DATA ENGINEERING PROSPECTUS

EXPLORE

Explore Data Science Academy

www.explore-datascience.net

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EXPLORE Overview

EXPLORE is a next generation Learning Institution that teaches students the skills of the future. From Data Science to Data Engineering to Machine Learning to Deep Learning we deliver cutting edge courses to satisfy your hunger to learn. Our Programmes are built by an amazing Faculty - we learn employ some of the world's most talented Scientists who have experience solving difficult problems on a global stage.

Our philosophy is to teach our students how to solve problems in the real world. We emphasise teamwork, collaboration and working within constraints, under pressure, with deadlines while understanding context, audience and implementation challenges. We are not a theoretical institution (although we cover the theory) - we are a 'practical, hands-on, roll-up-your-sleeves and get stuff done' kind of institution. As real-world Scientists who have delivered impact in the world of work we're well positioned to deliver these skills.

EXPLORE launched during 2013 and since then has taught 1,000's of students and solved many problems for businesses across multiple Industries across the world. We're reinventing education and invite you to join us to change things for the better.

Why Data Engineering?

Four megatrends are fundamentally changing the shape of our world:

Unlimited Data

Vast amounts of data are being generated every minute.

Incredible Speed

The processing speed of our machines is increasing exponentially.

Cloud Integration

We now have cloud providers who can store insane amounts of data for a few dollars.

Open Source Algorithms

Powerful open source algorithms that can read, write, translate and see are now available to everyone.

Data Engineering is the skillset used to harness the power of these tectonic shifts in our world. Over the last 4 years, the rise of job opportunities for data engineers has become almost level to those traditionally seen for software engineering positions. Knowing how to work with large data sets in the cloud and build robust pipelines is a core skill of the future.

This Course Is For You If You Want To

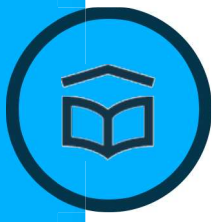
This course is 100% for you if these are what you are looking for:

Improve Your Skills

Learn the latest advances to turbo-charge your career and set you up for success in the digital age.

Learn New Techniques

Learn what matters - invest in your career by studying the latest algorithms, cloud solutions, open source tools and data science technologies.



Have a Support Team

EXPLORE has a large Faculty of Scientists with lots of Academic and real-world experience who are available to support you through the learning process.

Solve real-world problems

EXPLORE exposes you to real-world problems by delivering project-based deliverables where you need to apply your knowledge to solve problems.

Who Should Take This Course?

This course is geared towards newcomers to the field of Data Engineering who want to close the gaps in their engineering skills and knowledge. It will be beneficial to professionals who need to rapidly upskill and enhance their data engineering toolkit with demonstrable and practical skills.

This course is technical in nature. It is therefore recommended that you have a basic understanding of mathematics and statistics. Basic knowledge of at least one programming language would be beneficial and is recommended but is not required. Lastly, experience working with databases, particularly SQL will be very helpful as a skillset before starting this course.

How You'll Learn

Every course is broken down into manageable, weekly units, designed to accelerate your learning process through diverse learning activities:

- Work through downloadable content and online instructional material.
- Investigate real-world case studies.
- Interact with your peers and learning facilitators through real-time chat platforms and regular live webinars.
- Learn how to use Jupyter Notebook, GitHub, Power BI, AWS, and various machine learning models.
- Enjoy a wide range of interactive content, including video lectures, coding challenges, hackathons, and presentations.
- Apply what you learn each week to quizzes, coding challenges and ongoing project submissions, culminating in the ability to use real-world data to solve a real-life problem.

Software Requirements

BASIC REQUIREMENTS

Basic computer literacy is essential for successful completion of the course. To complete the course, you will need a current email account and access to a computer and the internet, as well as a PDF Reader. You may need to make use of the Google office suite, which is free to anyone with a Gmail account. Alternatively, Microsoft Office applications (such as PowerPoint and Word) may be used. We recommend using Google Chrome to access the course, but any popular browser should suffice.

