

CELEBRATING
13 YEARS

QualityThought[®]

Course designed for
Graduates/Professionals

Experiential Learning from
Practitioners & Industry
Experts

Optimal batch for effective
mentoring

Curriculum at par with
current Industry practices

**Techno-Functional
Approach**

ADVANCED COURSE IN DATA SCIENCE



BEST JOB IN IT INDUSTRY : DATA SCIENTIST!

AI, ML and Deep Learning Constitute 60% of the Demand

Experience is losing its premium. With traditional IT job roles vanishing, Techies are turning to short-term Deep-learning courses to stay in the race.



Data Scientist

\$110k median base salary



Data Engineer

\$106k median base salary
4.3/5.0 level of job satisfaction



Analytics Manager

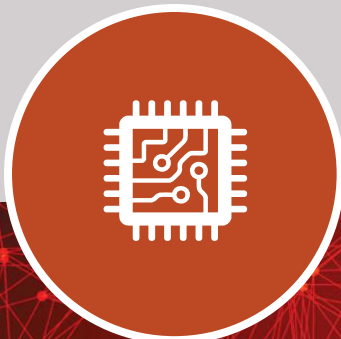
2000 openings
\$112k median base salary
4.1/5.0 level of job satisfaction

WHY ARE THESE JOBS IN DEMAND ?

Influx of data to be captured, cleaned and analyzed
Technology is struggling to keep up
Academic institutions scrambling to prepare students
Candidates in short supply
Limited technological capacity
Overwhelming demand

Top Majors for Data Scientists

Statistics
Math
Quantitative IT
Operations Research
Highly technical social
Science concentrations



In-demand soft skills include:

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Intellectual curiosity
Openness to learning new things
Ability to solve problems in
unique ways
Passion for innovation



Must-have skills and expertise:

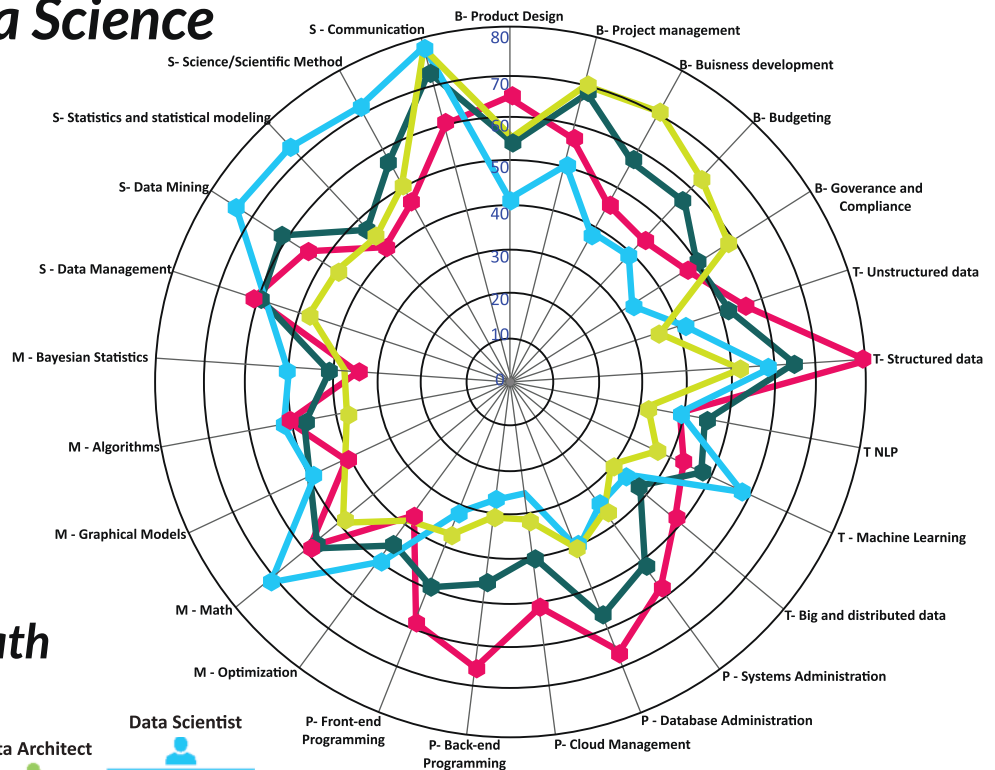
Must-have skills and expertise:
Classical statistics
Bayesian statistics
Linear algebra for machine
learning applications
In-depth knowledge of R
and Secondly SAS
Coding in Python, SQL,
NoSQL and Hadoop
Knowledge of the Hadoop platform
Experience with spark,
Hive or Pig



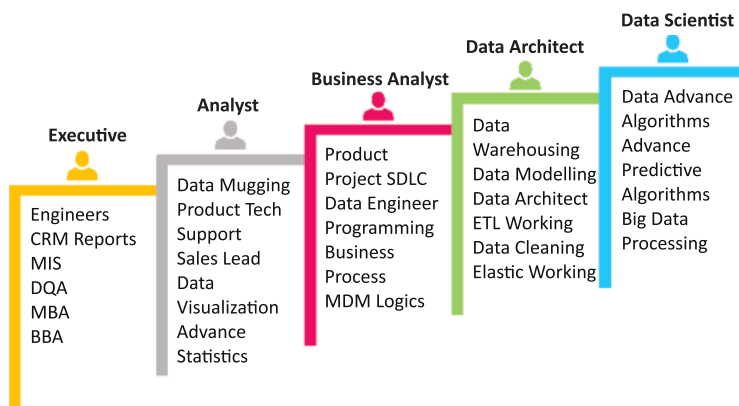
Data are becoming the new raw material of business.

