

# AI & ML Engineering

Learn machine learning, generative AI, prompt engineering, RAG workflows, AI APIs, and deployable AI applications.

## PROGRAM SNAPSHOT

<b>4 Months</b> Live Training	<b>1 Year</b> LMS Access	<b>Recorded</b> Sessions	<b>Capstone</b> Project	<b>90%</b> Attendance Expected	<b>80%</b> Projects Completion
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## PROGRAM OVERVIEW

The AI & ML Engineering program is a 4-month online live training program designed to help learners build practical skills in Python, machine learning, deep learning basics, natural language processing, generative AI, prompt engineering, embeddings, RAG applications, AI APIs, and AI product development.

### Program Highlights

- 4 months online live training
- LMS access for 1 year with class recordings
- Assignments, case studies, and mentor feedback
- AI tools integrated into the learning workflow
- Capstone project in the final phase
- Certificate eligibility based on attendance, assignment completion, fee clearance, and policy compliance
- Python, ML, GenAI, RAG, and AI app building
- Practical model-building assignments and AI application prototypes

### Key Skills You Will Master

- Python for AI/ML	- Data preprocessing
- Machine learning model building	- Model evaluation
- Deep learning fundamentals	- Natural Language Processing
- Generative AI workflows	- Prompt engineering
- RAG application building	- AI app deployment
- Model documentation	- AI product thinking

### Tools You Will Work With

<b>Python</b>	<b>Jupyter Notebook</b>	<b>Google Colab</b>	<b>NumPy</b>
<b>pandas</b>	<b>Matplotlib</b>	<b>Seaborn</b>	<b>scikit-learn</b>
<b>TensorFlow basics</b>	<b>PyTorch basics</b>	<b>Hugging Face basics</b>	<b>OpenAI API</b>
<b>LangChain basics</b>	<b>Vector databases basics</b>	<b>Streamlit</b>	<b>FastAPI basics</b>

<b>GitHub</b>	<b>ChatGPT</b>	<b>Claude</b>	<b>Gemini</b>
<b>Cursor</b>			

## What You Will Build

<p><b>ML Models</b> Build regression, classification, and clustering models.</p>	<p><b>AI Assistants</b> Create prompt-based AI assistants.</p>	<p><b>RAG Apps</b> Build document Q&amp;A and retrieval workflows.</p>	<p><b>Deployed AI Mini-Apps</b> Deploy AI prototypes using Streamlit/FastAPI basics.</p>	<p><b>Capstone Portfolio</b> Present a complete AI/ML project.</p>
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**Learn by doing with live classes, assignments, projects, capstone work, LMS recordings, and mentor feedback.**

Important Note: Careerpedia does not guarantee placements, employment, job offers, interview calls, salary outcomes, or employer selection. The program focuses on training, skill building, projects, assessments, and structured learning support.

## DETAILED COURSE CURRICULUM

AI & ML Engineering

The curriculum below is structured module-wise so learners can clearly understand exactly what is covered, what tools are used, and what practical work is expected.

### Module 1: AI, ML, and Python Foundations

This module introduces AI/ML concepts and builds Python programming foundations required for data and AI work.

#### Topics Covered

- What is Artificial Intelligence?
- What is Machine Learning?
- AI vs ML vs Deep Learning vs Generative AI
- Real-world AI use cases
- Python setup
- Variables and data types
- Lists, tuples, sets, dictionaries
- Conditional statements
- Loops
- Functions
- Lambda functions
- File handling
- Python libraries for AI/ML
- Jupyter Notebook and Google Colab

#### Practical Activities

- Python practice notebook
- AI use-case identification
- Python programming assignment

### Module 2: Data Handling and Preprocessing

This module teaches learners how to prepare data for machine learning models and AI workflows.

#### Topics Covered

- NumPy for numerical computing
- pandas for data handling
- Reading CSV, Excel, and JSON files
- DataFrames and Series
- Missing value handling
- Duplicate removal
- Outlier detection
- Data type conversion
- Feature selection basics
- Feature scaling
- Encoding categorical variables
- Train-test split
- Exploratory Data Analysis
- Data visualization using Matplotlib and Seaborn

#### Practical Activities

- Dataset cleaning assignment
- EDA report
- Preprocessing pipeline mini-project

### Module 3: Statistics and Mathematics for ML

This module builds the statistical and mathematical intuition needed to understand model behavior.

#### Topics Covered

- Descriptive statistics

- Mean, median, mode
- Variance and standard deviation
- Probability basics
- Probability distributions
- Normal distribution
- Correlation and covariance
- Hypothesis testing basics
- Linear algebra basics
- Vectors and matrices
- Distance measures
- Loss functions introduction
- Gradient descent intuition

### Practical Activities

- Statistics assignment
- Correlation analysis
- ML math interpretation worksheet

## Module 4: Supervised Machine Learning

This module trains learners to build and evaluate regression and classification models.

