**Welcome!**

Welcome to **Exploratory Data Analysis**. This is a project-based course that should take approximately 2 hours to complete. Before diving into the project, please take a look at the course objectives and structure.

**Course Objectives**

In this course, we are going to focus on **three** learning objectives:

1. *Understanding the concept of Exploratory Data Analysis.*
2. *Creating Visual methods to analyze the data.*
3. *Analyzing trends, patterns, relationships in the data.*

By the end of this course, you will be able to **apply exploratory data analysis to real-world datasets.**

**Course Structure**

This course is divided into 3 parts:

1. Course Overview: This introductory reading material.
2. **Exploratory Data Analysis:**This is the hands-on project that we will work on in Rhyme.
3. Graded Quiz: This is the final assignment that you need to pass in order to finish the course successfully.

**Project Structure**

The hands-on project on **Exploratory Data Analysis** is divided into the following tasks:

**Task 1: Understanding Exploratory Data Analysis**

**Task 2: Importing libraries and Exploring the Dataset**

**Task 3: Checking missing values and Outliers**

**Task 4: Creating visual methods to analyze the data**

**Task 5: Analyzing trends, patterns, and relationships in the Data.**

**Meet the Instructor**

Mo Rebaie is a Data Scientist and Deep Learning Specialist who works in developing AI prototypes and works in the educational sector to help AI enthusiasts kick start their journey with AI. He is currently leading a Data Science team in creating Deep Learning prototypes across industries.

**Kickstart your journey at Coursera: AI & Data Science Learning Path**

Data science is on the rise and by the new year, more people are getting engaged with AI, for that, I’ve decided to write this blog as a learning path for beginners to start taking online courses at Coursera.

Perhaps the most successful path of learning is to directly learn by applying skills and knowledge gained from taking online courses, and don’t forget to take notes while watching the video lectures and summarizing content that will be later a great resource for you to revise.

**In this article, I will show you the best learning paths in AI, Data Science, and Machine Learning at Coursera using different tools and learning various topics.**

So let’s start our journey with AI and Data Science and explore available online programs at Coursera!

The first fundamental non-technical course will be AI for everyone which is essential to understand the basics of Artificial Intelligence, it takes 2 to 7 days for a busy schedule to finish. [AI for Everyone](https://www.coursera.org/learn/ai-for-everyone) course by Andrew Ng, a 4-week course that takes 6 hours to complete with 4 quizzes without practical assignments, it covers AI fundamentals, Easy explanation to learn how to build AI projects, apply AI transformation in companies and finally AI and society.

If you want to learn Data Analysis, you will find an amazing program at Coursera, you will learn through taking [Data Visualization with Tableau Specialization](https://www.coursera.org/specializations/data-visualization) how to Visualize Business Data with Tableau and create powerful business intelligence reports, and this program is the best fit for business intelligence and analytics.

I always recommend and prefer and suggest for beginners to take the basic Mathematical courses before you start with Data Science, and that’s because all algorithms are based on mathematics and it’s cool to understand how you deal with data, also this program will let you freshen up on the basics in Mathematics if you have already taken it at university, and one of the best programs to learn the Math needed is to take the [Mathematics for Machine Learning Specialization](https://www.coursera.org/specializations/mathematics-machine-learning)that consists of 3 easy courses with intuitive exercises covering the essential Mathematical topics: Linear Algebra, Multivariate Calculus, and Principal Component Analysis.

**Next, you have to develop your skills using a powerful tool to apply your knowledge and practice what you have learned. I’ll provide 3 paths, one for Python and second with R and the third with Matlab, and you can choose the tool you find yourself most familiar with based on your background.**

Don’t spend a lot of time searching which tool to use, because the main challenge is to solve problems with data not getting stuck what tool to use, if you are a complete beginner, I recommend learning Python, it’s easy not better than R but you will find more courses designed with Python than that in R.

It’s always better to learn more tools, so you can take basic courses applied with more than one tool, but at the end it’s better to dive deeply in one of them because it’s really the same, and this path is most recommended, this is how I started!

Notice that you can even switch between tools you are using, this means that you can easily switch from Python to R and vise versa. Also, you will find many tutorials, books, video lectures, blogs to learn data science with the mentioned tools. Below are the 3 learning paths at Coursera:

**1- For Python enthusiasts:**

The [Python for Everybody Specialization](https://www.coursera.org/specializations/python)by University of Michigan for beginners that consists of 5 courses that are coherent in material and provide a solid practical knowledge to learn Python coding and covers Python basics, Python data structures, using Python to access web data, Using Databases with Python and finally building a series of application to retrieve, process and visualize data using Python. By that, you will learn how to code with Python in an easy, managed way.

