



Data Science & AI

# GENERATIVE AI ONLINE COURSE



**500K+**

Satisfied Students



**100K+**

Online Students



**300+**

Trainers



**300K+**

Placements



**200+**

Global Certifications



**150+**

Companies

# Python for AI

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## ✔ Introduction To Python

- Installation and Working with Python
- Understanding Python variables
- Python basic Operators
- Understanding the Python blocks.

## ✔ Python Keyword And Identifiers

- Python Comments, Multiline Comments.
- Python Indentation
- Understanding the concepts of Operators
- Arithmetic
- Relational
- Logical
- Assignment
- Membership
- Identity

## ✔ Introduction To Variables

- Variables, expression condition and function
- Global and Local Variables in Python
- Packing and Unpacking Arguments
- Type Casting in Python
- Byte objects vs. string in Python
- Variable Scope

## ✔ Python Data Type

- Declaring and using Numeric data types
- Using string data type and string operations
- Understanding Non-numeric data types
- Understanding the concept of Casting and Boolean.
- Strings
- List
- Tuples
- Dictionary
- Sets

## ✔ Control Structure & Flow

- Statements – if, else, elif
- How to use nested IF and Else in Python
- Loops
- Loops and Control Statements.
- Jumping Statements – Break, Continue, pass
- Looping techniques in Python
- How to use Range function in Loop?
- Programs for printing Patterns in Python

- How to use if and else with Loop
- Use of Switch Function in Loop
- Elegant way of Python Iteration
- Generator in Python
- How to use nested Loop in Python
- Use If and Else in for and While Loop
- Examples of Looping with Break and Continue Statement
- How to use IN or NOT IN keyword in Python Loop.

## ✓ List

- What is List.
- List Creation
- List Length
- List Append
- List Insert
- List Remove
- List Append & Extend using “+” and Keyword
- List Delete
- List related Keyword in Python
- List Reverse
- List Sorting
- List having Multiple Reference
- String Split to create a List
- List Indexing
- List Slicing
- List count and Looping
- List Comprehension and Nested Comprehension

## ✓ Tuple

- What is Tuple
- Tuple Creation
- Accessing Elements in Tuple
- Changing a Tuple
- Tuple Deletion
- Tuple Count
- Tuple Index
- Tuple Membership
- TupleBuilt in Function (Length, Sort)

## ✓ Dictionary

- Dict Creation
- Dict Access (Accessing Dict Values)
- Dict Get Method
- Dict Add or Modify Elements
- Dict Copy
- Dict From Keys.
- Dict Items
- Dict Keys (Updating, Removing and Iterating)

- Dict Values
- Dict Comprehension
- Default Dictionaries
- Ordered Dictionaries
- Looping Dictionaries
- Dict useful methods (Pop, Pop Item, Str , Update etc.)

## ✓ Sets

- What is Set
- Set Creation
- Add element to a Set
- Remove elements from a Set
- PythonSet Operations
- Frozen Sets

## ✓ Strings

- What is Set
- Set Creation
- Add element to a Set
- Remove elements from a Set
- PythonSet Operations

## ✓ Python Function, Modules And Packages

- Python Syntax
- Function Call
- Return Statement
- Arguments in a function – Required, Default, Positional, Variable-length
- Write an Empty Function in Python –pass statement.
- Lamda/ Anonymous Function
- \*args and \*\*kwargs
- Help function in Python
- Scope and Life Time of Variable in Python Function
- Nested Loop in Python Function
- Recursive Function and Its Advantage and Disadvantage
- Organizing python codes using functions
- Organizing python projects into modules
- Importing own module as well as external modules
- Understanding Packages
- Random functions in python
- Programming using functions, modules & external packages
- Map, Filter and Reduce function with Lambda Function
- More example of Python Function

## ✓ Decorator, Generator And Iterator

- Creation and working of decorator
- Idea and practical example of generator, use of generator
- Concept and working of Iterator

## ✓ Python Exception Handling

- Python Errors and Built-in-Exceptions
- Exception handling Try, Except and Finally
- Catching Exceptions in Python
- Catching Specific Exception in Python
- Raising Exception
- Try and Finally

## ✓ Python File Handling

- Opening a File
- Python File Modes
- Closing File
- Writing to a File
- Reading from a File
- Renaming and Deleting Files in Python
- Python Directory and File Management
- List Directories and Files
- Making New Directory
- Changing Directory

## ✓ Memory Management Using Python

- Threading, Multi-threading
- Memory management concept of python
- working of Multi tasking system
- Different os function with thread

## ✓ Python Database Interaction

- SQL Database connection using
- Creating and searching tables
- Reading and Storing config information on database
- Programming using database connections

## ✓ Reading An Excel

- Working With Excel
- Reading an excel file using Python
- Writing to an excel sheet using Python
- Python| Reading an excel file
- Python | Writing an excel file
- Adjusting Rows and Column using Python
- ArithmeticOperation in Excel file.
- Play with Workbook, Sheets and Cells in Excel using Python
- Creating and Removing Sheets
- Formatting the Excel File Data
- More example of Python Function

## ✓ Complete Understanding Of OS Module Of Python

- Check Dirs. (exist or not)

- How to split path and extension?
- How to get user profile detail?
- Get the path of Desktop, Documents, Downloads etc.
- Handle the File System Organization using OS
- How to get any files and folder's details using OS?

## Data Analysis and Visualization

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### ✓ Data Analysis And Visualization Using Pandas.

