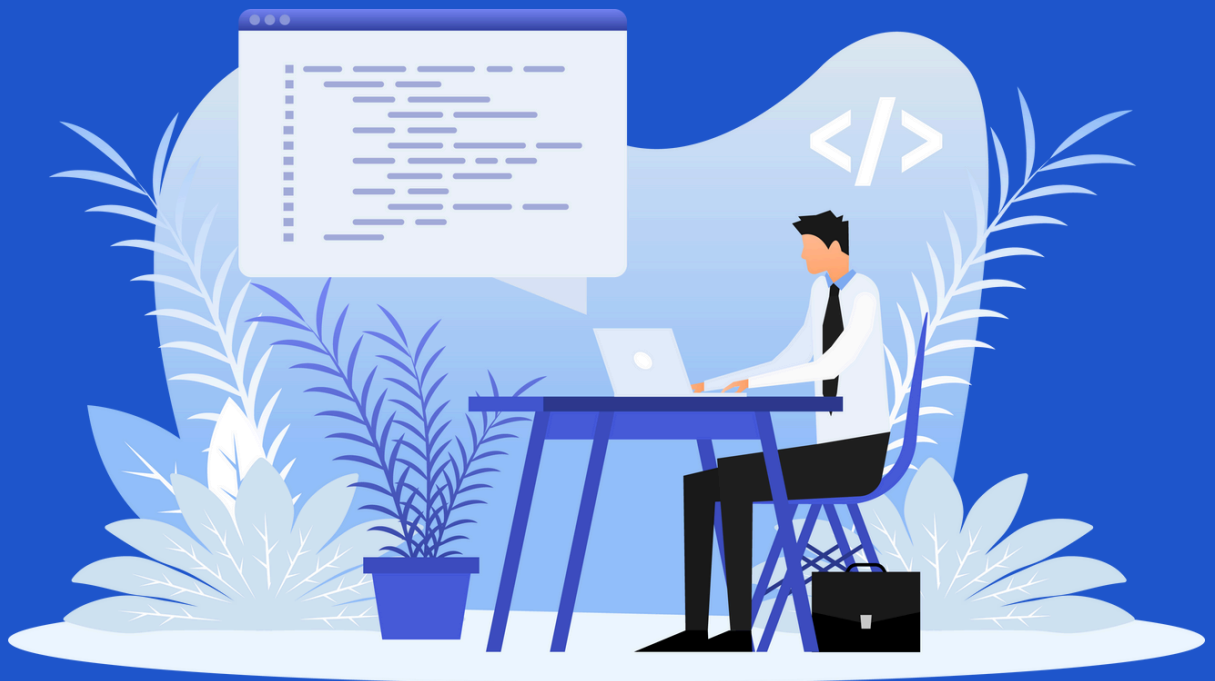


# Data Science

Empower Your Developer Journey  
Data Science in **100+ Hours**



# ABOUT BTREE

Leading the Way in IT Education based in Chennai, we are dedicated to shaping the future of aspiring professionals through expert training in cutting-edge technologies. Join our trusted institute and unlock your true potential in the world of IT.

## OUR HIGHLIGHTS



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**Dedicated Placement team**



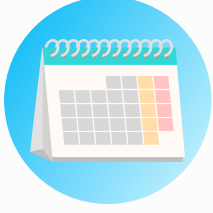
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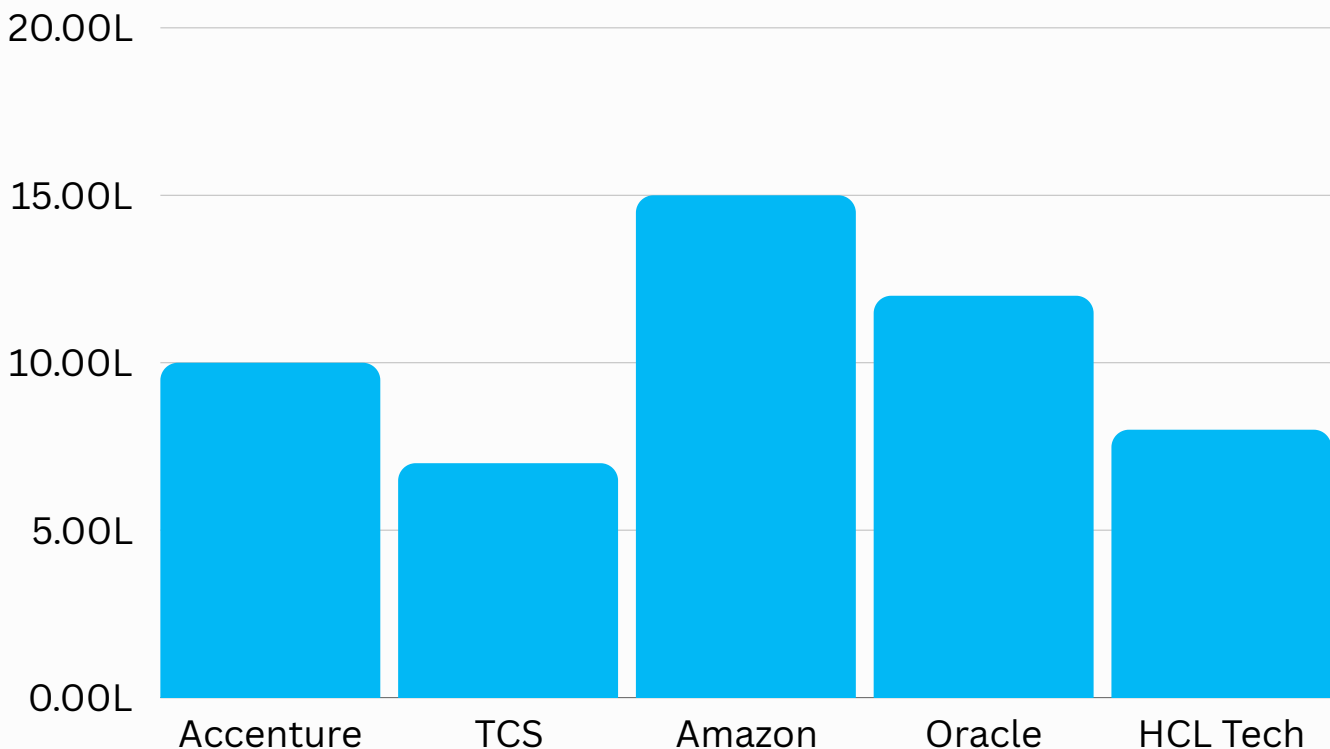
**Flexible Classes - Both WE/WD**