Next, you should take an intermediate level data science specialization to start understanding how you can solve problems through data science and to continue your learning path and practice data analysis on Python which is [Applied Data Science with Python Specialization](https://www.coursera.org/specializations/data-science-python) by University of Michigan that consists of 5 courses and covers introduction to Data Science with Python, data visualization and representation with Python, Applied Machine Learning with Python, applied text mining in Python, and applied social network analysis with Python, provided with helpful explanations and cool practical and exercises from the real world.

After taking this specialization, there is a great, easy intermediate level [Machine Learning Specialization](https://www.coursera.org/specializations/machine-learning) by University of Washington which consists of 4 courses and teaches in-depth all types of Machine Learning algorithms with real-world applications in Python covering Machine Learning foundations, Regression algorithms, Classification algorithms, Clustering algorithms (Supervised and Unsupervised learning), and then you will gain applied experience in major areas of machine learning and learn to analyze large and complex datasets from the real world and build intelligent applications.

The [Advanced Machine Learning Specialization](https://www.coursera.org/specializations/aml) is inevitably a great series to continue your learning journey and upgrade your skills into more advanced levels.

It gives an introduction to deep learning, reinforcement learning, natural language understanding, computer vision, and Bayesian methods. Also, Top Kaggle machine learning practitioners will share their experience of solving real-world problems and help you to fill the gaps between theory and practice. Upon completion of 7 courses, you will be able to apply modern machine learning methods in enterprise and understand the caveats of real-world data and settings.

**2- For R enthusiasts:**

You can start with the [Statistics with R Specialization](https://www.coursera.org/specializations/statistics) offered by Duke University and designed for beginners that consists of 5 courses and covers introduction to probability, inferential statistics, linear regression, Bayesian statistics, and a capstone project, and you will learn to analyze and visualize data in R and create reproducible data analysis reports and also produce a portfolio of data analysis projects.

And then you can dive into data science by taking the [Data Science Specialization](https://www.coursera.org/specializations/jhu-data-science) with R offered by John Hopkins University that helps you launch your career and taught by leading professors. In this specialization, you will learn how to clean, analyze and visualize data and perform regression analysis and navigate the entire data science pipeline from data acquisition to publication and how to use Github for managing your projects, and it consists of 10 courses including toolbox of data scientist, learn R programming, cleaning data and exploratory data analysis, regression models, practical machine learning and developing a data product with a capstone project.

**3- For Matlab enthusiasts:**

This great program, [Practical Data Science with MATLAB Specialization](https://www.coursera.org/specializations/practical-data-science-matlab) offered by MathWorks at Coursera is a great start to learn practical data science using Matlab, and accomplishing the program gives you the skills you need to achieve practical real-world results quickly and easily through visualizing, analyzing and modeling data which are being in-demand career skills across industries, and this specialization assumes you have domain expertise in a technical field and some exposure to computational tools. The good news is that you will be provided with free access to Matlab for the duration of the specialization to complete your work, and notice that Matlab is the go-to choice for many data enthusiasts who are working in related fields, and provides the capabilities you need to accomplish your data science tasks.

**Don't miss this top Machine Learning course!**

Released in 2011, it covers all aspects of the machine learning workflow. I recommend every person who wants to learn Data Science and Machine Learning to take the [Machine Learning](https://www.coursera.org/learn/machine-learning) course offered by Stanford University and taught by Andrew Ng who is one of the top AI pioneers across the globe, and he is probably teaching more people than anyone else across the world, and I highly suggest taking it as it’s still being the top ML online course!

Note that the assignments of this courses are designed with Octave, so for Matlab enthusiasts, it seems familiar to complete the assignments, but for those who are working with either Python or R, feel free to understand carefully the video lectures of the course if you aren’t able to complete the assignments because you will implement similar assignments in other courses.