- Statistics
  - Categorical Data
  - Numerical Data
  - Mean
  - Median
  - Mode
  - Outliers
  - Range
  - Interquartile range
  - Correlation
  - Standard Deviation
  - Variance
  - Box plot
- Pandas
  - Read data from Excel File using Pandas More Plotting, Date Time Indexing and writing to files
  - How to get record specific records Using Pandas Adding & Resetting Columns, Mapping with function
  - Mapping with function to read multiple sheets More Mapping, Filling
  - Normalizing the Data Plotting, Correlations, and Histograms
  - Getting statistical information about the data Analysis Concepts, Handle the None Values
  - Reading files with no header and skipping records Cumulative Sums and Value Counts, Ranking etc
  - Reading a subset of columns Data Maintenance, Adding/Removing Cols and Rows
  - Applying formulas on the columns Basic Grouping, Concepts of Aggregate Function
  - Complete Understanding of Pivot Table Data Slicing using iLoc and Loc property (Setting Indices)
  - Properties of Pivot Table in Pandas Advanced Reading CSV/HTML the results to Excel etc
  - Exporting the results to Excel etc
  - Python | Pandas Data Frame Inner Join
  - Understanding the properties of Data Frame Left Join (Left Outer Join)
  - Indexing and Selecting Data with Pandas Right Join (Right Outer Join)
  - Pandas | Merging, Joining and Concatenating Full Join (Full Outer Join)
  - Pandas | Find Missing Data and Fill and Drop NA Appending Data Frame and Data
  - Pandas | How to Group Data How to apply Lambda / Function on Data Frame
  - Other Very Useful concepts of Pandas in Python Data Time Property in Pandas (More and More)

### ✓ Data Analysis And Visualization Using NumPy And Matplotlib

- NumPy
  - Introduction to NumPy Numerical Python
  - Importing NumPy and Its Properties
  - NumPy Arrays
  - Creating an Array from a CSV

- Operations an Array from a CSV
- Operations with NumPy Arrays
- Two-Dimensional Array
- Selecting Elements from 1-D Array
- Selecting Elements from 2-D Array
- Logical Operation with Arrays
- Indexing NumPy elements using conditionals
- NumPy's Mean and Axis
- NumPy's Mode, Median and Sum Function
- NumPy's Sort Function and More
- Matplotlib
  - Bar Chart using Python Matplotlib
  - Column Chart using Python Matplotlib
  - Pie Chart using Python Matplotlib
  - Area Chart using Python Matplotlib
  - Scatter Plot Chart using Python Matplotlib
  - Play with Charts Properties Using Matplotlib
  - Export the Chart as Image
  - Understanding plt. subplots () notation
  - Legend Alignment of Chart using Matplotlib
  - Create Charts as Image
  - Other Useful Properties of Charts.
  - Complete Understanding of Histograms
  - Plotting Different Charts, Labels, and Labels Alignment etc.

## ✔ Introduction To Data Visualization With Seaborn

- Introduction to Seaborn
  - Introduction to Seaborn
  - Making a scatter plot with lists
  - Making a count plot with a list
  - Using Pandas with seaborn
  - Tidy vs Untidy data
  - Making a count plot with a Dataframe
  - Adding a third variable with hue
  - Hue and scatter plots
  - Hue and count plots
- Visualizing Two Quantitative Variables
  - Introduction to relational plots and subplots
  - Creating subplots with col and row
  - Customizing scatters plots
  - Changing the size of scatter plot points
  - Changing the style of scatter plot points
  - Introduction to line plots
  - Interpreting line plots
  - Visualizing standard deviation with line plots
  - Plotting subgroups in line plots
- Visualizing a Categorical and a Quantitative Variable
  - Current plots and bar plots

- Count plots
- Bar plot with percentages
- Customizing bar plots
- Box plots
- Create and interpret a box plot
- Omitting outliers
- Adjusting the whisk
- Point plots
- Customizing points plots
- Point plot with subgroups
- Customizing Seaborn Plots
  - Changing plot style and colour
  - Changing style and palette
  - Changing the scale
  - Using a custom palette
  - Adding titles and labels Part 1
  - Face Grids vs. Axes
  - Adding a title to a face Grid object
  - Adding title and labels Part 2
  - Adding a title and axis labels
  - Rotating x-tics labels and subplot
  - Putting it all together
  - Box plot with subgroups
  - Bar plot with subgroups and subplots
  - LM plot and heatmap

## Statistics for Data Science

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### ✓ Introduction To Statistics

- Descriptive Statistics
- Sample vs Population Statistics
- Random variables
- Probability distribution functions
- Expected value
- Normal distribution
- Gaussian distribution
- Z-score
- Spread and Dispersion
- Correlation and Co-variance

### ✓ EDA (Exploratory Data Analysis)

- Need for structured exploratory data
- EDA framework for exploring the data and identifying any problems with the data (Data Audit Report)
- Identify missing data
- Identify outliers' data
- Imbalanced Data Techniques



## ✓ Data Pre-Processing & Data Mining

- Data Preparation
- Feature Engineering
- Feature Scaling, Feature Transformation and Dimensionality Reduction
- Datasets
- Dimensionality Reduction (PCA, ICA,LDA)
- Anomaly Detection
- Parameter Estimation
- Data and Knowledge
- Selected Applications in Data Mining

## ✓ Introduction To Predictive Modelling

- Difference between Analysis and Analytics
- Concept of model in analytics and how it is used?
- Common terminology used in Analytics & Modelling process
- Popular Modelling algorithms, Data Analytics Life cycle
- Types of Business problems - Mapping of Techniques
- Introduction to Machine Learning

# Databases – MS SQL and SQL Queries

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## ✓ SQL Server Fundamentals

