THE SKILLIANS

DATA SCIENCE & ANALYTICS PROGRAM

DETAILED CURRICULUM

MAY 2025

www.theskillians.com

@TheSkillians

About Data Science & Analytics Program

Master the foundations of data analysis, statistics, and machine learning, and prepare for a rewarding career in data science with Skillians.

This rigorous program sharpens your analytical and technical skills by equipping you with practical knowledge in data wrangling, predictive modeling, and real-world problem solving.
Built on a project-based learning methodology, the curriculum is one of the most expansive in the industry — enabling you to confidently understand and apply data science tools through hands-on sessions.

With over 450 hours of intensive practical training, Skillians ensures you're fully job-ready to kickstart your journey as a data scientist.

Program Highlights

Live Learning

The faculty will help you establish a DSA and full-stack development foundation through online live interactive courses. The teaching assistants will lead hands-on projects and practice sessions.

Dedicated Career Services

Our career services include resume development, profile enhancement, interview preparation workshops, mock interviews and one-on-one career counselling. You will get personalised mentorship and support to succeed in job interviews.

Job-focused Curriculum

Develop a strong foundation in data structures and algorithms and learn popular full-stack technologies like Java, Spring, MongoDB, JavaScript, React, Docker, and Jenkins. Build end-to-end software applications and be a skilled full-stack developer.

Hackathon and Coding Challenges

Participate in Coding Challenges and Hackathons, delivered by our community initiative to tackle complex business problems and make your resume stand out.

Assured Interview Opportunities

We have placed over 1500 students in leading companies with our job-guarantee program. You will get access to opportunities with our 500+ hiring global partners. You will get placed between an average salary range of 6 to 10 LPA through assured interview opportunities.

Placement Overview

1500+
Students Placed

24 LPA
Highest Salary

80%
Average Salary Hike

500+
Hiring Partners

Our alumni work at:

amazon · J.P.Morgan · Microsoft · Groww · zomato · OLA · PayPal · SWIGGY · Paytm · Uber · NETFLIX · Razorpay · stripe · accenture

Shreyanshu Kumar
Before Skillians:
Fresher

Placed at:
McKinsey & Company

Ajay kumar
Before Skillians:
Fresher

Placed at:
Paytm

Gautam Sharma
Before Skillians:
Fresher

Placed at:
SWIGGY

Iti jain
Before Skillians:
Fresher

Placed at:
NETFLIX

Omkar Krishna Sharma
Before Skillians:
Fresher

Placed at:
Stealth Startup

Garima Sharma
Before Skillians:
Fresher

Placed at:
GE HealthCare

Why join this Program

100% Job Assurance Program

Our program comes with a 100% job guarantee and is designed to help you land your dream role as a data scientist with one of our 500+ top hiring partners.

1500+ students placed

500+ Hiring Partners

22.5 LPA Highest Salary

52% Average salary hike

Top Job Roles

- Data Scientist
- Data Analyst
- Business Analyst
- Data Engineer
- Business Intelligence Specialist
- Machine Learning Engineer
- Tableau Developer
- PowerBI Developer
- Data Science Consultant
- Business Analytics Professional

Data Science & Analytics Curriculum

Build a strong foundation in data analysis and programming with Python. Learn to work with real datasets, understand core concepts in statistics, and develop problem-solving skills. With hands-on practice, become proficient in data handling, visualization, and essential tools used in the data science industry.

Week 1: Introduction to Data Structures

- Overview of data structures.
- Time and space complexity analysis.
- Arrays and their operations.

Week 2: Linked Lists, Stacks, and Queues

- Linked lists and their types.
- Stacks and their operations.
- Queues and their operations.
- Implementing basic data structures in code

Week 3: Trees and Binary Trees

- Introduction to trees.
- Binary trees and their properties.

Week 4: Binary Search Trees (BSTs) and Balanced Trees

- Binary search trees (BSTs) and operations.
- Balanced trees: AVL and Red-Black trees.
- Applications and implementation of BSTs.

