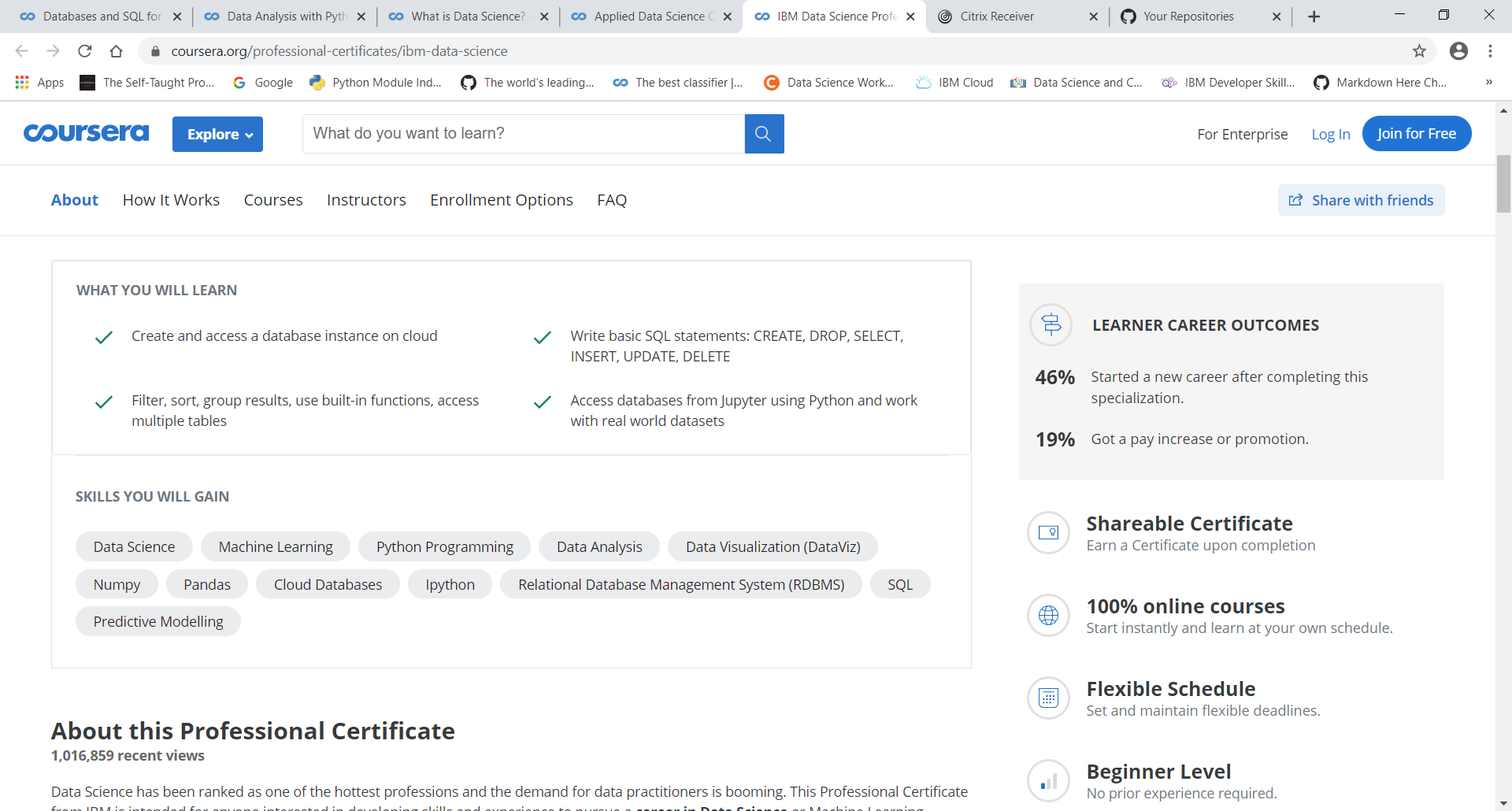
**IBM Data Science Professional Certificate**

[**https://www.coursera.org/professional-certificates/ibm-data-science**](https://www.coursera.org/professional-certificates/ibm-data-science)



**Applied Learning Project**

This professional certificate has a strong emphasis on applied learning. Except for the first course, all other courses include a series of hands-on labs and are performed in the IBM Cloud. Throughout this Professional Certificate you are exposed to a series of tools, libraries, cloud services, datasets, algorithms, assignments and projects that will provide you with **practical skills with applicability to real jobs** that employers value, including: **Tools**: Jupyter / JupyterLab, Zeppelin notebooks, R Studio, and Watson Studio, **Libraries**: Pandas, NumPy, Matplotlib, Seaborn, Folium, ipython-sql, Scikit-learn, ScipPy, etc. **Projects**: random album generator, predict housing prices, best classifier model, battle of neighborhoods

What is Data Science?

**About this Course**

The art of uncovering the insights and trends in data has been around since ancient times. The ancient Egyptians used census data to increase efficiency in tax collection and they accurately predicted the flooding of the Nile river every year. Since then, people working in data science have carved out a unique and distinct field for the work they do. This field is data science. In this course, we will meet some data science practitioners and we will get an overview of what data science is today.

WEEK 1

Defining Data Science and What Data Scientists Do

In this module, you will go over the course syllabus to learn what will be taught in this course. Also, you will hear from data science professionals to learn what data science is, what data scientists do, and what tools and algorithms data scientists use on a daily basis. Finally, you will be required to complete a reading assignment to learn why data science is considered the sexiest job in the 21st century.