- SQL Server 2019 Installation
- Service Accounts & Use, Authentication Modes & Usage, Instance Configurations
- SQL Server Features & Purpose
- Using Management Studio (SSMS)
- Configuration Tools & SQLCMD
- Conventions & Collation

## ✓ SQL Server 2019 Database Design

- SQL Database Architecture
- Database Creation using GUI
- Database Creation using T-SQL scripts
- DB Design using Files and File Groups
- File locations and Size parameters
- Database Structure modifications

## ✓ SQL Tables In MS SQL Server

- SQL Server Database Tables
- Table creation using T-SQL Scripts
- Naming Conventions for Columns
- Single Row and Multi-Row Inserts
- Table Aliases
- Column Aliases & Usage
- Table creation using Schemas
- Basic INSERT
- UPDATE

- DELETE
- SELECT queries and Schemas
- Use of WHERE, IN and BETWEEN
- Variants of SELECT statement
- ORDER BY
- GROUPING
- HAVING
- ROWCOUNT and CUBE Functions

## ✔ Data Validation And Constraints

- Table creation using Constraints
- NULL and IDENTITY properties
- UNIQUE KEY Constraint and NOT NULL
- PRIMARY KEY Constraint & Usage
- CHECK and DEFAULT Constraints
- Naming Composite Primary Keys
- Disabling Constraints & Other Options

## ✔ Views And Row Data Security

- Benefits of Views in SQL Database
- Views on Tables and Views
- SCHEMA BINDING and ENCRYPTION
- Issues with Views and ALTER TABLE
- Common System Views and Metadata
- Common Dynamic Management views
- Working with JOINS inside views

## ✔ Indexes And Query Tuning

- Need for Indexes & Usage?
- Indexing Table & View Columns
- Index SCAN and SEEK
- INCLUDED Indexes & Usage
- Materializing Views (storage level)
- Composite Indexed Columns & Keys
- Indexes and Table Constraints
- Primary Keys & Non-Clustered Indexes

## ✔ Stored Procedures And Benefits

- Why to use Stored Procedures?
- Types of Stored Procedures
- Use of Variables and parameters
- SCHEMABINDING and ENCRYPTION
- INPUT and OUTPUT parameters
- System level Stored Procedures
- Dynamic SQL and parameterization

## ✔ System Functions And Usage

- Scalar Valued Functions

- Types of Table Valued Functions
- SCHEMABINDING and ENCRYPTION
- System Functions and usage
- Date Functions
- Time Functions
- String and Operational Functions
- ROW\_COUNT
- GROUPING Functions

## ✓ Triggers, Cursors, Memory Limitations

- Why to use Triggers?
- DML Triggers and Performance impact
- INSERTED and DELETED memory tables
- Data Audit operations & Sampling
- Database Triggers and Server Triggers
- Bulk Operations with Triggers

## ✓ Cursors And Memory Limitations

- Cursor declaration and Life cycle
- STATIC
- DYNAMIC
- SCROLL Cursors
- FORWARD\_ONLY and LOCAL Cursors
- KEYSSET Cursors with Complex SPs

## ✓ Transactions Management

- ACID Properties and Scope
- EXPLICIT Transaction types
- IMPLICIT Transactions and options
- AUTOCOMMIT Transaction and usage

# **Analytics with Excel**

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## ✓ Understanding Concepts Of Excel

- Creation of Excel Sheet Data
- Range Name, Format Painter
- Conditional Formatting, Wrap Text, Merge & Centre
- Sort, Filter, Advance Filter
- Different type of Chart Creations
- Auditing, (Trace Precedents, Trace Dependents)Print Area
- Data Validations, Consolidate, Subtotal
- What if Analysis (Data Table, Goal Seek, Scenario)
- Solver, Freeze Panes
- Various Simple Functions in Excel(Sum, Average, Max, Min)
- Real Life Assignment work

## ✓ Ms Excel Advance

- Advance Data Sorting

- Multi-level sorting
- Restoring data to original order after performing sorting
- Sort by icons
- Sort by colours
- Lookup Functions
  - Lookup
  - VLookup
  - HLookup
- Subtotal, Multi-Level Subtotal
- Grouping Features
  - Column Wise
  - Row Wise
- Consolidation With Several Worksheets
- Filter
  - Auto Filter
  - Advance Filter
- Printing of Row & Column Heading on Each Page
- Workbook Protection and Worksheet Protection
- Specified Range Protection in Worksheet
- Excel Data Analysis
  - Goal Seek
  - Scenario Manager
- Data Table
  - Advance use of Data Tables in Excel
  - Reporting and Information Representation
- Pivot Table
  - Pivot Chart
  - Slicer with Pivot Table & Chart
- Generating MIS Report In Excel
  - Advance Functions of Excel
  - Math & Trig Functions
- Text Functions
- Lookup & Reference Function
- Logical Functions & Date and Time Functions
- Database Functions
- Statistical Functions
- Financial Functions
- Functions for Calculation Depreciation

## ✔ MIS Reporting & Dash Board

- Dashboard Background
- Dashboard Elements
- Interactive Dashboards
- Type of Reporting In India
  - Industry Related Dashboard
  - Indian Print Media Reporting

## ✔ What Is Macro?

- Understanding Macros

## ✔ Recording A Macro

- Recording a Macro

## ✔ Different Components Of A Macro

- User Form
- Title
- Module

## ✔ What Is VBA And How To Write Macros In VBA.

- Writing a simple macro
- Apply arithmetic operations on two cells using macros.
- How to align the text using macros.
- How to change the background color of the cells using macros.
- How to change the border color and style of the cells using macros.
- Use cell referencing using macros.
- How to copy the data from one cell and paste it into another.
- How to change the font color of the text in a cell using macros

