Content

Course Code	Course Name	Semester	Theory	Practice	Lab	Credit	ECTS
INF438	Advanced Databases	7	3	0	0	3	5

Prerequisites	INF324
Admission Requirements	INF324

Language of Instruction	French
Course Type	Elective
Course Level	Bachelor Degree
Objective	This course is designed for students with good basis in programming, as well as good knowledge of relational data model, relational algebra and a broad knowledge of the relational DBMS. The objective of this course is to situate and understand the tools of access to relevant information and develop an analytical framework and keys to comprehend the company's needs in a project of Data Warehousing It provides a strong competency on distributed system data storage units, query all types of databases, transform different types of data on these databases and integrate them on a single data warehouse, as well as model data warehouse and teaches reporting and questioning suitable for business intelligence to be used in business life. At the same time, it aims to provide the student with competence on Big Data architecture, analytics and data flow.
Content	1. Introduction, basic concepts, Data types 2. Basic concepts of business intelligence, introduction to OLAP systems 3. Data warehouse architecture and principles 4. Data warehouse modeling 5. ETL applications, basic concepts and tools 6.Data analysis, creating OLAP cubes, querying 7 Hierarchy, KPI and Calculation definition and MDX queries 8.Introduction to Data Engineering 9. Big Data: Basic Concepts - Introduction to RTAP systems 10. Big data ecosystem: Hadoop, HDFS, YARN and MapReduce algorithms 11.Data piplinea and Data Ingestion 12.Lambda Architecture 13. Data Processing Methods 1) Streaming processing with Kafka, Flink, Spark 2) Batch processing with HDFS, Hive, Spark 14. Big Data Analytics on cloud systems
References	1. G. Gardarin, "Internet intranet et bases de données, dataweb, datamedia, datawarehouse, datamining", Eyrolles, 1999 2. M. Jarke et al., "Fundamentals of Data Warehouses", Springer, 1999 3. M. Franco, "Le Data Warehouse, le Data Mining", Eyrolles, 1997 4. S. Chaudhuri, U. Dayal, "An overview of data warehousing and OLAP technology", Sigmod Record 26(1), 1997. 5.Krishnan, K. (2013). Data warehousing in the age of big data. Newnes. Talabis, M., McPherson, R., Miyamoto, I., & Martin, J. (2014). Information Security Analytics: Finding Security Insights, Patterns, and Anomalies in Big Data. Syngress. 6.Zikopoulos, P., & Eaton, C. (2011). Understanding big data: Analytics for enterprise class hadoop and streaming data. McGraw-Hill Osborne Media.

Theory Topics

Week	Weekly Contents
1	Introduction, basic concepts, Data types
2	Basic concepts of business intelligence, introduction to OLAP systems
3	Data warehouse architecture and principles
4	Data warehouse modeling
5	ETL applications, basic concepts and tools
6	Data analysis, creating OLAP cubes, querying

Week	Weekly Contents
7	Hierarchy, KPI and Calculation definition and MDX queries
8	Introduction to Data Engineering
9	Big Data: Basic Concepts - Introduction to RTAP systems
10	Big data ecosystem: Hadoop, HDFS, YARN and MapReduce algorithms
11	Data pipline and Data Ingestion
12	Lambda Architecture
13	Data Processing Methods 1) Streaming processing with Kafka, Flink, Spark 2) Batch processing with HDFS, Hive, Spark
14	Big Data Analytics on cloud systems