# WHY TO LEARN DATA SCIENCE ?

- ✓ In India, the average salary for a Data Scientist is around ₹10 LPA, with highly skilled professionals earning upwards of ₹15 LPA.
- ✓ Recent reports indicate that the number of Data Science jobs in India will skyrocket from 137,000 to over 900,000 by 2024
- ✓ The demand for Data Science professionals has been increasing at a remarkable rate of 40% each year since 2016

## AVERAGE SALARY OF DATA SCIENTIST IN TOP MNCS'

Source:  glassdoor



# WHY TO INVEST IN IT EDUCATION?



Standing Apart  
the Competition



Job Options  
Across The Globe



Higher Earning  
Potential



Fastest Growing  
Industry

## A LEARNING COMPARISON

Learning Options		Institutes	
Learn with hands-on experience	<input type="checkbox"/> NO 	<input checked="" type="checkbox"/> YES 	<input checked="" type="checkbox"/> YES 
Skill Credibility & Proof	<input type="checkbox"/> NO 	<input checked="" type="checkbox"/> YES 	<input checked="" type="checkbox"/> YES 
Industry Experts as Trainers	<input type="checkbox"/> NO 	<input checked="" type="checkbox"/> YES 	<input checked="" type="checkbox"/> YES 
Work on real-time projects	<input type="checkbox"/> NO 	<input type="checkbox"/> NO 	<input checked="" type="checkbox"/> YES 
Dedicated Placement Guidance	<input type="checkbox"/> NO 	<input type="checkbox"/> NO 	<input checked="" type="checkbox"/> YES 
Certification Support	<input type="checkbox"/> NO 	<input type="checkbox"/> NO 	<input checked="" type="checkbox"/> YES 

# WHY TO CHOOSE BTREE?

**100+**

Hours of Engaging  
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Modules to make  
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trainers

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Students trained  
across globe

**3+**


Projects for Hands  
on experience

**100%**

Dedicated  
Placement  
Guidance

# COURSE SYLLABUS



MODULE NAME	TOPICS
<p>Module 01 : Python</p>  <p><i><b>“Where Simplicity Meets Power”</b></i></p>	<p><b>Python Introduction :</b></p> <ul style="list-style-type: none"><li>• Introduction to Python</li><li>• History of Python</li><li>• Why Python?</li><li>• Python Environment Setup</li><li>• Comments in Python</li><li>• Variables in Python</li><li>• Operators in Python</li></ul> <p><b>Data Types :</b></p> <ul style="list-style-type: none"><li>• Input and Output in Python</li><li>• Data Types in Python</li><li>• Type Conversion</li><li>• Type Casting in Python</li><li>• Numeric Data type and its Methods</li><li>• Text Datatype and its Methods</li><li>• String Modification</li><li>• Strings are Arrays</li><li>• String Slicing</li><li>• Format String</li></ul>

# COURSE SYLLABUS



MODULE NAME	TOPICS
Module 01: Python(cont..)	<p><b><u>Practice Exercise :</u></b></p> <p>Task 1 :</p> <ul style="list-style-type: none"><li>• Write a function that takes a string as input and returns the string reversed.</li></ul> <p>Task 2 :</p> <ul style="list-style-type: none"><li>• Write a function that counts the number of vowels (a, e, i, o, u) in a given string.</li></ul> <p>Task 3 :</p> <ul style="list-style-type: none"><li>• Design a method to check given number is palindrome or not.</li></ul> <hr/> <p><b>Collections :</b></p> <ul style="list-style-type: none"><li>• Creating a List</li><li>• Accessing List Elements</li><li>• List Slicing</li><li>• Modifying Lists</li><li>• List Methods</li><li>• List Comprehension</li><li>• List Operations</li><li>• Creating a Tuple</li><li>• Accessing Tuple Elements</li><li>• Slicing Tuples</li><li>• Tuple Operations</li><li>• Tuple Methods</li><li>• Tuple Unpacking</li></ul>

# COURSE SYLLABUS



MODULE NAME	TOPICS
Module 01: Python(cont..)	<ul style="list-style-type: none"><li>• Creating a Set</li><li>• Properties of a Set</li><li>• Adding Elements to a Set</li><li>• Removing Elements from a Set</li><li>• Set Operations</li><li>• Set Membership</li><li>• Frozenset</li><li>• Common Set Methods</li><li>• Creating a Dictionary</li><li>• Accessing Dictionary Elements</li><li>• Adding and Modifying Dictionary Elements</li><li>• Removing Elements from a Dictionary</li><li>• Dictionary Methods</li><li>• Iterating Over a Dictionary</li><li>• Nested Dictionaries</li></ul>



# COURSE SYLLABUS



MODULE NAME	TOPICS
Module 01: Python(cont..)	<p><b><u>Practice Exercise :</u></b></p> <p>Task 4 :</p> <ul style="list-style-type: none"><li>• Write a list comprehension that filters out all the even numbers from a given list of integers.</li></ul> <p>Task 5 :</p> <ul style="list-style-type: none"><li>• Write a list comprehension that converts all strings in a list to uppercase.</li></ul> <p>Task 6 :</p> <ul style="list-style-type: none"><li>• Write a list comprehension that removes all vowels from a given string.</li></ul> <p>Task 7 :</p> <ul style="list-style-type: none"><li>• Write a function that finds the longest word in a given sentence.</li></ul> <p>Task 8 :</p> <ul style="list-style-type: none"><li>• Design a method to check given number is palindrome or not.</li></ul> <p>Task 9 :</p> <ul style="list-style-type: none"><li>• Write a function that generates the Fibonacci sequence up to the n-th number.</li></ul>