# Analytics Microsoft Power BI

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## ✔ Introduction To Power BI

- Overview of BI concepts
- Why we need BI?
- Introduction to SSBI
- SSBI Tools
- Why Power BI?
- What is Power BI?
- Building Blocks of Power BI
- Getting started with Power BI Desktop
- Get Power BI Tools
- Introduction to Tools and Terminology
- Dashboard in Minutes
- Interacting with your Dashboards
- Sharing Dashboards and Reports

## ✔ Power BI Desktop

- Power BI Desktop
- Extracting data from various sources
- Workspaces in Power BI

## ✔ Power BI Data Transformation

- Data Transformation
- Query Editor
- Connecting Power BI Desktop to our Data Sources
- Editing Rows
- Understanding Append Queries

- Editing Columns
- Replacing Values
- Formatting Data
- Pivoting and Unpivoting Columns
- Splitting Columns
- Creating a New Group for our Queries
- Introducing the Star Schema
- Duplicating and Referencing Queries
- Creating the Dimension Tables
- Entering Data Manually
- Merging Queries
- Finishing the Dimension Table
- Introducing the another DimensionTable
- Creating an Index Column
- Duplicating Columns and Extracting Information
- Creating Conditional Columns
- Creating the FACT Table
- Performing Basic Mathematical Operations
- Improving Performance and Loading Data into the Data Model

## ✓ **Modelling With Power BI**

- Introduction to Modelling
- Modelling Data
- Manage Data Relationship
- Optimize Data Models
- Cardinality and Cross Filtering
- Default Summarization & Sort by
- Creating Calculated Columns
- Creating Measures & Quick Measures

## ✓ **Data Analysis Expressions (DAX)**

- What is DAX?
- Data Types in DAX
- Calculation Types
- Syntax, Functions, Context Options
- DAX Functions
- Date and Time
- Time Intelligence
- Information
- Logical
- Mathematical
- Statistical
- Text and Aggregate
- Measures in DAX
- Measures and Calculated Columns
- ROW Context and Filter Context in DAX
- Operators in DAX - Real-time Usage

- Quick Measures in DAX - Auto validations
- In-Memory Processing DAX Performance

## ✓ Power BI Desktop Visualisations

- How to use Visual in Power BI?
- What Are Custom Visuals?
- Creating Visualisations and Colour Formatting
- Setting Sort Order
- Scatter & Bubble Charts & Play Axis
- Tooltips and Slicers, Timeline Slicers & Sync Slicers
- Cross Filtering and Highlighting
- Visual, Page and Report Level Filters
- Drill Down/Up
- Hierarchies and Reference/Constant Lines
- Tables, Matrices & Conditional Formatting
- KPI's, Cards & Gauges
- Map Visualizations
- Custom Visuals
- Managing and Arranging
- Drill through and Custom Report Themes
- Grouping and Binning and Selection Pane, Bookmarks & Buttons
- Data Binding and Power BI Report Server

## ✓ Introduction To Power BI Dashboard And Data Insights

- Why Dashboard? and Dashboard vs Reports
- Creating Dashboards
- Configuring a Dashboard Dashboard Tiles, Pinning Tiles
- Power BI Q&A
- Quick Insights in Power BI

## ✓ Direct Connectivity

- Custom Data Gateways
- Exploring live connections to data with Power BI
- Connecting directly to SQL Server
- Connectivity with CSV & Text Files
- Excel with Power BI Connect Excel to Power BI, Power BI Publisher for Excel
- Content packs
- Update content packs

## ✓ Publishing And Sharing

- Introduction and Sharing Options Overview
- Publish from Power BI Desktop and Publish to Web
- Share Dashboard with Power BI Service
- Workspaces (Power BI Pro) and Content Packs (Power BI Pro)
- Print or Save as PDF and Row Level Security (Power BI Pro)
- Export Data from a Visualization
- Export to PowerPoint and Sharing Options Summary

## ✓ Refreshing Datasets

- Understanding Data Refresh
- Personal Gateway (Power BI Pro and 64-bit Windows)
- Replacing a Dataset and Troubleshooting Refreshing

# Mastering Machine Learning

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## ✓ Introduction To Machine Learning

- What is Machine Learning?
- Machine Learning Use-Cases
- Machine Learning Process Flow
- Machine Learning Categories

## ✓ Supervised Learning

- Classification and Regression
- Where we use classification model and where we use regression
- Regression Algorithms and its types

## ✓ Regression Algorithm

- Linear regression
- Logistic Regression
- Evaluation Matrix of Regression Algorithm

## ✓ Classification Algorithm

- Implementation of SVM
- Implementing KNN
- Implementing Naïve Bayes Classifier
- Implementation and Introduction to Decision Tree using CART and ID3
- Introduction to Ensemble Learning
- Random Forest algorithm using bagging and boosting
- Evaluation Matrix of classification algorithms (confusion matrix, r2score, Accuracy, f1-score, recall and precision)

## ✓ Optimization Algorithm

- Gradient descent
- Hyperparameter Optimization
- Grid Search vs. Random Search

## ✓ Dimensionality Reduction

- Introduction to Dimensionality
- Why Dimensionality Reduction
- PCA
- Factor Analysis
- Scaling dimensional model
- LDA
- ICA



## ✓ Unsupervised Learning

- What is Clustering & its Use Cases?
- What is K-means Clustering?
- How does the K-means algorithm works?
- How to do optimal clustering
- What is Hierarchical Clustering?
- How does Hierarchical Clustering work?

