Fundamentals of Data Science II

School of Sciences and Engineering
Department of Mathematics and Actuarial Science

THE AMERICAN UNIVERSITY IN CAIRO

Course Description

Fundamentals of Python programming in the context of Data Science with a focus on relevant packages. Coverage of techniques for database handling, data manipulation, visualization and summarizing. Study of probability basics and further statistics required for assessing sampling techniques, designing estimators, hypothesis testing and fitness tests. Focus on simulation basics, analytic, data interpretation and basic machine learning models such as regression and kNN classifiers.

Overview

School/Department name: SSE/Mathematics and Actuarial sciences

Course Name/ Course Number: Fundamentals of Data Science II 3cr, no

Prerequisite: DSCI 1412

Semester offered: Spring 2022

Instructor Name: Dhafer Malouche

Contact Information: dhafer.malouche@aucegypt.edu

Meeting Times: Upon request (online or in person)

Online Office Hours: TBA

Preferred method of contact: email

Course material

- **Textbook**

  (1) Data Science from Scratch, by Joel Grus, Published by O'Reilly Media.

- **Class Materials on Blackboard**
  - Class materials (e.g., course syllabus, lecture notes, announcements, etc.) will be available on the Internet using Blackboard.
  - To access Blackboard, open your Internet browser and type: http://Blackboard.aucegypt.edu/.
  - Login to Blackboard. Your User Name and Password are the same as your AUC e-mail account. Select the course DSCI 1412.

Assessment/Grading Criteria

Assignment	Total % of Grade
Assignments (3)	15%
Quizzes (4)	10%
Projects	10%
Two midterm exams	25%
Final Exam	40%

- Late assignments are not accepted.
- All assignments should be submitted on Blackboard.

Important Dates	Dates
First midterm exam	TBA
Drop course deadline	March 24th
Second midterm exam	TBA
Final Exam	TBA

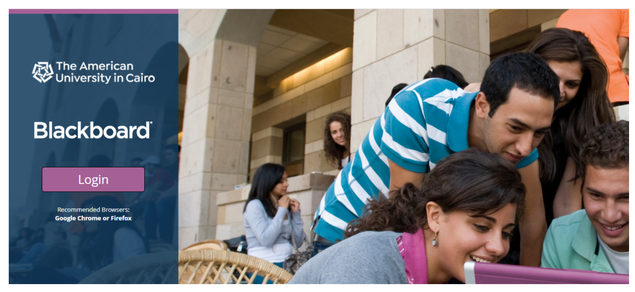
Course Learning Outcomes

Upon successful completion of the requirements of this course, students should have the knowledge and skills to:
Perform a statistical analysis with Python on different kind of data sets.

- Best practices in Python programming.
- Manipulating data with Python.
- Understanding the probability tools for statistical inference and testing.
- Using multivariate statistical models to analyse multidimensional data.
- Demonstrate skills in interpreting and communicating the results of statistical analysis, orally and in writing.

Textbooks

blackboard.aucegypt.edu



Course Content

Topic	**Weeks**	Dates
Programming in Python/Notebooks/Workflows	1	30/1-2/2
Probability/Simulation	1	6/2-9/2
Statistical Inference/Hypothesis Testing	2	13/2-16/2-20/2-23/2
Working with Data/Cleaning and Munging/Data Visualization	2	27/2-2/3-6/3-9/3
kNN/Naive Bayes	1	13/3-16-3
Regression models	2	20/3-23/3-27/3-30/3
Logistics Regression	1	3/4-6/4
Decision Trees	1	10/4-13/4
Clustering	2	5/5-8/5-11/5-15/5
Revision		18/5

Class Expectations and Policies

It is my responsibility to provide students with excellent teaching and learning environments. I am therefore asking you to please respect both my responsibility to teach and the right of other students to learn. In particular

1. Attendance Policy:
   - Your attendance is required in all classes.
   - Attendance is part of class participation.
   - The university attendance policy as communicated regarding the Fall semester will apply.
   - You are expected to attend all live class sessions and participate in all class activities as directed.

2. Students are responsible for:
   - Downloading all course material in a timely manner.
   - Contacting the University's IT and Blackboard support as needed using this link: https://aucegypt.selfservice.vivantio.com.

3. Academic While I expect you to help and cooperate with each other in study groups, the work in the assignments, project, and exams is expected to be your own. Academic integrity is a commitment, even in the face of adversity, to five fundamental values: honesty, trust, fairness, respect and responsibility.

4. All activities at AUC, from teaching to administrative and support functions, serve the process of learning. Academic fraud and dishonesty includes, but is not limited to, the following categories: cheating, plagiarism, fabrication, multiple submissions, obtaining unfair advantage, unauthorized access to academic or administrative systems, aiding and abetting, impersonation, threatening, harm, and copyright infringement. For more details see http://in.aucegypt.edu/auc- academics/academic-integrity.

5. University's Academic Standards, Integrity, and Honesty Codes, (see http://www.aucegypt.edu/academics/integrity/Pages/default.aspx) will be strictly enforced. I have a zero-tolerance for any violation of the academic integrity code.

6. Disability Policy: If you have established accommodations with Student Disability Services (SDS) , please activate your accommodations via Simplicity and contact the instructor to discuss how the approved accommodations will be implemented in this course.

7. If the exams are not conducted F2F, then the online exams will be conducted using Respondus LockDown Browser. AUC's administration, assures us that Respondus is safe and that its terms of use are typical of any software that students use. You will have access to the exam on the course content on the Blackboard. In addition, to minimize possibilities of cheating I may call any student for an oral exam on Zoom after the exams are graded. Further exam instructions will be provided on the Blackboard.