College of Engineering
UNIVERSITY OF WISCONSIN–MADISON

DATA SCIENCE AND ANALYTICS BOOTCAMP

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Table of Contents

About the Data Science and Analytics Bootcamp

Mission Statement

This program creates ambassadors that will speak on behalf of data as the organization's single source of truth. Data analysts and data scientists are valuable for a variety of reasons, including their ability to address an organization's data needs, work on collecting and formatting data, reduce the cost of doing business, support all team members, and more.

From customer churn to employee satisfaction, fraud to cybersecurity, nearly every aspect of our lives and business is now about data. Whether it's a smartphone, call center, or any other web or mobile application, it relies on data, data integrity, and data science.

Every company, in every industry, has data needs. This program was designed to provide the skills and practical hands-on experience that maps to roles companies will need to take advantage of the data they are collecting and make better business decisions.

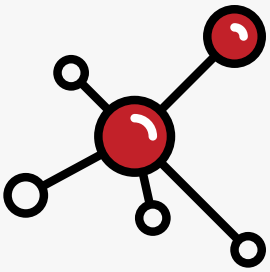
The goal of the **Data Science and Analytics Bootcamp** is to take you from little or no experience to a ready-to-hire data professional by providing you with the most up-to-date skills and hands-on experience that companies look for in candidates. Data professionals have many advantages over other job seekers because they can organize business requirements into data requirements, see the big picture, and work on a variety of data ingestion, cleaning, and analysis assignments.

The skills required in the professional landscape are evolving. The workforce needs more people who can work responsibly with data, leverage the power of artificial intelligence, and build visualizations that are accessible to everyone to help the business achieve its goals.

Technological advancements are moving quickly, and quite simply, there are not nearly enough people equipped with the skills needed to fill the open data professional positions.

ThriveDX is a leader in the effort to close the skills gap. The Data Science and Analytics Bootcamp is a market-driven program that addresses this massive deficit in the workforce. ThriveDX's industry-leading team has developed a programmatic approach to discover the skills gap in the workforce and include those skills in the Data Science and Analytics Bootcamp curriculum.* This allows market demand to drive the content of the curriculum and the experience that closely aligns with the challenges current businesses face.

* ThriveDX reserves the right to amend the course material according to market demand and to maintain relevance in the industry.



The accelerated programs powered by ThriveDX help reskill and upskill learners in today's fast-growing digital economy. With over a decade of experience as the world's premier digital skills and cybersecurity education provider, ThriveDX works with highly ranked academic institutions, government organizations, and global enterprises to offer advanced workforce and professional development programs in digital technology.

The US Bureau of Labor Statistics cites data science as a fast-growing occupation with an anticipated growth rate of **31% through 2030**.

Preparing You for Data Science and Analytics Careers

The accelerated **Data Science and Analytics Bootcamp** is built for learners of any professional background who have a strong affinity for technical solutions, enjoy aspects of conceptual and visual design, and seek creative ways to solve problems. The program provides you with the skills and hands-on experience companies seek in qualified data professionals. This ensures that you complete the program with a robust GitHub portfolio of real-world projects that demonstrate you are ready to join the workforce and contribute to a company's ability to solve complex problems.

Completion of the program qualifies you for a variety of data analytics roles,* such as:

- Data Analyst
- Business Analyst

With additional training or existing experience, you can work toward or be qualified for the following advanced data-focused roles:

- Business Intelligence Architect
- Data Infrastructure Architect
- Data Scientist
- Machine Learning Engineer
- Data Engineer

* Job titles listed do not necessarily reflect entry-level positions.