Week 5-6: Priority Queues and Heaps

- Introduction to priority queues.
- Heap data structure.
- Week 6: Heaps and Heap Sort----
- Operations on heaps.
- Implementing and using heaps.- Heap sort algorithm.

Week 7-8: Hashing and Hash Tables

- Hashing basics.
- Hash functions and collision resolution techniques.
- Week 8: Hash Tables----
- Hash table implementation and analysis.
- Applications of hash tables.

Week 9-10: Graphs and Graph Algorithms

- Graph representations: adjacency matrix and adjacency list.
- Depth-First Search (DFS) and its applications.
- Week 10: Graph Algorithms----
- Breadth-First Search (BFS) and its applications.
- Shortest path algorithms: Dijkstra's and Bellman-Ford.
- Minimum Spanning Trees (MST): Prim's and Kruskal's algorithms.

Week 11-12: Advanced Data Structures

- Disjoint Set (Union-Find) data structure.
- Trie data structure and its applications.
- Week 12: B-trees, B+ Trees, and Skip Lists----
- B-trees and B+ trees: structure and operations.
- Skip lists and their implementations.

Week 13-14: Advanced Topics and Applications

- Suffix trees and arrays.
- Bloom filters.
- Geometric data structures.
- Week 14: Real-World Applications----
- Parallel and concurrent data structures.
- Using data structures in real-world applications: case studies and projects.

Week 15-18: Course Introduction and Overview

- Data Science Lifecycle and Process
- Data Collection and Cleaning
- Data Visualization and Exploration
- Basic Statistics and Descriptive Analysis
- Introduction to Python for Data Science

Week 18-21: Introduction to Machine Learning

- Supervised Learning (Regression and Classification)
- Unsupervised Learning (Clustering and Dimensionality Reduction)
- Model Evaluation and Validation
- Feature Engineering
- Ensemble Methods (Random Forest, Gradient Boosting)
- Natural Language Processing (NLP)

Week 21- 24: Artificial Neural Networks (ANN)

- Deep Learning Frameworks (TensorFlow, Keras, PyTorch)
- Backpropagation and Optimization Algorithms
- Convolutional Neural Networks (CNNs)
- Recurrent Neural Networks (RNNs)
- Long Short-Term Memory (LSTM) Networks
- Gated Recurrent Unit (GRU) Networks
- Sequence-to-Sequence Models
- Natural Language Processing with RNNs

Week 24-26/27:Introduction to Data Visualization and BI Concepts

- Power BI Fundamentals
- Power BI Basics
- Data Transformation and Modeling in Power BI
- Tableau Fundamentals
- Tableau Basics
- Data Preparation in Tableau
- Advanced Tableau Features
- Advanced Tableau Techniques
- Integrating and Sharing Insights
- Integration and Collaboration

Languages and Tools Covered

Advanced Topics and Projects

Explore advanced topics in data science, including data manipulation with Pandas, data visualization with Seaborn and Matplotlib, and best practices in data cleaning and preprocessing. Deepen your Python skills with concepts like data structures, file handling, and working with APIs. Engage in hands-on projects that mirror real-world scenarios, helping you apply your knowledge effectively and build confidence for a career in data science.

Industry-specific Projects

Difficulty Level - Easy

Real-Time Traffic Management System

- Develop an AI-driven system that uses live traffic data, weather conditions, and social media feeds to predict traffic patterns and optimize traffic flow in real-time.

- Utilize neural networks for predictive analysis and reinforcement learning for dynamic traffic signal adjustments.

Personalized Medicine Using Genomic Data

- Create a model that predicts the effectiveness of various treatments for patients based on their genetic information.

- Use deep learning techniques to analyze genomic sequences and identify patterns related to specific diseases and treatment responses.

Fraud Detection in Financial Transactions

- Build a machine learning model to detect fraudulent activities in financial transactions.

- Employ neural networks to identify anomalies in transaction patterns and implement a real-time alert system.

Predictive Maintenance for Industrial Equipment

- Develop a system that predicts equipment failures in manufacturing plants before they occur.