# COURSE SYLLABUS



MODULE NAME	TOPICS
Module 01: Python(cont..)	<p><b>Control Flow Statements :</b></p> <p><b>1.Conditional Statements :</b></p> <ul style="list-style-type: none"><li>• If-Else Statement</li><li>• Elif Statement</li><li>• Nested IF Statement</li></ul> <p><b>2.Loops in Python :</b></p> <ul style="list-style-type: none"><li>• Understanding of Iterators and Iterables</li><li>• For Loop</li><li>• For Loop Using Range</li><li>• Nested For Loop</li><li>• While Loop</li></ul> <p><b>3. Control Transfer Statements :</b></p> <ul style="list-style-type: none"><li>• Break</li><li>• Continue</li><li>• Pass</li></ul>

# COURSE SYLLABUS



MODULE NAME	TOPICS
Module 01: Python(cont..)	<p><b><u>Practice Exercise :</u></b></p> <p>Task 10 :</p> <ul style="list-style-type: none"><li>• Design a method to check given number is prime or not.</li></ul> <p>Task 11 :</p> <ul style="list-style-type: none"><li>• Design a method to check given number is even or odd.</li></ul> <p>Task 12 :</p> <ul style="list-style-type: none"><li>• Design a method to print factorials</li></ul> <p>Task 13 :</p> <ul style="list-style-type: none"><li>• Write a function that calculates the sum of the digits of a given number.</li></ul>

# COURSE SYLLABUS



MODULE NAME	TOPICS
Module 01: Python(cont..)	<p><b>Functions in Python :</b></p> <ul style="list-style-type: none"><li>• Built-in Functions</li><li>• User Defined Functions</li><li>• Define a function</li><li>• Calling a function</li><li>• Function Parameters</li><li>• Passing an Argument</li><li>• Arbitrary Arguments</li><li>• Keyword Arguments</li><li>• Arbitrary Keyword Arguments</li><li>• Default Parameter</li><li>• Lambda Function</li></ul> <p><b><u>Practice Exercise :</u></b></p> <p>Task 14 :</p> <ul style="list-style-type: none"><li>• Write a lambda function that multiplies two numbers and use it to calculate the product of 7 and 5.</li></ul> <p>Task 15 :</p> <ul style="list-style-type: none"><li>• Write a function average that takes a variable number of arguments and returns their avg.</li></ul> <p>Task 16 :</p> <ul style="list-style-type: none"><li>• Write a function sum_of_three that takes three numbers as arguments and returns their sum.</li></ul>

# COURSE SYLLABUS



MODULE NAME	TOPICS
Module 01: Python(cont..)	<p><b>File Handling :</b></p> <ul style="list-style-type: none"><li>• Opening a File</li><li>• Reading a File</li><li>• Writing to a File</li><li>• Appending to a File</li><li>• Closing a File</li><li>• File Methods</li><li>• Working With Text Files</li><li>• Delete a File</li><li>• Working Binary Files[videos, audios and images]</li><li>• Context Manager</li><li>• File Pointer</li><li>• Checking if File Exists</li><li>• Delete a Folder</li><li>• Working with CSV Files</li><li>• Working with ZIP Files</li><li>• Handling Exceptions in File Handling</li></ul>

# COURSE SYLLABUS



MODULE NAME	TOPICS
Module 01: Python(cont..)	<p><b><u>Practice Exercise :</u></b></p> <p>Task 17 :</p> <ul style="list-style-type: none"><li>• Write a Python program to read a text file and print its contents line by line.</li></ul> <p>Task 18 :</p> <ul style="list-style-type: none"><li>• Write a Python program to read the contents of a binary file and create a new binary file with the same contents.</li></ul> <p>Task 19 :</p> <ul style="list-style-type: none"><li>• Write a Python program that reads a text file and counts the number of words in it.</li></ul> <p>Task 20 :</p> <ul style="list-style-type: none"><li>• Write a Python program to read a CSV file and print each row.</li></ul> <p><b>Exception Handling :</b></p> <ul style="list-style-type: none"><li>• What is Exception?</li><li>• Common Built-in Exceptions</li><li>• Basic Syntax of Exception Handling</li><li>• Catching Multiple Exceptions</li><li>• Catching All Exceptions</li><li>• The else Clause</li><li>• The finally Clause</li><li>• Raising Exceptions</li></ul>

# COURSE SYLLABUS



MODULE NAME	TOPICS
Module 01: Python(cont..)	<p><b><u>Practice Exercise :</u></b></p> <p>Task 21 :</p> <ul style="list-style-type: none"><li>• Write a function <code>divide_numbers(a, b)</code> that divides two numbers <code>a</code> and <code>b</code>. Implement exception handling to catch division by zero and return a message "Cannot divide by zero" if <code>b</code> is zero.</li></ul>
	<p><b>OOPS in Python :</b></p> <p><b>Class and Objects :</b></p> <ul style="list-style-type: none"><li>• How to Define a Class?</li><li>• Creating a Objects</li><li>• Use of Self Keyword</li><li>• Methods and Attributes</li><li>• Constructor(<code>__init__</code>)</li></ul>

# COURSE SYLLABUS



MODULE NAME	TOPICS
Module 01: Python(cont..)	<p><b>Inheritance :</b></p> <ul style="list-style-type: none"><li>• What is Inheritance?</li><li>• Types of Inheritance</li><li>• Single Inheritance</li><li>• Multiple Inheritance</li><li>• Multilevel Inheritance</li><li>• Hierarchical Inheritance</li><li>• Hybrid Inheritance</li></ul> <p><b>Polymorphism :</b></p> <ul style="list-style-type: none"><li>• What is Polymorphism?</li><li>• Method Overloading</li><li>• Method Overriding</li></ul> <p><b>Encapsulation:</b></p> <ul style="list-style-type: none"><li>• What is Encapsulation?</li><li>• Access Modifiers</li><li>• Using Public Members</li><li>• Using Private Members</li><li>• Using Protected Members</li></ul> <p><b>Abstraction :</b></p> <ul style="list-style-type: none"><li>• import the ABC module</li><li>• Abstract Base Class</li><li>• Abstract Class</li><li>• Abstract Method</li></ul>