What You Will Learn

Data-Driven Storytelling

- Data Storytelling
- Data Analysis with Excel
- Statistics and Probability
- Communication and Presentation Skills

Data Wrangling and Analytics

- Responsible Use of Data
- Data Wrangling (Discover, Structure, Clean, Enrich, Validate, Publish)
- Structured Query Language (SQL)
- Databases
- Data for Good
- Analytics Tools (Tableau, Power BI)
- Data Visualization

Data Science and Business Intelligence

- Responsible Use of Artificial Intelligence
- Python Programming
- Artificial Intelligence
- Machine Learning
- Applied Artificial Intelligence (Voice, Computer Vision, Language Detection)
- AI for Good

Teaching Methodologies

Classes are conducted in live, synchronous, virtual classroom environments. This allows for a program that is nimble and adaptable, much like the industry itself. This provides you with the opportunity to learn in an environment that is aligned with the profession and allows you to balance education with your other responsibilities. The program applies foundational elements from advanced teaching methodologies that include:

A Library of Recorded Classroom Sessions

Curated by professionals currently working in the field, the course curriculum is consistently updated to reflect new platforms, applications, technologies, and trends and is made available for you to review at your convenience. Recorded classroom sessions provide the opportunity to revisit any topics that were discussed during a lesson.

Career Services

Career Services are integrated throughout the program to give you the opportunity to prepare for the job market. Learning how to communicate with leadership, present ideas, and describe thought processes are all important parts of each milestone project and strengthen your interview skills.

Synchronous, Virtual, Live Classrooms

Online classes are held by expert instructors and occur on a regular basis with real-time interaction. Lessons stem from top-tier instructional methodologies and are enhanced by cloud-based chat software that allows live, hands-on interactions between you and your instructors.

Taught by Experts in the Field

Classes are taught by instructors who are leaders in the industry and who bring a wealth of knowledge and experience to the learning environment. You will benefit from your instructors' current industry expertise as well as from their unique insider's understanding of the fast-paced field of data science and analytics.

Hands-on Projects and Challenges

With three milestone projects and in-class activities, you will have numerous opportunities to practice your analytical skills in a virtual environment alongside your instructors to ensure in-depth comprehension. You can also apply the skills gained in your virtual lessons to real-world scenarios and gain extensive experience solving problems while obtaining feedback from industry experts. As you create meaningful projects, you will also be building a portfolio of real-world solutions for potential employers to evaluate.

Advanced Remote Education Technologies

You can take advantage of industry-leading remote technologies that increase the comprehension level of course material. Being able to instantly message instructors, virtually raise your hand during class, and collaborate with peers via remote workspaces ensures you have the tools you need to learn even the most intricate concepts.

Extended Virtual Office Hours

You will have access to additional support outside of lecture via your instructors' extended virtual office hours. You are encouraged to prepare your own questions regarding lessons, as well as any concerns about your progress in the course.

Online Q&A Sessions with Instructors

Through virtual, instructor-led question-and-answer sessions, you can request clarification on challenging concepts or ask for assignment feedback from instructors. This community environment promotes the kind of teamwork and collaboration that translates outside of the classroom.

Five-Step Data Education Process

The Five-Step Data Education Process, powered by ThriveDX, is the result of over a decade of proven research conducted by global industry experts. It combines unique teaching methods and curricula that ensure you receive the highest-quality education possible with the aim of helping you complete the program with the competitive skill set today's job market demands.

01 Talk to Us

As a prospective learner, you will set up a free consultation with an Admissions Advisor to assess your aptitude in the field and determine appropriate placement in one of the Data Science and Analytics Bootcamps.

02 One-on-One Meeting

Each prospective learner meets with their assigned Admissions Advisor to further discuss the program, career expectations, and future job opportunities. Meetings can be virtual or on the phone.

03 Introductory Course

This 30-hour course is designed to teach you the fundamentals of the data project life cycle. After the course, you will take a summary exam and have a one-on-one assessment with an Admissions Advisor to examine your future in the program.

04 The Program

The ThriveDX-powered Data Science and Analytics Bootcamp curriculum is developed and refined by experts in the field. The program provides immersive, hands-on, experiential training that is centered on coding languages and knowledge transfer methodologies.

05 Career Services

Career Services provides personalized support on resumes, digital presence, interview training, and professional networking to help empower you to be a polished and prepared candidate for the job market.* Guidance is provided throughout the program to help prepare you to enter the field of data science and analytics.

* Career Services are consultation-based only and do not guarantee job placement.

Program Structure

Powered by ThriveDX, this program aims to provide you with the knowledge base and practical experience you need to obtain a data science and analytics role. The curriculum integrates real-world projects and training exercises in data storytelling, data analysis, and data science to provide the practical experiences, tools, and insights you need to succeed as a data professional.

