Blended Intensive Programme

Applied Artificial Intelligence

University of Bielsko-Biala, Poland
Faculty of Mechanical Engineering and Computer Science

Virtual part: **8th - 15th** **of April 2024**
Physical mobility: **22nd - 26th** **of April 2024**

ABOUT US

The University of Bielsko-Biala was founded in October 2001 as an independent governmental academic institution. At present, about 5,000 students study at five faculties: Faculty of Mechanical Engineering and Computer Science; Faculty of Materials, Civil and Environmental Engineering; Faculty of Management and Transport; Faculty of Humanities and Social Sciences, and Faculty of Health Sciences. The University employs about 400 people, including 200 experienced professors and other academic staff. As the only state educational institution in the Podbeskidzie region which provides tertiary education, the University of Bielsko-Biala has a vibrant community of ambitious individuals who contribute to the University's research and didactic potential by constantly attaining their professional, educational and social goals. The University is firmly rooted in the region which is reflected in various enterprises with members of the community and also in its research interests.

The "Blended Intensive Program on Applied Artificial Intelligence" offers a comprehensive overview of AI concepts through a combination of remote lectures and stationary practicals. The program covers diverse topics to provide participants with a well-rounded understanding of applied AI.

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Welcome Point

Virtual part – run before the physical mobility

The area of lectures and laboratories:

1. Background of Artificial Intelligence and Classic Machine Learning
   - ✓ Introduction to AI fundamentals and the basics of classical machine learning.
2. Convolutional Neural Networks (CNN). Image Recognition
   - ✓ Exploring CNNs and their application in image recognition, enabling participants to grasp key concepts in computer vision
3. Recurrent Neural Networks (RNN). Signal Processing
   - ✓ Understanding RNNs and their relevance in signal processing tasks, emphasizing their sequential data processing capabilities
4. Generative Models. Natural Language Processing
   - ✓ Delving into generative models and their role in Natural Language Processing (NLP) for text generation and understanding
5. Metaheuristics and Evolutionary Programming
   - ✓ Exploration of metaheuristics and evolutionary programming as optimization techniques in AI, providing a broader perspective on problem-solving approaches
6. Reinforcement Learning
   - ✓ Overview of reinforcement learning, including its applications and implications for developing intelligent systems capable of decision-making

Physical mobility

The area of lectures:

1. AI for Healthcare
   - ✓ Applications of AI in the healthcare sector, including diagnosis, treatment optimization, and patient care
2. AI for Automatics and Robotics

- ✓ Integration of AI in automatics and robotics, showcasing advancements in automation and intelligent control systems

3. AI for Industry (Metallurgy)
   - ✓ Utilizing AI to enhance processes in the metallurgy industry, focusing on efficiency, quality control, and predictive maintenance
4. AI for Cybersecurity
   - ✓ Examining the role of AI in cybersecurity, covering threat detection, anomaly identification, and risk mitigation
5. AI for Research
   - ✓ Highlighting how AI is transforming research methodologies across various disciplines, from data analysis to hypothesis generation
6. AI for Biometrics
   - ✓ Exploring AI applications in biometrics for secure and accurate identity verification
7. AI for Art
   - ✓ Understanding how AI is influencing and contributing to the field of art, including generative art and creative applications
8. AI for Virtual Reality (VR)
   - ✓ Discussing the intersection of AI and VR, showcasing how AI enhances virtual experiences and simulations

The program's blended approach, combining theoretical understanding through remote lectures and practical application in stationary sessions, ensures participants gain a comprehensive skill set in Applied Artificial Intelligence across diverse domains.

The maximum number of participants in this BIP is limited to 35, but at least 10 participants (students) from each university

Forms of activity

- ✓ Online lectures before arrival - 0.5 ECTS (12 hours)
- ✓ Part organized at our University 1.5 ECTS (lectures, workshops and study visits)
- ✓ Students' own work - 1 ECTS (25 hours)

Number of credits for BIP – 3 ECTS

Practical information for physical component

- ✓ Venue: Campus of the University of Bielsko-Biala, 2 Willowa Str.
- ✓ Dates: 22nd - 26th of April 2024

PROGRAMME

Virtual part (MS Teams Platform)

Monday, 8th April

15^{00}-16^{30} *Background of Artificial Intelligence. Classic Machine Learning* – Marcin Bernaś, PhD.

Tuesday, 9th April

15^{00}-16^{30} *Convolutional Neural Networks. Image Recognition* – Łukasz Więcław, PhD.

Wednesday, 10th April

15^{00}-16^{30} *Recurrent Neural Networks. Signal Processing* – Prof. Vasyl Martsenyuk

Thursday, 11th April

15^{00}-16^{30} *Generative Models. Natural Language Processing* – Łukasz Hamera, MSc.

Friday, 12th April

15^{00}-16^{30} *Metaheuristics and Evolutionary Programming* – Prof. Mirosław Kordos

Monday, 15th April

15^{00}-16^{30} *Reinforcement Learning* – Prof. Vasyl Martsenyuk

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Welcome Point

Physical mobility (Campus of the University of Bielsko-Biala)

Sunday, 21st April

Accommodation in Bielsko-Biala

Monday, 22nd April

8^{30}-9^{00}	*Registration and morning coffee*
9^{00}-9^{15}	*Official opening of the Blended Intensive Programme and welcome of the guests* Prof. Vasyl Martsenyuk and Prof. Andrzej Urbaś
9^{15}-10^{00}	*Presentation of the University of Bielsko-Biala and its academic campus* Dagmara Mika, PhD.
10^{00}-10^{45}	*Poland and Bielsko-Biala – a city of many possibilities for foreign students*
10^{45}-11^{00}	*Coffee break*
11^{00}-11^{45}	*Get to know each other – integration workshops*
13^{45}-12^{15}	*We speak Polish – what's your superpower?*
12^{15}-13^{00}	*Lunch*
13^{15}-14^{45}	*AI for Healthcare* – Prof. Vasyl Martsenyuk
15^{00}-16^{30}	*AI for Automatics and Robotics* – Daniel Jancarczyk, PhD.

Tuesday, 23rd April

8^{30}-13^{00}	*Excursion to Regional Development Agency – practical workshop – Bartosz Dębowski, MSc.* *Excursion to Rekord IT Systems – practical workshop – Bartosz Dębowski, MSc.*
13^{15}-14^{00}	*Lunch*
14^{15}-15^{45}	*AI for Industry. Metallurgy* – Prof. Mirosław Kordos
16^{00}-17^{30}	*AI for Cybersecurity* – Ruslan Shevchuk, PhD.
17^{30}	*In the afternoon. Guided city tour*

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Welcome Point

Wednesday, 24th April

8^{30}-9^{00}	*Registration and morning coffee*
9^{00}-10^{30}	*AI for Research* – Aleksandra Kłos-Witkowska, PhD.
10^{45}-12^{15}	*AI for Biometrics* – Łukasz Więcław, PhD.
12^{30}-13^{15}	*Lunch*
13^{30}-15^{00}	*AI for Art* – Mikołaj Grygiel, MSc.
15^{15}-16^{45}	*AI for VR* – Marcin Bernaś, PhD.

Thursday, 25th April

8^{00}-17^{00}	*Excursion to Guido Coal Mine (https://kopalniaguido.pl)*

Friday, 26th April

8^{30}-9^{00}	*Registration and morning coffee*
9^{00}-11^{30}	*Group project presentation*
12^{30}-13^{00}	*BIP evaluation and certificates*
	Prof. Vasyl Martsenyuk and Prof. Andrzej Urbaś
13^{00}-14^{00}	*Lunch*

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