6 videos, 6 readings

1. **Reading:**Course Syllabus
2. **Reading:**Professional Certificate Career Support
3. [**Video:**What is Data Science?](https://www.coursera.org/lecture/what-is-datascience/what-is-data-science-kIuf0)
4. **Video:**The Many Paths to Data Science
5. **Video:**Advice for New Data Scientists
6. **Reading:**Data Science: The Sexiest Job in the 21st Century
7. **Video:**A day in the Life of a Data Scientist
8. **Video:**Data Science Topics and Algorithms
9. **Video:**What is the cloud?
10. **Reading:**What Makes Someone a Data Scientist?
11. **Reading:**Exercise: Identifying objects in images with IBM Watson
12. **Reading:**Exercise: Upload and classify your images!

Show lessweek 1 material

**Graded:**Data Science: The Sexiest Job in the 21st Century

**Graded:**What Makes Someone a Data Scientist?

WEEK 2

Data Science Topics

In this module, you will hear from Norman White, the Faculty Director of the Stern Centre for Research Computing, at New York University, as he talks about data science and what skills are required for anyone interested in pursuing a career in this field and as he gives advice to those who are looking to start a career in data science. Finally, you will be required to complete reading assignments to learn about the process of mining a given dataset and about regression analysis.

7 videos, 2 readings

1. [**Video:**Data Science Skills & Big Data](https://www.coursera.org/lecture/what-is-datascience/data-science-skills-big-data-CFO4Y)
2. **Video:**Data Scientists at New York University
3. **Video:**What is Hadoop?
4. **Reading:**Data Mining
5. **Video:**Neural Networks and Deep Learning
6. **Video:**How Can Someone Become a Data Scientist?
7. **Video:**High School Students and Data Science Careers
8. **Video:**Applications of Machine Learning
9. **Reading:**Regression

**Graded:**Data Mining

**Graded:**Regression

WEEK 3

Data Science in Business

In this module, you will learn about what companies need to do in order to start with data science. You will also learn about some of the qualities that differentiate data scientists from other professionals. In addition, you will learn about analytics and what important role data scientists play in this process, and about story-telling and the importance of an effective final deliverable. Finally, you will be required to apply what you learned about data science by answering open-ended questions.

3 videos, 2 readings

1. [**Video:**How Should Companies Get Started in Data Science?](https://www.coursera.org/lecture/what-is-datascience/how-should-companies-get-started-in-data-science-AAArc)
2. **Video:**Recruiting for Data Science
3. **Video:**Applications of Data Science
4. **Reading:**The Final Deliverable
5. **Reading:**The Report Structure

Show less week 3 material

**Graded:**The Final Deliverable

**Graded:**The Report Structure

**Graded:**Final Assignment

Tools for Data Science

What are some of the most popular data science tools, how do you use them, and what are their features? In this course, you'll learn about Jupyter Notebooks, RStudio IDE, Apache Zeppelin and Data Science Experience. You will learn about what each tool is used for, what programming languages they can execute, their features and limitations. With the tools hosted in the cloud on Cognitive Class Labs, you will be able to test each tool and follow instructions to run simple code in Python, R or Scala. To end the course, you will create a final project with a Jupyter Notebook on IBM Data Science Experience and demonstrate your proficiency preparing a notebook, writing Markdown, and sharing your work with your peers.

WEEK 1

Introducing Skills Network Labs

This week, you will get an overview of the various data science tools available to you, hosted on the IBM Developer Skills Network Labs (SN Labs). You will create an account and start exploring some of the features.

3 readings, 1 practice quiz

1. **Reading:**What is Skills Network Labs?
2. **Reading:**Account Features
3. **Reading:**Creating an account.
4. **LTI Item:**Lab - Getting Started with Skills Network Labs
5. **LTI Item:**Lab - Exploring My Data on Skills Network Labs
6. **Practice Quiz:**Practice Quiz

Show lessweek 1 material

**Graded:**Quiz 1 - Skills Network Labs

Jupyter Notebooks

This week, you will learn about a popular data science tool, Jupyter Notebooks, its features, and why they are so popular among data scientists today.

2 videos

1. [**Video:**What are Jupyter Notebooks?](https://www.coursera.org/lecture/open-source-tools-for-data-science/what-are-jupyter-notebooks-GBOZX)
2. **Video:**Getting started with Jupyter Notebooks
3. **LTI Item:**Lab - Jupyter Notebooks - The Basics
4. **LTI Item:**Lab - Jupyter Notebooks - More Features
5. **LTI Item:**Lab - Jupyter Notebooks - Advanced Features
6. **Discussion Prompt:**Interesting Jupyter Notebooks on the Internet

Show lessweek 1 material

**Graded:**Quiz 2 - Jupyter Notebooks

WEEK 2

Apache Zeppelin Notebooks

This week, you will learn about Apache Zeppelin Notebooks, its feature, and how they are different from Jupyter Notebooks.

3 videos

1. [**Video:**What are Zeppelin Notebooks?](https://www.coursera.org/lecture/open-source-tools-for-data-science/what-are-zeppelin-notebooks-OrGgA)
2. **Video:**Zeppelin for Scala
3. **Video:**Getting started with Zeppelin
4. **LTI Item:**Lab - Zeppelin Notebooks - The Basics
5. **LTI Item:**Lab - Zeppelin Notebooks - Tutorial

Show lessweek 2 material

**Graded:**Quiz 3 - Zeppelin Notebooks

RStudio IDE

This week, you will learn about a popular data science tool used by R programmers. You'll learn about the user interface and how to use its various features.

