

The University of Jordan
School of Engineering
Computer Engineering Department



Academic Year:	2026 / 2027
Semester:	Fall
Course:	091754732 Data Science 3 Credits / Dept. Elective
Catalog Description:	Definitions and applications; Market trends; Data analytics lifecycle; Data exploration and preprocessing; Data visualization; Theory, tools, and methods; Introduction to Big data management, warehousing, and processing. This course has practical assignments.
Prerequisite(s):	0917451 AI and Machine Learning
Co-requisite(s):	None
Background:	Students are assumed to have good background in mathematics, particularly, calculus, linear algebra, and statistics. Additionally, the students should have good programming skills using Python.
Textbooks:	1. Wes McKinney, Python for Data Analysis: Data Wrangling with Pandas, NumPy, and Ipython, O'Reilly Media, 3rd Edition, 2022. 2. Arshdeep Bahga and Vijay Madisetti, Big Data Analytics: A Hands-On Approach, 2019. 3. Course Slides
References:	3. Aurélien Géron, Hands-On Machine Learning with Scikit-Learn and PyTorch: Concepts: Tools, and Techniques to Build Intelligent Systems, O'Reilly Media, 2025. 4. Jake VanderPlas, A Whirlwind Tour of Python, O'Reilly Media, 2016. 5. Joel Gurs, Data Science from Scratch, O'Reilly Media, 2015.
Course Website:	https://www.abandah.com/gheith/?page_id=3346 Microsoft Teams
Schedule & Duration:	16 Weeks, 42 lectures, 50 minutes each; or 32 lectures, 75 minutes each (including exams)
Student Material:	Textbooks, class handouts, some instructor keynotes, selected YouTube videos, and access to a personal computer and the internet.
Facilities:	Classroom with whiteboard, smart board, projector, library, and computer laboratory.
Course Objectives:	1. Introduce students to the practical techniques used in data analytics including loading, cleaning, preparation, wrangling, visualization, and analysis. 2. Introduce students to the basic concepts and techniques in big data.

Course Outcomes and Relation to ABET Program Outcomes:

Upon successful completion of this course, a student should be able to:

1. Use Python and its specialized libraries to gain insight from data and solve problems [SO1].
2. Know the main concepts and techniques used in handling big data and performing data analytics [SO1].

Course Topics:

Week	Topic	ILO	Resources
1	Course Introduction	1	3
2+3	Pandas Data Structures, Essential Functionality & Descriptive Statistics	1	1
4+6	Data Loading, Storage and File Formats	1	1
6+7	Data Cleaning and Preparation	1	1
8	Data Wrangling: Join, Combine and Reshape	1	1
9+10	Plotting and Visualization with Matplotlib and Seaborn	1	1
11	Data Aggregation and Group Operations	1	1
12	Time Series	1	1
13	Introduction to Big Data	1	2
14	Big Data Architectures and Patterns	1	2
15	MapReduce Patterns	1	2

Computer Usage:

Practical aspects of the course are covered through exercises and homework.

Policies:

- Attendance is mandatory. Be ready to participate in solving class problems.
- All submitted work must be your own; cheating, plagiarism, unauthorized AI-generated work, or improper use of AI tools will result in academic penalties.
- Professional conduct, timely communication, and adherence to assessment schedules are expected throughout the course.
- The use of any electronic or communication device, including but not limited to calculators, smartwatches, mobile phones, tablets, laptops, wearables, or any other electronic gadgets, is strictly prohibited during exams.
- Refer to the relevant student bylaws on <https://units.ju.edu.jo/ar/LegalAffairs/Regulations.aspx>

Assessment Tools & Grading:

☐ First Exam	0%	☒ Midterm Exam	30%
☒ Final Exam	50%	☒ Quizzes	10%
☐ Assignments	0%	☐ Projects	0%
☒ Other: 10% In-Class Activities and Participation			

Instructor(s):

Prof. Gheith Abandah (abandah@ju.edu.jo)

Homepage: <https://www.abandah.com/gheith>

Office Hours: Sun Tue Thu 10:00–11:00, Mon 12:00–13:00, Wed 8:30–9:30

Section(s):

Section 1: CPE 102 and Computer Skills Lab, Monday and Wednesday 10:00 – 11:30

Important Dates	Date	Event
	Mon 12/10/2026	First Lecture
	Wed 4/11/2026	Quiz 1
	Wed 2/12/2026	Midterm Exam
	Wed 30/12/2026	Quiz 2
	Wed 13/1/2027	Last Lecture
	Wed 13/1/2027	Last Date to Withdraw
	Sun 17/1 – Thu 28/1/2027	Final Exam Period

Student Outcomes (SO)

- SO1.** An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
- SO2.** An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
- SO3.** An ability to communicate effectively with a range of audiences.
- SO4.** An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
- SO5.** An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
- SO6.** An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
- SO7.** An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Last modified: [October 8, 2026]