**I would also like to share with you other great programs offered by IBM, Google Cloud Platform and deeplearning.ai that you could take and create a strong portfolio and apply for jobs in the future. Here we go:**

**1-  IBM Professional Certificate:**

If you want to take a full learning Path and fulfill your Data Science and Machine Learning skills, IBM is offering a great program at Coursera, you can take as a beginner the [IBM Data Science Professional Certificate](https://www.coursera.org/professional-certificates/ibm-data-science)that consists of 9 courses which will help you to kickstart your career in data science and machine learning through learning Python, SQL, analyze and visualize data, and build powerful machine learning models.

The next step is to take the [IBM AI Engineering Professional Certificate](https://www.coursera.org/professional-certificates/ai-engineer) formed of 6 courses and designed for you to broaden your knowledge in machine learning and apply your skills with hands-on projects and apply deep learning models with PyTorch and Tensorflow and get ready to launch your career in AI.

**2- Machine Learning with Google Cloud Platform:**

Another amazing program is offered by Google Cloud at Coursera, and you can start with the beginner-level [Machine Learning with Tensorflow on Google Cloud Platform Certificate](https://www.coursera.org/specializations/machine-learning-tensorflow-gcp) to learn the fundamentals of machine learning and build end-to-end machine learning models with real-world data through taking 5 great courses.

After that you can improve your skills and take the [Advanced Machine Learning with Tensorflow on Google Cloud Platform Certificate](https://www.coursera.org/specializations/advanced-machine-learning-tensorflow-gcp) and build production-ready machine learning models with Tensorflow in only 5 courses.

**3- deeplearning.ai Specializations:**

Finally, I’ll introduce you to the amazing program by deeplearning.ai at Coursera if you want to start your journey with Deep Learning! This program is highly recommended for anyone who aims to master Deep Learning and apply for jobs in related fields.

The [Deep Learning Specialization](https://www.coursera.org/specializations/deep-learning) consists of 5 amazing courses with coherent content and taught by Andrew Ng.

In five courses, you will learn the foundations of Deep Learning, understand how to build neural networks, and learn how to lead successful machine learning projects. You will learn about Convolutional networks, RNNs, LSTM, Adam, Dropout, BatchNorm, Xavier/He initialization, and more. You will work on case studies from healthcare, autonomous driving, sign language reading, music generation, and natural language processing. You will master not only the theory but also see how it is applied in industry. You will practice all these ideas in Python and in TensorFlow, which we will teach. You will also hear from many top leaders in Deep Learning, who will share with you their personal stories and give you career advice. AI is transforming multiple industries. After finishing this specialization, you will likely find creative ways to apply it to your work. We will help you master Deep Learning, understand how to apply it, and build a career in AI.

By accomplishing the Deep Learning Specialization, you need to learn how to build scalable AI-powered algorithms, thus you need to understand how to use Deep Learning Frameworks and tools to build them. Taking the [Tensorflow in Practice Specialization](https://www.coursera.org/specializations/tensorflow-in-practice) is excellent to fulfill your skills, and it includes 4 courses that cover almost all Deep Learning fields (intro to Tensorflow, Computer Vision, NLP, Times Series) and teaches you best practices for using TensorFlow, which is a popular open-source framework for machine learning in order to implement Deep Learning principles so that you can start building and applying scalable models to real-world problems.

Next, you will learn how to deploy your own Deep Learning models based on what you have learned so far and put them into production. [Tensorflow: Data and Deployment Specialization](https://www.coursera.org/specializations/tensorflow-data-and-deployment) is an amazing series for you to develop your skills in TensorFlow as you learn to navigate through a wide range of deployment scenarios and discover new ways to use data more effectively when training your model.

This specialization consists of four courses that teach you getting your Machine Learning models into the hands of all people on all kinds of devices, including smartphones and edge devices. You will also understand how to train and run your own models in browsers and in mobile applications, and you will learn how to leverage built-in datasets with just a few lines of code, and you will use APIs to control how data splitting, and process all types of unstructured data. By taking this series, you will be able to apply your knowledge in various deployment scenarios and get introduced to Tensorflow.JS, Tensorflow Lite, TensorFlow Serving, TensorFlow, Hub, TensorBoard, and more.

At last, I would like to invite you to join our [AI community forum](https://coursera.community/artificial-intelligence-ai-64) at [Coursera community](https://coursera.community/), and ask questions about AI and deepen your knowledge through discussion with other learners.

Keep learning at Coursera and broadening your AI knowledge and skills. Start following your passion and start your learning journey with Coursera, and keep in mind that Artificial Intelligence is opening new opportunities in the future!

*Stay tuned for my upcoming articles and blogs.*

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