Over the past decade, the explosion of data has transformed the nature of business. From healthcare to nonprofits to financial services, nearly every industry needs professionals who have the ability to translate data into actionable insights. The University of Denver Data Analytics Boot Camp is a part-time 24-week program that will empower you to gain the knowledge and skills to conduct robust analytics on a host of real-world problems.

This program is designed to fit into your life, with convenient evening and weekend sessions tailored to the needs of working professionals.

The program is rigorous, fast-paced, and focused on the practical technical skills needed to solve data problems. Throughout the course, you’ll be gaining proficiencies on a host of marketable technologies like Excel, Python, JavaScript, SQL Databases, Tableau, and more. Plus, you’ll have an impressive professional portfolio and the confidence you need to succeed in the data-driven economy.
Are you creative, curious, and ambitious? Do you want to be part of the data revolution? If any of the following describes you, enrolling in our program could be a smart career move:

You’re a data professional and want to advance your career by building new technical skills.

You are a manager or professional in a business where data can positively impact the bottom line.

You’re interested in visualizing social, consumer, or popular trends.

You want to transition your career to a new field or industry, and are looking for a way to do it.

You are a full-time student, hungry to learn more and expand your skill set.
The **Skills You’ll Gain**

You will complete the certificate with skills including *:

<table>
<thead>
<tr>
<th>Advanced Excel</th>
<th>Front-End Web Visualization</th>
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<tr>
<td>• Pivot Tables</td>
<td>• HTML</td>
</tr>
<tr>
<td>• VBA Scripting</td>
<td>• CSS</td>
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<tr>
<th>Fundamental Statistics</th>
<th>Business Intelligence Software</th>
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<tr>
<td>• Introduction to Modeling</td>
<td>• Tableau</td>
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<td>• Forecasting</td>
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<tr>
<th>Python Programming</th>
<th>Advanced Topics</th>
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<tr>
<td>• Python 3</td>
<td>• Big Data Analytics with Hadoop</td>
</tr>
<tr>
<td>• NumPy</td>
<td>• Machine Learning</td>
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<tr>
<td>• Pandas</td>
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<td>• Matplotlib</td>
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<td>• API Interactions</td>
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<td>• Social Media Mining</td>
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<th>Databases</th>
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<td>• MySQL</td>
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<td>• MongoDB</td>
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* Note: These topics are subject to change based on local market demand and the input of hiring partners.
Building On The Basics

For those first entering the field of Data Analytics, knowing where to start can be a daunting task. That’s why our curriculum is designed to provide you with foundational technical skills needed to succeed in the field. Throughout the program, expect to learn brand new skills and be challenged to complete difficult “real-world” problems to demonstrate your new abilities. By the program’s end, you will have a professional portfolio showcasing your work.
Real Projects, Real Jobs

Students who complete the Boot Camp will be prepared for many different roles*, including:

- Data Analyst
- Database Administrator
- Data Journalist
- Business Intelligence Analyst
- Business Analyst
- Research Analyst

*Students with academic and professional backgrounds in computer science and/or engineering will also be prepared for roles such as Data Engineer, SQL Developer, Big Data Engineer, Systems Engineer, and Software Engineer.
What You Will Learn

By the time you complete the program, you can expect to be able to:

<table>
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<tr>
<th>Employ statistical analysis to model, predict, and forecast trends</th>
<th>Use SQL and Mongo techniques to combine multiple datasets into one so as to create even more impressive and comprehensive databases</th>
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<tbody>
<tr>
<td>Build VBA scripts in Excel to automate tedious manual processes</td>
<td>Create basic interactive websites and applications to show your work to the entire world</td>
</tr>
<tr>
<td>Utilize real-world data sources to showcase social, financial, and political phenomena</td>
<td>Work with small-scale teams to create applications and visual datasets</td>
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<tr>
<td>Create Python-based scripts to automate the cleanup, restructuring, and rendering of large, heterogeneous datasets</td>
<td>Scrape information from web pages in order to collect data from a wide-variety of online sources</td>
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<tr>
<td>Interact with RESTful APIs using Python Requests and JSON parsing techniques</td>
<td>Communicate and glean new business insights using enterprise-grade tools like Tableau</td>
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<tr>
<td>Create graphs, charts, and tables utilizing a wide-variety of data-driven programming languages and libraries</td>
<td>Analyze basic social media trends on Twitter and Facebook using automated programs</td>
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<tr>
<td>Use geographic data to create visually exciting, interactive, and informative maps</td>
<td>Work independently or in a group on complex data-mining projects</td>
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<td>Build custom interactive data visualizations using D3.js and other JavaScript libraries</td>
<td>Understand the basics of troubleshooting and enhancing legacy code</td>
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<td>Write SQL commands to perform Create, Read, Update, and Delete commands</td>
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Course Structure

