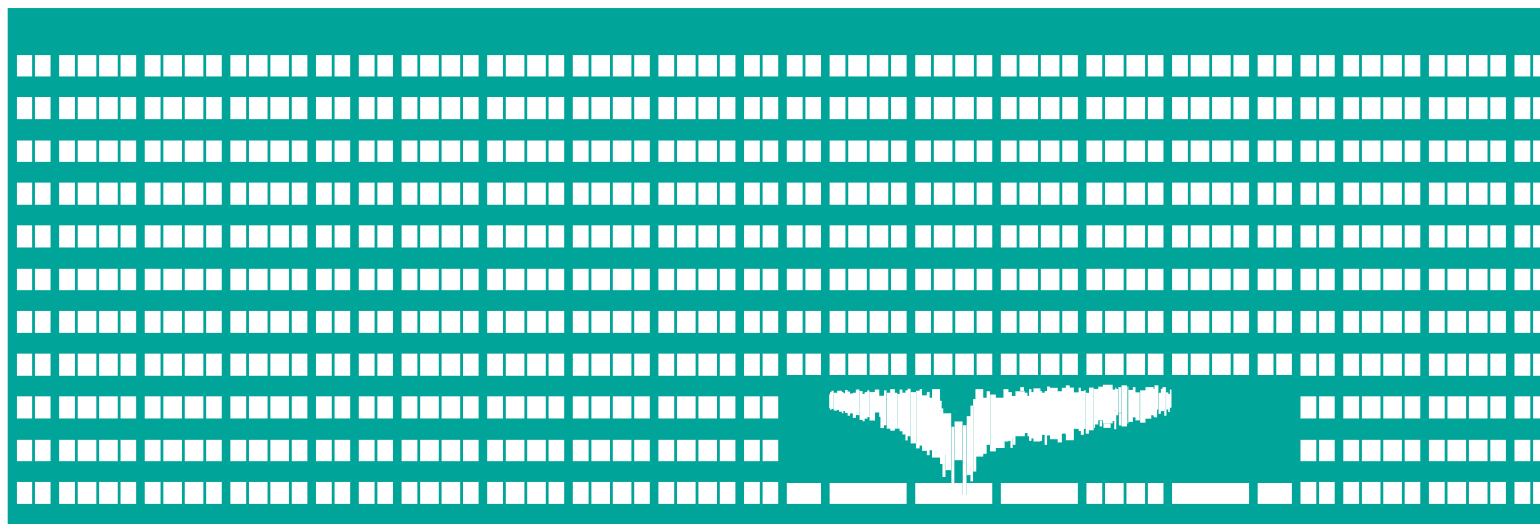


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Blended Intensive Programme (BIP) Network Technologies

Virtual Component

Petr Machník

18. 8. 2025

- Participating universities:
 - **VSB – Technical University of Ostrava (Czechia)**
 - **Frankfurt University of Applied Sciences (Germany)**
 - **Klaipeda University (Lithuania)**
 - **Polytechnic University of Lisbon (Portugal)**
- Number of students: 19
- Date: virtual activities – **18. 8. 2025**, physical activities – **25. 8. – 29. 8. 2025**
- BIP number: 2024-1-CZ01-KA131-HED-000199317-1
- Number of ECTS credits: 4
- Website: <https://www.fei.vsb.cz/440/en/study/erasmus-blended-intensive-programme/>
- University campus map: <https://www.vsb.cz/en/university/contacts-maps-parking/campus-maps/>

**Schedule of BIP
Network Technologies**

Day	Group	Morning	Afternoon
Monday 18. 8.	1 + 2	9:00 – 11:00 Virtual activity (online via Microsoft Teams)	
Monday 25. 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 26. 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)	

Day	Group	Morning	Afternoon
Wednesday 27. 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 28. 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 29. 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), analyzing 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.

Project Assignment

- The aim of the project is to familiarise students with the various technologies currently used to access the Internet. Due to the different historical development of communication infrastructure, different geographical and demographic conditions, there are differences in the degree of spread of individual Internet technologies in various European countries.
- Before starting the physical component, BIP participants should find out which technologies are used to access the Internet in their country, and which are the most widespread. They should also find out which ones they use at home or at school.
- During the physical component of the BIP, the students will be divided into groups consisting of representatives of all participating universities. Within these groups, they will then elaborate a joint project that will compare the differences in the technologies used in individual countries. Regional differences, city vs. countryside, offered transmission speeds, prices, etc. will also be taken into account.

Group	Students' names	University
1A	Duarte de Sousa Silva	ISEL
	Masoud Fahim	Frankfurt UAS
	Gaučys Ovidijus	KU
1B	Diogo Cerqueira de Lima	ISEL
	Micheal Vanek	Frankfurt UAS
	Janavičiūtė Saulė	KU
1C	Marco Martins Correia	ISEL
	Janko-Jorgos Turkic	Frankfurt UAS
	Janušauskas Ervinas	KU

Group	Students' names	University
2A	Daniel Ribeiro Nunes	ISEL
	Ahmet Anil Köksaldi	Frankfurt UAS
	Navickaitė Asutėja Jonė	KU
2B	Lucas Sebastião de Oliveira Silva	ISEL
	Nasir Ishaq	Frankfurt UAS
	Komarov Aleks	KU
	Razmadze Dominykas	KU
2C	Muhammad Haris Madmoud	Frankfurt UAS
	Tamošauskas Saulius	KU
	Užkuraitis Domas	KU

More Information

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