting up GPON optical network (basic setting of ONT, connecting ONU) and basic optical network measurements currently used in practice (OTDR, EtherSAM, RFC6349 or ITU-T Y.1564). Students will work in groups of three, so that there will be no collision of used devices and testers.

The topic of **access networks** deals with practical measurements in the xDSL network (ADSL, VDSL), configuration of DSLAM (Digital Subscriber Line Access Multiplexer), analysing services depending on the distance between the user and DSLAM.

In the **multimedia laboratory,** students can familiarize themselves with the work in a small multimedia studio, cameras, sound, lighting, online editing, broadcasting live stream.

Contact:

Petr Machník

Department of Telecommunications

Faculty of Electrical Engineering and Computer Science

VSB – Technical University of Ostrava

17. listopadu 2172/15

708 00 Ostrava, Czech Republic

e-mail: petr.machnik@vsb.cz

phone: +420 597 325 841