

Byte Academy Tech Syllabus Timeline



Data Science

Phase 1-1: Python Basics

- Runtime Environment Setup, Git and GitHub Repository Setup
- Linux Development Environment, Bash Commands, Linux File System, Navigating the terminal
- Python Installation, Running Python Programs using Sublime / IDLE / nano
- Programming Fundamentals: Introduction to python, Data Structures, File Operations, Iteration, Control flow, Functions and Functional Programming, Built-In Functions.
- Best Practices: Keeping it simple, DRY code, naming conventions, comments and documentation
- Python Standard Library (standard libraries typically include definitions for commonly used algorithms, data structures, and mechanisms for input and output)
- **Weekend:** Python mini project: Well- documented Python module; (one to two-hour mini project which could be finished in class so that the students can discuss with peers and get feedback from the teacher/TA.)

Phase 1-2: Beyond the basics

- Quiz 1 - Week 1 Syllabus
- Python Object Oriented Programming: Classes, Objects, Inheritance
- Regular Expressions
- Big O Notation, Data Structures, Algorithms (Sorting and Searching)
- DBMS Introduction
- **Weekend** – Interview Questions on Data Structures and Algorithms

Phase 1-3: Databases

- Quiz 2 - Week 2 Syllabus
- SQL Joins
- SQLite3, Postgress SQL and MySQL
- Introduction to APIs
- CRUD and HTTP Verbs
- MVC – Model View Controller
- Data Formats – XML, JSON and CSV
- **Weekend** - Building a terminal application with the MVC Design pattern, persisting data in SQL, and utilizing APIs to grab data in JSON format

Phase 1-4: Web Scraping and Phase 1 Assessment

- Introduction to Web Scraping using Beautiful Soup and Selenium
- Introduction to Pandas and Matplotlib
- Phase 1 Assessment

Phase 2: Core Data Science Concepts

Phase 2-1: Linear Regression, Regularizations and Optimization

- Probability Distributions
- Linear Regression
- Logistic Regression
- Minimizing Error
- Ridge and Lasso Regressions
- Evaluating performance
- Python Libraries



Phase 2-2: Classification, Ensemble methods and Unsupervised Learning

- Naive Bayes
- KNN
- LDA
- Support Vector Machines
- Cross-validation techniques for tuning
- Decision Trees
- Bagging and boosting
- K-means Clustering
- Dimensionality Reduction

Phase 2-3: Deep Learning

- Perceptron
- Gradient Descent
- Neural Networks
- Convolution Neural Networks
- Recurrent Neural Networks
- Auto encoding
- LSTM

Phase: 2-4: Natural Language Processing

- Preparing textual data using Regular Expressions
- Entity Extraction, Lemmatization
- Textual Classifiers (Naive Bayes, SVM)
- Sentiment Analysis

Phase 3: Big Data and Final Projects

- Introduction to Big Data and MongoDB
- Cloud Computing Platforms:
 - . Digital Ocean, AWS
 - . Google Cloud
 - . Azure
- Final Project Demo

