QF01/0408-4.0E	Course Plan for Bachelor program - Study Plan Development and Updating Procedures/ Artificial Intelligence Department

Study plan No.	**2021/2022**		**University Specialization**		Artificial Intelligence		
Course No.	**0142433**		**Course name**		Big Data		
Credit Hours	**3**		**Prerequisite Co-requisite**		Data Mining		
Course type	☒ MANDATORY UNIVERSITY REQUIREMENT	☐ **UNIVERSITY ELECTIVE REQUIREMENTS**	☐ **FACULTY MANDATORY REQUIREMENT**	☐ **Support course family requirements**	☐ **Mandatory requiremen ts**	Elective requirements	
Teaching style	☐ **Full online learning**		☐ **Blended learning**		☐ **Traditional learning**		
Teaching model	☐ **2Synchronous: 1asynchronous**		☐ **2 face to face : 1synchronous**		☐ **3 Traditional**		

Faculty member and study divisions information (to be filled in each semester by the subject instructor)

Name	Academic rank	Office No.	Phone No.	E-mail	
Division number	**Time**	**Place**	**Number of students**	**Teaching style**	**Approved model**

Brief description

Introduction to data warehouse, types of data warehouses, ETL, Star architecture, Snowflake architecture, implementing data warehouse using SQL, introduction to big data, OLAP vs RTAP, Map Reduce, Hadoop, Spark, Machine learning using Spark, Streamline Data Ingestion using AWS, Hive, NoSQL databases.

Learning resources

Course book information (Title, author, date of issue, publisher ... etc)	**1-** Data Science from Scratch: First Principles with Python. Joel Grus, 2019.O'REILLY, 2nd Edition.			
Supportive learning resources (Books, databases, periodicals, software, applications, others)	1. Data Mining, Concepts and Techniques, Jiawei Han, 3rd edition, 2016. 2. Introducing Data Science, big data, machine learning, and more, using python tools. Davy Cielen, Arno D. B. Meysman, and Mohamed Ali, Manning, 2016.			
Supporting websites				
The physical environment for teaching	☐ Class room	☐ labs	☐ Virtual educational platform	☐ Others
Necessary equipment and software				
Supporting people with special needs				
For technical support				

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Course learning outcomes (S= *Skills, C= Competences K= Knowledge,)*

No.	Course learning outcomes	The associated program learning output code
	Knowledge	
K1	To show excellent knowledge in the basic data warehouse and big data topics	**MK3**
K2	To be acquainted with the basics of various advanced data warehouse and big data topics.	MK3
	Skills	
S1	To be able to apply data warehouse concepts on a real case scenario using SQL	**MS3**
S2	To be able to use Spark for machine learning of a big data	**MS3**
	Competences	
C1	To apply the various concepts of data warehouse and big data in solving real life problems	**MC1**

Mechanisms for direct evaluation of learning outcomes

Type of assessment / learning style	Fully electronic learning	Blended learning	Traditional Learning (Theory Learning)	Traditional Learning (Practical Learning)
First exam	0	**0**	%20	0
Second / midterm exam	%30	**%30**	%20	30%
Participation / practical applications	0	**0**	10	30%
Asynchronous interactive activities	%30	**%30**	0	0
final exam	%40	**%40**	%50	40%

Note: Asynchronous interactive activities are activities, tasks, projects, assignments, research, studies, projects, work within student groups ... etc, which the student carries out on his own, through the virtual platform without a direct encounter with the subject teacher.

Schedule of simultaneous / face-to-face encounters and their topics

Week	Subject	learning style*	Reference **
1	Introduction to Data Warehouse	Lecture	**T:1-13**
2	Data Warehouse Types	Lecture	**T:111-128**
3	ETL	Lecture	**R1: 84-95**
4	Data Warehouse Architectures	Lecture	**R1: 95-110**
5	Implementing Data Warehouse	Lecture	**R1: 111-117**
6	Mid Exam Estimated + Revision	learning through problem solving	
7	Case Study 1: Data Warehouse implementation using SQL	learning through problem solving	**Handouts**

8	Introduction to Big Data	Lecture	**T:43-52**
9	Map Reduce	Lecture	**R1: 125-149**
10	Hadoop and Spark	Lecture	**T:55-99**
11	Spark Machine Learning	Lecture	**Handouts**
12	NoSQL databases	Lecture	**Handouts**
13	Streamline Data Ingestion	Lecture	**Handouts**
14	**Case Study 2: Spark Machine Learning using pyspark**	learning through problem solving	**Handouts**
15	**Case Study 3: Querying Unstructured data using Hadoop Hive**	learning through problem solving	**Handouts**
16	**Final Exam**		

*** Learning styles: Lecture, flipped learning, learning through projects, learning through problem solving, participatory learning ... etc.**
**** Reference: Pages in a book, database, recorded lecture, content on the e-learning platform, video, website ... etc.**

Schedule of asynchronous interactive activities (in the case of e-learning and blended learning)

Week	Task / activity	Reference	Expected results
1	Introduction to Data Warehouse		To show a good comprehension of the data warehousing basic concepts
2	Data Warehouse Types		To distinguish among different types of data warehouses
3	ETL		To be acquainted of basics of ETL concepts
4	Data Warehouse Architectures		To distinguish among different architectures of data warehouses
5	Implementing Data Warehouse		To implement a data warehouse using SQL
6	Mid Exam Estimated + Revision		
7	Case Study 1: Data Warehouse implementation using SQL		To apply data warehouse concepts
8	Introduction to Big Data		To show a good comprehension of the big data basic concepts
9	Map Reduce		To show a good comprehension of Map Reduce
10	Hadoop and Spark		To show a good comprehension of the Hadoop and Spark
11	Spark Machine Learning		To apply Spark to handle big data using python

12	NoSQL databases		To be acquainted with basics of NoSQL
13	Streamline Data Ingestion		To have basic understanding of data ingestion
14	**Case Study 2: Spark Machine Learning using pyspark**		To apply Spark to handle big data using python
15	**Case Study 3: Querying Unstructured data using Hadoop Hive**		To apply Hive to query NoSql databases
16	**Final Exam**		