TECHNICAL REQUIREMENTS

- Recommended OS: Since we make use of Windows based apps (such as Power BI), Windows 10 is recommended (Windows 7 minimum)
- Processor: Minimum i3. Baseline higher than 2GHz
- RAM: Minimum 4GB
- Bandwidth: 20GB data per month should be sufficient, but will vary based on your personal activity
- Communication: Webcam and Microphone

ADDITIONAL REQUIREMENTS

Certain activities may require additional software and resources. In such cases, we will ensure that they will operate properly on a device with the above-mentioned specifications and will be clearly communicated to you during the completion of the course. Please note that Google, Vimeo, YouTube, Udemy and Datacamp may be used in our course delivery, and if these services are blocked in your jurisdiction, you may have difficulty in accessing course content. Please check with a Course Consultant before registering for this course if you have any concerns about this affecting your experience with the Online Campus.

Your Success Team

EXPLORE has a range of Faculty members at hand to assist you if you get stuck during your learning journey. We have experts readily available to assist you for when things get tricky - they have a wealth of experience with the material and are a friendly message away to help you on your way.

Head Tutor

A subject matter expert who'll guide you through content-related challenges.

Success Manager

Your one-on-one support available during working hours (8am-5pm SAST) to resolve any challenges that you may have

Administration Support

Available to solve your software, tech and administrative queries and concerns.

Your Teaching Team

These EXPLORERs built the course you will go through - they have loads of experience working with the tools and technologies you will learn and had fun building something awesome for you to learn.

SUBJECT MATTER EXPERT

Jaco Jansen van Rensburg
Lead Instructor

Jaco is a Lead Data Scientist in the EXPLORE Data Science Academy. He has spent the bulk of his career on scientific and industrial research and holds a PhD in Mechanical Engineering with a focus on mathematical modelling and optimisation.

YOUR COURSE CO-CONVENORS

These subject matter experts guide the course design and appear in a number of course videos, along with a variety of industry professionals.

Jonathan Gerrand
Lead Instructor

Jonathan is an electrical engineer specialising in biomedical image processing and machine learning (MSc). Having been a founding member of the Data Science for Impact and Decision Enablement (DSIDE) program within the CSIR, he is passionate about teaching, innovating for good, and equipping others to reason within a data driven world. Jonathan loves the outdoors, is unashamedly nerdy, and relishes a compelling debate.

Jonathan Botha
Data Scientist

Jonathan has his PhD in Genetics. He decided to leave the world of Academia and pair his unique perspective and insight with Data Science in order to see what strange and interesting things unfold. He also unashamedly prefers tea to coffee.

Curriculum Overview

This course will provide students with the knowledge, skills and experience to get a job as a data engineer - which requires a mix of programming, cloud computing, big data knowledge and the ability to apply these skills in new and challenging domains. This course will teach you how to create automated pipelines for a business.