# COURSE SYLLABUS



MODULE NAME	TOPICS
Module 01: Python(cont..)	<ul style="list-style-type: none"><li>• How to Use Abstract in Python</li><li>• Why Use Abstraction?</li><li>• Real World Example</li></ul>
	<p><b><u>Practice Exercise :</u></b></p> <p>Task 24 :</p> <ul style="list-style-type: none"><li>• Create a BankAccount class that represents a bank account. The class should have:</li><li>• An <code>__init__</code> method to initialize the account with an account holder's name and an initial balance.</li></ul> <p>Methods to deposit and withdraw money. A method to check the balance. A method to display account details.</p> <p>Task 25 :</p> <ul style="list-style-type: none"><li>• Create two base classes: Person with attributes name and age, and Employee with an attribute <code>employee_id</code>. Create a derived class Manager that inherits from both Person and Employee, and add an additional attribute <code>department</code></li></ul> <p>Task 26 :</p> <ul style="list-style-type: none"><li>• Define a class MathOperation with a method <code>add()</code> that can handle both integer and float types. Implement method overloading to support addition of integers and floats.</li></ul>

# COURSE SYLLABUS



MODULE NAME	TOPICS
<b>Module 01 : Python(cont..)</b>	<p>Task 27 :</p> <ul style="list-style-type: none"><li>• Create a library management system Project using Python Abstraction</li></ul> <p>Task 28 :</p> <ul style="list-style-type: none"><li>• Develop calculator app implementing mathematical operations.</li></ul>
	<p><b>Python for Data Science</b></p> <p><b>Numpy</b></p> <p><b>Arrays</b></p> <ul style="list-style-type: none"><li>• Array operation</li><li>• Indexing and slicing</li><li>• Shape and reshape</li><li>• Data types</li><li>• Mathematical functions</li><li>• Statistical functions</li></ul> <p><b>Random</b></p>
	<p><b><u>Practice Exercise :</u></b></p> <p>Task 29 :</p> <ul style="list-style-type: none"><li>• Create a NumPy array of shape (3, 3) filled with random integers between 1 and 100.</li><li>• Perform element-wise addition of two NumPy arrays of the same shape.</li><li>• Find the mean, median, and standard deviation of a NumPy array.</li></ul>

# COURSE SYLLABUS



MODULE NAME	TOPICS
<p>Module 01 : Python(cont..)</p>	<p><b>Pandas</b></p> <p><b>Data structures</b></p> <ul style="list-style-type: none"><li>• Series</li><li>• Data Frame</li></ul> <p><b>Data operations</b></p> <ul style="list-style-type: none"><li>• Creation</li><li>• Indexing and selecting data</li><li>• Filtering</li><li>• Sorting</li></ul> <p><b>Data manipulation</b></p> <ul style="list-style-type: none"><li>• Adding/removing columns and rows</li><li>• Merging</li></ul> <p><b>Data manipulation</b></p> <ul style="list-style-type: none"><li>• Adding/removing columns and rows</li><li>• Merging</li></ul>
	<p><b><u>Practice Exercise :</u></b></p> <p>Task 30 :</p> <ul style="list-style-type: none"><li>• Create a Pandas Data Frame from a dictionary containing names, ages, and salaries of employees.</li><li>• Filter rows in the Data Frame where the age is greater than 30.</li><li>• Group the Data Frame by the department column and calculate the average salary for each department.</li></ul>

# COURSE SYLLABUS



MODULE NAME	TOPICS
Module 02 : SQL	<p><b>Why DataBase</b></p> <p><b>Types of DataBase</b></p> <ul style="list-style-type: none"><li>• Relational DataBase</li><li>• Non-Relational DataBase</li></ul> <p><b>Why Postgre SQL</b></p> <ul style="list-style-type: none"><li>• PostgreSQL follows standard SQL syntax, making it compatible with MySQL and SQL Server, while offering advanced features and high extensibility. MySQL is simpler for basic needs, and SQL Server is robust but costly for enterprise use.</li></ul> <p><b>Installation</b></p> <p><b>SQL Languages</b></p> <ul style="list-style-type: none"><li>• Data Definition Language (DDL)</li><li>• Data Manipulation Language (DML)</li><li>• Data Query Language (DQL)</li><li>• Data Control Language (DCL)</li><li>• Transaction Control Language (TCL)</li></ul>

# COURSE SYLLABUS



MODULE NAME	TOPICS
Module 02 : SQL(cont..)	<p><b>Constraints</b></p> <ul style="list-style-type: none"><li>• PRIMARY KEY</li><li>• UNIQUE</li><li>• FOREIGN KEY</li><li>• CHECK</li><li>• NOT NULL</li><li>• DEFAULT</li><li>• EXCLUDE</li></ul> <p><b>Clauses of SELECT statement</b></p> <ul style="list-style-type: none"><li>• FROM</li><li>• WHERE</li><li>• GROUP BY</li><li>• HAVING</li><li>• ORDER BY</li><li>• DISTINCT</li><li>• LIMIT/OFFSET</li></ul> <p><b>Subquery</b></p> <p><b>JOINS</b></p> <ul style="list-style-type: none"><li>• INNER JOIN,</li><li>• OUTER JOIN</li><li>• (LEFT OUTER JOIN, RIGHT OUTER JOIN, FULL OUTER JOIN)</li><li>• SELF JOIN and CROSS JOIN</li></ul> <p><b>Windows Function</b></p> <ul style="list-style-type: none"><li>• ROW_NUMBER</li><li>• RANK</li><li>• DENSE_RANK</li><li>• LEAD</li><li>• LAG</li></ul>

