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MODULE DESCRIPTION CARD – SYLLABUS

This module is a part of the Intensive International Education Programs in the field of the Artificial Intelligence organised at Poznan University of Technology as part of the „IMPACT – Innowacyjne Międzynarodowe Programy w AI, Cyberbezpieczeństwie i Teleinformatyce” project implemented SPINAKER Program of the National Agency for Academic Exchange, financed by the European Social Development Fund 2021–2027 (ESDF).

Module name:

Process Mining

Number of hours:

10

Lecturer:

Tomasz P. Pawlak, PhD, DSc

Module Descriptions:

Purpose of the support under Module:

The overall objective of the Innovative International Education Program in Artificial Intelligence is to raise the competencies of international students in key digital technologies and to support personalized, flexible, and modern education aligned with current global needs in the area of Artificial Intelligence. The specific objective of the module is to provide competencies and promote activities carried out at the Poznan University of Technology in the area of Process Mining. Specifically, it provides students with basic knowledge of modeling tools, execution, management, and business process analysis. It develops students' ability to solve problems related to designing and discovering business processes from event logs using technologies applied in business. It also strengthens students' skills in process diagnostics and improvement with the support of business tools. Finally, it fosters analytical thinking and the ability to draw conclusions based on observations and analytical models.

Method of support under Module:

Support within the module is provided with the participation of the instructor and divided into the following elements:

- 6-week self-study program using teaching materials provided by the instructor on the e-learning platform;
- 6 weeks of support from the instructor in the form of online consultations using tools that enable meetings to be held;
- a test to verify the acquisition of competences.

Module-related learning outcomes:

Descriptions of the new competences:

Upon completing the course, the student gains competencies in understanding business processes, process mining, business process management, and management methodologies such as Lean and Six Sigma. They acquire skills in modeling business processes using various notations, including Petri nets, BPMN, and process trees, as well as verifying and analyzing processes based on formal models. They learn how to prepare data for analysis, carry out ETL processes, and assess data quality. Additionally, the student becomes familiar with both basic and advanced process discovery algorithms (including Alpha, Heuristic Miner, and Inductive



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Miner). The course also equips them with skills in process conformance checking, diagnosing deviations, and understanding alternative process perspectives focused on resources, costs, and efficiency.

Knowledge:

1. The student has advanced and in-depth knowledge of systems supporting modeling, control, and implementation of business processes, theoretical foundations of their operation, as well as methods and tools used in the implementation of business processes.
2. The student has advanced detailed knowledge of modeling, discovering from event logs, analysis and diagnostics of business processes.
3. The student knows advanced methods, techniques and tools used in solving complex tasks of modeling and analyzing business processes and conducting research in the field of these tasks.

Skills:

1. When formulating and solving engineering tasks, the student is able to integrate knowledge from various areas of computer science and artificial intelligence, and if necessary also economics, and to apply a system approach, taking into account also non-technical aspects.
2. The student is able to assess the usefulness and possibility of using new achievements (methods and tools) and new IT products used in business.
3. The student can correctly use the chosen method of estimating the labor consumption of new AI products used in business.
4. The student is able to apply conceptually new methods, solve complex computer science and tasks, including artificial intelligence tasks and tasks with a research component.

Social competences:

1. The student understands that in computer science and artificial intelligence knowledge and skills very quickly become obsolete.
2. The student understands the importance of using the latest knowledge in the field of computer science and artificial intelligence in solving research and practical problems.

Criteria for verifying learning outcomes

Formative assessment: on the basis of answers to questions about the material discussed in the lectures.

Method of verification/validation of learning outcomes

Summative assessment: the verification of the assumed learning outcomes is carried out by: assessment of knowledge and skills demonstrated in the written exam consisting of a set of closed questions, from which each question can be answered with one correct answer out of four possible. For each correct answer 1 point is obtained. To obtain a grade of 3.0, a minimum of 50% of points should be obtained, 3.5 - 60%, 4.0 - 70%, 4.5 - 80%, 5.0 - 90%.

Workload



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25 h (including work with teaching materials provided by the lecturer, consultation, and the student's own work) – 1 ECTS point

Level of the European Qualifications Framework



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