Course Specification
— (Bachelor)

Course Title: Data Analysis	
Course Code: DSC 233	
Program: Applied Statistics & Data Management	
Department: Mathematics	
College: College of Science	
Institution: Majmaah University, Saudi Arabia	
Version: 1	
Last Revision Date: 21-9-2023	

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: (5.)

4. Course general Description:

Data analysis is the process of taking raw data and turning it into something meaningful we can understand. This course is designed to teach students how to analyze different types of data using Python. Students will learn how to prepare data for analysis, perform simple mathematical and statistical analysis, create meaningful data visualizations and predict future trends from data. Implement python packages for mathematical, scientific applications and for web data analysis. missing data mechanisms

5. Pre-requirements for this course (if any):

DSC 121 – Introduction to data science

6. Co-requisites for this course (if any):

7. Course Main Objective(s):

1. Prepare data for analysis procedures.
2. Implement standard data visualization and data analysis procedures.
3. Choose appropriately from a wider range of exploratory and inferential methods for analyzing data.
4. Perform simple statistical analysis, create meaningful data visualizations and predict future trends from data.
5. Implement python packages for mathematical, scientific applications and for web data analysis.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	20	45%

No	Mode of Instruction	Contact Hours	Percentage
2	E-learning		
3	Hybrid • Traditional classroom • E-learning	25	55%
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	20
2.	**Laboratory/Studio**	
3.	**Field**	
4.	**Tutorial**	25
5.	**Others (specify)**	
Total		45

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 the fundamentals for Data Analysis		Direct teaching: Inquiry-based instruction Power Points a discussion Aimed teaching: Discovery and oral questions	Homework Quiz Mid Exam Final Exam E-exam
1.2	Understanding basics of python for performing data analysis	K2		
1.3	Understanding the data, performing preprocessing, processing and data visualization to get insights from data.			
2.0	**Skills**			
2.1	Use different python packages for mathematical, scientific applications and for web data analysis.	S2	Direct teaching: Inquiry-based instruction Power Points a discussion	Homework Quiz Mid Exam Final Exam E-exam
2.2	Develop the model for data analysis and evaluate the model performance.			

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
			Aimed teaching: Discovery and oral questions	
3.0	**Values, autonomy, and responsibility**			
3.1	Illustrate how take up responsibility.	**V3**	Direct teaching: Inquiry-based instruction Power Points a discussion. Aimed teaching: Discovery and oral questions.	Homework Quiz Mid Exam Final Exam E-exam
3.2	Must be shown the ability of working independently and with groups.			
3.2	Students can actively and critically participate in class activities.			

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction to Fundamentals of Data Analysis: What is data analysis? Why data analysis is important? What is the role of Data Analysis? What are the tools used in Data Analytics? How can apply Data Analysis with world-life- Dataset Examples.	**9**
2.	Introduction to Data Understanding and Preprocessing: Knowledge domains of Data Analysis, understanding structured and unstructured data, Data Analysis process, Dataset generation and Importing Dataset:	**9**
3.	Data Processing and Visualization: Data Formatting, Data transform, Exploratory Data Analysis, Filtering and hierarchical indexing using Pandas and Basic Visualization Tools.	**9**
4.	Mathematical and Scientific applications for Data Analysis: Understanding and creating N-dimensional arrays, Basic indexing and slicing, Boolean indexing, Fancy indexing, Universal functions, Data processing using arrays, File input and output with arrays.	**9**
5.	Analyzing Web Data: Data wrangling, Web scrapping, Combing and merging data sets, Reshaping and pivoting, Data transformation, String Manipulation, case study for web scrapping. missing data mechanisms.	**9**
Total		**45**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Midterm Exam 1	6th	15

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
2.	Midterm Exam 2	12th	15
3.	Homework + Presentation	During semester	20
4.	Quizzes	4th - 9th	10
5.	Final Examination	12th	40
			100

*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	David Taieb, Packt , Publishing, Data Analysis with Python: A Modern Approach 1st Edition, 2000.
Supportive References	Ash tosh Pawar, Dummy, Data Analysis With Python For Beginners: Learn By Practice, 2018.
Electronic Materials	
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classroom with capacity of 30-students. Computer Lab of Mathematics Department
Technology equipment (projector, smart board, software)	Mathematical software packages like MINITAB and SPSS , Python
Other equipment (depending on the nature of the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students/ internal committee	Direct (Students evaluation electronically organized by Deanship of registration and admission)/ Verification of students' papers
Effectiveness of Students assessment	Staff members (Peer Reviewer)	Indirect (Frequent meetings consultation among the teaching staffs)

Assessment Areas/Issues	Assessor	Assessment Methods
Quality of learning resources	Staff members (course coordinators)	Direct (Meeting between course coordinators and the tutors)
The extent to which CLOs have been achieved		
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	
REFERENCE NO.	**1**
DATE	21-9-2023