IoT Fundamentals - Big Data & Analytics

The Internet of Things increases the opportunity for people to create and invent new devices due to lower costs and greater access. The resulting explosion of new types of devices and solutions further contributes to the exponential growth of data in the IoT. Organizations are now critically dependent on the collection, storage and analysis of this data to extract information and gain insights for the business: *Making good decisions depends on good data.* As the amount of data grows, decision makers increasingly rely on data analytics to extract the required information at the right time and in the right place to make the best decision.

Students who complete the Big Data & Analytics course will be able to perform the following functions:

- Explain how businesses can extract information and insights from IoT Data.
- Understand the steps of the Data Analysis Lifecycle and perform these tasks.
- Understand privacy and security aspects of data.
- Explain the different types of data analytics: descriptive, predictive and prescriptive.
- Use Python to create a data pipeline to acquire, manipulate and visualize sensor data.
- Apply exploratory data analysis to extract insights from data.
- Understand how Machine Learning algorithms can be used for predictive analytics.
- Present and communicate using data storytelling.
- Describe the evolution of data management technologies from SQL to NoSQL.
- Understand and explain the evolution of a modern data center computing platform and be aware of distributed scalable Big Data solutions such as Apache Hadoop, Cassandra and Spark.

Course Outline (40-50 hours of study in total)

Chapter	Big Data & Analytics	Summary Description
1	Data and the Internet of Things	Understand the concepts of Big Data & Analytics, and the role of Big Data in IoT systems.
2	Fundamentals of Data Analysis	Learn the basics of descriptive statistics, the practical aspects in acquiring data from a sensor and how to create visual representations of the data.
3	Data Analysis	Explore data using statistics and visualization to extract information and create hypotheses.
4	Advanced Analytics & Machine Learning	Learn about predictive analytics, the supervised and unsupervised approaches to Machine Learning and how to apply models to make predictions from the data.
5	Storytelling with Data	Learn how to transform analytics results into a clear and convincing narrative and visual communication.
6	Introduction to Data Center & Data Engineering	Learn the basic principles behind the most important scalable solutions for Big Data such as Apache Hadoop and the related ecosystem of technologies.