

King Fahd University of Petroleum and Minerals

DATA 211 : Introduction to Data Science

Instructor	: Prof Dr Usman Qamar Building 5, Room 330. Email: usman.qamar@kfupm.edu.sa
Textbook	: Chirag Shah, "A Hands-On Introduction to Data Science," Cambridge University Press, 2020.
References	: • Bishop, Christopher M., "Pattern recognition and machine learning," Springer, 2006. • Usman Qamar, Data Science Concepts and Techniques with Applications, Springer 2023.
Prerequisite(s)	: (Math 102 or Math 106) and ICS 104
Office Hour	: Monday, Wednesday 1pm to 3pm
Catalog Description	: An overview of Data-driven approach, Data analytics lifecycle. Basic statistics: Variance, Covariance, Correlation, Confidence interval, and Histogram. Data frames, series, slicing, sorting. Relational database with primary and foreign key.. Data acquisition, cleaning, scrubbing, and manipulation. Correlation analysis, PCA, Linear Regression, Gradient descent, Bayesian classifier, Decision tree, K-means clustering, Hierarchical clustering, Big data, and high-dimensional data. SQL implementation in Python. Overview of MapReduce and Hadoop.
Objectives	: Introduce data understanding and preparation, analyze and interpret data, and apply and validate data science techniques.
Learning Outcomes	: 1. Analyze and process different types (numerical and categorical) of structured data.

2. Apply data science methods to address practical problems.
3. Cross-validate the outcomes of data science methods.
4. Use a programming language/tool to implement data science methods.

Course Outline Tentative:	Topics	Quiz	Exam
	1. Introduction to Data Science	--	Mid-Term Exam
	2. Python Review 3. Basic Statistics	Quiz 1	
	4. Basic Programming Concepts 5. Data Understanding and Preparation	Quiz 2	
	6. Exploratory Data Analysis 7. Linear Regression Methods	Quiz 3	Final Exam
	8. Basic Classification Methods 9. Basic Clustering Methods	Quiz 4	
	10. Database, SQL & Big Data [Not Part of Exam]		

Course Structure:

Homeworks	5%	• Two HWs
Quizzes	10%	• Four quizzes
Project	20%	• Group Project (4-5 members) • Progress Report, • Final Report & • Presentation
Midterm Exam	20%	• conceptual & coding
Final Exam	40%	
Class Participation	5%	Attendance

The Registrar's Office will announce the midterm later (it will also be announced in the Common Section Blackboard).

The registrar's office will announce the final exam dates.

- HWs will be submitted through the HW submission link in Blackboard created by each instructor
- The quizzes will be conducted during class times.
- The above distribution and grading policy are tentative and may be changed later.

Course Policy for grading:

- There will be no make-up for the quizzes, homework, major exams, and the final for students who miss any of them except for those who have an extreme case (they need to provide an official Excuse/report of illness or death in the family, etc.).
- Attendance is strongly encouraged. Attending students has a positive impact on the instructor.
- Two Absences (Three for short classes) without penalty. After that penalty of 1.25 marks (For short courses, the penalty is 0.83 marks) for each absence, the student will get a “DN” grade after a total of Six Absences (Nine for short classes).
- Only an Official Excuse Letter from the “Students Affairs” office will be accepted for excuses. Otherwise, there will be a penalty according to the above rule.
- The worst quiz grades will be dropped, so we will consider Best Three Quizzes out of Four for each student.
- All HW are individual HWs, and all are counted for grades.
- Project Guidelines will be uploaded to Blackboard, and guidelines for the report will also be posted there. The instructor will form project groups.
- There will be no tolerance for any cheating. All exams and quizzes are individual work. The students involved in cheating will get zero points. I reserve my right to take further action for conduct of dishonesty, such as cheating and bringing materials that are not allowed during exams or quizzes. In addition to that, see the last section of this document on the **Academic Integrity Policy**.
- **Any emails** from students asking for **more points or grades** will be **ignored**. If you think your exams, homework, and quizzes were misevaluated, email me the reason and then arrange an office hour meeting (**within One week of the HW, Quiz, or Exam results**).

Student Responsibilities :

- Teamwork is encouraged throughout the course.
- You are encouraged to participate in the class.
- Keep up with the material presented in class. If you get behind it, it will not be easy to recover.
- Submit assignments on time.

- You are expected to attend all lectures on time.
- Do not leave before the end of class. **Attendance** is marked as “present” only if you are in class for 80% of the duration of the class.
- Please **turn off mobile phones** during **all class activities**.

Academic Integrity Policy:

Cheating for exams and any assignments will not be tolerated! This includes **plagiarism**. University Study and Examinations Regulations Article 38 states, “Cheating, or attempting to cheat, or violating instructions and examination regulations shall render the offender subject to punishment in accordance with the student disciplinary rules as issued by the University Council” along with its implementation rules.

Check Student’s responsibilities in the Guidelines for Conducting Exams at KFUPM

<http://regweb.kfupm.edu.sa/news11.htm>