Proficiency in Data Science Skills by Role

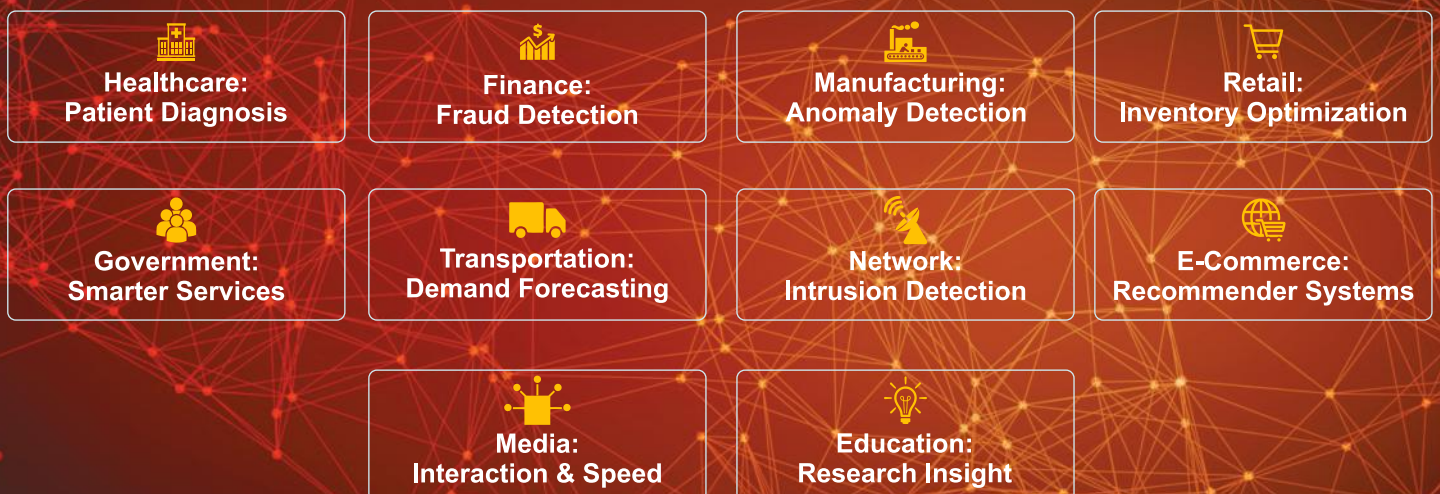
- Business Management People
- Developer - Technology / Programming
- Creative – Jack of all Trades
- Research – Scientist, Statistician and Researcher



Data Scientist Career Path



Top 10 Use Cases for Data Science & Machine Learning



Without data you're just another person with an opinion

~ W. Edwards Deming

COURSE CURRICULUM

ADVANCED COURSE IN DATA SCIENCE

COURSE DURATION
3 MONTHS

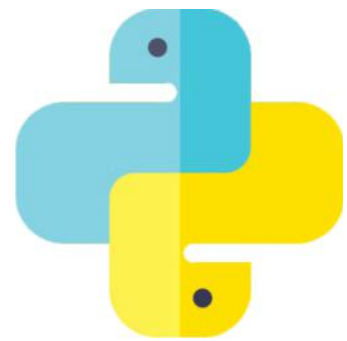
SESSION HOURS
120 HRS

CASE STUDIES
& PROJECTS

A: DATA SCIENCE ADVANCED TOPICS

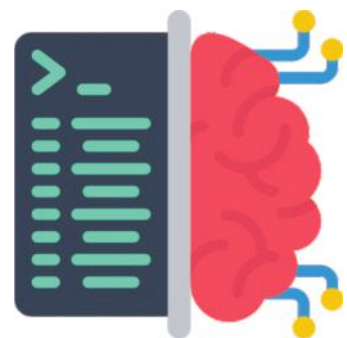
Module I: INTRODUCTION

Introduction to Jupyter Notebook
Getting Started with Data Science
Unix Introduction



Module II: PYTHON

Python Basics
Python Introduction
Python Data Structure: Lists and Arrays
Python : Conditions and Branching
Python : Functions and Methods
Python : Objects and Classes
Practice Questions in Python
Introduction to NumPy
Linear Algebra in NumPy
Seaborn, Matplotlib
Project 1 : Satellite Image Data Analysis using NumPy
Introduction to Pandas



Module III: PROBABILITY AND STATISTICS

Introduction to Probability
Probability Distributions
Describing Distributions
Probability Distribution with Multiple Variables
Population and Sample
Point Estimate
Confidence Interval
Hypothesis Testing
A/B Testing



The big technology trend is to make systems intelligent and data is the raw material.