4 videos

1. [**Video:**What is RStudio IDE?](https://www.coursera.org/lecture/open-source-tools-for-data-science/what-is-rstudio-ide-1lY7B)
2. **Video:**Uploading files, Installing packages and loading libraries in RStudio IDE
3. **Video:**Getting started with RStudio IDE
4. **Video:**RStudio Environment and History
5. **LTI Item:**Lab - RStudio - The Basics
6. **LTI Item:**Lab - RStudio - Creating an interactive map in R

Show lessweek 2 material

**Graded:**Quiz 4 - RStudio IDE

WEEK 3

IBM Watson Studio

This week, you will learn about an enterprise-ready data science platform by IBM, called Watson Studio (formerley known as Data Science Experience). You'll learn about some of the features and capabilities of what data scientists use in the industry.

4 videos, 2 readings

1. **Reading:**Preface: What is IBM Watson Studio (formerly Data Science Experience)?
2. [**Video:**What is IBM Watson Studio (Data Science Experience)?](https://www.coursera.org/lecture/open-source-tools-for-data-science/what-is-ibm-watson-studio-data-science-experience-EYQ8L)
3. **Video:**Creating an account on IBM Watson Studio (Data Science Experience)
4. **Video:**Jupyter notebooks on Watson Studio (Data Science Experience) - Part 1/2
5. **Video:**Jupyter Notebooks on IBM Watson Studio (Data Science Experience) - Part 2/2
6. **Reading:**Lab - IBM Watson Studio

Show lessweek 3 material

**Graded:**Quiz 5 - IBM Watson Studio

Project: Create and share a Jupyter Notebook

1 reading

1. **Reading:**IBM Digital Badge

Show lessweek 3 material

**Graded:**Create and share your Jupyter Notebook

Data Science Methodology

**About this Course**

Despite the recent increase in computing power and access to data over the last couple of decades, our ability to use the data within the decision making process is either lost or not maximized at all too often, we don't have a solid understanding of the questions being asked and how to apply the data correctly to the problem at hand. This course has one purpose, and that is to share a methodology that can be used within data science, to ensure that the data used in problem solving is relevant and properly manipulated to address the question at hand. Accordingly, in this course, you will learn: - The major steps involved in tackling a data science problem. - The major steps involved in practicing data science, from forming a concrete business or research problem, to collecting and analyzing data, to building a model, and understanding the feedback after model deployment. - How data scientists think!

WEEK 1

From Problem to Approach and From Requirements to Collection

In this module, you will learn about why we are interested in data science, what a methodology is, and why data scientists need a methodology. You will also learn about the data science methodology and its flowchart. You will learn about the first two stages of the data science methodology, namely Business Understanding and Analytic Approach. Finally, through a lab session, you will also obtain how to complete the Business Understanding and the Analytic Approach stages and the Data Requirements and Data Collection stages pertaining to any data science problem.

Show less

5 videos, 4 readings

1. **Reading:**Syllabus
2. [**Video:**Welcome](https://www.coursera.org/lecture/data-science-methodology/welcome-lMNmc)
3. **Reading:**Introduction to CRISP-DM
4. **Video:**Business Understanding
5. **Video:**Analytic Approach
6. **LTI Item:**Lab: From Problem to Approach
7. **Reading:**Lesson Summary
8. **Video:**Data Requirements
9. **Video:**Data Collection
10. **LTI Item:**From Requirements to Collection
11. **Reading:**Lesson Summary

Show lessweek 1 material

**Graded:**From Problem to Approach

**Graded:**From Requirements to Collection

WEEK 2

From Understanding to Preparation and From Modeling to Evaluation

In this module, you will learn what it means to understand data, and prepare or clean data. You will also learn about the purpose of data modeling and some characteristics of the modeling process. Finally, through a lab session, you will learn how to complete the Data Understanding and the Data Preparation stages, as well as the Modeling and the Model Evaluation stages pertaining to any data science problem.

6 videos, 3 readings

1. [**Video:**Data Understanding](https://www.coursera.org/lecture/data-science-methodology/data-understanding-4NFql)
2. **Video:**Data Preparation - Concepts
3. **Reading:**Correction
4. **Video:**Data Preparation - Case Study
5. **LTI Item:**From Understanding to Preparation
6. **Reading:**Lesson Summary
7. **Video:**Modeling - Concepts
8. **Video:**Modeling - Case Study
9. **Video:**Evaluation
10. **LTI Item:**From Modeling to Evaluation
11. **Reading:**Lesson Summary

Show lessweek 2 material

**Graded:**From Understanding to Preparation

**Graded:**From Modeling to Evaluation

WEEK 3

From Deployment to Feedback

In this module, you will learn about what happens when a model is deployed and why model feedback is important. Also, by completing a peer-reviewed assignment, you will demonstrate your understanding of the data science methodology by applying it to a problem that you define.

3 videos, 2 readings

1. [**Video:**Deployment](https://www.coursera.org/lecture/data-science-methodology/deployment-qNosf)
2. **Video:**Feedback
3. **Video:**Course Summary
4. **Reading:**Lesson Summary
5. **Reading:**IBM Digital Badge

Show lessweek 3 material

**Graded:**From Deployment to Feedback

**Graded:**Final Assignment

Python for Data Science and AI

**About this Course**

This introduction to Python will kickstart your learning of Python for data science, as well as programming in general. This beginner-friendly Python course will take you from zero to programming in Python in a matter of hours.

