RICE

DATA ANALYTICS
— BOOT CAMP —

CURRICULUM OVERVIEW

Over the past decade, the explosion of data has transformed nearly every industry known to man. Whether it's marketing, healthcare, government, or activism—the ability to translate data into actionable insights has quickly become a highly in-demand skill by all. **Rice University Data Analytics** is a part-time, 24-week program that will empower students to gain the knowledge and skills to conduct robust analytics on a host of real-world problems.

The program is designed to fit into your life, whether you're employed or attending college full-time, with convenient weekend and evening sessions.

The program is rigorous, fast-paced, and focused on the practical technical skills needed to solve data problems. Throughout the course, students gain proficiencies on numerous marketable technologies, including Excel, Python, JavaScript, SQL Databases, Tableau, and more. Plus, students leave with an impressive professional portfolio and the confidence to succeed in the data-driven economy.

Is This Program **Right For You?**

Are you a creative, curious, and ambitious professional looking to join the data revolution? If so--or if any of the following describes your situation--enrolling in our Data Analytics Boot Camp could be a smart career move:

You are currently a professional working with data, but are looking to advance your career by building technical skills.

You are a manager or professional in a business where data can be used to boost your company's bottom line.

You have interests in visualizing social, consumer, or popular trends.

You are looking to enter a new field in healthcare, government, or media and are looking for a way to jump in.

You are a full-time student, hungry to learn more and expand your skill set.

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The **Skills** You'll Gain

You will graduate with skills in Data Analytics and Visualization, including:*

Advanced Excel

- Pivot Tables
- VBA Scripting

Fundamental Statistics

- Modelling
- Forecasting

Python Programming

- Python 3
- NumPy
- Pandas
- Matplotlib
- API Interactions
- Social Media Mining

Databases

- MySQL
- MongoDB

Front-End Web Visualization

- HTML
- CSS
- Bootstrap
- Dashboarding
- JavaScript Charting
- D3.js
- Geomapping with Leaflet.js

Business Intelligence Software

- Tableau

Advanced Topics

- Big Data Analytics with Hadoop
- Machine Learning

* 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 a deep foundation on the core technical skills needed to succeed in the field. Throughout the program, expect to learn brand new skills and be challenged in completing difficult real-world problems to demonstrate your new abilities. By the program's end, you will have a strong professional portfolio showcasing your work.

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Real Projects, **Real Jobs**

Our graduates will be qualified for many different roles, including:

Data Analyst	Systems Engineer
Data Engineer	Database Administrator
Data Scientist	Big Data Engineer
Data Journalist	Business Intelligence Analyst
Business Analyst	Research Analyst
SQL Developer	Software Engineer

What You Will **Learn**

By the time you graduate, you can expect to be able to:

- Employ statistical analysis to model, predict, and forecast trends

- Expertly build VBA scripts in Excel to automate tedious manual processes

- Utilize real-world data sources to showcase social, financial, and political phenomena

- Create Python-based scripts to automate the cleanup, re-structuring, and rendering of large, heterogeneous datasets

- Interact with RESTful APIs using Python Requests and JSON parsing techniques

- Create in-depth graphs, charts, and tables utilizing a wide-variety of data-driven programming languages and libraries

- Use geographic data to create visually exciting, interactive, and informative maps

- Build custom interactive data visualizations using D3.js and other JavaScript libraries

- Write SQL commands to perform Create, Read, Update, and Delete commands

- Use advanced SQL and Mongo techniques to combine multiple datasets into one so as to create even more impressive and comprehensive databases

- Create basic interactive websites and applications to show your work to the entire world

- Work with and lead small-scale teams in order to create applications and visual datasets

- Scrape information from web pages in order to collect data from a wide variety of online sources

- Communicate and glean new business insights using enterprise-grade tools like Tableau

- Analyze social media trends on Twitter and Facebook using automated programs

- Work independently or in a group on complex data-mining projects

- Understand the basics of troubleshooting and enhancing legacy code

Course **Structure**

Over the course of 24 weeks, you'll attend informative lectures, participate in a variety of individual and team exercises, and work independently 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 true insight into a "day in the life" of a data professional.

DISCUSSION

Instructor-led discussions cover the background, history, and use new technologies or concepts.

PROJECT WORK

You'll work on timed in-class exercises and projects individually and in teams to put classroom teachings into practice.

