Course Specification
(Bachelor)

Course Title:	Big Data and Data Warehouse
Course Code:	DSC 334
Program:	Applied Statistics & Data Management
Department:	Mathematics
College:	College of Science
Institution:	Majmaah University, Saudi Arabia
Version:	2023
Last Revision Date:	19/09/2023

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: (3 (2+2))					
2. Course type					
A.	☐University	☐College	☒Department	☐Track	Others
B.	☒Required		☐Elective		
3. Level/year at which this course is offered: (…….)					
4. Course general Description:					
This course includes the study of: Plane Curvilinear Motion, Newton's laws of motion, Momentum and angular momentum, Energy, Oscillations, Calculus of variations, Lagrange's equations, and two-body central force problem. This course introduces the fundamentals of Big Data management based on the Apache Hadoop platform, providing students with an overview of Big Data technologies, architecture, and analytics. The course will cover the Selection, processing and querying of Big Data stores for disparate data sets. From the other hand, after providing the student with an understanding of database concepts and database management systems relating to modern enterprise-level database development, this course will introduce the concepts and analytical foundations of data warehousing as well as how data warehousing is developed. This course is based on intensive hands-on sessions that will make the student be able to get familiar with related technological trends and development in the field.					
5. Pre-requirements for this course (if any)**:**					
Database - DSC 312					
6. Co-requisites for this course (if any)**:**					
7. Course Main Objective(s):					
1-Determine the best data warehouse architecture using proven analytic modeling concepts 2-Design and develop a data warehouse and model dimensions for it					

3-Query and manage the data warehouse.
4-Extract, transform and load operational data.
5-Define and describe Big Data and its role.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	30	50%
2	E-learning		
3	Hybrid • Traditional classroom • E-learning	30	50%
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	30
3.	**Field**	
4.	**Tutorial**	
5.	**Others (specify)**	
Total		60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Understanding of how DBMS systems work and an appreciation for how difficult it is to develop real-life applications is important.	K1	Direct teaching: Lectures Aimed teaching: Discovery and oral questions Indirect teaching: Cooperative Learning	. Homework · Quiz · Midterms · Final Exams

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.2	A Exhibit competence in the development, configuration, utilization and management of data warehouse applications in a wide variety of situations	K1	Direct teaching: Lectures Aimed teaching: Discovery and oral questions Indirect teaching: Cooperative Learning.	. Homework · Quiz · Midterms · Final Exams
2.0	**Skills**			
2.1	Understanding of how to organize, validate, transform, and analyze large volumes of data on specialized platforms (Big Data) coming from a variety of data sources, including files, databases, server logs, etc.	S1	Direct teaching: Lectures Aimed teaching: Discovery and oral questions Indirect teaching: Cooperative Learning.	. Homework · Quiz · Midterms · Final Exams
3.0	**Values, autonomy, and responsibility**			
3.1	Learn about, assess and engage in the legal, social, ethical, and professional framework needed to develop data-intensive system	V1	Direct teaching: Lectures Aimed teaching: Discovery and oral questions Indirect teaching: Cooperative Learning	. Homework · Quiz · Midterms · Final Exams

C. Course Content

No	List of Topics	Contact Hours
	Introduction of database models and system architecture.	6
	Multidimensional data modelling (Data warehouse, Dimensional model concepts, Dimensional modelling process, Dimension Normalization).	6
3.	SQL data manipulation and OLAP operations.	6
4.	Data processing using DBMS; data definition and manipulation using SQ.	6
5.	Introduction of Data warehouse concepts and analytical foundations.	6
6.	Data warehouse development; system architecture and data transformation.	6
7.	An introduction to Big Data technology stack, emerging trends and use cases where Big Data outperforms traditional data warehouse.	6
8.	An overview of the function components of Big Data technology stack including open source tools like Hadoop, HDFS, Map Reduce, Yarn, Spark, Storm, Hive for massively parallel on-disk data processing.	6
9.	An overview of batch and real-time data ingestion patterns using Apache Flume and Kafka, data transformation techniques and generation of summary statistics using Apache Spark.	12
Total		**60**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes	Week 4 and Week 8	10%
2.	Assignments/Exercises	Every Week	10%
3.	Mid Term Exam 1	Week 6	15%
4.	Mid Term Exam 2	Week 12	15%
5.	Final Exam	After Week 15	40%
6.	E-exam-Lab	Week 13	10%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Data Warehousing in the Age of Big Data, Krish Krishnan Morgan Kaufmann 2020.
Supportive References	Data Science and Big Data Computing Frameworks and Methodologies, Zaigham Mahmood Springer International Publishing Switzerland 2016.
Electronic Materials	https://executiveeducation.nus.edu.sg/programmes/leading-with-big-data-analytics-machine-learning/?gclid=EAIaIQobChMI5vqvzKeF_AIVWunmCh2JDQCOEAAYAiAAEgJT7_D_BwE
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classroom Laboratory.
Technology equipment (projector, smart board, software)	Smart Board, Projector .
Other equipment (depending on the nature of the specialty)	Laboratory.

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Indirect
Effectiveness of Students assessment	Peer Reviewer	Direct
Quality of learning resources	Faculty	Direct
The extent to which CLOs have been achieved	Peer Reviewer	Direct
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	