## ✓ Association Rules Mining And Recommendation Systems

- What are Association Rules?
- Association Rule Parameters
- Calculating Association Rule Parameters
- Recommendation Engines
- How do Recommendation Engines work?
- Collaborative Filtering
- Content-Based Filtering
- Association Algorithms
- Implementation of Apriori Association Algorithm

## ✓ Reinforcement Learning

- What is Reinforcement Learning?
- Why Reinforcement Learning?
- Elements of Reinforcement Learning
- Exploration vs. Exploitation dilemma
- Epsilon Greedy Algorithm
- Markov Decision Process (MDP)
- Q values and V values
- Q – Learning
- Values

## ✓ Time Series Analysis

- What is Time Series Analysis?
- Importance of TSA
- Components of TSA

## ✓ Model Selection And Boosting

- What is Model Selection?
- Need for Model Selection
- Cross Validation
- What is Boosting?
- How do Boosting Algorithms work?
- Types of Boosting Algorithms
- Adaptive Boosting

# Understanding Deep Learning for AI

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## ✓ Introduction To Text Mining And NLP

- Overview of Text Mining
- Need of Text Mining
- Natural Language Processing (NLP) in Text Mining
- Applications of Text Mining
- OS Module
- Reading, Writing to text and word files
- Setting the NLTK Environment
- Accessing the NLTK Corpora

## ✓ **Extracting, Cleaning And Preprocessing Text**

- Tokenization
- Frequency Distribution
- Different Types of Tokenizers
- Bigrams, Trigrams & Ngrams
- Stemming
- Lemmatization
- Stopwords
- POS Tagging
- Named Entity Recognition

## ✓ **Analyzing Sentence Structure**

- Syntax Trees
- Chunking
- Chinking
- Context Free Grammars (CFG)
- Automating Text Paraphrasing

## ✓ **Text Classification - I**

- Machine Learning: Brush Up
- Bag of Words
- Count Vectorizer
- Term Frequency (TF)
- Inverse Document Frequency (IDF)

## ✓ **Getting Started With TensorFlow 2.0**

- Introduction to TensorFlow 2.x
- Installing TensorFlow 2.x
- Defining Sequence model layers
- Activation Function
- Layer Types
- Model Compilation
- Model Optimizer
- Model Loss Function
- Model Training
- Digit Classification using Simple Neural Network in TensorFlow 2.x
- Improving the model
- Adding Hidden Layer
- Adding Dropout

- Using Adam Optimizer

## ✓ Introduction To Deep Learning

- What is Deep Learning?
- Curse of Dimensionality
- Machine Learning vs. Deep Learning
- Use cases of Deep Learning
- Human Brain vs. Neural Network
- What is Perceptron?
- Learning Rate
- Epoch
- Batch Size
- Activation Function
- Single Layer Perceptron

## ✓ Neural Networks

- What is NN
- Types of NN
- Creation of simple neural network using tensorflow

## ✓ Convolution Neural Network

- Image Classification Example
- What is Convolution
- Convolutional Layer Network
- Convolutional Layer
- Filtering
- ReLU Layer
- Pooling
- Data Flattening
- Fully Connected Layer
- Predicting a cat or a dog
- Saving and Loading a Model
- Face Detection using OpenCV

## ✓ Image Processing And Computer Vision

- Introduction to Vision
- Importance of Image Processing
- Image Processing Challenges – Interclass Variation, ViewPoint Variation, Illumination, Background Clutter, Occlusion & Number of Large Categories
- Introduction to Image – Image Transformation, Image Processing Operations & Simple Point Operations
- Noise Reduction – Moving Average & 2D Moving Average
- Image Filtering – Linear & Gaussian Filtering
- Disadvantage of Correlation Filter
- Introduction to Convolution
- Boundary Effects – Zero, Wrap, Clamp & Mirror
- Image Sharpening
- Template Matching

- Edge Detection – Image filtering, Origin of Edges, Edges in images as Functions, Sobel Edge Detector
- Effect of Noise
- Laplacian Filter
- Smoothing with Gaussian
- LOG Filter – Blob Detection
- Noise – Reduction using Salt & Pepper Noise using Gaussian Filter
- Nonlinear Filters
- Bilateral Filters
- Canny Edge Detector - Non Maximum Suppression, Hysteresis Thresholding
- Image Sampling & Interpolation – Image Sub Sampling, Image Aliasing, Nyquist Limit, Wagon Wheel Effect, Down Sampling with Gaussian Filter, Image Pyramid, Image Up Sampling
- Image Interpolation – Nearest Neighbour Interpolation, Linear Interpolation, Bilinear Interpolation & Cubic Interpolation
- Introduction to the dnn module
  - Deep Learning Deployment Toolkit
  - Use of DLDT with OpenCV4.0
- OpenVINO Toolkit
  - Introduction
  - Model Optimization of pre-trained models
  - Inference Engine and Deployment process

## ✓ Regional CNN

- Regional-CNN
- Selective Search Algorithm
- Bounding Box Regression
- SVM in RCNN
- Pre-trained Model
- Model Accuracy
- Model Inference Time
- Model Size Comparison
- Transfer Learning
- Object Detection – Evaluation
- mAP
- IoU
- RCNN – Speed Bottleneck
- Fast R-CNN
- RoI Pooling
- Fast R-CNN – Speed Bottleneck
- Faster R-CNN
- Feature Pyramid Network (FPN)
- Regional Proposal Network (RPN)
- Mask R-CNN

## ✓ Introduction To RNN And GRU

- Issues with Feed Forward Network
- Recurrent Neural Network (RNN)

- Architecture of RNN
- Calculation in RNN
- Backpropagation and Loss calculation
- Applications of RNN
- Vanishing Gradient
- Exploding Gradient
- What is GRU?
- Components of GRU
- Update gate
- Reset gate
- Current memory content
- Final memory at current time step

