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Universities of the Future is seeking for strong cooperation between players of the quadruple helix. Our team will act as amplifier and connector to the needs, concerns, and expectations of the higher education communities (including students and alumni), business and public bodies.

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UNIVERSITIES OF THE FUTURE

COLLABORATIVE DIGITAL SHIFT TOWARDS A NEW
FRAMEWORK FOR INDUSTRY AND EDUCATION

MACHINE LEARNING AND DATA ANALYTICS TO PREDICTIVE MAINTENANCE

Short-course (2 ECTS)

universitiesofthefuture.eu

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ABOUT THE COURSE

This first course (24h) will focus on “**Machine Learning and Data Analytics to Predictive Maintenance**” and aims to give to the participants a deeper understanding of Predictive Maintenance and its advantages, as well as knowledge of the process and tools required for its implementation. At the end of the course, the participants will:

- Be able to recognize the added value of Predictive Maintenance;
- Understand the basics of Machine Learning
- Be familiar with the process of predicting failures and with some of the algorithms that can be used;
- Know some of the most commonly used intelligent data analysis tools.

SHORT-COURSE DESCRIPTION

The short-course will be hosted by **Instituto Politécnico do Porto (P.PORTO)**, at the **Porto Design Factory (PDF)**, starting on **31st January 2020** and during four weekends of February (Fridays and Saturdays). The sessions last about 3h, from **6 pm to 9 pm** (Fridays) and **10 am to 1 pm** (Saturdays). The contents and the description of each session are presented below:

SESSION 1 Introduction / Data Analysis with R (31st Jan)

- Course objectives
- Introduction to Predictive Maintenance
- Installation and configuration of the R development environment

SESSION 2 Introduction / Data Analysis with R (1st Feb)

- Installation and configuration of the R development environment (continued)
- Essential R concepts environment

SESSION 3 Machine Learning / Data Exploration (7th Feb)

- Introduction to Machine Learning
- Exploratory analysis of labelled data

SESSION 4 Supervised Learning (8th Feb)

- Supervised learning algorithms in the context of Predictive Maintenance

SESSION 5 Supervised Learning (14th Feb)

- Supervised learning algorithms in the context of Predictive Maintenance (continued)

SESSION 6 Data Exploration (15th Feb)

- Exploratory analysis of unlabelled data

SESSION 7

Unsupervised Learning (21st Feb)

- Unsupervised learning algorithms in the context of Predictive Maintenance

SESSION 8

Unsupervised Learning (22nd Feb)

- Unsupervised learning algorithms in the context of Predictive Maintenance (continued)

PURPOSE AND MOTIVATION

Competitiveness is more crucial than ever in the current economic landscape, affecting a company's ability to deliver quality products at low prices. Due to their potential to substantially reduce production costs and increase productivity, proactive maintenance practices, such as predictive maintenance, have a profound impact on business competitiveness. With predictive maintenance, maintenance interventions are performed only when necessary and before equipment failure occurs, avoiding potentially catastrophic breakdowns and unnecessary interruptions of production. Thanks to the current trend of automation and data exchange in industrial environments, assisted by the rise of the Internet of Things, a large amount of operational data is now available or can be acquired with relative ease. Machine Learning and Data Mining techniques can be used to extract knowledge from this data and support a company's decision making to improve its operations and competitiveness.

This continuous training course is free, and is part of the short courses programme that the Universities of the Future consortium is preparing to expand the current offer of academic partners in terms of lifelong learning courses. For further information please contact directly Prof Maria Teresa Pereira @ mtp@isep.ipp.pt.

REGISTRATION: to register in this short duration course, please fill the questionnaire available [here](#).