- Use IoT data from sensors, combined with machine learning algorithms, to forecast maintenance needs and minimize downtime.

Autonomous Drone Navigation

- Create an AI-driven drone navigation system capable of autonomous flight in complex environments.

- Implement reinforcement learning and computer vision techniques to enable the drone to avoid obstacles and complete tasks such as package delivery.

Sentiment Analysis for Market Prediction

- Analyze social media posts, news articles, and financial reports to predict market trends and stock prices.

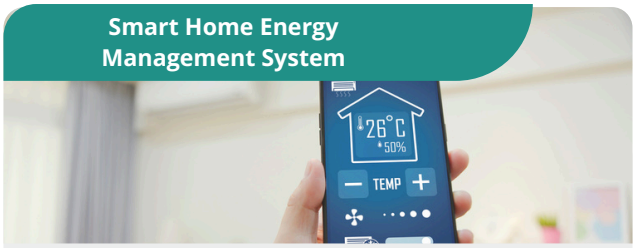
- Use natural language processing (NLP) and sentiment analysis to gauge public and expert sentiment about different stocks and market conditions.

Disease Outbreak Prediction and Management

- Build a predictive model to identify potential disease outbreaks using data from various sources such as social media, health reports, and climate data.

- Use machine learning to analyze and predict the spread of infectious diseases, helping in effective management and response planning.

Smart Home Energy Management System



- Develop an AI system that optimizes energy usage in smart homes based on real-time data from various devices.

- Implement reinforcement learning to adjust heating, cooling, and appliance usage to reduce energy consumption while maintaining comfort.

Automated Image Captioning System

- Create a deep learning model that generates descriptive captions for images.

- Use convolutional neural networks (CNNs) for image feature extraction and recurrent neural networks (RNNs) for generating natural language descriptions.

AI-Powered Legal Document Analysis

- Develop a system that can analyze and summarize large volumes of legal documents, identifying key information and potential risks.

- Use NLP and machine learning to extract relevant clauses, compare legal texts, and assist in contract review processes.

Industry-specific Projects

Difficulty Level - Medium

Self-Driving Car Simulation

- Develop a reinforcement learning model to navigate a self-driving car in a simulated environment.

- Use neural networks for object detection and lane tracking.

- Incorporate sensor fusion techniques to combine data from multiple sources like LiDAR, radar, and cameras.

Healthcare Predictive Analytics

- Create a predictive model to forecast patient outcomes based on historical health records.

- Use deep learning for image analysis on MRI or CT scans to detect anomalies.

- Apply natural language processing (NLP) to extract insights from medical records and doctors' notes.

Fraud Detection System

- Build a system to detect fraudulent transactions in real-time using machine learning techniques.

- Employ anomaly detection algorithms and neural networks to identify patterns of fraudulent behavior.

- Implement an ensemble learning approach to combine multiple models for improved accuracy.

Natural Language Processing for Sentiment Analysis

- Develop a sentiment analysis model to analyze social media posts, reviews, and feedback.

- Use transformers (e.g., BERT, GPT) for context-aware sentiment analysis.

- Create a dashboard to visualize sentiment trends over time and across different platforms.

Recommendation Engine

- Build a recommendation system for an e-commerce platform or streaming service.

- Use collaborative filtering and content-based filtering techniques.

- Implement a hybrid approach combining neural networks and matrix factorization for improved recommendations.

Real-Time Stock Market Prediction

- Develop a model to predict stock prices using historical data and real-time news feeds.

- Use time series analysis and LSTM (Long Short-Term Memory) networks for sequential data.

- Incorporate sentiment analysis of financial news articles and social media posts to enhance
predictions

Image Super-Resolution

- Create a model to enhance the resolution of low-quality images using deep learning.

- Implement a generative adversarial network (GAN) to generate high-resolution images from low-resolution inputs.

- Train the model on a large dataset of images to improve the quality and accuracy of the generated
images.

Autonomous Drone Navigation

- Design an autonomous drone navigation system using reinforcement learning.