# COURSE SYLLABUS



MODULE NAME	TOPICS
Module 02 : SQL(cont..)	<p><b>Aggregate function</b> <b>UNION/UNION ALL</b> <b>Normalization</b> <b>Special Operators</b> <b>Stored Procedure</b></p> <ul style="list-style-type: none"><li>• CRUD Operations</li></ul> <hr/> <p><b><u>Practice Exercise :</u></b></p> <p>Task 01 :</p> <ul style="list-style-type: none"><li>• Get department-wise maximum salary from Employee Detail table Order by Salary Ascending.</li></ul> <p>Task 02 :</p> <ul style="list-style-type: none"><li>• Write down the query to fetch project name assign to more than one employee.</li></ul> <p>Task 03 :</p> <ul style="list-style-type: none"><li>• What will execute first, tell the order of every keyword.</li></ul>

# COURSE SYLLABUS



MODULE NAME	TOPICS
<p>Module 03: Introduction to Data Science</p>	<ul style="list-style-type: none"><li>• <b>Real -World applications</b><ul style="list-style-type: none"><li>▪ Finance</li><li>▪ Healthcare</li><li>▪ Marketing etc.,</li></ul></li></ul> <hr/> <ul style="list-style-type: none"><li>• <b>Data Science Workflow</b><ul style="list-style-type: none"><li>▪ Data collection</li><li>▪ Data cleaning and preprocessing</li><li>▪ Exploratory Data Analysis (EDA)</li><li>▪ Model building</li><li>▪ Model evaluation and deployment</li></ul></li></ul> <p><b><u>TASK</u></b></p> <p>Task 01:</p> <ul style="list-style-type: none"><li>• Write a brief report on the applications of Data Science in different industries.</li><li>• Set up your Python environment and write a simple script to perform basic operations.</li><li>• Create a presentation outlining the data science workflow and key tools.</li></ul>

# COURSE SYLLABUS



MODULE NAME	TOPICS
<p>Module 04: Data Collection and Preprocessing</p>	<ul style="list-style-type: none"><li>• <b>Data Collection Techniques</b><ul style="list-style-type: none"><li>▪ Collecting data using APIs</li><li>▪ Basics of web scraping with BeautifulSoup and Scrapy</li><li>▪ Managing databases with SQL</li><li>▪ Importing data from various file formats (CSV, Excel, JSON)</li></ul></li><li>• <b>Data Cleaning and Wrangling</b><ul style="list-style-type: none"><li>• Handling missing values (deletion and imputation)</li><li>• Managing outliers</li><li>• Transforming data (scaling and normalization)</li><li>• Merging and combining datasets</li></ul></li></ul>



# COURSE SYLLABUS



MODULE NAME	TOPICS
<p>Module 04: Data Collection and Preprocessing(cont..)</p>	<ul style="list-style-type: none"><li>• <b>Handling Missing Data</b><ul style="list-style-type: none"><li>▪ Understanding missing data patterns</li><li>▪ Techniques for handling missing data</li><li>▪ Assessing the impact of missing data on analysis</li></ul></li><li>• <b>Feature Engineering</b><ul style="list-style-type: none"><li>▪ Creating new features from existing data</li><li>▪ Binning and categorizing data</li><li>▪ Scaling and normalizing features</li><li>▪ Encoding categorical variables</li></ul></li></ul> <p><b><u>TASK</u></b></p> <p>Task 01:</p> <ul style="list-style-type: none"><li>• Collect data from a public API (e.g., Twitter, OpenWeather) and store it in a DataFrame.</li><li>• Clean and preprocess a given dataset: handle missing values, remove duplicates, and normalize features.</li><li>• Perform feature engineering on a dataset (e.g., create new features based on existing ones).</li></ul>

# COURSE SYLLABUS



MODULE NAME	TOPICS
Module 05: Data Visualization	<ul style="list-style-type: none"><li>• <b>Principles of Data Visualization</b><ul style="list-style-type: none"><li>▪ Importance of visualization in data analysis</li><li>▪ Best practices for effective visualizations</li><li>▪ Choosing the right chart type</li></ul></li><li>• <b>Visualization Tools</b><ul style="list-style-type: none"><li>▪ Matplotlib, Seaborn (Python)</li><li>▪ ggplot2</li><li>▪ Customizing plots (colors, labels, legends)</li></ul></li><li>• <b>Creating Basic Plots</b><ul style="list-style-type: none"><li>▪ Bar charts</li><li>▪ Line charts</li><li>▪ Scatter plots</li><li>▪ Histograms</li></ul></li></ul>

# COURSE SYLLABUS



MODULE NAME	TOPICS
Module 05: Data Visualization(cont..)	<ul style="list-style-type: none"><li>• <b>Advanced Visualization Techniques</b><ul style="list-style-type: none"><li>▪ Heatmaps</li><li>▪ Pair plots</li><li>▪ Box plots and violin plots</li></ul></li></ul> <p><b><u>TASK</u></b></p> <p>Task 01:</p> <ul style="list-style-type: none"><li>• Create visualizations (bar charts, line charts, scatter plots) using a given dataset.</li><li>• Design an interactive dashboard using Plotly to display key metrics from a dataset.</li><li>• Analyze a dataset using advanced visualization techniques (heatmaps, pair plots) and provide insights.</li></ul>
Module 06: Probability and Statistics for Data Science	<ul style="list-style-type: none"><li>• <b>Descriptive Statistics</b><ul style="list-style-type: none"><li>▪ Measures of central tendency (mean, median, mode)</li><li>▪ Measures of dispersion (variance, standard deviation)</li><li>▪ Skewness and kurtosis</li></ul></li><li>• <b>Probability Theory</b><ul style="list-style-type: none"><li>▪ Basic probability concepts</li><li>▪ Conditional probability and Bayes' Theorem</li></ul></li></ul>