PORTFOLIO PROJECTS

Your portfolio signals to employers that you are ready for primetime! You'll build a substantial portfolio of projects that demonstrate 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 some 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 in a truly asynchronous fashion. In addition to learning to code, you will have access to career services that will help you prepare for technical roles after graduation such as:

Career Content and Practice Sessions

Online Career Events With Industry Professionals

Projects Supported by Industry

High Impact Career Events

Database of Customizable Tools and Templates

- Multiple Technical Resume Templates
- Github Best Practices
- Guidelines To Building A Portfolio
- Creating an Elevator Pitch
- Developing a Bio

Soft Skills Training

One-on-One Career Coaching

- Assist In Targeting Job Search
- Continued Interview Preparation

Frequent Program Enhancements Driven by Industry Professionals

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. We cover real-world data projects, ranging from visualizing bike sharing data in New York City to mapping worldwide earthquakes in real-time.

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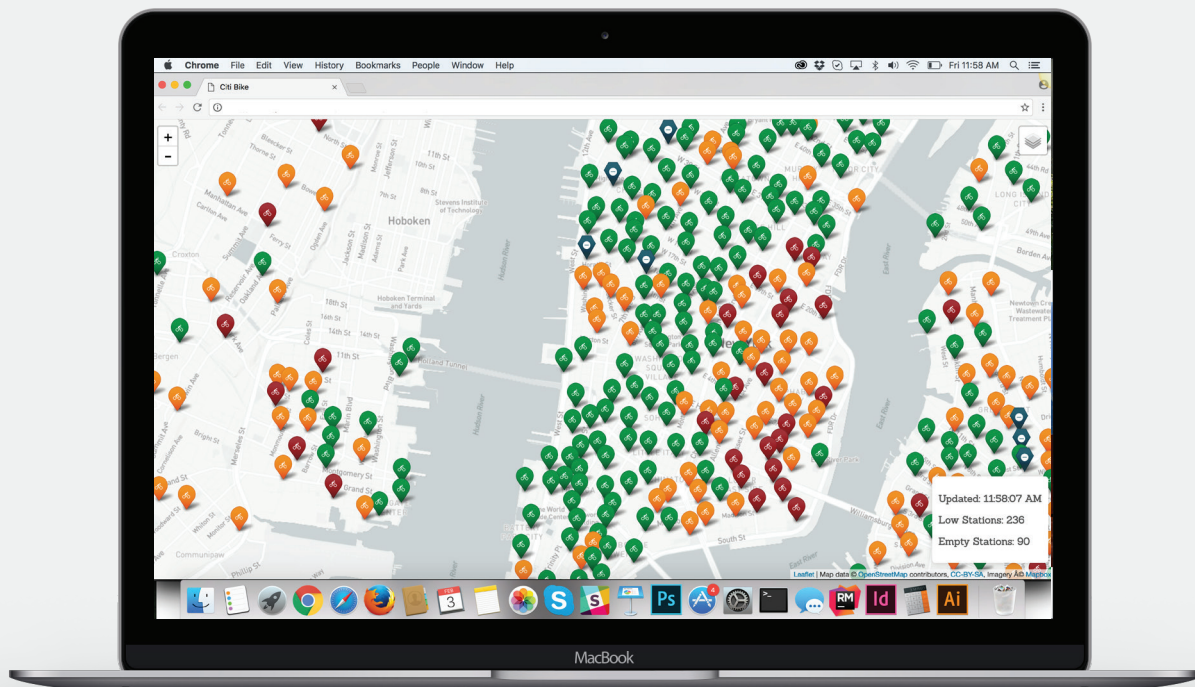
Building **Your Portfolio**

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
- Matplotlib
- APIs

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 its 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 in 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 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

Module	Description	What You'll Learn
Module 1: Excel Crash Course (Weeks 1-2)	Learn to do more with Microsoft Excel. In this module we'll cover advanced topics like statistical modeling, forecasting and prediction, pivot tables, and VBA scripting. You'll even learn to model historic stock trends -- and hopefully, learn to beat the market!	» Microsoft Excel » VBA Script » Statistics Modeling
Module 2: Python Data Analytics (Weeks 3-9)	Gain a strong foothold in one of today's fundamental programming languages. In the course of this module, you'll gain deep proficiencies with core Python, data analytic tools like NumPy, Pandas, Matplotlib, and specific libraries for interacting with web data like Requests, BeautifulSoup, and Tweepy.	» Python » APIs » JSON » NumPy » Pandas » Matplotlib » Beautiful Soup » Tweepy
Module 3: Databases (Weeks 10-12)	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
Module 4: Web Visualization (Weeks 13-19)	Building visualizations is 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, interactive data visualizations that you can share with everyone on the web.	» HTML » CSS » JavaScript » AJAX » D3 » Leaflet
Module 5: Advanced Topics (Weeks 20-23)	By program's end, you'll be immersed in new and in-demand topics like Tableau, Hadoop, and Machine Learning.	» Tableau » Hadoop » Machine Learning
Module 6: Final Project (Week 24)	Bring everything that you have learned in 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!	» Dreaming up something fantastic and understanding the bounds of reasonable and achievable