In the **Data Science and Analytics Bootcamp**, you will attend lectures, take part in individual and group exercises, and gain access to virtual labs and real-world projects that teach you how to use data to gain business insight while using data analytics and data science best practices.

The Data Science and Analytics Bootcamp was designed for working professionals. The program offers flexible evening and weekend course schedules and consists of a total of 400 in-class hours focusing on the materials above as well as additional components to ensure your success.

You can look forward to finishing this course with at least three completed data projects and learning a variety of topics, including Excel, statistics, data analytics, data wrangling, SQL, scripting languages, machine learning, and artificial intelligence to jumpstart your professional portfolio.

30-Hour Introductory Course

Over 30 hours, you will grasp an understanding of the data-driven business world as you gain exposure to different career paths and a variety of analytic tools. This course provides an accurate representation of the skills you will acquire and the projects you can hope to complete should you choose to pursue the full Data Science and Analytics program.

Portfolio Projects

You will complete three experiential training projects that you can showcase on your personal portfolio when applying to jobs in the field:

- A data-driven visualization project for which you can choose from three datasets: financial data from a small business, astronomical data from NASA, and Twitter data regarding airline sentiment
- A query project that takes in a dirty dataset and allows you to demonstrate data wrangling techniques and execute queries against the dataset to create meaningful conclusions for the business
- A machine learning project that allows you to create a model from scratch and leverage existing AI APIs to solve business challenges with artificial intelligence

Career Services

ThriveDX works with every learner to ensure they have the best chance possible when applying for a position in data science and analytics. Together, we work on your resume, LinkedIn profile, and interview skills. We also provide internship placement assistance and connect you with professional networking opportunities.

You are given multiple opportunities throughout the program to learn the critical skills you need to be successful during the hiring process. At least two events, such as demo days and hackathons, provide you with the opportunity to build additional portfolio projects you can use to demonstrate the skills you have acquired.

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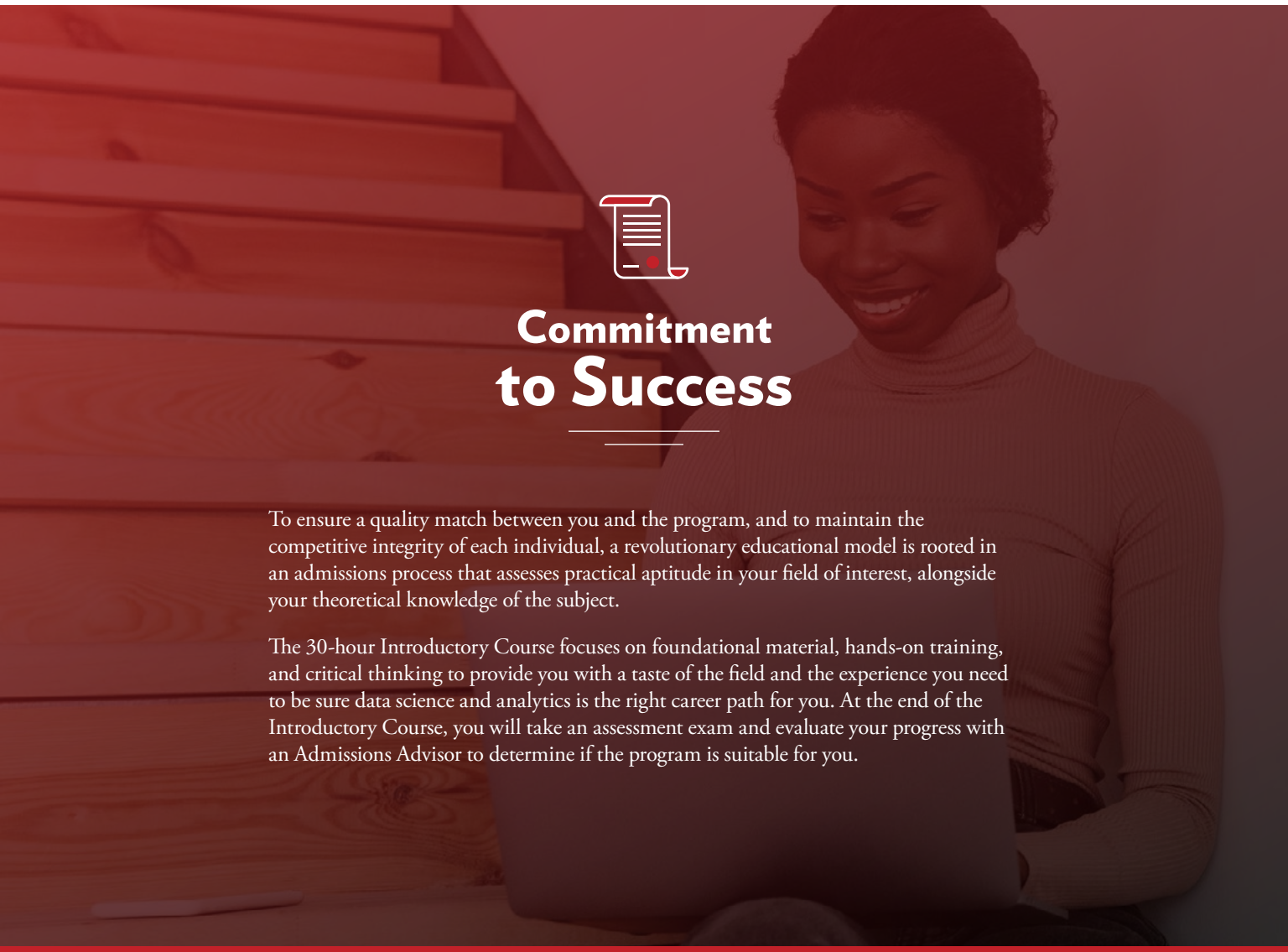
Program Structure »