MODULE NAME	TOPICS
<p>Module 06: Probability and Statistics for Data Science(cont..)</p>	<ul style="list-style-type: none"><li>▪ Independent and dependent events</li><li>• <b>Probability Distributions</b><ul style="list-style-type: none"><li>▪ Normal distribution</li><li>▪ Binomial distribution</li><li>▪ Poisson distribution</li><li>▪ Probability density functions (PDFs) and cumulative</li><li>▪ Distribution functions (CDFs)</li></ul></li><li>• <b>Hypothesis Testing</b><ul style="list-style-type: none"><li>▪ Null and alternative hypotheses</li><li>▪ Types of errors (Type I and Type II)</li><li>▪ p-values and statistical significance</li><li>▪ t-tests, chi-square tests, ANOVA</li></ul></li><li>• <b>Confidence Intervals and P-Values</b><ul style="list-style-type: none"><li>▪ Constructing confidence intervals</li><li>▪ Interpreting p-values</li><li>▪ Margin of error</li></ul></li></ul> <p><b><u>TASK</u></b></p> <p>Task 01:</p> <ul style="list-style-type: none"><li>• Calculate and interpret descriptive statistics for a given dataset.</li><li>• Perform hypothesis testing on a dataset and interpret the results (e.g., t-test, chi-square test).</li></ul>

# COURSE SYLLABUS



MODULE NAME	TOPICS
Module 06: Probability and Statistics for Data Science(cont..)	<ul style="list-style-type: none"><li>• Create and interpret confidence intervals for sample data.</li></ul>
Module 07: Exploratory Data Analysis (EDA)	<ul style="list-style-type: none"><li>• <b>Importance of EDA</b><ul style="list-style-type: none"><li>▪ Why EDA is crucial in the data science process</li><li>▪ Understanding data distributions and patterns</li><li>▪ Identifying data quality issues</li></ul></li><li>• <b>Techniques for EDA</b><ul style="list-style-type: none"><li>▪ Univariate, bivariate, and multivariate analysis</li><li>▪ Data summarization and visualization</li><li>▪ Correlation analysis</li></ul></li><li>• <b>Correlation and Causation</b><ul style="list-style-type: none"><li>▪ Understanding correlation coefficients</li><li>▪ Spurious correlations</li><li>▪ Causation vs. correlation</li></ul></li><li>• <b>Dimensionality Reduction Techniques</b><ul style="list-style-type: none"><li>▪ Principal Component Analysis (PCA)</li><li>▪ Handling high-dimensional data</li></ul></li></ul>

# COURSE SYLLABUS



MODULE NAME	TOPICS
<b>Module 07: Exploratory Data Analysis (EDA) (cont..)</b>	<p><b><u>TASK</u></b></p> <p>Task 01:</p> <ul style="list-style-type: none"><li>• Perform EDA on a given dataset: summarize data, visualize distributions, and identify patterns.</li><li>• Use dimensionality reduction techniques (PCA or t-SNE) on a high-dimensional dataset.</li><li>• Write a report discussing insights and potential data quality issues identified during EDA.</li></ul>
<b>Module 08: Introduction to Machine Learning</b>	<ul style="list-style-type: none"><li>• <b>Supervised vs. Unsupervised Learning</b><ul style="list-style-type: none"><li>▪ Differences between supervised and unsupervised learning</li><li>▪ Examples of each type</li><li>▪ Key algorithms</li></ul></li><li>• <b>Regression Techniques</b><ul style="list-style-type: none"><li>▪ Linear regression</li><li>▪ Polynomial regression</li><li>▪ Assumptions of linear regression</li><li>▪ Evaluating regression models</li></ul></li><li>• <b>Classification Techniques</b><ul style="list-style-type: none"><li>▪ Logistic regression</li><li>▪ K-Nearest Neighbors (KNN)</li><li>▪ Decision boundaries</li></ul></li></ul>

# COURSE SYLLABUS



MODULE NAME	TOPICS
<b>Module 08: Introduction to Machine Learning(cont..)</b>	<ul style="list-style-type: none"><li>▪ Evaluating classification models</li><li>• <b>Introduction to Model Evaluation Metrics</b><ul style="list-style-type: none"><li>▪ Accuracy, Precision, Recall, F1-score</li><li>▪ Confusion matrix</li><li>▪ ROC and AUC curves</li><li>▪ Cross-validation technique</li></ul></li></ul> <p><b><u>TASK</u></b></p> <p>TAsk 01:</p> <ul style="list-style-type: none"><li>• Implement and evaluate a simple regression model (e.g., linear regression) on a dataset.</li><li>• Build and assess a classification model (e.g., logistic regression or KNN) for a classification problem.</li><li>• Compare model performance using evaluation metrics (accuracy, precision, recall) and visualize the results</li></ul>
<b>Module 09: Advanced Machine Learning</b>	<ul style="list-style-type: none"><li>• <b>Decision Trees and Random Forests</b><ul style="list-style-type: none"><li>▪ Building decision trees</li><li>▪ Overfitting and pruning</li><li>▪ Random Forests and feature importance</li><li>▪ Bagging techniques</li></ul></li><li>• <b>Support Vector Machines</b><ul style="list-style-type: none"><li>▪ SVM for classification</li></ul></li></ul>

# COURSE SYLLABUS



MODULE NAME	TOPICS
<p>Module 09: Advanced Machine Learning(cont..)</p>	<ul style="list-style-type: none"><li>▪ Kernel methods</li><li>▪ Hyperparameter tuning</li><li>• <b>Ensemble Methods</b><ul style="list-style-type: none"><li>▪ Bagging vs. boosting</li><li>▪ Gradient Boosting Machines (GBM)</li><li>▪ XGBoost, AdaBoost</li></ul></li><li>• <b>Hyperparameter Tuning</b><ul style="list-style-type: none"><li>▪ Grid search and random search</li><li>▪ Cross-validation in hyperparameter tuning</li><li>▪ Automating hyperparameter tuning</li></ul></li><li>• <b>Model Overfitting and Regularization Techniques</b><ul style="list-style-type: none"><li>▪ Understanding overfitting and underfitting</li><li>▪ Regularization methods (Lasso, Ridge)</li><li>▪ Bias-variance tradeoff</li></ul></li></ul> <p><b><u>TASK</u></b></p> <p>Task 01:</p> <ul style="list-style-type: none"><li>• Build and tune a decision tree model and evaluate its performance.</li><li>• Implement a random forest model and analyse feature importance.</li></ul>



