

DATA & AI

Data Science with AI

Go from exploring data to building intelligent systems. Learn Python, machine learning and AI through practical work.

7 months**5 days a week****2-3 hours a day**

Your learning path

13 modules covering the concepts, tools and practical work in this course.

01 Data science foundations

- Introduction Concept Of Data Science
- Installation Of All Necessary Modules

02 Coding concepts & databases

- Variable declaration. Variables are containers for storing values
- Control structures. A control structure specifies the flow of control in a program
- Data structures
- Object-oriented programming
- Debugging
- Programming tools

03 Python programming

- Introduction To Python And Installation, Introducing Pycharm, Variable In Python
- List, Set, Dictionary, Tuple
- Data Types In Python, Operators
- Functions And Modules
- User Input
- If, if Else, If Elif
- Loop In Python: For, While

- Loop Control Statements: Break, Continue, Pass
- Functions In Python
- Filter Map Reduce, Anonymous Functions
- Decorators
- Special Variables And Special Functions
- Object-Oriented Programming
- Class And Objects, Init Method
- Types Of Variables And Types Of Methods
- Inheritance
- Iterators, Generators, File Handling
- Database Connectivity
- Github Integration

04 NumPy, Pandas & Matplotlib

- Numpy: Installation And Introduction, Numpy Array, Different Ways To Create Numpy Array, 2d Array, Numpy Array Operations, Slicing, Linear Algebra, Load Data From External Source
- Pandas: Introduction To Pandas, Data Frames, Different Ways To Create Dataframes, Read And Write CSV, Excel, Textfile, SQL Read And Write, Slicing, Reshaping, Operations With Dataframe, Datetime Index, Data Cleaning, Group By, Merge, Concatenate, Analytics Using Pandas
- Matplotlib: Introduction To Matplotlib, Line Plot, Barplot, Scatter Plot, Stack Plot, Pie Chart, Plotting With Seaborn And Advanced Concepts

05 Statistics

- Data, Types Of Data, Types Of Statistics, Central Tendency
- Measure Of Spread, Variables And Types Of Variables
- Basics Of Probability
- Random Variables And Types Of Random Variables
- Types Of Distributions (Bernoulli Distribution, Uniform Distribution, Geometric Distributions, Binomial Distribution, Poisson Distribution, Normal Distribution, Exponential Distribution)
- Covariance And Correlation
- Conditional Probability
- Central Limit Theorem And Sampling Distributions
- Frequency (Absolute Frequency, Relative Frequency, Ratio, Rate, Proportion)
- Probability Mass Function, Probability Density Function, Cumulative Distribution Function

- Descriptive And Inferential Statistics (Skewness And Kurtosis, Point Of Estimations-confidence Interval)
- Measure Of Errors (Standard Error, Relative Error, Confidence Interval)

06 Machine learning foundations

- What Is Machine Learning?
- How Does Machine Learning Work?
- Types Of Machine Learning (Supervised Learning, Unsupervised Learning, and Reinforcement Learning)
- AI Vs ML Vs DL
- Data Cleaning
- Data Reduction (PCA)

07 Supervised learning

- Linear Regression
- Logistic Regression
- Support Vector Machine (SVM)
- Decision Tree Algorithm
- Random Forest Algorithm
- K-Nearest Neighbors (KNN)
- Naive Bayes Algorithm

08 Unsupervised learning

- K Means Algorithm
- Hierarchical Clustering
- Association Rules
- Apriori Algorithm

09 Reinforcement learning

- Q Learning
- Machine Learning Mini Project

10 Deep learning

- What Is Deep Learning?

- What Is AI?
- Applications Of AI
- Limitations Of Machine Learning
- How Deep Learning Works
- Artificial Neuron
- Perceptron (Single Layer And Multilayer)
- What Are The Activation Function And Different Types Of Activation Functions
- Back Propagation And Gradient Descent Optimizers
- Vanishing Gradient And Exploding Gradient Problems
- What Are Tensors And TensorFlow Basic Operations
- Keras Basic Operations
- PyTorch Basic Operations
- Fully Connected Network
- What Is CNN (Convolutional Neural Network)?
- CNN Layers
- What Is RNN (Recurrent Neural Network)?
- Difference between CNN and RNN
- Structure of RNN (RNN Layers)
- The Disadvantage of Traditional RNN
- LSTM (Long Short Term Memory)
- GRU
- Encoders and Decoders
- What is Chatbots?
- Chatbot walkthrough
- Deep Learning Project

11 Natural language processing

- What is NLP..?
- Applications of NLP
- NLP Basic Steps
- Tokenization
- Stemming
- Lemmatization

- POS (Parts of Speech) tags
- NER (Named Entity Recognition)
- Chunking
- NLTK
- What Is Stop Words? How To Remove It?
- Spacy
- Word Embedding Or Vectorization
- Tf-idf
- Count Vectorizer
- Bag Of Words
- Unigrams, Bigrams, Ngrams
- NLP Models (LSTM & GRU)
- Pipeline Transformers
- Sentiment Analysis
- Speech To Text And Text To Speech Conversion Using Python
- Building Alexa
- NLP Mini Project

12 Computer vision

- What Is An Image?
- OpenCV
- What Is Anaconda?, Installation Of Anaconda
- How To Read, Display, And Write An Image
- Drawing Functions In OpenCV (Line, Rectangle, Ellipse)
- How To Put Text To An Image
- Open Webcam Using cv2
- Open And Save A Video
- Channel Conversion (Gray Scale, HSV, YCbCr)
- Copy & Paste Images
- What Is Image Thresholding..?
- Different Methods In Thresholding
- Image Filtering
- Histogram Of An Image

- Morphological Transformations
- Erosion
- Dilation
- Closing
- Opening
- Gradient
- Top Hat
- Black Hat
- Edge Detection
- Contouring
- Face Detection Using Haarcascades
- Eye Detection
- Smile Detection
- Face Recognition Using Dlib
- CV Project

13 Tableau

- Tableau Intro
- Installation Of Tableau
- Creating Charts In Tableau
- Filters In Tableau
- Creating Calculated Field
- Applying Analytics To The Worksheet
- Dashboard In Tableau
- Tableau Mini Project

Curriculum: <https://gencorpusdatahub.com/courses/>