Experiential Learning

This hands-on program provides knowledge of industry tools, methods, and coding languages, including:

- Data Storytelling and Visualization
- Critical Thinking and Inclusive Engineering Practices
- Responsible Use of Data and AI
- Presentation and Communication
- Extract, Transform, Load (ETL) and Data Wrangling Pipelines
- SQL and Queries
- Tableau and Power BI
- Statistics and Probability
- Python
- Machine Learning (Supervised and Unsupervised Learning, Natural Language Processing, Neural Networks)
- Applied AI (Speech, Vision, Text, Language, Knowledge APIs)
- MLaaS (AWS)



Commitment to Success

To ensure a quality match between you and the program, and to maintain the competitive integrity of each individual, a revolutionary educational model is rooted in an admissions process that assesses practical aptitude in your field of interest, alongside your theoretical knowledge of the subject.

The 30-hour Introductory Course focuses on foundational material, hands-on training, and critical thinking to provide you with a taste of the field and the experience you need to be sure data science and analytics is the right career path for you. At the end of the Introductory Course, you will take an assessment exam and evaluate your progress with an Admissions Advisor to determine if the program is suitable for you.

Program Flow

The Data Science and Analytics Bootcamp is divided into three parts. The first group of courses covers the fundamentals of how data can be used to tell a story and how the combination of statistics and probability give you the tools to interpret the data and solve business problems. It reinforces that you are an advocate for the truth the data represents, and you will learn to be an effective storyteller for that data. The second part focuses on the most common tasks associated with data analytics, often called data wrangling. This includes cleaning data, structuring data, and transforming data to prepare it for visualization or for use in a machine learning model. The third section focuses on taking those foundational data skills and using them to solve the most common business problems using programming skills, machine learning, and applied artificial intelligence.

Part 1: Data-Driven Storytelling

In these courses, you will learn the importance of being an advocate for the truth of data you are given to analyze. Part of that is understanding how to use data to tell the story about challenges impacting the business, as well as the ability to offer solutions to those challenges.

In the Data Science and Analytics Bootcamp, you will learn the principles of how data is collected, transformed, and used from day one. The fundamentals are taught with user experience in mind, and best practices are consistently explained in each course.

Part 2: Data Wrangling and Analytics

In these courses, you further apply the steps for a data project life cycle to include ethically sourcing data, combining data, wrangling data, and interacting with a database via programming SQL queries.