# COURSE SYLLABUS



MODULE NAME	TOPICS
Module 09: Advanced Machine Learning(cont..)	<ul style="list-style-type: none"><li>• Apply ensemble methods (e.g., boosting with XGBoost) and compare their performance with other models.</li></ul>
Module 10: Unsupervised Learning	<ul style="list-style-type: none"><li>• <b>Clustering Techniques</b><ul style="list-style-type: none"><li>▪ K-Means clustering</li><li>▪ Hierarchical clustering</li><li>▪ Evaluating clustering results</li></ul></li><li>• <b>Dimensionality Reduction in Unsupervised Learning</b><ul style="list-style-type: none"><li>▪ Application of PCA in unsupervised learning</li><li>▪ Latent Dirichlet Allocation (LDA)</li></ul></li><li>• <b>Association Rule Learning</b><ul style="list-style-type: none"><li>▪ Market basket analysis</li><li>▪ Apriori algorithm</li><li>▪ Evaluation metrics (Support, Confidence, Lift)</li></ul></li><li>• <b>Anomaly Detection</b><ul style="list-style-type: none"><li>▪ Techniques for identifying anomalies</li><li>▪ Applications in fraud detection</li><li>▪ Isolation Forest, DBSCAN</li></ul></li></ul>

# COURSE SYLLABUS



MODULE NAME	TOPICS
Module 10: Unsupervised Learning(cont..)	<p><b><u>TASK</u></b></p> <p>Task 01:</p> <ul style="list-style-type: none"><li>• Implement and evaluate a clustering algorithm (e.g., K-Means) on a dataset.</li><li>• Apply dimensionality reduction techniques (PCA) and analyze the results.</li><li>• Perform association rule learning on transactional data and interpret the rules.</li></ul>
Module 11: Deep Learning	<ul style="list-style-type: none"><li>• <b>Introduction to Neural Networks</b><ul style="list-style-type: none"><li>▪ Neurons, activation functions</li><li>▪ Feedforward neural networks</li><li>▪ Backpropagation and gradient descent</li></ul></li></ul>

# COURSE SYLLABUS



MODULE NAME	TOPICS
Module II: Deep Learning (cont..)	<ul style="list-style-type: none"><li>• <b>Deep Learning Frameworks</b><ul style="list-style-type: none"><li>▪ Introduction to TensorFlow</li><li>▪ Introduction to Keras</li><li>▪ Building basic neural networks</li></ul></li><li>• <b>Convolutional Neural Networks (CNNs)</b><ul style="list-style-type: none"><li>▪ Convolutional layers, pooling layers</li><li>▪ CNN architecture for image classification</li><li>▪ Transfer learning in CNNs</li></ul></li><li>• <b>Recurrent Neural Networks (RNNs)</b><ul style="list-style-type: none"><li>▪ RNNs for sequence data</li><li>▪ Long Short-Term Memory (LSTM) networks</li><li>▪ Applications in time series forecasting and NLP</li></ul></li><li>• <b>Transfer Learning</b><ul style="list-style-type: none"><li>▪ Using pre-trained models</li><li>▪ Fine-tuning and customizing models</li><li>▪ Applications in various domains</li></ul></li></ul>

# COURSE SYLLABUS



MODULE NAME	TOPICS
Module 11: Deep Learning (cont..)	<p><b><u>TASK</u></b></p> <p>Task 01:</p> <ul style="list-style-type: none"><li>• Build a simple neural network using TensorFlow/Keras and evaluate its performance.</li><li>• Implement a Convolutional Neural Network (CNN) for image classification and analyze the results.</li><li>• Apply a Recurrent Neural Network (RNN) or LSTM for a time-series prediction task.</li></ul>
Module 12: Natural Language Processing (NLP)	<ul style="list-style-type: none"><li>• <b>Basics of NLP</b><ul style="list-style-type: none"><li>▪ Introduction to NLP and text data</li><li>▪ Common NLP tasks (sentiment analysis, text classification)</li></ul></li><li>• <b>Text Preprocessing</b><ul style="list-style-type: none"><li>▪ Tokenization, stop words, stemming, and lemmatization</li><li>▪ Bag of Words (BoW) and TF-IDF</li><li>▪ Word embeddings (Word2Vec, GloVe)</li></ul></li><li>• <b>Sentiment Analysis</b><ul style="list-style-type: none"><li>▪ Techniques for sentiment analysis</li><li>▪ Applications in social media and marketing</li></ul></li></ul>

# COURSE SYLLABUS



MODULE NAME	TOPICS
<p>Module 12: Natural Language Processing (NLP) (cont..)</p>	<ul style="list-style-type: none"><li>• <b>Text Classification</b><ul style="list-style-type: none"><li>▪ Naive Bayes classifier</li><li>▪ SVM for text classification</li><li>▪ Evaluating NLP models</li></ul></li><li>• <b>Introduction to Transformers</b><ul style="list-style-type: none"><li>▪ Overview of transformer models (BERT, GPT)</li><li>▪ Applications of transformers in NLP tasks</li><li>▪ Fine-tuning transformers for specific tasks</li></ul></li></ul> <p><b><u>TASK</u></b></p> <p>Task 01:</p> <ul style="list-style-type: none"><li>• Perform text preprocessing (tokenization, stemming, lemmatization) on a text dataset.</li><li>• Implement a sentiment analysis model and evaluate its performance.</li><li>• Use a pre-trained transformer model (e.g., BERT) for text classification and fine-tune it on a specific task.</li></ul>