## ✓ RNN, LSTM

- What is LSTM?
- Structure of LSTM
- Forget Gate
- Input Gate
- Output Gate
- LSTM architecture
- Types of Sequence-Based Model
- Sequence Prediction
- Sequence Classification
- Sequence Generation
- Types of LSTM
- Vanilla LSTM
- Stacked LSTM
- CNN LSTM
- Bidirectional LSTM
- How to increase the efficiency of the model?
- Backpropagation through time
- Workflow of BPTT

## ✓ Faster Object Detection Algorithm

- YOLO v3
- YOLO v4
- Darknet
- OpenVINO
- ONNX
- Fast R-CNN
- Faster R-CNN
- Mask R-CNN

## ✓ BERT Algorithm

- What is BERT
- Brief on types of BERT
- Applications of BERT

# Mastering Generative AI

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## ✓ Understanding ChatGPT

- Introduction to Generative AI
- Introduction to ChatGPT and OpenAI
- Unleashing the Power of ChatGPT
- The Applications of ChatGPT
- Human-AI Collaboration and the Future
- Engaging with ChatGPT
- Wrapping Up and Looking Ahead

## ✓ ChatGPT For Productivity

- Leveraging ChatGPT for Productivity
- Mastering Excel through ChatGPT
- Becoming a Data Scientist using ChatGPT
- Data Analysis in PowerBI with ChatGPT
- Creating a Content Marketing Plan
- Social Media Marketing using ChatGPT
- Keyword Search and SEO using ChatGPT
- Generating Content using ChatGPT
- Implementing ChatGPT for Customer Service
- Email Marketing using ChatGPT
- Developing a Project Management Plan using ChatGPT

## ✓ ChatGPT For Developers And Exploring ChatGPT API

- ChatGPT for Creating Programs
- ChatGPT for Debugging
- ChatGPT for Integrating New Features
- ChatGPT for Testing
- Introducing OpenAI and ChatGPT API

## ✓ Developing Web Application Using ChatGPT

- Building web development architecture
- Building backend server
- Setting up the database
- Setting up a React-based client-side application
- Writing user API requests to MongoDB with Express and React
- Fetching and updating the database with MongoDB API and routing with Express
- Routing to React-based client-side application
- Debugging and client-side coding
- Building a BMI Calculation application
- Building a website and create landing page content using ChatGPT

## ✓ GPT Models

- Transformers (Encoder - Decoder Model by doing away from RNN variants)
- Bidirectional Encoder Representation from Transformer (BERT)
- OpenAI GPT-2 & GPT-3 Models (Generative Pre-Training)

- Text Summarization with T5
- Configurations of BERT
- Pre-Training the BERT Model
- ALBERT, RoBERTa, ELECTRA, SpanBERT, DistilBERT, TinyBERT

## ✓ Deep RNN And Deep LSTM

- Introduction to LSTM – Architecture
- Importance of Cell State, Input Gate, Output Gate, Forget Gate, Sigmoid and Tanh
- Mathematical Calculations to Process Data in LSTM
- RNN vs LSTM - Bidirectional vs Deep Bidirectional RNN
- Deep RNN vs Deep LSTM

## ✓ Autoencoders

- Autoencoders
  - Intuition
  - Comparison with other Encoders (MP3 and JPEG)
  - Implementation in Keras
- Deep AutoEncoders
  - Intuition
  - Implementing DAE in Keras
- Convolutional Autoencoders
  - Intuition
  - Implementation in Keras
- Variational Autoencoders
  - IntuitionImplementation in Keras
- Introduction to Restricted Boltzmann Machines - Energy Function, Schematic implementation, Implementation in TensorFlow

## ✓ DBN Architecture

- Introduction to DBN
- Architecture of DBN
- Applications of DBN
- DBN in Real World

## ✓ Generative Adversarial Networks GAN

- Introduction to Generative Adversarial Networks (GANS)
- Data Analysis and Pre-Processing
- Building Model
- Model Inputs and Hyperparameters
- Model losses
- Implementation of GANs
- Defining the Generator and Discriminator
- Generator Samples from Training
- Model Optimizer
- Discriminator and Generator Losses
- Sampling from the Generator
- Advanced Applications of GANS
  - Pix2pixHD

- CycleGAN
- StackGAN++ (Generation of photo-realistic images)
- GANs for 3D data synthesis
- Speech quality enhancement with SEGAN

## ✓ SRGAN

- Introduction to SRGAN
- Network Architecture - Generator, Discriminator
- Loss Function - Discriminator Loss & Generator Loss
- Implementation of SRGAN in Keras

## ✓ Q-Learning Type Of Reinforcement Learning

- Reinforcement Learning
- Deep Reinforcement Learning vs Atari Games
- Maximizing Future Rewards
- Policy vs Values Learning
- Balancing Exploration With Exploitation
- Experience Replay, or the Value of Experience
- Q-Learning and Deep Q-Network as a Q-Function
- Improving and Moving Beyond DQN
- Keras Deep Q-Network

## ✓ Speech To Text Building

- Speech Recognition Pipeline
- Phonemes
- Pre-Processing
- Acoustic Model
- Deep Learning Models
- Decoding

## ✓ Chatbot Building

- Introduction to Chatbot
- NLP Implementation in Chatbot
- Integrating and implementing Neural Networks Chatbot
- Introduction to Sequence to Sequence models and Attention
  - Transformers and it applications
  - Transformers language models
    - BERT
    - Transformer-XL (pretrained model: "transfo-xl-wt103")
    - XLNet
- Building a Retrieval Based Chatbot
- Deploying Chatbot in Various Platforms