- Utilize computer vision techniques for obstacle detection and avoidance.

- Implement sensor fusion to integrate data from cameras, GPS, and other sensors for accurate
navigation

Customer Churn Prediction

- Create a deep learning model that generates descriptive captions for images.

- Use convolutional neural networks (CNNs) for image feature extraction and recurrent neural networks (RNNs) for generating natural language descriptions.

Climate Change Impact Analysis

- Develop a model to analyze the impact of climate change on different regions.

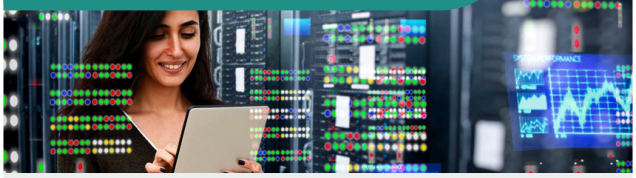
- Use satellite imagery and remote sensing data for environmental monitoring.

- Apply machine learning techniques to predict changes in temperature, precipitation, and vegetation cover

Industry-specific Projects

Difficulty Level - Hard

Predictive Maintenance Using IoT Data



Description: Develop a predictive maintenance system using IoT sensor data from industrial equipment. The goal is to predict when a machine is likely to fail and recommend maintenance before the failure occurs.

Techniques:
Time-series analysis, anomaly detection, machine learning models (e.g., LSTM, GRU).

Sentiment Analysis with Contextual Understanding

Description: Build a sentiment analysis model that not only detects the sentiment of a text but also understands the context. This could involve analyzing social media posts, reviews, or news articles.

Techniques:
Natural Language Processing (NLP), BERT or GPT models, sentiment analysis.

Real-time Traffic Flow Prediction and Optimization

Description: Create a system to predict real-time traffic flow in a city and suggest optimal routes to avoid congestion. This could involve using historical traffic data, weather conditions, and public event schedules.

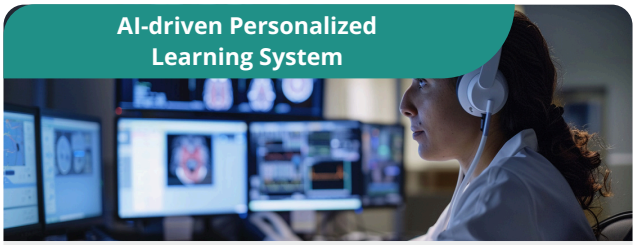
Techniques:
Time-series forecasting, reinforcement learning, neural networks, GIS data analysis.

Autonomous Drone Navigation and Obstacle Avoidance

Description: Develop an autonomous drone that can navigate and avoid obstacles in real-time. This project involves creating a perception system and a navigation algorithm.

Techniques:
Computer vision, deep learning (e.g., CNNs), reinforcement learning, SLAM (Simultaneous Localization and Mapping).alysis.

AI-driven Personalized Learning System



Description: Design an AI-powered platform that personalizes the learning experience for students by recommending resources, tracking progress, and adapting to individual learning styles.

Techniques:
Recommendation systems, deep learning, user behavior analysis, adaptive learning algorithms.

Healthcare Diagnostics with Multi-modal Data

Description: Create a diagnostic tool that integrates multiple data types (e.g., medical images, patient records, genetic data) to predict disease outcomes and recommend treatments.

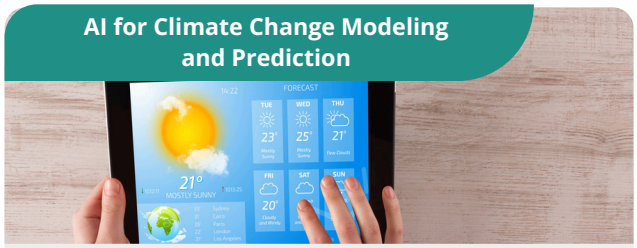
Techniques:
Multi-modal deep learning, convolutional neural networks (CNNs), electronic health records (EHR) analysis, ensemble learning

Financial Market Prediction Using Deep Learning

Description: Develop a model to predict stock prices or other financial metrics using historical data, news sentiment, and macroeconomic indicators

Techniques:
Time-series forecasting, LSTM networks, sentiment analysis, feature engineering.