# COURSE SYLLABUS



MODULE NAME	TOPICS
Module 13: Power BI	<ul style="list-style-type: none"><li>• <b>Introduction to Power BI</b><ul style="list-style-type: none"><li>▪ What is Power BI?</li><li>▪ Power BI Desktop vs. Power BI Service</li><li>▪ Connecting to data sources</li></ul></li><li>• <b>Data Preparation</b><ul style="list-style-type: none"><li>▪ Importing data (Excel, CSV, databases)</li><li>▪ Basic data cleaning and transformation</li></ul></li><li>• <b>Data Modeling</b><ul style="list-style-type: none"><li>▪ Creating relationships between tables</li><li>▪ Using simple DAX formulas for calculations</li></ul></li><li>• <b>Visualizations</b></li><li>• <b>Basic charts and tables</b></li><li>• Bar Chart</li><li>• Stacked Bar chart</li><li>• Pie Chart</li><li>• Donut Chart</li><li>• Line Chart</li><li>• Area Chart</li></ul>

# COURSE SYLLABUS



MODULE NAME	TOPICS
<p>Module 13: Power BI(cont..)</p>	<ul style="list-style-type: none"><li>▪ Scatter Plot</li><li>▪ KPI (Key Performance Indicator)</li><li>▪ Tree Map</li><li>▪ Bubble Chart</li><li>▪ Matrix</li><li>▪ Table</li><li>▪ Funnel Chart</li><li>▪ Filled Map</li><li>▪ Gauge Chart</li><li>▪ Ribbon Chart</li><li>▪ Q &amp; A Card</li><li>▪ Multi Card</li><li>▪ Slicer</li><li>▪ Combination Chart</li><li>▪ Customizing Visuals</li><li>▪ Building Interactive Dashboards</li><li>• <b>Report Sharing</b><ul style="list-style-type: none"><li>▪ Publishing to Power BI Service</li><li>▪ Sharing reports with others</li></ul></li></ul>

# COURSE SYLLABUS



MODULE NAME	TOPICS
Module 13: Power BI(cont..)	<ul style="list-style-type: none"><li>• <b>Advanced Features</b><ul style="list-style-type: none"><li>▪ Power BI Q&amp;A (natural language queries)</li><li>▪ Basic integration with other tools (e.g., Excel)</li></ul></li></ul> <p><b><u>TASK</u></b></p> <p>Task 01:</p> <ul style="list-style-type: none"><li>• Create a bar chart to visualize the total sales by product category using a given dataset. Customize the chart with different colors for each category and add data labels.</li><li>• Design a dashboard that displays key performance indicators (KPIs) such as total revenue, profit margin, and customer count. Use different visualizations like cards, gauges, and pie charts to represent the KPIs effectively.</li><li>• Use DAX (Data Analysis Expressions) to create a calculated column that categorizes products into 'High', 'Medium', and 'Low' price ranges based on their unit price. Then, create a pie chart to show the distribution of products across these price ranges.</li></ul>



# PRACTICAL PROJECTS

## Predicting Customer Churn

**Difficulty:** Intermediate

**Project Duration:** 5 Weeks

**Description:** Customer churn prediction is a critical project for businesses that rely on recurring revenue, such as subscription-based services.

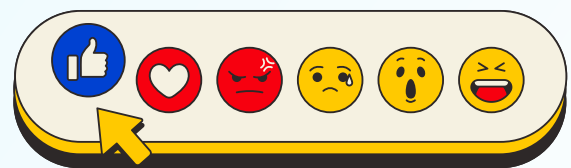


## Sentiment Analysis on Social Media

**Difficulty:** Intermediate

**Project Duration:** 4 weeks

**Description:** Sentiment analysis involves determining the emotional tone behind a series of words, which can be particularly useful for brands.



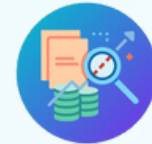
# PRACTICAL PROJECTS

## Recommendation System for E-commerce

**Difficulty:** Intermediate

**Project Duration:** 4-6 weeks

**Description:** Recommendation systems are integral to e-commerce platforms like Amazon or Netflix, where they suggest products or content based on user preferences and behavior



# BTREE'S PLACEMENT GUIDANCE

## Step 1



### PROJECT PORTFOLIO

Post Training, We will help you to create project portfolio to showcase your projects.

## Step 2



### JOB GUIDANCE SESSION - I

A real-time session will be arranged to guide you in resume creation & job portal optimisation

## Step 3



### JOB GUIDANCE SESSION - II

We will guide you in interview preparations and techniques to help you stand out in the job market

## Step 4



### MOCK INTERVIEW & SUPPORT

Polish your interview skills with our trainers for real-world success by attending mock interviews

## Step 5



### GUARANTEED PLACEMENT

We will arrange interviews with our tie-up companies exclusively for our students until they get placed.

# CERTIFICATION AT BTREE



## GOOGLE REVIEWS

 **B.Arrun-UCE-TKY**  
1 review · 3 photos

★★★★★ 2 days ago **NEW**

I attended BTree Systems' AWS training in Chennai. I received good instruction from qualified mentors. They provided theoretical and practical training, which helped me advance my cloud tool and technological knowledge. We appreciate the instructor and facility for the top-notch AWS training.

 **Vel Murugan**  
1 review

★★★★★ 2 weeks ago **NEW**

I chose BTree Systems for my Python for Data Science course because I was impressed by their vast curriculums. The best academic course I have taken was this one. I currently earn an excellent wage as a Junior Data Engineer at a multinational company. I'm glad I went to the training, and the instructors were excellent.

 **Yamini Yamu**  
1 review

★★★★★ a week ago **NEW**

At btree systems, I have finished my Salesforce training. I had a really informative and interesting class and had to learn every salesforce CRM subject from beginning to proceed. For the real-time project sessions, I am grateful to my trainer Bharathi.

 **Syed Salman**  
3 reviews · 3 photos

★★★★★ 6 days ago **NEW**

I enrolled in the big data testing training course. Classes were excellent and the instructor had plenty of expertise. My trainer provided all hadoop real-world projects and thoroughly broke down each and every aspect. I'll undoubtedly advise my friends to enroll in a big data training course

# LIFE AT BTREE SYSTEMS




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