## ✓ Auto ML

- AutoML Methods
  - Meta-Learning
  - Hyperparameter Optimization
  - Neural Architecture Search



- Network Architecture Search
- AutoML Systems
  - MLBox
  - Auto-Net 1.0 & 2.0
  - Hyperas
- AutoML on Cloud - AWS
  - Amazon SageMaker
  - Sagemaker Notebook Instance for Model Development, Training and Deployment
  - XG Boost Classification Model
  - Training Jobs
  - Hyperparameter Tuning Jobs
- AutoML on Cloud - Azure
  - Workspace
  - Environment
  - Compute Instance
  - Compute Targets
  - Automatic Featurization
  - AutoML and ONNX

## ✓ Explainable AI

- Introduction to XAI - Explainable Artificial Intelligence
- Why do we need it?
- Levels of Explainability
  - Direct Explainability
  - Simulatability
  - Decomposability
  - Algorithmic Transparency
  - Post-hoc Explainability
    - Model-Agnostic Algorithms
    - Explanation by simplification (Local Interpretable Model-Agnostic Explanations (LIME))
    - Feature relevance explanation
    - SHAP
    - QII
    - SA
    - ASTRID
    - XAI
    - Visual Explanations
- General AI vs Symbolic AI vs Deep Learning

## ✓ Generative AI – Prompt Engineering And LLM

- Generative AI
  - Creative Applications
  - Data Augmentation
- Diffusion Models
  - Realistic Data Generation
  - Applications Beyond Text
  - LLM
  - Prompt Engineering

- Fine-Tuning for Specific Tasks
- Mitigating Bias and Ethical Concerns
- Tailoring to Domain-Specific Contexts
- Building AI application with Gradio
- Large language Model with Semantic Search
- Pair Programming with Large Language Model
- Understanding and Applying Text Embedding
- LLMOps Vs DevOps

## Cloud: AWS(Amazon Web Services)

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### ✓ Introduction To Cloud Computing

- In this module, you will learn what Cloud Computing is and what are the different models of Cloud Computing along with the key differentiators of different models. We will also introduce you to virtual world of AWS along with AWS key vocabulary, services and concepts.
  - A Short history
  - Client Server Computing Concepts
  - Challenges with Distributed Computing
  - Introduction to Cloud Computing
  - Why Cloud Computing?
  - Benefits of Cloud Computing

### ✓ Amazon EC2 And Amazon EBS

- In this module, you will learn about the introduction to compute offering from AWS called EC2. We will cover different instance types and Amazon AMIs. A demo on launching an AWS EC2 instance, connect with an instance and host ing a website on AWS EC2 instance. We will also cover EBS storage Architecture (AWS persistent storage) and the concepts of AMI and snapshots.
  - Amazon EC2
  - EC2 Pricing
  - EC2 Type
  - Installation of Web server and manage like (Apache/ Nginx)
  - Demo of AMI Creation
  - Exercise
  - Hands on both Linux and Windows

### ✓ Amazon Storage Services S3 (Simple Storage Services)

- In this module, you will learn how AWS provides various kinds of scalable storage services. In this module, we will cover different storage services like S3, Glacier, Versioning, and learn how to host a static website on AWS.
  - Versioning
  - Static website
  - Policy
  - Permission
  - Cross region Replication
  - AWS-CLI
  - Life cycle

- Classes of Storage
- AWS CloudFront
- Real scenario Practical
- Hands-on all above

## ✔ **Cloud Watch & SNS**

- In this module, you will learn how to monitoring AWS resources and setting up alerts and notifications for AWS resources and AWS usage billing with AWS CloudWatch and SNS.
  - Amazon Cloud Watch
  - SNS - Simple Notification Services
  - Cloud Watch with Agent

## ✔ **Scaling And Load Distribution In AWS**

- In this module, you will learn about 'Scaling' and 'Load distribution techniques' in AWS. This module also includes a demo of Load distribution & Scaling your resources horizontally based on time or activity.
  - Amazon Auto Scaling
  - Auto scaling policy with real scenario based
  - Type of Load Balancer
  - Hands on with scenario based

## ✔ **AWS VPC**

- In this module, you will learn introduction to Amazon Virtual Private Cloud. We will cover how you can make public and private subnet with AWS VPC. A demo on creating VPC. We will also cover overview of AWS Route 53.
  - Amazon VPC with subnets
  - Gateways
  - Route Tables
  - Subnet
  - Cross region Peering

## ✔ **Identity And Access Management Techniques (IAM)**

- In this module, you will learn how to achieve distribution of access control with AWS using IAM.
- Amazon IAM
  - add users to groups,
  - manage passwords,
  - log in with IAM-created users.
- User
- Group
- Role
- Policy

## ✔ **Amazon Relational Database Service (RDS)**

- In this module, you will learn how to manage relational database service of AWS called RDS.
  - Amazon RDS

- Type of RDS
- RDS Failover
- RDS Subnet
- RDS Migration
- Dynamo DB (No SQL DB)
- Redshift Cluster
- SQL workbench
- JDBC / ODBC

## ✔ Multiple AWS Services And Managing The Resources' Lifecycle

- In this module, you will get an overview of multiple AWS services. We will talk about how do you manage life cycle of AWS resources and follow the DevOps model in AWS. We will also talk about notification and email service of AWS along with Content Distribution Service in this module.
  - Cloud Trail,

