Software Engineering For Data Science (SEDS)

Class: 2 Year 2nd Cycle
Branch: IASD

Dr. Belkacem KHALDI| ESI-SBA

Course Overview

About the instructor

Dr. Belkacem KHALDI

Assoc. Professor at the Computer Sciences Higher School, May 8^{th} 1945 (ESI-SBA), Sidi Bel Abbes, Algeria.

Date of Birth: Feb. 21, 1979

Tamerna Djadida, Djamaa P.O Box: 39041, EL-Oued, Algeria.

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Working Experience

Sept, 2019 – ongoing	**Assoc. Professor**	**ESI-SBA**

A Senior Lecturer
Major Course Lectures/TDs/TPs:

- Conducting Scientific Projects
- Modelling and Simulation
- Software Engineering for Data Science
- Advanced Database
- Algorithmic and dynamic data structures

Jan, 2006 – Sept, 2019	**Software Engineer,**	**Sonatrach, IT Dept., HRM**

A software Developer in the **Oil & Gas industry sector**.
Contributed in developing a number of Java web based business applications to help managers making decision, monitoring, analyzing, and reporting daily, monthly and yearly production & exploration activities for the different sub-regions of the company.

2004 - 2005	**Software Engineer**	**Algerie Telecom Company, Ouargla**

A software developer,
Developed applications to monitor the states of different data center network devices for the southeast region that contains 08 provinces.

About the instructor

Research Interests

- Machine Learning
- Data-Driven Models
- Fault and Anomaly Detection
- Swarm Intelligence
- Swarm Robotics
- Bio-inspired Control Models

Skills

Programming:

- Java, C/C++
- Python, lua
- SQL, PL/SQL
- Latex

Tools:

- Scikit-learn
- PyTorch
- TensorFlow

Simulation Platforms:

- ARGoS
- ROS,Gazebo
- AnyLogic

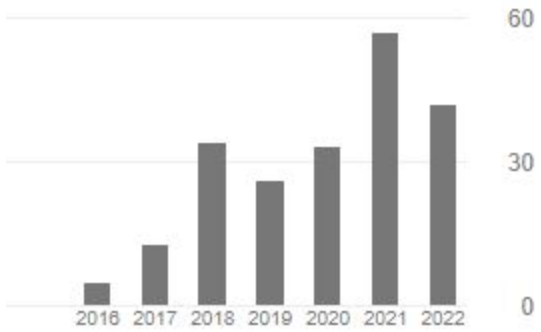
Education

2013 – 2018	**Doctoral of Science in Computer Sciences**	**University of Biskra**
	Project Title: Toward Entertainment in Swarm Robotics: A Focus on Artistic Dynamic Patterns Transformation	
2010 – 2012	**M.Sc. in Images Systems & Artificial Life**	**University of Biskra**
	Project Title: Computer Simulation of an Immune Response against Virus Infection Using Artificial Life Techniques	
1996 – 2001	**State Engineer in Computer Sciences**	**University of Biskra**
	Project Title: Design & Realization of a Multi-Agents System for Computer-Assisted Teaching	

About the instructor

Recent Publications

	All	Since 2017
Citations	210	205
h-index	8	8
i10-index	7	7



TITLE	CITED BY	YEAR
A data-driven soft sensor for swarm motion speed prediction using ensemble learning methods B Khaldi, F Harrou, SM Benslimane, Y Sun IEEE Sensors Journal 21 (17), 19025-19037	9	2021
Towards emerging cubic spline patterns with a mobile robotics swarm system B Khaldi, F Harrou, F Cherif, Y Sun IEEE Transactions on Cognitive and Developmental Systems	3	2021
Improving robots swarm aggregation performance through the Minkowski distance function B Khaldi, F Harrou, F Cherif, Y Sun 2020 6th International Conference on Mechatronics and Robotics Engineering ...	8	2020
An efficient statistical strategy to monitor a robot swarm F Harrou, B Khaldi, Y Sun, F Cherif IEEE Sensors Journal 20 (4), 2214-2223	5	2019
Flexible and efficient topological approaches for a reliable robots swarm aggregation B Khaldi, F Harrou, F Cherif, Y Sun IEEE Access 7, 96372-96383	12	2019
Statistical detection of faults in swarm robots under noisy conditions F Harrou, B Khaldi, Y Sun, F Cherif 2018 6th International Conference on Control Engineering & Information ...	2	2018
Monitoring robotic swarm systems under noisy conditions using an effective fault detection strategy F Harrou, B Khaldi, Y Sun, F Cherif IEEE Sensors Journal 19 (3), 1141-1152	10	2018
Self-organization in aggregating robot swarms: A DW-KNN topological approach B Khaldi, F Harrou, F Cherif, Y Sun Biosystems 165, 106-121	26	2018
Toward Entertainment in Swarm Robotics: A Focus on Artistic Dynamic Patterns Transformation B KHALDI Université mohamed khider-Biskra		2018