WEEK 1

Python Basics

3 videos, 1 reading

1. **Reading:**About this Course
2. [**Video:**Types](https://www.coursera.org/lecture/python-for-applied-data-science-ai/types-WtDWG)
3. **Video:**Expressions and Variables
4. **LTI Item:**Your First Program, Types, Expressions and Variables
5. **Video:**String Operations
6. **LTI Item:**LAB: Strings

Show lessweek 1 material

**Graded:**Types

**Graded:**Expressions and Variables

**Graded:**String Operations

WEEK 2

Python Data Structures

3 videos

1. [**Video:**List and Tuples](https://www.coursera.org/lecture/python-for-applied-data-science-ai/list-and-tuples-bUWEy)
2. **LTI Item:**Lab: Tuples
3. **LTI Item:**Lab: Lists
4. **Video:**Dictionaries
5. **LTI Item:**Lab: Dictionaries
6. **Video:**Sets
7. **LTI Item:**Lab: Sets

Show lessweek 2 material

**Graded:**List and Tuples

**Graded:**Dictionaries

**Graded:**Sets

WEEK 3

Python Programming Fundamentals

4 videos

1. [**Video:**Conditions and Branching](https://www.coursera.org/lecture/python-for-applied-data-science-ai/conditions-and-branching-WuZVi)
2. **LTI Item:**Lab:Conditions and Branching
3. **Video:**Loops
4. **LTI Item:**Lab: Loops
5. **Video:**Functions
6. **LTI Item:**Lab: Functions
7. **Video:**Objects and Classes
8. **LTI Item:**Objects and Classes

Show lessweek 3 material

**Graded:**Conditions and Branching

**Graded:**Loops

**Graded:**Functions

**Graded:**Objects and Classes

WEEK 4

Working with Data in Python

8 videos, 1 reading

1. [**Video:**Reading Files with Open](https://www.coursera.org/lecture/python-for-applied-data-science-ai/reading-files-with-open-78ZHl)
2. **LTI Item:**Lab:Reading Files with Open
3. **Video:**Writing Files with Open
4. **LTI Item:**Lab:Writing Files with Open
5. **Video:**Loading Data with Pandas
6. **Reading:**Using loc, iloc and ix
7. **Video:**Pandas: Working with and Saving Data
8. **Ungraded Plugin:**Lab: Pandas with IBM Watson Studio
9. **Video:**One Dimensional Numpy
10. **LTI Item:**One Dimensional Numpy
11. **Video:**Two Dimensional Numpy
12. **LTI Item:**Two Dimensional Numpy
13. **Video:**Simple APIs (Part 1)
14. **Video:**Simple APIs (Part 2)
15. **Ungraded Plugin:**Instruction for Speech to Text and Language Translator API Keys
16. **LTI Item:**Introduction to API
17. **LTI Item:**Watson Speech to Text and Language Translator API

Show lessweek 4 material

**Graded:**Reading Files with Open

**Graded:**Writing files with open

**Graded:**Pandas

**Graded:**One Dimensional Numpy

**Graded:**Two Dimensional Numpy

WEEK 5

Analyzing US Economic Data and Building a Dashboard

2 readings

1. **Reading:**Overview
2. **Ungraded Plugin:**Lab: Setup Watson Studio
3. **Reading:**IBM Digital Badge

Show lessweek 5 material

**Graded:**Analyzing US Economic Data and Building a Dashboard

Databases and SQL for Data Science

**About this Course**

Much of the world's data resides in databases. SQL (or Structured Query Language) is a powerful language which is used for communicating with and extracting data from databases. A working knowledge of databases and SQL is a must if you want to become a data scientist. The purpose of this course is to introduce relational database concepts and help you learn and apply foundational knowledge of the SQL language. It is also intended to get you started with performing SQL access in a data science environment. The emphasis in this course is on hands-on and practical learning . As such, you will work with real databases, real data science tools, and real-world datasets. You will create a database instance in the cloud. Through a series of hands-on labs you will practice building and running SQL queries. You will also learn how to access databases from Jupyter notebooks using SQL and Python.

WEEK 1

Week 1 - Introduction to Databases and Basic SQL

In Week 1 you will be introduced to databases. You will create a database instance on the cloud. You will learn some of the basic SQL statements. You will also write and practice basic SQL hands-on on a live database.

12 videos, 6 readings, 2 practice quizzes

1. [**Video:**Welcome to SQL for Data Science](https://www.coursera.org/lecture/sql-data-science/welcome-to-sql-for-data-science-ey8Cf)
2. **Video:**Introduction to Databases
3. **Video:**How to create a Database instance on Cloud
4. **Reading:**Hands-on LAB: Provision a Cloud Hosted Database Instance
5. **Video:**CREATE Table Statement
6. **Reading:**Examples to CREATE and DROP tables
7. **Video:**SELECT Statement
8. **Reading:**SELECT statement examples
9. **Video:**COUNT, DISTINCT, LIMIT
10. **Video:**INSERT Statement
11. **Video:**UPDATE and DELETE Statements
12. **Reading:**Hands-on LAB: Composing and Running basic SQL queries
13. **Reading:**About this Optional lesson
14. **Video:**Information and Data Models
15. **Video:**Types of Relationships
16. **Video:**Mapping Entities to Tables
17. **Video:**Relational Model Concepts
18. **Reading:**Additional Reading
19. **Practice Quiz:**Practice Quiz: Review of Relational Database Concepts
20. **Practice Quiz:**Optional Not Graded Quiz on Relational Concepts

Show lessweek 1 material

**Graded:**Databases

**Graded:**Basic SQL

WEEK 2

Week 2 - Advanced SQL

By the end of this module, you will learn the following: (1) Learn how to use string patterns and ranges to search data and how to sort and group data in result sets. (2) Learn how to work with multiple tables in a relational database using join operations.