Part 3: Data Science and Business Intelligence

In the first two courses, you learn about business intelligence tools and big data. These tools are invaluable as you progress through a deeper data project life cycle, where you have much more advanced and flexible methods available to fulfill your needs. Additionally, you utilize scaffolding to build upon your prior knowledge to reinforce the data sourcing, data wrangling, data analysis, and data visualization steps.

In the last two courses, you delve into and constantly reinforce the importance of not only being able to use whichever advanced tools your use case requires, but also the need to ensure that the complexity of the tool is balanced with explainability. The more complex a tool is, the harder it is to explain it to stakeholders and decision-makers. High accuracy and recall scores are great, but if you cannot explain what is going on in the background and how the results were predicted, then you have lost half of your value to a decision-maker. Further, you are challenged to ensure you are ethically building your feature selection and ensuring that the algorithm or model is inclusive and representative of everyone without marginalizing any group.

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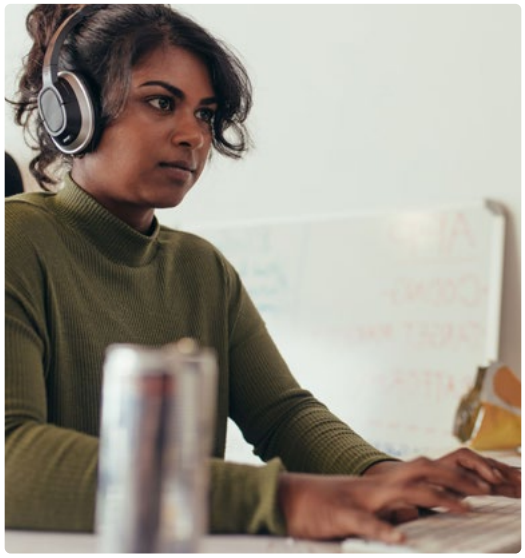
What's Included

- Professional Networking
- 12 Specialized Courses
- 400 In-Class Hours
- Experiential Learning
- 3 Milestone Projects
- 3 Dedicated Test Preparation Workshops



Prerequisites

- You are not required to have a background in any related field, but should be prepared to learn technical concepts at a rapid pace.
- Professional evaluation and admission exam

Industry Certifications

Preparation assistance for certification exams includes the following:†**

- Microsoft Certified: Data Analyst Associate
- IBM Data Analyst Professional Certificate
- IBM Data Science Professional Certificate
- AWS Cloud Practitioner

With these certifications, those completing the Data Science and Analytics Bootcamp can continue growing a career as a data professional.††

* While the curriculum covers much of the knowledge needed to perform well on industry exams, this program is not a test-preparation program, where the primary focus is your performance on the exam. The program is designed to teach in-demand knowledge for today's workforce.

** Certification exams are not conducted as part of the program and require additional costs not included in tuition.

† The test preparation workshops are not mandatory and are not part of the program curriculum. The workshops are designed to provide extra resources and help for those who wish to take specific exams.

†† You must have a minimum of one year of cumulative work experience in the specific cloud provider in order to be certified.

The ThriveDX Difference

The University of Wisconsin–Madison's Data Science and Analytics Bootcamp was developed in partnership with ThriveDX (formerly known as HackerU). Originally founded in Israel, ThriveDX is one of the world's premier digital education providers with more than 15 years of global experience powering career-change programs that help adult learners join the digital economy. This program leverages industry leaders to develop and teach curriculum tailored to today's job market, including hands-on simulation labs that support individuals aspiring to build a career in technology. ThriveDX partners with many top-tier universities to offer accelerated professional development programs for learners from all backgrounds.

Program Breakdown
By Course

Course 1

Introductory Course

30 Hours

In the first 30 hours, you are introduced to core data science and analytics topics, such as computing basics and the data life cycle. You will have the opportunity to learn the basics of a Jupyter notebook and interact with a Titanic dataset. You will pull the project materials from a GitHub repository and walk through it in a Google Colaboratory notebook. You can then look forward to completing three more projects throughout the remainder of the program to add to your personal portfolio.