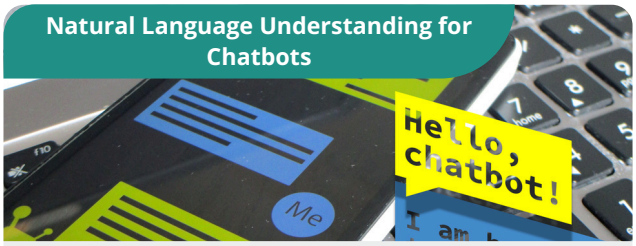
AI for Climate Change Modeling and Prediction



Description: Build a model to predict climate change patterns and impacts using historical climate data, satellite images, and socio-economic data

Techniques:
Climate modeling, neural networks, geospatial data analysis, scenario analysis.

Natural Language Understanding for Chatbots



Description: Develop an advanced chatbot capable of understanding and generating human-like responses, capable of context switching, and handling complex queries.

Techniques:
NLP, transformer models (e.g., GPT-4), dialogue management systems, reinforcement learning.

Fraud Detection in Financial Transactions

Description: Create a fraud detection system that identifies suspicious transactions in real-time using transaction data and user behavior patterns.

Techniques:
Anomaly detection, machine learning, ensemble methods, unsupervised learning.

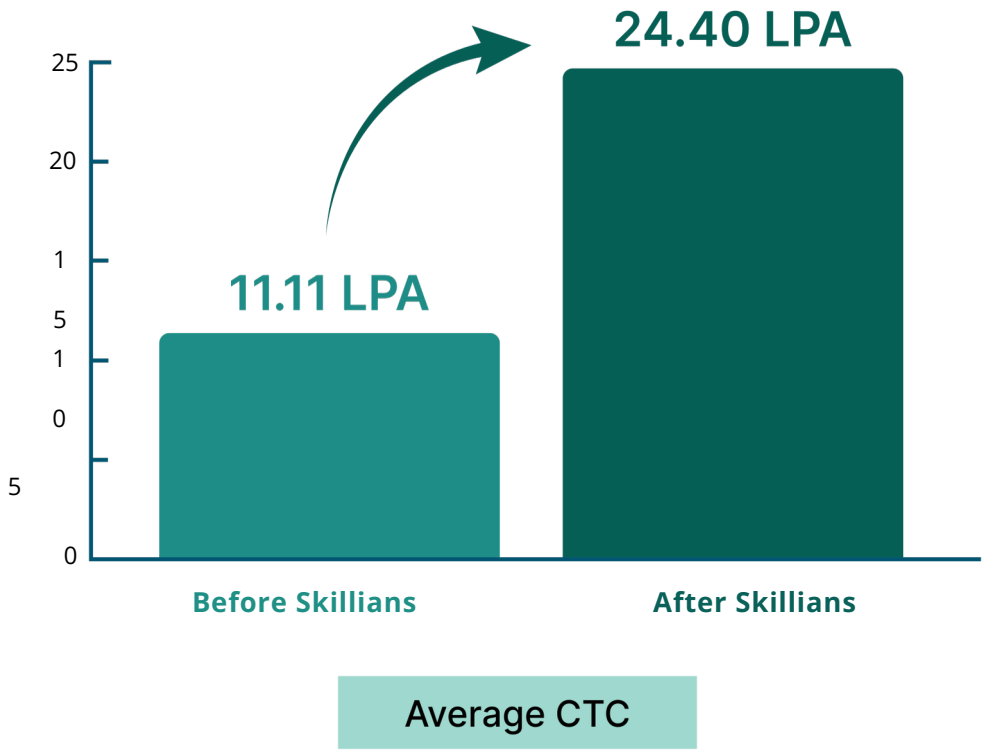
Program Outcome

1500
Learners Placed

6.25x
Return on Investment

24 LPA
Highest Package

80%
Salary Hike



Average CTC

Learners' Profiles

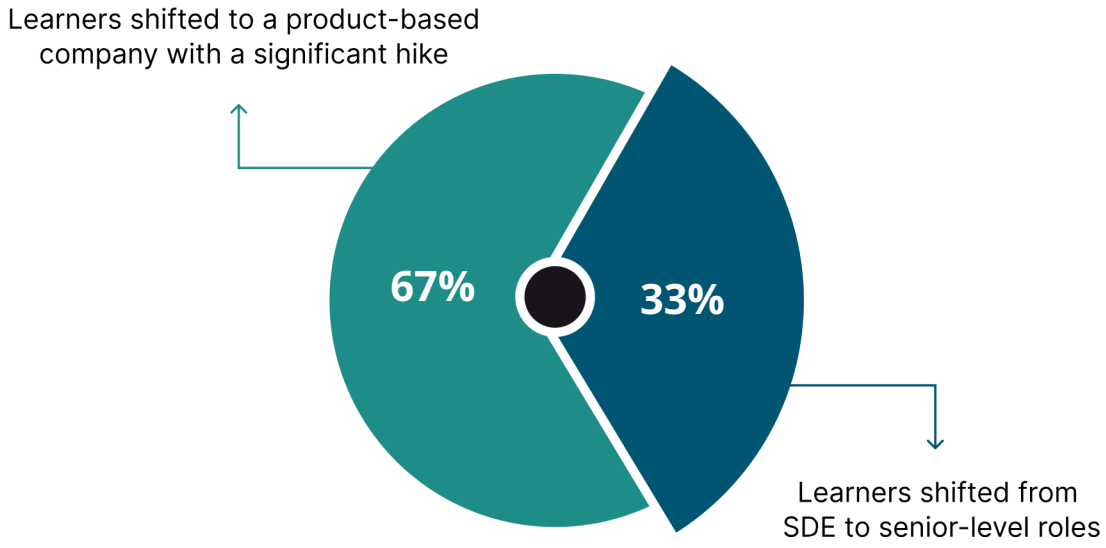
Final year students from STEM background (preferably CS, IT, Electronics) with min 50% marks

Fresh graduates/Postgraduates in STEM (preferably CS, IT, Electronics) with min 50% marks

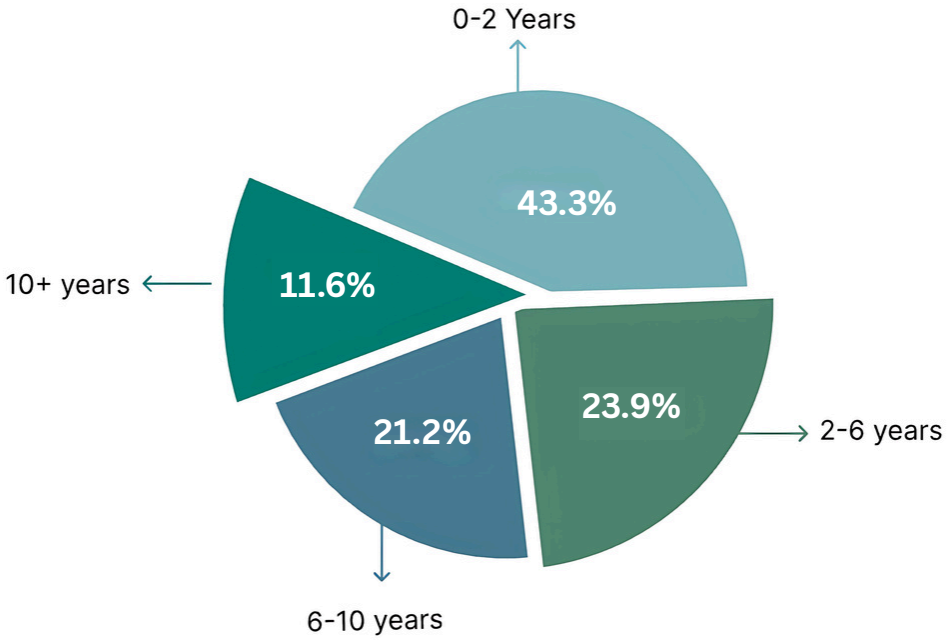
Experienced Professionals (0 to 3 years) in IT roles

You can join even if you're new to programming – we've got you covered.