Over the course of 24 weeks, you’ll attend informative lectures and take part in a variety of individual and team exercises, working independently and in groups, in the classroom and at home. Homework assignments provide an opportunity to apply what you’ve learned and build on it. The goal is to give you a comprehensive learning experience and prepare you for a career in data analytics.

Instructor-led discussions cover the background, history, and use of a new technology or concept.

You’ll put classroom teaching into practice individually and with a team to work on timed in-class exercises and projects.

Your portfolio signals to employers that you are ready for primetime! You’ll build a substantial portfolio of projects that demonstrates your abilities across a wide variety of technologies.
We’re Here To Help

As you move up the learning curve, you’re likely to have questions around many of the concepts covered in class. We’re here to help through in-person and virtual office hours, as well as a dedicated #slack channel where you can get assistance from instructors, support staff and your fellow students. All work is done via Github, so you can create issues directly on your own projects for instructors to assist you. You will also have access to a set of career services that will help you prepare for technical roles after program completion.

Access to Prospective Employers

Career Content and Practice Sessions

Projects Supported by Industry

Customizable Tools and Templates

Panel Speaker Event

Career Coaching

High Impact Career Events

Soft Skills Training
Building Your Portfolio

It’s a fact: companies care about what you can do, not what you say you can do. For that reason, our curriculum teaches you how to put what you’ve learned to work on real-world data projects, ranging from visualizing bike sharing data in New York City to mapping worldwide earthquakes in real-time.
Bank Deserts

Social economists have long noted a trend that in geographic areas with higher poverty rates, there is often a dearth of reputable banks or financial services. The shortage leads to higher rates of financial victimization in these areas. But how could we show this trend using data? In this activity, you’ll learn how to combine data from the US Census, Google Maps, and Google Places to visualize the relationship between various socioeconomic factors and the number of banks in a given zip code.

Skills Needed
- Python
- Pandas
- Google Maps
- Google Places

Objectives
- Utilize the Python Requests library to make hundreds of API calls to the US Census and Google Maps datasets
- Utilize the Python pandas library to organize the retrieved information by zip code and socioeconomic factors
- Build scatter plots to easily communicate the Banking Desert phenomena

Earthquake History

Data isn’t just about finance and numbers. It can also be used for good as well. In this activity, you will create an interactive visualization of historic earthquakes over time using Leaflet.js, a popular JavaScript geo-mapping library. Your final application will provide a near-live feed of global earthquakes and their relative magnitudes.

Skills Needed
- HTML
- CSS
- Javascript
- Leaflet.js
- APIs
- JSON

Objectives
- Harness the power of APIs and JSON to gather earthquake data from USGS datasets
- Utilize Leaflet.js library to create visually compelling, animated maps
- Embed the created map onto a live web page using HTML and CSS

Web Scraping Application

Sometimes, data is just out of reach. Whether it’s a social media website that is guarding it’s information, a government agency that has poorly organized records, or a cookbook website filled with secret recipes — data isn’t always accessible by external applications. This is where data scraping comes in. Utilizing Python libraries like Beautiful Soup, you will learn to convert data straight from raw HTML into a queryable and storable form, opening up troves of data for your future applications.

Skills Needed
- Python
- Beautiful Soup
- HTML
- CSS
- MongoDB

Objectives
- Scrape your favorite social media website for otherwise inaccessible data
- Parse through the retrieved information and store it into a MongoDB database
- Create new representations of the data using HTML and CSS
Data Journalism and D3
In this activity, you will be taking on the role of a data visualization specialist working for a major metropolitan newspaper. Your editor wants to run a series of feature stories about the health risks facing particular demographics of the United States. Using the latest information from two government databases and the D3 JavaScript library, you will be creating charts and interactive graphs for this important news article.