Course Description

- **Software Engineering Techniques** ⇒ A huge benefits for Data Scientists
  - Allow to more easily reutilize your code and share it with collaborators.

- **Software Engineering For Data Science:**
  - Learn the important ideas of modularity, data analysis, building ML based APIs & automated ML deployment,
  - Help you solve Data Science problems quicker
  - Acquired software engineering skills to write your Python package for performing ML models.

- **Why should you as a Data Scientist care about Software Engineering Techniques?**
  - Cover specific Software Engineering Concepts and use them to revolutionize your Data Science workflow
  - Learn to use **Pandas**, **NumPy**, **SciPy**, etc for Data Analysis and Numerical Data
  - Learn to use **Matplotlib** and **Seaborn** for statistical plots
  - Learn to use **Flask** for web application development and **MLOps**

Course Description

- **Total Course Hours:**
  - Course (30 H)
  - Practical Labs (30 H)

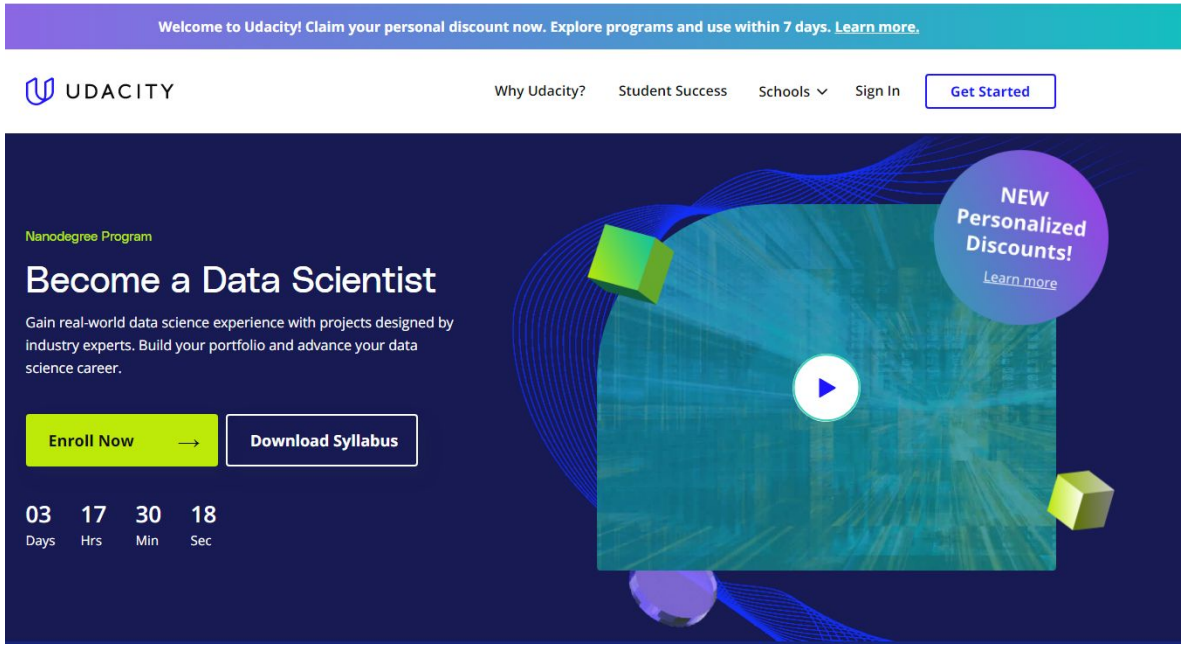
- **Assessment:**
  - Final exam
  - Practical Lab Assignment
  - A Mini-Project