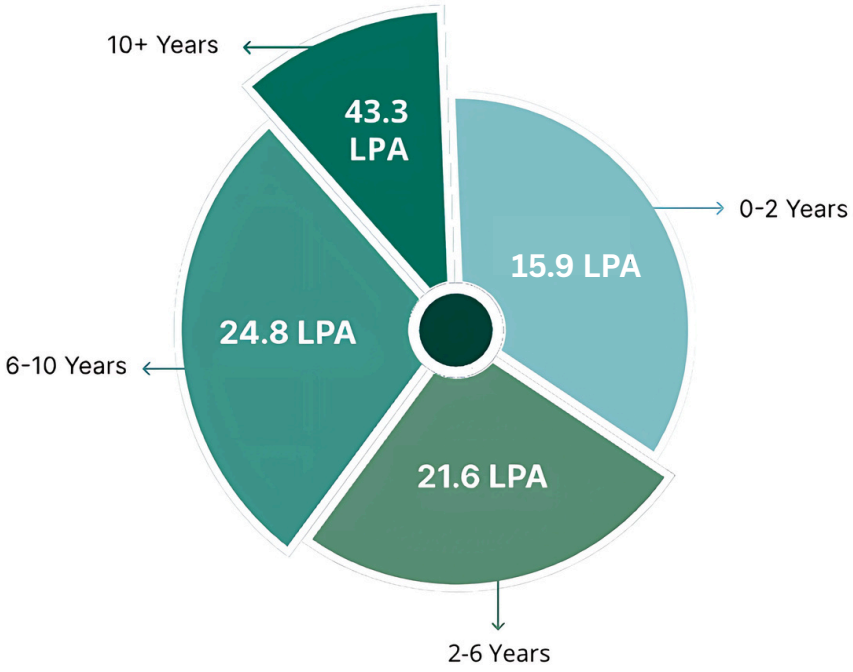
Skillians Learning Transition



Skillians Learner's Experience



Average CTC based on Years of Experience



Grow with The Skillians

At Skillians, we're focused on delivering an integrated learning experience that extends beyond the classroom. With our one-of-its-kind career support services, we continue to guide you as you step into your career with renewed clarity and confidence. Gain access to over 500+ placement partners and give your career the competitive edge it deserves.

Resume Building

Redesign your resume with professional help and highlight your strengths in the best possible way.

Enhancement

We assist you in building a robust portfolio to ensure that your profile always catches the eye of prospective employers.

Interview Prep

We have analysed the most commonly asked interview questions and built a training module with mock interviews that will confidently prepare you for job interviews.

Career Mentoring

Resolve all your career-related queries in a 1:1 session with an industry expert.

What Our Students Say

Shreyanshu Kumar

I would like to thank the Skillians team for providing me with an excellent platform to kickstart my career. I had the opportunity to participate in a hackathon through Skillians, and it was a great learning experience. I truly appreciate the entire team's dedication, support, and efforts throughout the journey.

Placed At: McKinsey & Company

Iti jain

Skillians has been a game-changer in my career journey. The mentorship, hands-on projects, and guidance I received helped me gain real-world exposure. Participating in the hackathon organized through Skillians boosted my confidence and skills immensely. Thank you to the entire team for the constant support!

Placed At: NETFLIX

Omkar Krishna Sharma

I'm incredibly grateful to Skillians for providing such a supportive and practical learning environment. The hackathon experience gave me a real taste of industry-level challenges and improved my problem-solving abilities. Kudos to the team for creating such impactful opportunities

Placed At: **Stealth Startup**

What Our Students Say

Ajay kumar

I'd like to thank Skillians for being an integral part of my professional journey. The hackathon I participated in was not only a great learning experience but also gave me a chance to connect with like-minded peers. The team's commitment and support made the whole experience smooth and enriching.