Duration: 12 Months

Recommended Time: 380 hours

Pre-Requisite Skills: Basic analytical background

Course Difficulty: Advanced

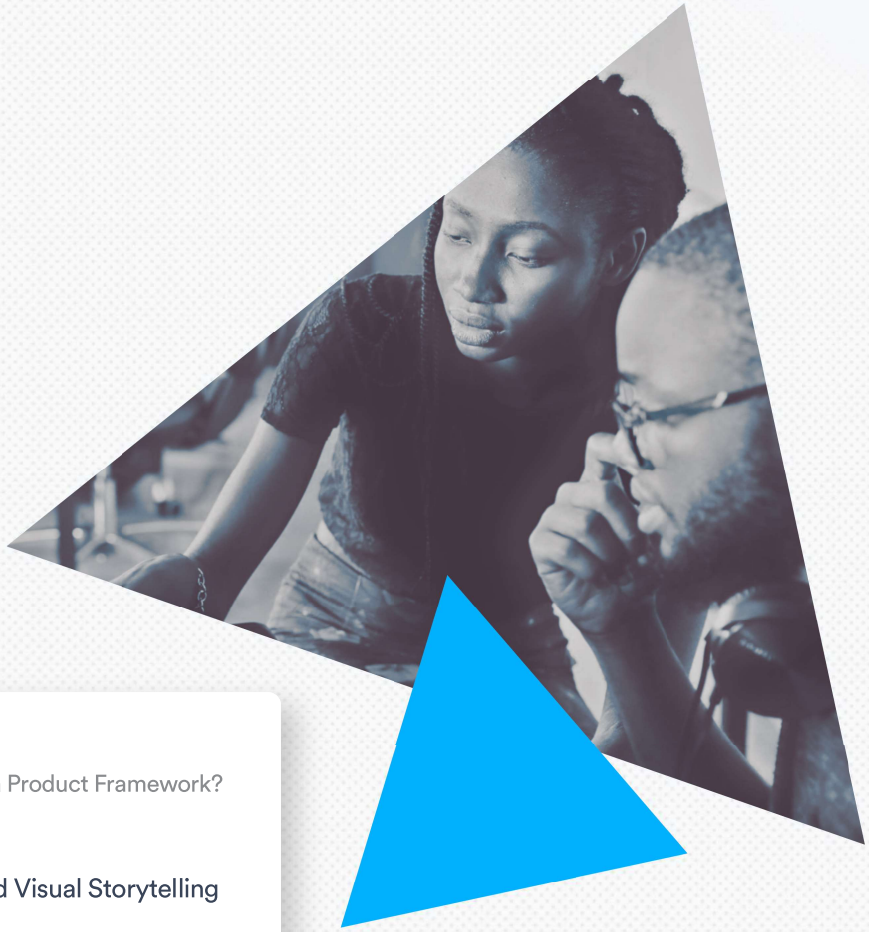
Tools Learnt: python MySQL aws hadoop Spark

Phase	Module	Time
Fundamentals	EXPLORE 101	20 hours
	SQL for Data Science	60 hours
	Python for Data Science	60 hours
	Cloud Computing	60 hours
Data Architecture	Storing Big Data	60 hours
	Moving Big Data	60 hours
	Processing Big Data	60 hours

Module 1

EXPLORE 101

Recommended Time: 20 hours



Learn about the EXPLORE Data Product Framework

What is covered in Module 1:

EXPLAIN

What is "explaining" in the EXPLORE Data Product Framework?

- Defining a Problem Statement
- Introduction to Communication and Visual Storytelling

GATHER

What is "gathering" in the EXPLORE Data Product Framework?

- Understand the Problem Landscape
- Introduction to Databases and Data Engineering

ANALYSE

What is "analysing" in the EXPLORE Data Product Framework?

- Understand the project Equation of Value
- Introduction to Programming and Solution Governance

DEPLOY

What is "deploying" in the EXPLORE Data Product Framework?

- Understand the basics of Project Management
- Introduction to Version Control and Production

Module 2

SQL for Data Science

Recommended Time: 60 hours

Project: Set up and extract valuable information about online retailers during a pandemic and national lockdown

What is covered in Module 2:

A. Working with SQL

Introduction to SQL

- Working with databases
- The value of well structured data
- How to work with data

Basic SQL

- SELECT, FROM, WHERE
- JOINS
- Aggregations

Module 2

SQL for Data Science

B. Working with databases

Database Management

- Normalisation of TABLES
- CREATE, ALTER commands
- Working with temporary tables
- Optimising performance

Data Manipulation

- INSERT, UPDATE, DELETE commands
- Cleaning data
- Writing complex SQL queries
- Real-world project

Module 3

Python for Data Science

Recommended Time: 60 hours

Project: Write a set of functions into a module that calculates specific metrics and analyses a company

What is covered in Module 3:

A. Python Fundamentals

Python programming basics

- Working in a Notebook environment
- Pseudo code and debugging concepts
- Interactive vs scripting mode
- Working with primitive data types - variables, strings, integers, floating points, booleans

Logic and functions

- Conditional statements - IF and ELSE IF
- Working with lists
- For loops and while loops
- Break | Continue principles
- Creating and working with functions

Module 3

Python for Data Science

B. Python Data Structures

Data Types

- Working with Strings, Numbers, Booleans
- Lists and Tuples Semantics
- Working with Comparisons
- Working with Statements

Dataframes and using libraries

- Sets and Dictionaries Semantics
- Working with Comparisons
- Importing Data - using Numpy and Pandas libraries
- Working with Data Frames