- **Prerequisite:**
  - OOP
  - Algorithmique and data structures
  - Basic Probability Concepts
  - Basic Python Programming Skills

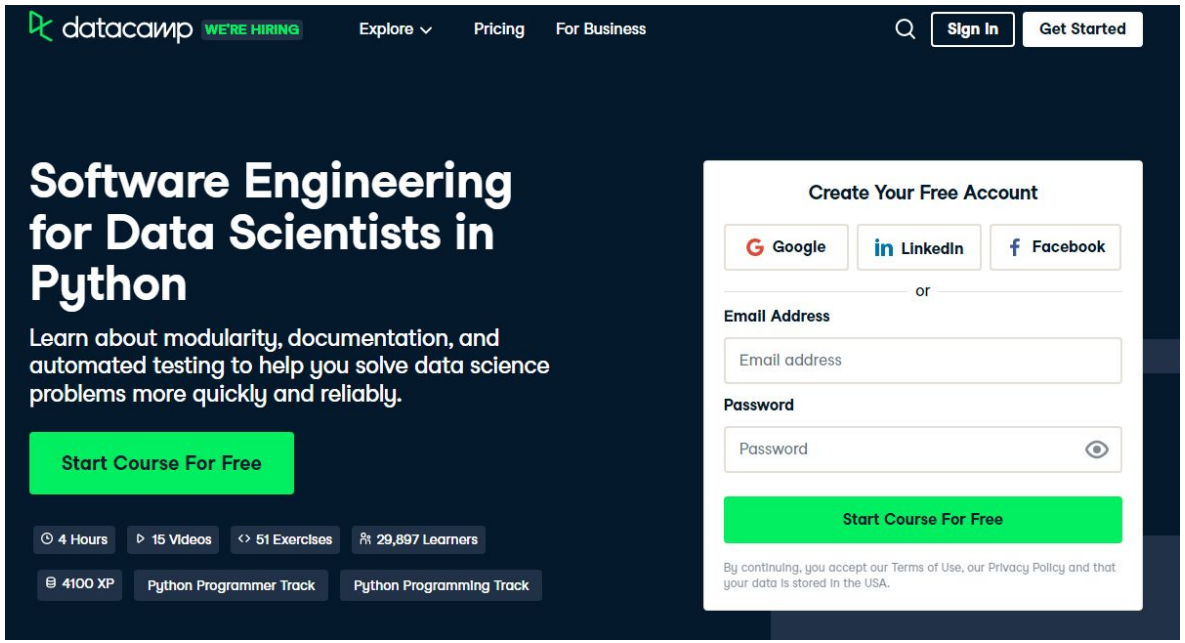
Course Content

7%	**Introduction to data science**	• Data Science Overview • Getting Started with Python & Jupyter Notebook
13%	**Advanced Concepts for Python Software Engineering**	• Modularity, Readability, and Refactoring • Unit testing and Code Version Control
30%	**Data Processing for Data Science**	• Data Preprocessing and Cleaning • Data Analysis and Practical Statistics • Data Visualization
30%	**Web Development for Data Science**	• HTML, CSS, ... • Full MVC Web application with a web framework • Building RESTful Web API
20%	**MLOps: Machine Learning Operations**	• Deployment of Machine Learning Models • Continuous Integration and Deployment Pipelines