Placed At: Paytm

Garima Sharma

Joining Skillians was one of the best decisions I've ever made for my professional growth. Before this, I was constantly hopping between courses, unsure of how to build a career that aligned with my interests. Skillians offered clarity, structure, and real opportunities. The hands-on learning, mock interviews, and mentor sessions were incredibly impactful.

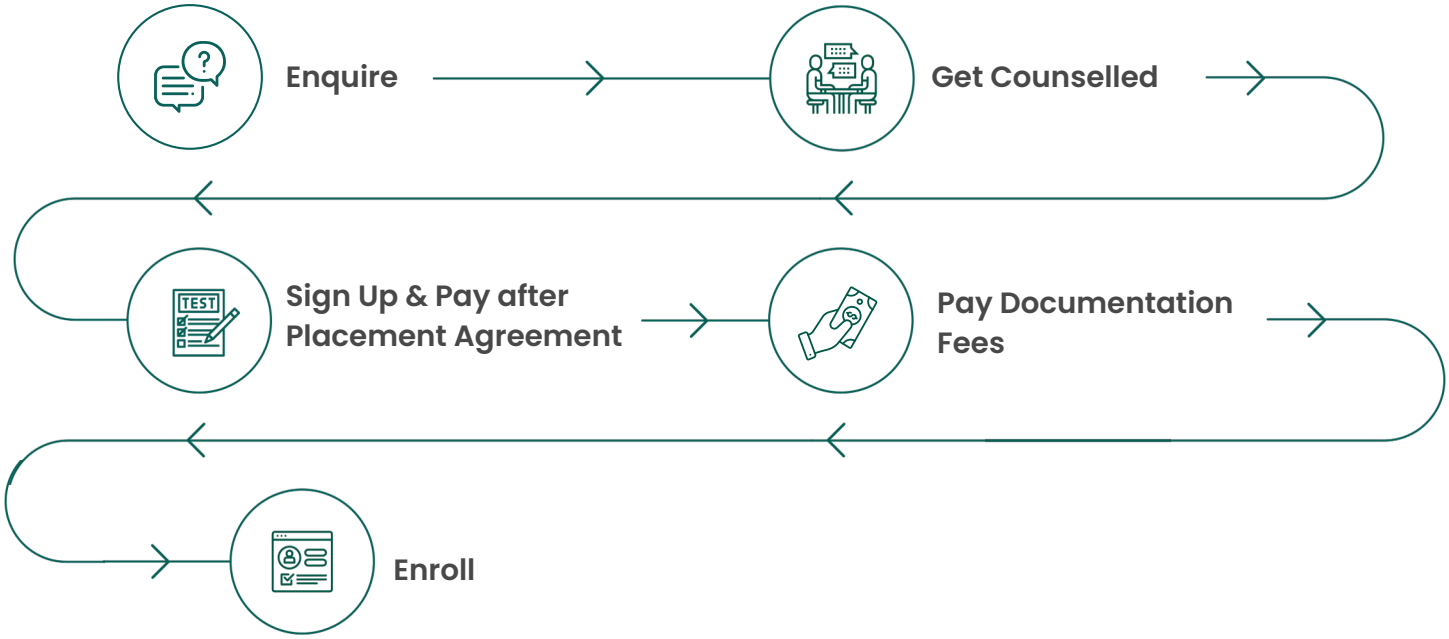
Placed At: GE HealthCare

Gautam Sharma

I'll always credit Skillians for helping me transform from a confused fresher to a confident professional. The journey with them was filled with growth, learning, and constant support. I was introduced to real-world challenges through hackathons and projects that gave me the exposure I desperately needed.

Placed At: SWIGGY

Admission Process



Step into the world of data science with Skillians and build a bright future in analytics and AI.

THE SKILLIANS

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