9 videos, 5 readings, 2 practice quizzes

1. [**Video:**Using String Patterns, Ranges](https://www.coursera.org/lecture/sql-data-science/using-string-patterns-ranges-UPbqw)
2. **Video:**Sorting Result Sets
3. **Video:**Grouping Result Sets
4. **Reading:**Hands-on LAB: String Patterns, Sorting & Grouping
5. **Video:**Built-in Database Functions
6. **Video:**Date and Time Built-in Functions
7. **Reading:**Hands-on Lab: Built-in functions
8. **Video:**Sub-Queries and Nested Selects
9. **Video:**Working with Multiple Tables
10. **Reading:**Hands-on Lab: Sub-queries, Multiple Tables
11. **Reading:**About this Optional lesson
12. **Video:**Relational Model Constraints
13. **Video:**Relational Model Constraints - Advanced
14. **Reading:**Additional Information on Keys and Constraints
15. **Practice Quiz:**Practice Quiz: Review of Database Constraints
16. **Practice Quiz:**Optional Not Graded Quiz on Constraints

Show lessweek 2 material

**Graded:**String Patterns, Ranges, Sorting and Grouping

**Graded:**Functions, Sub-Queries, Multiple Tables

WEEK 3

Week 3 - Accessing Databases using Python

After completing the lessons in this week, you will learn how to explain the basic concepts related to using Python to connect to databases and then create tables, load data, query data using SQL, and analyze data using Python

10 videos, 3 readings, 1 practice quiz

1. [**Video:**How to Access Databases Using Python](https://www.coursera.org/lecture/sql-data-science/how-to-access-databases-using-python-ZtWlh)
2. **Video:**Writing code using DB-API
3. **Video:**Connecting to a database using ibm\_db API
4. **Reading:**Lab 0: Create Database Credentials
5. **LTI Item:**Hands-on LAB 1: Connecting to a database instance
6. **Video:**Creating tables, loading data and querying data
7. **LTI Item:**Hands-on LAB 2: Creating tables, inserting and querying Data
8. **LTI Item:**Hands-on Tutorial: Accessing Databases with SQL magic
9. **Video:**Analyzing data with Python
10. **LTI Item:**Hands-on LAB 3: Analyzing a real World Data Set
11. **Reading:**About this Optional Section
12. **Video:**Join Overview
13. **Video:**Inner Join
14. **Video:**Left Outer Join
15. **Video:**Right Outer Join
16. **Video:**Full Outer Join
17. **Reading:**Hands-on LAB: JOINs
18. **Practice Quiz:**JOIN operations

Show lessweek 3 material

**Graded:**Database access from Python

WEEK 4

Week 4: Course Assignment

As a hands-on Data Science assignment, you will be working with multiple real world datasets for the city of Chicago. You will be asked questions that will help you understand the data just like a data scientist would. You will be assessed both on the correctness of your SQL queries and results.

2 videos, 2 readings, 1 practice quiz

1. [**Video:**Working with Real World Datasets](https://www.coursera.org/lecture/sql-data-science/working-with-real-world-datasets-M0czN)
2. **Video:**Getting Table and Column Details
3. **Reading:**LOADing Data
4. **LTI Item:**Hands-on Lab 1: Practice Querying Real World Datasets
5. **LTI Item:**Jupyter Notebook with Problems for Peer Reviewed Assignment
6. **Ungraded Plugin:**1min Survey and Feedback
7. **Reading:**IBM Digital Badge
8. **Practice Quiz:**Opt-in to receive your badge!

Show lessweek 4 material

**Graded:**Peer Reviewed Assignment

Data Analysis with Python

**About this Course**

Learn how to analyze data using Python. This course will take you from the basics of Python to exploring many different types of data. You will learn how to prepare data for analysis, perform simple statistical analysis, create meaningful data visualizations, predict future trends from data, and more! Topics covered: 1) Importing Datasets 2) Cleaning the Data 3) Data frame manipulation 4) Summarizing the Data 5) Building machine learning Regression models 6) Building data pipelines Data Analysis with Python will be delivered through lecture, lab, and assignments. It includes following parts: Data Analysis libraries: will learn to use Pandas, Numpy and Scipy libraries to work with a sample dataset. We will introduce you to pandas, an open-source library, and we will use it to load, manipulate, analyze, and visualize cool datasets. Then we will introduce you to another open-source library, scikit-learn, and we will use some of its machine learning algorithms to build smart models and make cool predictions.