Before taking the Introductory Course, you should have:

1. A reliable machine that is 10 years old or less
2. A typing speed of 30 WPM or better
3. Basic knowledge of using computers, such as how to open programs, point and click, and navigate to a website via a web browser
4. Knowledge of basic math through algebra

Topics:

- **Git and GitHub**
- **Scripting**
- **Data Life Cycles**
- **Computing Basics**
- **Intro to Data Projects**

Course 2

SQL and Databases

30 Hours

This course provides you with an introduction to SQL, a popular language used to query databases. Using SQL, you will import data into databases, query data, join data together, filter and sort data, create views, and export data. Further, this course introduces you to database design and teaches you how to manage your own database.

Topics:

- **SQL**
- **Advanced Querying**
- **Debugging SQL Queries**
- **Basic Data Modeling**
- **Database Management**

Course 3

Statistics and Probability

36 Hours

This course aims to enlighten you on how statistics and probability are used in business decision-making. This course aids you in building a strong foundation in descriptive statistics, conditional probability, and advanced modeling techniques. We use Microsoft Excel to provide a practical application to theoretical discussions. You develop the ability to approach real-world problems from an analytical perspective with confidence.

Topics:

- **Descriptive Statistics**
- **Hypothesis Testing**
- **Probability Theory**
- **Correlation**
- **Analysis of Variance (ANOVA)**
- **Regression**
- **Sampling Techniques**

Course 4

Data Storytelling

18 Hours

In this course, you discover the power of a story and how to develop a story arc around your data goals. Successfully communicating data insights depends on the audience of stakeholders and the story points that speak to their needs and expectations. You continue to keep a data story thread throughout the entire data wrangling adventure as you frame your data goals with purpose.

Topics:

- **Public Speaking**
- **Story Arcs**
- **Requirements and Goals**
- **Story Narratives**
- **Personas, User Stories, and Scenarios**
- **Communicating Insights**
- **Engage the Audience**

Milestone Project 1

Building and Presenting Data Stories

3 Hours

This milestone project allows you to explore your skills in the areas of statistics, Excel, SQL, and data storytelling. You have the opportunity to demonstrate your ability to clean and manipulate a dataset. Additionally, you perform advanced statistical analysis on the data using summary statistics, linear regression, and modeling. Finally, you put your visualizations and insights into a coherent data story to present to your classmates. The instructional team formally reviews the data analytics milestone project. You then incorporate the project into your GitHub portfolio.

Topics:

- **Data Analysis ToolPak**
- **Visualizations**
- **Storyboarding**
- **Team Collaboration**
- **SQL Queries**
- **Presentation Skills**

Course 5

Advanced SQL Programming

30 Hours

Building upon the skills you gained in the SQL and Database course, this course extends your skill in SQL programming and covers topics such as stored procedures, functions, common table expressions (CTEs), and query optimization. You also develop ETL scripts and data pipelines combining the use of SQL and Python.

Topics:

- **Stored Procedures**
- **SQL Functions**
- **SQL Best Practices**
- **Debugging SQL Code**
- **Query Optimization**
- **ETL and Data Pipelines**

Course 6

Python Programming

21 Hours

In this course, you explore the fundamental concepts of programming and learn how to structure their analyses. Topics include core programming concepts such as expressions, data types, variables, functions, loops, and arrays. Practice your coding skills through building highly structured and maintainable code using Jupyter notebooks.

Topics:

- **Variables, Loops, Arrays, Functions**
- **Data Types**
- **Dicts and Lists**
- **Jupyter Notebooks**

Course 7

Data Wrangling

40 Hours

Develop core data wrangling skills by expanding your Python programming skills. Explore a series of data analysis processes from sourcing, curating, and importing data to exploratory data analysis, data cleansing techniques, and data visualization techniques. Next, expand your toolbox by using industry-standard software to automate data wrangling processes.

Topics:

- Data Collection and Curation
- Exploratory Data Analysis
- Data Cleansing
- Techniques
- Feature Engineering Techniques
- Ethical Data Practices
- ETL/ELT Processes

Course 8

Visual Communications

18 Hours

Explore visual dynamics and principles to produce effective data visualizations that show the most important parts of data to stakeholders in a clear and simplified way.