Module 4

Cloud Computing

Recommended Time: 60 hours

Project: Prepare for the AWS Certified Cloud Practitioner Exam

What is covered in Module 4:

A. Introduction to the Cloud

Cloud computing basics

- Intro to cloud computing
- Pros and cons of cloud computing
- Cloud providers

Intro to AWS

- Intro to AWS
- Creating an AWS account
- Overview of AWS services

Module 4

Cloud Computing

B. AWS Services

Storage, Databases and Compute services

- Set up IAM policies
- Storing data in S3 buckets
- Spin up an EC2 instance
- RDS instances

Other services

- Security, Identity and compliance
- Networking and content delivery
- Using Lambdas

Module 5

Storing Big Data

Recommended Time: 60 hours

Project: Build a source system connection and ingests data into a data lake

What is covered in Module 5:

A. Big Data Concepts

Databases

- Storing, designing and accessing relational databases solutions
- Non-relational Databases
- Data warehouses
- OLTP and OLAP

Storage

- Block Storage and caching
- Legacy systems, file stores and business unit collaboration
- Cloud based object storage
- Build data lakes

Module 5

Storing Big Data

B. Source Systems

Static Data

- APIs and IoT devices
- File Transfer Protocols
- Connecting within-business, on-premise and cloud-based solutions

Streaming

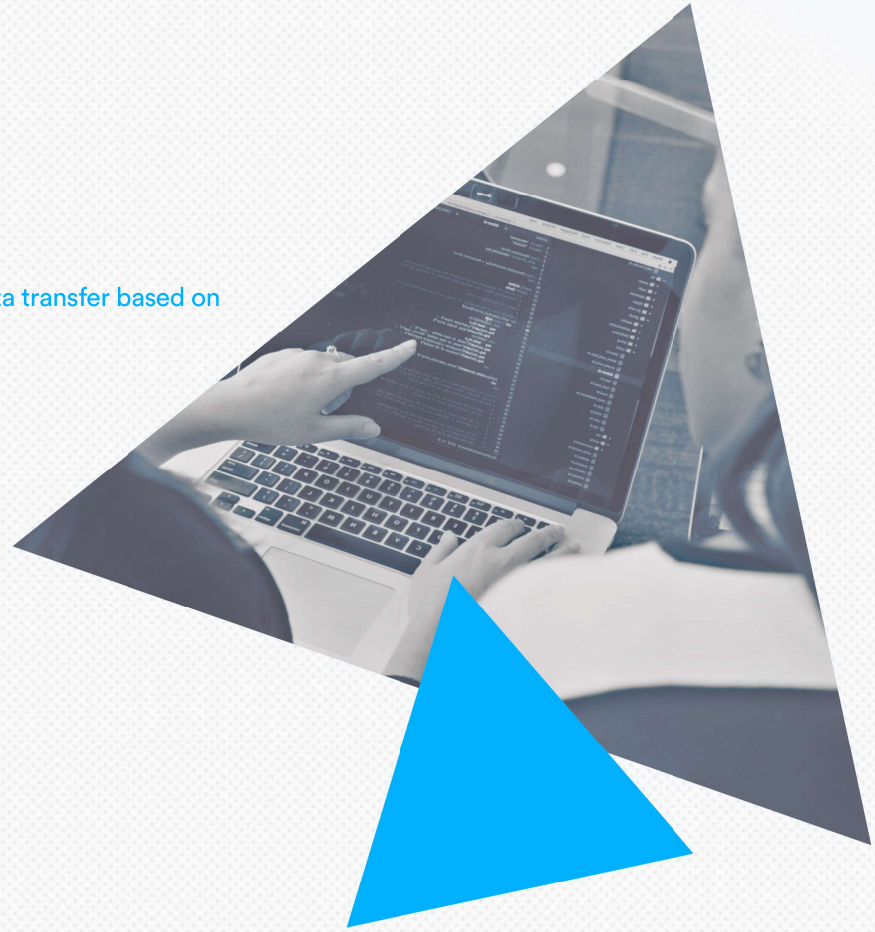
- Why stream data?
- Retrieving data from source systems: Kafka and AWS Kinesis
- Making data available: queues and streams