WEEK 1

Importing Datasets

6 videos

1. [**Video:**The Problem](https://www.coursera.org/lecture/data-analysis-with-python/the-problem-WjKC0)
2. **Video:**Understanding the Data
3. **Video:**Python Packages for Data Science
4. **Video:**Importing and Exporting Data in Python
5. **Video:**Getting Started Analyzing Data in Python
6. **Video:**Accessing Databases with Python
7. **LTI Item:**Lab 1:Importing Datasets

Show lessweek 1 material

**Graded:**Understanding the Data

**Graded:**Python Packages for Data Science

**Graded:**Importing and Exporting Data in Python

**Graded:**Getting Started Analyzing Data in Python

**Graded:**Importing Datasets

WEEK 2

Data Wrangling

6 videos

1. [**Video:**Pre-processing Data in Python](https://www.coursera.org/lecture/data-analysis-with-python/pre-processing-data-in-python-1wWCA)
2. **Video:**Dealing with Missing Values in Python
3. **Video:**Data Formatting in Python
4. **Video:**Data Normalization in Python
5. **Video:**Binning in Python
6. **Video:**Turning categorical variables into quantitative variables in Python
7. **LTI Item:**Data Wrangling

Show lessweek 2 material

**Graded:**Dealing with Missing Values in Python

**Graded:**Data Formatting in Python

**Graded:**Data Normalization in Python

**Graded:**Turning categorical variables into quantitative variables in Python

**Graded:**Data Wrangling

WEEK 3

Exploratory Data Analysis

6 videos

1. [**Video:**Exploratory Data Analysis](https://www.coursera.org/lecture/data-analysis-with-python/exploratory-data-analysis-iNeWs)
2. **Video:**Descriptive Statistics
3. **Video:**GroupBy in Python
4. **Video:**Correlation
5. **Video:**Correlation - Statistics
6. **Video:**Analysis of Variance ANOVA
7. **LTI Item:**Exploratory Data Analysis

Show lessweek 3 material

**Graded:**Descriptive Statistics

**Graded:**GroupBy in Python

**Graded:**Correlation

**Graded:**Correlation - Statistics

**Graded:**Exploratory Data Analysis

WEEK 4

Model Development

6 videos

1. [**Video:**Model Development](https://www.coursera.org/lecture/data-analysis-with-python/model-development-qF8hd)
2. **Video:**Linear Regression and Multiple Linear Regression
3. **Video:**Model Evaluation using Visualization
4. **Video:**Polynomial Regression and Pipelines
5. **Video:**Measures for In-Sample Evaluation
6. **Video:**Prediction and Decision Making
7. **LTI Item:**Model Development

Show lessweek 4 material

**Graded:**Linear Regression and Multiple Linear Regression

**Graded:**Model Evaluation using Visualization

**Graded:**Polynomial Regression and Pipelines

**Graded:**Measures for In-Sample Evaluation

**Graded:**Model Development

WEEK 5

Model Evaluation

4 videos, 1 reading

1. [**Video:**Model Evaluation and Refinement](https://www.coursera.org/lecture/data-analysis-with-python/model-evaluation-and-refinement-izKyc)
2. **Video:**Overfitting, Underfitting and Model Selection
3. **Video:**Ridge Regression
4. **Video:**Grid Search
5. **LTI Item:**Model Evaluation and Refinement
6. **Reading:**Course Creators

Show lessweek 5 material

**Graded:**Model Evaluation

**Graded:**Overfitting, Underfitting and Model Selection

**Graded:**Ridge Regression

**Graded:**Quiz: Model Refinement

WEEK 6

Final Assignment

2 items

1. **Ungraded Plugin:**Lab Instructions

Show lessweek 6 material

**Graded:**House Sales in King County, USA

WEEK 7

IBM Digital Badge

1 reading

1. **Reading:**IBM Digital Badge

Data Visualization with Python

**About this Course**

"A picture is worth a thousand words". We are all familiar with this expression. It especially applies when trying to explain the insight obtained from the analysis of increasingly large datasets. Data visualization plays an essential role in the representation of both small and large-scale data. One of the key skills of a data scientist is the ability to tell a compelling story, visualizing data and findings in an approachable and stimulating way. Learning how to leverage a software tool to visualize data will also enable you to extract information, better understand the data, and make more effective decisions. The main goal of this Data Visualization with Python course is to teach you how to take data that at first glance has little meaning and present that data in a form that makes sense to people. Various techniques have been developed for presenting data visually but in this course, we will be using several data visualization libraries in Python, namely Matplotlib, Seaborn, and Folium.

WEEK 1

Introduction to Data Visualization Tools

In this module, you will learn about data visualization and some of the best practices to keep in mind when creating plots and visuals. You will also learn about the history and the architecture of Matplotlib and learn about basic plotting with Matplotlib. In addition, you will learn about the dataset on immigration to Canada, which will be used extensively throughout the course. Finally, you will briefly learn how to read csv files into a pandas dataframe and process and manipulate the data in the dataframe, and how to generate line plots using Matplotlib.

More

6 videos, 2 readings

1. **Reading:**Syllabus
2. [**Video:**Welcome](https://www.coursera.org/lecture/python-for-data-visualization/welcome-QAODs)
3. **Video:**Introduction to Data Visualization
4. **Video:**Introduction to Matplotlib
5. **Video:**Basic Plotting with Matplotlib
6. **Video:**Dataset on Immigration to Canada
7. **Video:**Line Plots
8. **LTI Item:**Introduction to Matplotlib and Line Plots
9. **Reading:**[Optional] Download Jupyter Notebook

Show lessweek 1 material

**Graded:**Introduction to Data Visualization Tools

WEEK 2

Basic and Specialized Visualization Tools

In this module, you learn about area plots and how to create them with Matplotlib, histograms and how to create them with Matplotlib, bar charts, and how to create them with Matplotlib, pie charts, and how to create them with Matplotlib, box plots and how to create them with Matplotlib, and scatter plots and bubble plots and how to create them with Matplotlib.