## ✔ AWS Architecture And Design

- In this module, you will cover various architecture and design aspects of AWS. We will also cover the cost planning and optimization techniques along with AWS security best practices, High Availability (HA) and Disaster Recovery (DR) in AWS.
  - AWS High Availability Design
  - AWS Best Practices (Cost +Security)
  - AWS Calculator & Consolidated Billing

## ✔ Migrating To Cloud & AWS

### ✔ Router S3 DNS

- Public DNS
- Private DNS
- Routing policy
- Records
- Register DNS
- Work with third party DNS as well

### ✔ Cloud Formation

- Stack
- Templet
- Json / Ymal

### ✔ Elastic Beanstalk

### ✔ EFS / NFS (hands-On Practice)

### ✔ Hands-On Practice On Various Topics

### ✔ Linux

- Installation of Linux
- Configuration
- Manage

- Installation of app on Linux (apache / Nginx etc)
- AWS cli configuration on Linux
- Complete hands-on on Linux.
- Scenario based lab and practical
- Each topic and services will be cover with lab and theory.

## **Data Science - Live Projects**

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# e-Learning through LMS

## Learning **Management System**

Our LMS (LearnPitch) is for the administration, documentation, tracking, reporting, automation, and delivery of educational courses, training programs, or learning and development programs.

Our LMS has been designed to identify training and learning gaps, using analytical data and reporting to keep you up with the class activities.

## Key Features **Learning Management System**



Live Sessions with Class recordings



Get study material with Assignments.



Track your curriculum covered.



Track your class wise attendance



Share your feedback for Trainer & Training



Get your Training Certificate from LMS



# | Training Certification

## Earn Your **Certificate**

Your certificate and skills are vital to the extent of jump-starting your career and giving you a chance to compete in a global space.



|Croma Campus is Nasscom Certified

Croma Campus is now

**NASSCOM**<sup>®</sup>

Certified Member



[www.cromacampus.com](http://www.cromacampus.com)



# |Croma Campus! Reviews



"The most rewarding part of my experience has been achieving a prestigious certification in the subject that I love. Moreover, the training offered out by the specialists are of world-class and prepares out the students for corporate world. For me Croma Campus means a lot."

*"By The Students For The Students,"*

## Your Success is **Our Story**



**Bharat**

“I am fully satisfied with the excellent training services received by the expert staff at Croma Campus. I want to thank Croma Campus for providing me with the most innovative and affordable training services for learning all the software testing procedures and guidelines.”



**Ankit**

“It was a lifetime experience for me to get trained by IT Experts of Croma Campus. What I liked most about the training was the consistent high-quality education, which was friendly and co-active. The placement department was also proactive, they keep me updated regarding new job opportunities and provide the grooming session to crack the interview. At last, I would like to thank all faculty members of Croma Campus for their immense help and support.”



**Umesh**

“Without any second thought, I will give Croma Campus 10/10. Their placement department is highly proactive. I remember they started scheduling interviews for me from the very next day when I told them my course has been completed. These people are doing a phenomenal job and I highly recommend Croma Campus to everyone.”



**Shams Khan**

“Croma Campus is doing a phenomenal job in the IT training industry. The reason why I decided to join their training program was that they provide quality training at very a nominal price. Plus, the online training mode was also a factor due to which I decided to join the training program of Croma Campus as I didn't want to attend physical classes.”



# | Meet Our Team



## Sales Team

Our Sales team is highly passionate, emphatic, positive attitude, great listening skills, ability to deliver quick solutions, and they are multitasker too. Our team always remains up-to-date about all the latest technologies and market trends. With effective communication skills, they always work to deliver the right information to customers when it is needed.

## Product Team

Our product team is highly functional and collaborative working together to achieve the common outcome of designing exceptional digital experiences. Each of our members is a contributor to help us achieve success in long-run. Sitting at the high-end of technology and innovation, team helps to deliver high-end customer experiences and always comes out with a big idea as a game-changing plan.



## Marketing Team

Our Marketing team works as gladiators and helps us to achieve business success in all possible ways. They are included in almost everything either it is building a brand, creating brand awareness, promoting products or services, delivering trailblazing customer experiences or increasing engagement at public forums. They are the true backbone of the Company.

## Content Team

Our content team is responsible for ideation, creation, optimization, and distribution of content throughout the company. The team always starts its work with a strategy, how to create high-quality contents, and how to promote or share the content. Our in-house content team help us to produce all types of contents either they are educational content pieces, marketing content, SEO content, or any other forms too.



## Customer Access Team

This is the team that has actually been taken up us from reactive state to a pro-active state. The team utilizes high-valued solutions to satisfy customers in all possible ways. It is truly said that no company can succeed if your customers are not satisfied. And our customer success team is dedicatedly working to keep all the customers satisfied and we always consider our customer feedback on priority.

## HR Team

Our HR team is committed to provide high-end solutions to employees as they require. Our HR team has the right skills and knowledge to make sure that the HR department can always be legally and strategically successful. They know how to keep employees motivated all the time with the best HR policies and fun activities too from time to time.



# | Glimpse Of Our Office

## Look **Who We are**

Our office's infrastructure comprises all the necessary software and network resources that are required to deliver IT & Design, Human Resources, Digital Marketing, and training services.

We are well-equipped with bright designed work bays for employees and managers having separate cabins with spacious cafeteria and training classrooms.



# | About Croma Campus

“ Our Mission is to Build Nation through Education & Beyond Limitation. ”

Croma Campus Training & Development Private Limited is an education platform providing rigorous industry-relevant programs designed and delivered in collaboration with world-class faculty, industry & Infrastructure. In the past 13 years we have trained 18000+ candidates and out of which we are able to place 12000+ professionals in various industries successfully.

We Are Affiliated With Different Partners



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