Topics:

- Visual Dynamics
- Effective Data Visualizations
- Visual Aesthetics

Milestone Project 2

Data Integration, Preparation, Reporting, and Presentation

3 Hours

This milestone project focuses on developing your ability to attain, transform, investigate, and present data throughout a data project life cycle. Demonstrate your ability to build data pipelines and wrangle data into a usable format for downstream data visualization and analytics. Present your reports and findings to classmates and then incorporate the project into your GitHub portfolio. The instructional team reviews projects in this milestone.

Topics:

- Portfolios
- Data Ingestion
- Data Preparation
- Data Reporting
- Presentation

Course 9

Business Intelligence

42 Hours

Build upon visual communication concepts by learning to use popular industry business intelligence tools to create insightful analyses and visualizations. Develop and apply best practices for reporting, graphs and charts, and dashboards in a way that can be applied in any business intelligence application.

Topics:

- Dashboarding
- Data Visualization
- Benchmarking
- Sorting, Filtering, and Creating Metrics
- Joining Tables

Course 10

Machine Learning

60 Hours

Analyze a variety of use cases in a business context for determining appropriate machine learning methods to apply. Through a series of Python lectures and labs and using Jupyter notebooks, investigate and apply supervised and unsupervised machine learning algorithms, including classification, clustering, association rules, and time-series forecasting. Next, explore several advanced methods, including natural language processing, neural networks, and deep learning.

Topics:

- Supervised and Unsupervised Learning
- Classification and Clustering Algorithms
- Regression
- Association Rules
- Time-Series Analyses
- Natural Language Processing
- Deep Learning

Course 11

Big Data

30 Hours

In this course, examine core concepts and methods used for big data and IoT, including characteristics of big data, data warehousing, data lakes, data virtualization, and cloud-based data infrastructure services. Build upon your previous knowledge of Python by using PySpark to access big data and create analytics models.

Topics:

- **Data Warehousing, Data Lakes, and Hubs**
- **Data Virtualization**
- **Cloud Services**
- **Streaming Data**
- **IoT**
- **Database Scaling**
- **Spark and PySpark**

Course 12

Applied AI

21 Hours

After the introduction to machine learning-created AI in the previous course, explore a variety of pre-packaged AI cloud services offered by leading providers like Microsoft, Amazon, and Google. AI provides a more targeted data analytics experience, as it produces a greater amount of data insights through various applications of computer vision, speech recognition, natural language processing, and robotics.

Topics:

- **AI Cloud Services**
- **Computer Vision and Speech**
- **Natural Language Processing**
- **Search Engine AI**
- **Deploying AI**
- **Using Python for AI**

Milestone Project 3

Capstone Project: Delivering Insights and Presentations

8 Hours

Meet the challenge of presenting your data insights and visualizations clearly and with ease to diverse types of stakeholders. Learn how to organize data visualizations around a goal and integrate a story arc to keep your audience engaged. Work on your own individual project that incorporates the skills and knowledge you gained throughout the program. This milestone culminates in a final project presentation that capitalizes on your data analysis, data storytelling, and presentation skills. Finally, share your work by uploading your completed project to your GitHub portfolio.

Topics:

- **Public Speaking Skills**
- **Organizing and Presenting Data Stories**
- **Decision-Making Processes**
- **Delivering Insights**
- **Understanding Your Audience**
- **Building Portfolios**

Course 13

Career Services

10 Hours

You will integrate with Career Services and the career curriculum to acquire the knowledge and skills to be successful in the digital job market. This preparation ensures you possess the tools to readily apply to opportunities in the field.

Topics:

- **Resume Building**
- **Job Search**
- **Interview Preparation**

Program Summary

Courses	In-Class Hours
Introductory Course	**30**
SQL and Databases	**30**
Statistics and Probability	**36**
Data Storytelling	**18**
Milestone Project 1: Building and Presenting Data Stories	**3**
Advanced SQL Programming	**30**
Python Programming	**21**
Data Wrangling	**40**
Visual Communications	**18**
Milestone Project 2: Data Integration, Preparation, Reporting, and Presentation	**3**
Business Intelligence	**42**
Machine Learning	**60**
Big Data	**30**
Applied AI	**21**
Milestone Project 3: Capstone Project: Delivering Insights and Presentations	**8**
Career Services	**10**
Total	**400**

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