6 videos, 2 readings

1. [**Video:**Area Plots](https://www.coursera.org/lecture/python-for-data-visualization/area-plots-qfO3z)
2. **Video:**Histograms
3. **Video:**Bar Charts
4. **LTI Item:**Basic Visualization Tools
5. **Reading:**[Optional] Download JupyterNotebook
6. **Video:**Pie Charts
7. **Video:**Box Plots
8. **Video:**Scatter Plots
9. **LTI Item:**Specialized Visualization Tools
10. **Reading:**[Optional] Download Jupyter Notebook

Show lessweek 2 material

**Graded:**Basic Visualization Tools

**Graded:**Specialized Visualization Tools

WEEK 3

Advanced Visualizations and Geospatial Data

In this module, you will learn about advanced visualization tools such as waffle charts and word clouds and how to create them. You will also learn about seaborn, which is another visualization library, and how to use it to generate attractive regression plots. In addition, you will learn about Folium, which is another visualization library, designed especially for visualizing geospatial data. Finally, you will learn how to use Folium to create maps of different regions of the world and how to superimpose markers on top of a map, and how to create choropleth maps.

More

6 videos, 3 readings

1. [**Video:**Waffle Charts](https://www.coursera.org/lecture/python-for-data-visualization/waffle-charts-rxnrk)
2. **Video:**Word Clouds
3. **Video:**Seaborn and Regression Plots
4. **LTI Item:**Advanced Visualization Tools
5. **Reading:**[Optional] Download Jupyter Notebook
6. **Video:**Introduction to Folium
7. **Video:**Maps with Markers
8. **Video:**Choropleth Maps
9. **LTI Item:**Creating Maps and Visualizing Geospatial Data
10. **Reading:**[Optional] Download Jupyter Notebook
11. **Reading:**IBM Digital Badge

Show lessweek 3 material

**Graded:**Advanced Visualization Tools

**Graded:**Visualizing Geospatial Data

**Graded:**Final Assignment

Machine Learning with Python

**About this Course**

This course dives into the basics of machine learning using an approachable, and well-known programming language, Python. In this course, we will be reviewing two main components: First, you will be learning about the purpose of Machine Learning and where it applies to the real world. Second, you will get a general overview of Machine Learning topics such as supervised vs unsupervised learning, model evaluation, and Machine Learning algorithms.

WEEK 1

Introduction to Machine Learning

In this week, you will learn about applications of Machine Learning in different fields such as health care, banking, telecommunication, and so on. You’ll get a general overview of Machine Learning topics such as supervised vs unsupervised learning, and the usage of each algorithm. Also, you understand the advantage of using Python libraries for implementing Machine Learning models.

4 videos

1. [**Video:**Welcome](https://www.coursera.org/lecture/machine-learning-with-python/welcome-GjNfa)
2. **Video:**Introduction to Machine Learning
3. **Video:**Python for Machine Learning
4. **Video:**Supervised vs Unsupervised

Show lessweek 1 material

**Graded:**Intro to Machine Learning

WEEK 2

Regression

In this week, you will get a brief intro to regression. You learn about Linear, Non-linear, Simple and Multiple regression, and their applications. You apply all these methods on two different datasets, in the lab part. Also, you learn how to evaluate your regression model, and calculate its accuracy.

6 videos

1. [**Video:**Introduction to Regression](https://www.coursera.org/lecture/machine-learning-with-python/introduction-to-regression-AVIIM)
2. **Video:**Simple Linear Regression
3. **Video:**Model Evaluation in Regression Models
4. **Video:**Evaluation Metrics in Regression Models
5. **LTI Item:**Lab: Simple Linear Regression
6. **Video:**Multiple Linear Regression
7. **LTI Item:**Lab: Multiple Linear Regression
8. **Video:**Non-Linear Regression
9. **LTI Item:**Lab: Polynomial Regression
10. **LTI Item:**Lab: Non-linear Regression

Show lessweek 2 material

**Graded:**Regression

WEEK 3

Classification

In this week, you will learn about classification technique. You practice with different classification algorithms, such as KNN, Decision Trees, Logistic Regression and SVM. Also, you learn about pros and cons of each method, and different classification accuracy metrics.

9 videos

1. [**Video:**Introduction to Classification](https://www.coursera.org/lecture/machine-learning-with-python/introduction-to-classification-95g22)
2. **Video:**K-Nearest Neighbours
3. **Video:**Evaluation Metrics in Classification
4. **LTI Item:**Lab: KNN
5. **Video:**Introduction to Decision Trees
6. **Video:**Building Decision Trees
7. **LTI Item:**Lab: Decision Trees
8. **Video:**Intro to Logistic Regression
9. **Video:**Logistic regression vs Linear regression
10. **Video:**Logistic Regression Training
11. **LTI Item:**Lab: Logistic Regression
12. **Video:**Support Vector Machine
13. **LTI Item:**Lab: SVM (Support Vector Machines)

Show lessweek 3 material

**Graded:**Classification

WEEK 4

Clustering

In this section, you will learn about different clustering approaches. You learn how to use clustering for customer segmentation, grouping same vehicles, and also clustering of weather stations. You understand 3 main types of clustering, including Partitioned-based Clustering, Hierarchical Clustering, and Density-based Clustering.