Module 6

Moving Big Data

Recommended Time: 60 hours

Project: Create a pipeline that automates data transfer based on schedules and trigger events



What is covered in Module 6:

A. Automation

Pipelines

- Orchestrating pipelines
- AWS Glue
- Sources and dependencies

Triggers

- How to set up pipeline triggers
- Run pipelines based on specific events
- Event metadata and parameters

Module 6

Moving Big Data

B. Observation

Logging

- Why log pipeline runs and data quality metrics?
- Log application metrics to S3
- Use Cloudwatch to access logs

Monitoring and Alerts

- Why and when is it crucial to monitor and alert end users
- Integrate Cloudwatch Logs Insights
- Build relevant alerts and dashboards for logs

Module 7

Processing Big Data

Recommended Time: 60 hours

Project: Write functions in Spark with data quality metrics and data lineage documentation

What is covered in Module 7:

A. Big Data Processing

Spark, Hive and Hadoop

- Set up a cluster that is “big-data ready”
- Overview of Hadoop and Spark framework
- Massively Parallel Processing (MPP) on Spark clusters
- Efficient ways of storing and accessing data

Transforming Data

- Understand how to best use Spark parallel processing
- Partitioning and indexing data

Module 7

Processing Big Data

B. Governance

Data Lineage and Quality

- Building a data dictionary
- Governance documentation
- Managing dependencies
- Track and log data quality metrics
- Surfacing data quality

Data Security

- Maintaining high availability of datasets
- Data masking, encryption in transit and rest
- Disaster recovery

EXPLORE Philosophy: Solving problems in the real world

At EXPLORE we focus on building our student's ability to solve problems in the real world. Building things that work and make a difference is hard - that's what we teach.

We're not a traditional learning institution that spends weeks teaching matrix multiplication on a whiteboard (although understanding that is useful) - we're a practical, solution-oriented institution that teaches our students to work in teams, under pressure, with deadlines while understanding context, constraints and the audience.

Our courses are typically broken into Sprints where we teach a core set of concepts within the framework of solving a problem in a team with a tight deadline.

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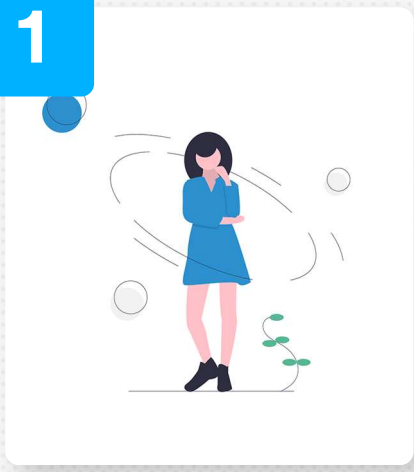

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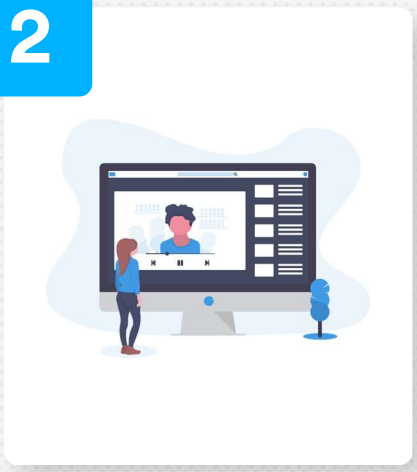

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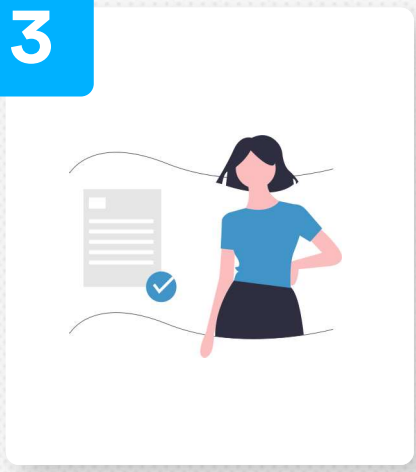

Students cycle from Sprint to Sprint solving different problems in different teams as they build this core muscle over the course.

EXPLORE

Start a new career today by enrolling in one of our
Data Science, Data Analytics or
Data Engineering courses.

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