Syllabus

Course Description

Course Title	Codeless Machine Learning in KNIME
Course Code	71078
Course Title Additional	
Scientific-Disciplinary Sector	IINF-05/A
Language	English
Degree Course	PhD Programme in Computer Science
Other Degree Courses (Loaned)	
Lecturers	Prof. Giuseppe Di Fatta, Giuseppe.DiFatta@unibz.it https://www.unibz.it/en/faculties/engineering/academic-staff/person/46582
Teaching Assistant	
Semester	Second semester
Course Year/s	2025 - 2026
CP	3
Teaching Hours	30
Lab Hours	0
Individual Study Hours	45
Planned Office Hours	-
Contents Summary	KNIME Analytics Platform is a widely used, free and open-source software for Data Science and Machine Learning. It can be used to create visual workflows for data processing and model building for descriptive and predictive Machine Learning methods. This platform is particularly popular and valued for its user-friendly interface and its openness, particularly to other external tools (e.g., JDBC drivers, MS Power BI, AWS, Tableau), programming languages (e.g., Java, Python, R) and popular Machine Learning libraries (e.g., H2O, Weka, Keras, Tensorflow). The course introduces the platform, its user interface, and its rich repository of data manipulation methods and machine learning

	algorithms. It also covers KNIME's advanced features that allow implementing more complex workflows in a similar way to programming languages but in a completely visual fashion and without writing code. Examples and exercises will be carried out using datasets from real-world applications. By passing the final tests students are also awarded with KNIME Certifications on Data Science.
Course Topics	1.Introduction to "KNIME Analytics Platform" 2.Overview of methods for data manipulation 3.Main methods for data transformation and crosstabulation 4.Main methods for data visualization 5.Introduction to basic Machine Learning concepts and methods 6.Introduction to main algorithms for Regression 7.Introduction to main algorithms for Clustering 8.Introduction to main algorithms for Classification 9.Design of KNIME workflows for Machine Learning 10.Codeless and advanced techniques in KNIME for programmability 11.Codeless and advanced techniques in KNIME for modularity 12.Codeless and advanced techniques in KNIME for abstraction 13.Integration of external tools and programming languages into KNIME 14.Configuration of libraries for Deep Learning in KNIME 15.Design of data workflow with the use of libraries for Deep Learning in KNIME
Keywords	Machine Learning, Data Science, KNIME
Recommended Prerequisites	
Propaedeutic Courses	
Teaching Format	Frontal lectures and exercices
Mandatory Attendance	Attendance is compulsory
Specific Educational Objectives and Learning Outcomes	Knowledge and understanding: • D1.1 - Knowledge of the key concepts and technologies of data science disciplines • D1.2 - Understanding of the skills, tools and techniques required for an effective use of data science • D1.11 - Knowledge of the main machine learning algorithms for data analysis Applying knowledge and understanding:

	• D2.2 - Ability to address and solve a problem using scientific methods • D2.4 - Ability to develop programmes and use tools for the analysis of data Making judgments • D3.2 - Ability to autonomously select the documentation (in the form of books, web, magazines, etc.) needed to keep up to date in a given sector Communication skills • D4.1 - Ability to use English at an advanced level with particular reference to disciplinary terminology. Learning skills • D5.3 - Ability to deal with problems in a systematic and creative way and to appropriate problem-solving techniques.
Specific Educational Objectives and Learning Outcomes (additional info.)	
Assessment	- Individual weekly assignments (70%) - a 30-minute multiple-choice test (10%) - a 45-minute multiple-choice test (20%) The two multiple-choice tests are also valid for the KNIME Certification Program for the L1 and L2 Certification in Data Science: - L1: Basic Proficiency in KNIME Analytics Platform - L2: Advanced Proficiency in KNIME Analytics Platform Note: non-attending students will be able to submit their assignment work online.
Evaluation Criteria	The student's grade is calculated based on the weighted average grade from the course assignments and the tests.
Required Readings	Lecture notes, tool guidelines and manual
Supplementary Readings	https://www.knime.com/certification-program
Further Information	KNIME Analytics Platform https://www.knime.com/
Sustainable Development Goals (SDGs)	Quality education