Program	Type of studies (cycle)	Third cycle
	Name of the program	Doctoral Studies in Mathematical and Computer Science

COURSE

Course title	**Artificial Intelligence Techniques for Audio and Video Content Processing**

Course code	Semester	Course status	ECTS credits	Contact hours
CS 665	II	elective	10	30

Aims and intended learning outcomes	The aim of the course is to introduce students to the methods and techniques of applying artificial intelligence (AI) to the analysis and processing of audio and video content. Throughout the course, students acquire theoretical and practical knowledge of the development and implementation of AI models for various multimedia processing tasks, including speech recognition, object detection and tracking, signal analysis, and content classification. The focus is on the application of contemporary tools and algorithms in real projects and analyses. Upon successful completion of the course, the student is expected to be able to apply artificial intelligence to the analysis and processing of audio and video data, to develop and implement AI models for speech recognition, object detection, and multimedia content analysis, and to use large language models (LLM) for various tasks in the analysis of audio and video material.

Course content/topics

- Introduction to the analysis of audio and video content using AI
- Fundamentals of signal processing and pattern recognition
- Audio analysis: speech recognition and sound detection
- Video analysis: object detection and tracking
- Deep neural networks in multimedia analysis
- Application of LLMs in the analysis of audio and video content
- Use of tools and libraries for audio and video content analysis
- Ethics and responsibility in multimedia analysis

LITERATURE

[1] Understanding Deep Learning, Simon J. D. Prince

[2] Computer Vision: Algorithms and Applications, Richard Szeliski

[3] Course materials

[4] Scientific papers in the field of the course

Grading

	Criterion	Points	Cut-off points
1.	Assignments	50	27.5
2.	Project	50	27.5
3	Final exam		
	T o t a l	100	55