**Skills Needed**
- JavaScript and the D3 Library
- HTML/CSS
- Bootstrap
- Microsoft Excel

**Objectives**
- Collect data from two government databases
- Store the data within a series of .CSV files
- Create fully interactive graphs that alter with button-clicks
- Place all of your information into a mobile-responsive webpage

Game Studio Analytics
Congratulations! You have landed a job as the Lead Analyst for an independent game company and for your first assignment you have been given the difficult task of analyzing data and creating a report for their latest smash hit release. You will be using the Python Pandas Library and Jupyter Notebook to create demographic and other financial reports.

**Skills Needed**
- Python
- Jupyter Notebook
- Pandas Library

**Objectives**
- Use Python and the Pandas library to create a report containing a vast amount of data
- Make the data viewable using Jupyter Notebook
- Find, analyze, and write up descriptions of observable trends in the data

PlotBot5
Twitter bots are all the rage these days and, for this assignment, you will be creating an interactive Twitter bot of your very own. This Twitter bot will receive tweets via mentions and then perform “sentiment analysis” on the first Twitter account specified in the mention. A plot of data will then be tweeted out from the PlotBot5 Twitter feed.

**Skills Needed**
- Python
- VADER (Sentiment Analysis)
- Tweepy (Twitter)
- Pandas
- Matplotlib
- Heroku

**Objectives**
- Create your own fully-interactive Twitter bot and to be run off of Heroku
- Perform sentiment analysis on Twitter accounts using VADER and Tweepy
- Parse, store, and post to the web on call
# Course Curriculum By Module

<table>
<thead>
<tr>
<th>Module 1: Excel Crash Course (Weeks 1-2)</th>
<th>Description</th>
<th>What You’ll Learn</th>
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</table>
| Learn to do more with Microsoft Excel! In this module we’ll be covering advanced topics like statistical modelling, forecasting, and prediction; pivot tables, and VBA scripting. You will even learn to model historic stock trends -- and hopefully, learn to beat the market! |  | » Microsoft Excel  
» VBA Script  
» Statistics Modeling |

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<tr>
<th>Module 2: Python Data Analytics (Weeks 3-9)</th>
<th>Description</th>
<th>What You’ll Learn</th>
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</table>
| Gain a strong foothold in one of the fundamental programming languages of today. In the course of this module, you’ll gain deep proficiencies with core Python; data analytic tools like NumPy, Pandas, and Matplotlib; and specific libraries for interacting with web data like Requests, BeautifulSoup, and Tweepy. |  | » Python  
» APIs  
» JSON  
» NumPy  
» Pandas  
» Matplotlib  
» Beautiful Soup  
» Tweepy |

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<tr>
<th>Module 3: Databases (Weeks 10-12)</th>
<th>Description</th>
<th>What You’ll Learn</th>
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</table>
| Dive deep into the most prolific database languages: SQL and NoSQL. Work with MySQL and MongoDB to organize data into well-structured and easily retrievable data formats. |  | » SQL  
» NoSQL  
» MySQL  
» MongoDB |

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<tr>
<th>Module 4: Web Visualization (Weeks 13-19)</th>
<th>Description</th>
<th>What You’ll Learn</th>
</tr>
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</table>
| Building visualizations are of little benefit without a way to communicate the message. In this module, you’ll be learning the core technologies of web development (HTML, CSS, and JavaScript) to create new and interactive data visualizations that you can share with everyone on the web! |  | » HTML  
» CSS  
» JavaScript  
» AJAX  
» D3  
» Leaflet |

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<tr>
<th>Module 5: Advanced Topics (Weeks 20-23)</th>
<th>Description</th>
<th>What You’ll Learn</th>
</tr>
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</table>
| By program’s end, you’ll be immersed in new and in-demand topics like Tableau, Hadoop, and Machine Learning. |  | » Tableau  
» Hadoop  
» Machine Learning |

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<tr>
<th>Module 6: Final Project (Week 24)</th>
<th>Description</th>
<th>What You’ll Learn</th>
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<tr>
<td>Bring everything that you have learned in the class altogether to create an impressive data-visualization application with a small team! Get creative and come up with something cool to show off to the whole world!</td>
<td></td>
<td>» Dreaming up something fantastic and understanding the bounds of reasonable and achievable</td>
</tr>
</tbody>
</table>