6 videos

1. [**Video:**Intro to Clustering](https://www.coursera.org/lecture/machine-learning-with-python/intro-to-clustering-Nlxjw)
2. **Video:**Intro to k-Means
3. **Video:**More on k-Means
4. **LTI Item:**Lab: k-Means
5. **Video:**Intro to Hierarchical Clustering
6. **Video:**More on Hierarchical Clustering
7. **LTI Item:**Lab: Agglomerative clustering
8. **Video:**DBSCAN
9. **LTI Item:**Lab: DBSCAN Clustering

Show lessweek 4 material

**Graded:**Clustering

WEEK 5

Recommender Systems

In this module, you will learn about recommender systems. First, you will get introduced with main idea behind recommendation engines, then you understand two main types of recommendation engines, namely, content-based and collaborative filtering.

3 videos

1. [**Video:**Intro to Recommender Systems](https://www.coursera.org/lecture/machine-learning-with-python/intro-to-recommender-systems-6vXTY)
2. **Video:**Content-based Recommender Systems
3. **LTI Item:**Lab: Content-based Recommendation Systems
4. **Video:**Collaborative Filtering
5. **LTI Item:**Lab: Collaborative Filtering on Movies

Show lessweek 5 material

**Graded:**Recommender System

WEEK 6

Final Project

In this module, you will do a project based of what you have learned so far. You will submit a report of your project for peer evaluation.

2 videos, 3 readings

1. **Reading:**How to do the final project?
2. **Ungraded Plugin:**Watson Studio Sign-up and Share Lab
3. [**Video:**OPTIONAL: Signing-up for a Watson Studio Account](https://www.coursera.org/lecture/machine-learning-with-python/optional-signing-up-for-a-watson-studio-account-J1anF)
4. **Video:**OPTIONAL: Sharing Notebooks on Watson Studio
5. **Reading:**Congratulations!
6. **Reading:**IBM Digital Badge

Show lessweek 6 material

**Graded:**The best classifier

Applied Data Science Capstone

**About this Course**

This capstone project course will give you a taste of what data scientists go through in real life when working with data. You will learn about location data and different location data providers, such as Foursquare. You will learn how to make RESTful API calls to the Foursquare API to retrieve data about venues in different neighborhoods around the world. You will also learn how to be creative in situations where data are not readily available by scraping web data and parsing HTML code. You will utilize Python and its pandas library to manipulate data, which will help you refine your skills for exploring and analyzing data. Finally, you will be required to use the Folium library to great maps of geospatial data and to communicate your results and findings.

WEEK 1

Introduction

In this module, you will learn about the scope of this capstone course and the context of the project that you will be working on. You will learn about different location data providers and what location data is normally composed of. Finally, you will be required to submit a link to a new repository on your Github account dedicated to this course.

2 videos, 1 reading

1. **Reading:**Syllabus
2. [**Video:**Introduction](https://www.coursera.org/lecture/applied-data-science-capstone/introduction-vQGoA)
3. **Video:**Location Data Providers

Show lessweek 1 material

**Graded:**Capstone Project Notebook

WEEK 2

Foursquare API

In this module, you will learn in details about Foursquare, which is the location data provider we will be using in this course, and its API. Essentially, you will learn how to create a Foursquare developer account, and use your credentials to search for nearby venues of a specific type, explore a particular venue, and search for trending venues around a location.

5 videos

1. [**Video:**Introduction to Foursquare](https://www.coursera.org/lecture/applied-data-science-capstone/introduction-to-foursquare-rD4tX)
2. **Video:**Signing up for a Foursquare Developer Account
3. **Video:**Foursquare - Search
4. **Video:**Foursquare - Explore and Other Queries
5. **Video:**Foursquare - Summary
6. **LTI Item:**Foursquare API

Show lessweek 2 material

**Graded:**Foursquare API

WEEK 3

Neighborhood Segmentation and Clustering

In this module, you will learn about k-means clustering, which is a form of unsupervised learning. Then you will use clustering and the Foursquare API to segment and cluster the neighborhoods in the city of New York. Furthermore, you will learn how to scrape website and parse HTML code using the Python package Beautifulsoup, and convert data into a pandas dataframe.

2 videos

1. [**Video:**Introduction to Clustering](https://www.coursera.org/lecture/applied-data-science-capstone/introduction-to-clustering-mdcen)
2. **Video:**k-means Clustering
3. **LTI Item:**k-means Clustering
4. **LTI Item:**Segmenting and Clustering Neighborhoods in New York City

Show lessweek 3 material

**Graded:**Segmenting and Clustering Neighborhoods in Toronto

WEEK 4

The Battle of Neighborhoods

In this module, you will start working on the capstone project. You will clearly define a problem and discuss the data that you will be using to solve the problem.

**Graded:**Capstone Project - The Battle of Neighborhoods (Week 1)

WEEK 5

The Battle of Neighborhoods (Cont'd)

In this module, you will carry out all the remaining work to complete your capstone project. You will submit a report of your project for peer evaluation.

2 readings, 1 practice quiz

1. **Reading:**IBM Digital Badge
2. **Reading:**Professional Certificate Career Support Services
3. **Practice Quiz:**Opt-in to receive your badge!

Show lessweek 5 material

**Graded:**Capstone Project - The Battle of Neighborhoods (Week 2)