



Course Specification

DIPLOMA

Course Title: **Advanced Programming**

Course Code: **APDA2206**

Program: **Diploma in Data Analytics**

Department: **Diploma Department**

College: **The Applied College**

Institution: **Umm Al-Qura University**

Version: **1**

Last Revision Date: **05 May 2025**



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A. General information about the course:

1. Course Identification

1. Credit hours: (3 hours)

2. Course type

- A. ☐ University ☐ College ☒ Department ☐ Track ☐ Others
- B. ☒ Required ☐ Elective

3. Level/year at which this course is offered: (2nd level – 1st year)

4. Course General Description

This course will provide:

- Introduction of using programming language with artificial intelligence methods.
- Basics of data science, machine learning, and big data techniques.

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

APDA1204 (Fundamentals of Algorithms and Programming)

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

None

7. Course Main Objective(s):

The main objective of this course is to provide students with an overview of utilizing programming concepts with big data and machine learning methods.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning		
3	Hybrid <ul style="list-style-type: none"> • Traditional classroom • E-learning 		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
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1.	Lectures	2 * 15 = 30
2.	Laboratory/Studio	2 * 15 = 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 PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Recall programming concepts.	K1	<ul style="list-style-type: none">▪ Lectures▪ Lab demonstrations	<ul style="list-style-type: none">▪ Written exam▪ Homework assignments▪ Lab assignments▪ Class Activities▪ Quizzes
1.2	Recognize different data science, big data, and machine learning methods.	K1, K3		
2.0	Skills			
2.1	Apply advanced programming to leverage available libraries to prepare and manipulate datasets to solve simple problems using classification	S1, S2	<ul style="list-style-type: none">▪ Lectures.▪ Lab projects.▪ Case studies▪ Individual presentations.	<ul style="list-style-type: none">▪ Written exam▪ Homework assignments▪ Lab assignments.▪ Class Activities▪ Quizzes▪ Practical Exam.
2.2	Design and code software solutions using programming language concepts, data science, big data and machine learning techniques.	S3, S4		
3.0	Values, autonomy, and responsibility			
3.1	Manage self-learning by collecting and classifying information on a specific topic.	V3	<ul style="list-style-type: none">▪ Small group discussions.▪ Whole group discussions.▪ Brainstorming.▪ Presentations.▪ Case study.	<ul style="list-style-type: none">▪ Practical Exam.▪ Lab assignments.▪ Class Activities.▪ Quizzes.
3.2	Demonstrate commitment to academic values, standards, and ethical code of conduct, and represent responsible citizenship.	V1		





Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
3.3	Work in groups	V2	Labs	▪ Group Project

C. Course Content

No	List of Topics	Contact Hours	
		Theoretical	Practical
1.	OOP: Class and Object	4	4
2.	Data Loading, Storage, and File Formats in Python	2	2
3.	Data Cleaning and Preparation in Python	4	4
4.	Intro to Data Science and Machine Learning	2	2
5.	Python language and Libraries	4	6
3.	CSV/Datasets Files	2	2
4.	Working with Big Data	4	4
8.	Machine Learning (ML) Types and Algorithms	4	4
9.	Applying Machine Learning Algorithms (Classification)	4	2
Total		30	30

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes & Assignments	Throughout the term	10 %
2.	Midterm Exam	8	20 %
3.	Practical skills	Throughout the term	20 %
4.	Group Project	Throughout the term	10%
4.	Final Exam	Final Weeks	40% Theoretical Exam

*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	<ul style="list-style-type: none"> Intro to Python for Computer Science and Data Science : Learning to Program with AI, Big Data and The Cloud, 2021 McKinney, W., 2022. <i>Python for Data Analysis: Data Wrangling with Pandas, NumPy, and Jupyter</i>. 3rd ed. Sebastopol, CA: O'Reilly Media.
Supportive References	Course notes on the E-learning web-site
Electronic Materials	
Other Learning Materials	Instructor handouts and presentation in ppt.





2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	<ul style="list-style-type: none"> Classroom well equipped with at least 40 adequate seats. Laboratory well equipped with at least 20 adequate seats. Internet connection
Technology equipment (projector, smart board, software)	<ul style="list-style-type: none"> Data show IDE software for Programming language
Other equipment (depending on the nature of the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Indirect Course survey and students' feedback.
Effectiveness of Students	Faculty Members, Peer Reviewers	Direct Report on the satisfaction of exam standards.
Quality of learning resources	Faculty Member, Course Coordinators	Direct Learning resources evaluation survey.
The extent to which CLOs have been achieved	Faculty Members, Program Leaders	Direct Course reports.
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	Umm Al-Qura University Council
REFERENCE NO.	851281214463/193664
DATE	1447/01/20