~ Amod Malviya, CTO, Flipkart

Module IV: CALCULUS

- Derivatives
- Optimization
- Gradients
- Gradient Decent
- Optimization in Neural Networks
- Newton Methods

Module V : LINEAR ALGEBRA

- System of Linear Equations
- Elimination Method
- Row and Row Reduced Echelon form
- Vector Algebra
- Linear Transformation
- Determinants
- Eigen Values of Eigen Vectors

Module VI : DATA SCIENCE AND METHODOLOGY

- Data Acquisition
- Data Wrangling
- Data Statistical Analysis, Grouping and Correlation
- Model Development
- Model Evaluation and Refinement
- Getting started in scikit-learn with the famous iris dataset
- Training a Machine Learning Model with scikit-learn
- Comparing Machine Learning Models in scikit-learn
- Data Science Pipeline: Pandas, Seaborn, and scikit-learn
- Cross-Validation for Parameter Tuning, Model Selection, and Feature Selection
- Efficiently Searching for Optimal Tuning Parameters
- Evaluating a Classification Model : Confusion Matrix and ROC



Module VII : DATA VISUALIZATION

- Basic Plotting for Data Visualisation
- Data Manipulation for Visualisation
- 1D Data Analysis: Histograms, Boxplots, and Violin Plots
- Project 2 : Visualization of world GDP and carbon dioxide emission**
- Project 3 : Using Folium Library for Geographic Overlays**



Data is the new science. Big data holds the answers.

~ Pat Gelsinger, CEO, VMware

Module VIII : MACHINE LEARNING

Simple Linear Regression
Multiple Linear Regression
Non-Linear Regression
Regression Methods
Ridge Regression and Lasso Regression
Linear Regression and Decision Tree Regression
Random Forest Regression
Logistic Regression



Project 4 : Sentiment Analysis using Logistic Regression
Decision Tree Classification

Project 5 : Daily Weather Data Analysis using Decision Tree Classification
Random Forest Classification
Boosting Algorithms
Bagging
K- Nearest Neighbours Classification

Project 6 : Nearest Neighbour for Handwritten Digit Recognition
Naive Bayes Classification
K-Means Clustering

Project 7 : Minute Weather Data Clustering using K-Means Clustering
Hierarchical Clustering
K-Means and Hierarchical Clustering on the same dataset
Density-Based Spatial Clustering of Applications with Noise (DB-SCAN)
Support Vector Machines & Regression

Project 8 : Sentiment Analysis with Support Vector Machines
Principal Component Analysis (PCA)
Applying Principal Component Analysis on Handwritten Digits Dataset
Market Basket Analysis

Module IX : ALGORITHM DESIGN AND ANALYSIS

Evaluate the speed, runtime and memory dependencies of algorithmic models
Parallel computing systems such as SISD (Single Instruction SingleData Stream),
SIMD (Single Instruction Multiple Data Streams),
MISD (MultipleInstructions Single Data Stream),
MIMD (Multiple Instructions Multiple DataStreams)
How to use coding tools
Create, review and execute unit test cases
Corrective and Preventive actions for problems and defects can improve future designs
Measure and Optimize performance of algorithm
Deployment of the Models



Tech giants have acquired 140 AI companies since 2011

~ Observer Magazine

B: ADD-ON MODULES

Module A: SQL: DATABASE QUERY PROCESSING

RDBMS Principals
Install a DB Engine
SQL syntax and Data types
Operators, Expressions, Comments
Data Definition Language (DDL)
Data Manipulation Language (DML)
Grant and Revoke
SQL Functions (Sum , Count, Avg etc)
Joins (self, left, right, full outer)
Queries and Sub Queries
SQL Clauses
SQL Window functions
SQL Real time examples
SQL live Practice Session



Module B: TABLEAU

Tableau Desktop
Tableau Products
Tableau Terminology
Data Connection
Working with Data
Visualizing Data
Statistical Models
Dashboards
Sharing the Visuals



Predicting the future isn't magic, it's artificial intelligence

~ Dave Waters

C. DEEP LEARNING TOPICS / AI

Deep Learning

Part 1: Introduction

L01: Introduction to deep learning

L02: The brief history of deep learning

L03: Single-layer neural networks: The perceptron algorithm

Part 2: Mathematical and computational foundations

L04: Linear algebra and calculus for deep learning

L05: Parameter optimization with gradient descent

L06: Automatic differentiation with PyTorch

L07: Cluster and cloud computing resources

Part 3: Introduction to neural networks

L08: Multinomial logistic regression / Softmax regression

L09: Multilayer perceptrons and backpropagation

L10: Regularization to avoid overfitting

L11: Input normalization and weight initialization

L12: Learning rates and advanced optimization algorithms

Part 4: Deep learning for computer vision and language modeling

L13: Introduction to convolutional neural networks

L14: Convolutional neural networks architectures

L15: Introduction to recurrent neural networks

Part 5: Deep generative models

L16: Autoencoders

L17: Variational autoencoders

L18: Introduction to generative adversarial networks

L19: Self-attention and transformer networks



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