Recommended Online Courses

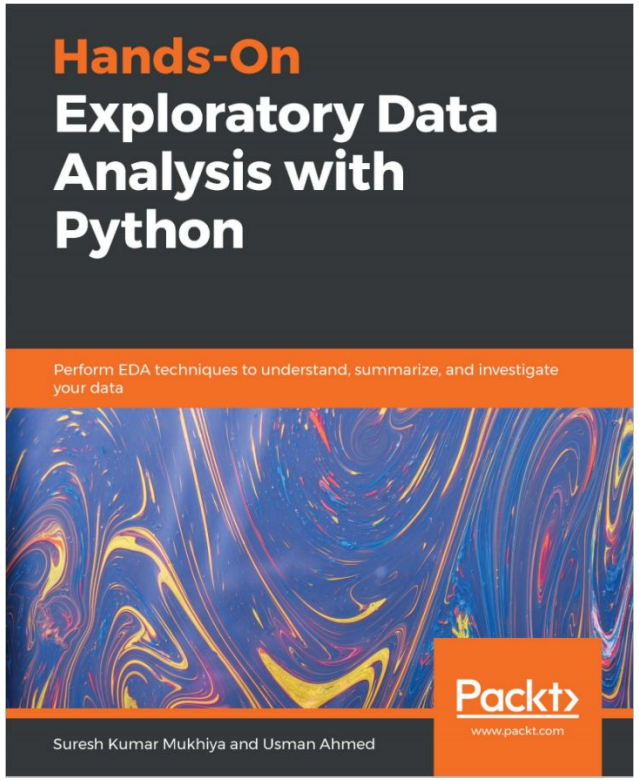


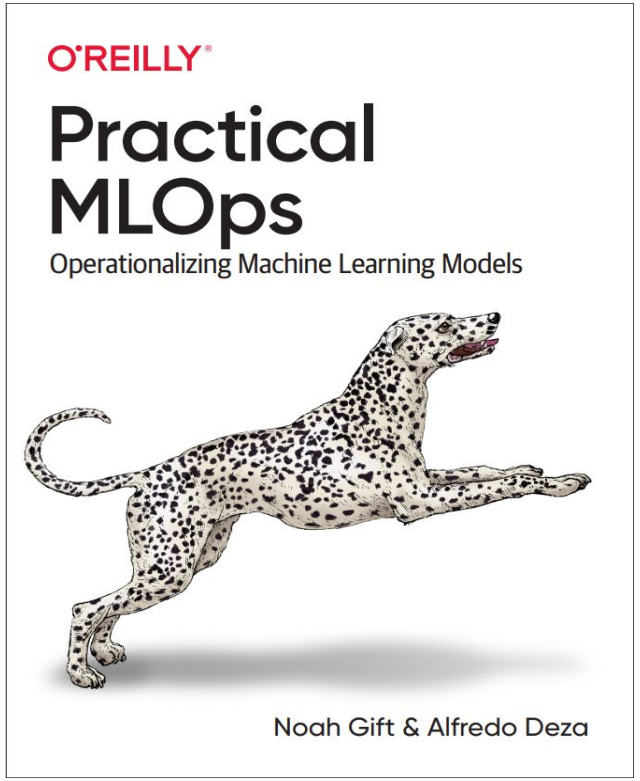
https://www.udacity.com/course/data-scientist-nanodegree--nd025

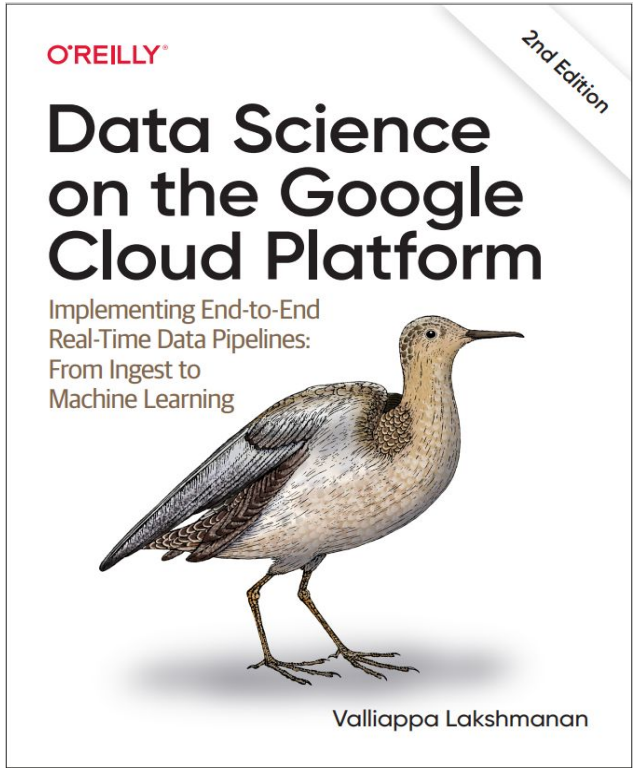


https://www.datacamp.com/courses/software-engineering-for-data-scientists-in-python

Recommended eBooks







Thanks for your attention

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