### Topics Covered

- Supervised learning introduction
- Regression vs classification
- Linear regression
- Multiple regression
- Logistic regression
- Decision tree
- Random forest
- K-nearest neighbors
- Naive Bayes basics
- Support vector machine basics
- Model training process
- Model evaluation
- Accuracy, precision, recall, F1-score
- Confusion matrix
- ROC-AUC basics
- Overfitting and underfitting
- Cross-validation
- Hyperparameter tuning basics

### Practical Activities

- Regression model project
- Classification model project
- Model evaluation assignment

## Module 5: Unsupervised Machine Learning

This module introduces clustering and pattern discovery without labeled target variables.

### Topics Covered

- Unsupervised learning introduction
- Clustering concepts
- K-means clustering
- Hierarchical clustering basics
- Customer segmentation
- Dimensionality reduction
- PCA basics
- Anomaly detection introduction
- Business use cases of unsupervised learning

### Practical Activities

- Customer segmentation project

- Clustering model assignment
- PCA visualization task

## Module 6: Deep Learning Foundations

This module introduces the logic of neural networks and basic deep learning workflows.

### Topics Covered

- Neural network basics
- Perceptron intuition
- Activation functions
- Forward propagation basics
- Backpropagation intuition
- TensorFlow/PyTorch introduction
- Building a simple neural network
- Training and validation
- Epochs and batch size
- Loss and optimizer basics
- CNN introduction
- Image classification basics

### Practical Activities

- Neural network mini-project
- Image classification practice
- Deep learning notebook assignment

## Module 7: NLP and Text Analytics

This module focuses on processing and analyzing text data for AI and ML applications.

### Topics Covered

- Natural Language Processing introduction
- Text preprocessing
- Tokenization
- Stopword removal
- Stemming and lemmatization basics
- Bag of Words
- TF-IDF
- Sentiment analysis
- Text classification
- Embeddings introduction
- Transformer model overview
- Hugging Face basics

### Practical Activities

- Sentiment analysis project
- Text classification assignment
- Embedding demo task

## Module 8: Generative AI and Prompt Engineering

This module helps learners understand and use LLMs through structured prompting and validation.

### Topics Covered

- What is Generative AI?
- Large Language Models overview
- ChatGPT, Gemini, Claude overview
- Prompt engineering fundamentals
- Zero-shot prompting
- Few-shot prompting
- Role-based prompting
- Structured reasoning prompts
- Prompt templates
- Output formatting

- AI hallucinations
- AI safety and validation
- Business use cases of GenAI

### Practical Activities

- Prompt engineering assignment
- AI use-case documentation
- GenAI workflow design

## Module 9: OpenAI API, RAG, and AI Applications

This module teaches learners how AI applications are designed using APIs, embeddings, vector search, and RAG workflows.

### Topics Covered

- OpenAI API introduction
- API keys and environment variables
- Prompt-response workflow
- Chat completion basics
- Embeddings introduction
- Vector databases basics
- Document loading
- Text chunking
- Vector search
- Retrieval-Augmented Generation
- LangChain basics
- Building document Q&A applications
- AI assistant architecture
- AI app deployment basics using Streamlit/FastAPI

### Practical Activities

- AI chatbot prototype
- Document Q&A app
- RAG mini-project
- AI assistant workflow

## Module 10: Capstone Project

This module focuses on building a complete AI/ML project that can be explained and demonstrated.

### Topics Covered

- Problem selection
- Dataset understanding
- Model or AI workflow selection
- Data preparation
- Model building or RAG workflow creation
- Evaluation and validation
- Deployment workflow
- Documentation
- Final demo preparation
- Project presentation

### Practical Activities

- AI-powered document question-answering system
- Resume screening AI assistant
- Customer support chatbot
- Loan eligibility prediction model
- Sales forecasting model
- Sentiment analysis dashboard
- AI-powered learning assistant

## ASSESSMENTS THROUGHOUT THE PROGRAM

Python Tasks	Data Preprocessing Assignment	ML Model Assignments	Prompt Engineering Task	RAG Mini-Project	Final AI/ML Capstone
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## CAPSTONE PROJECT EXAMPLES

<b>Document Q&amp;A Assistant</b> Ask questions from documents using RAG.	<b>Resume Screening Assistant</b> Extract, analyze, and rank resume information.	<b>Customer Support Chatbot</b> Build an FAQ and support assistant.	<b>Sales Forecasting Model</b> Predict future sales using ML and data trends.
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## Certificate Eligibility


- Minimum 90% live-class attendance expected
- Minimum 80% assignment/project completion expected
- No pending course fee dues
- Compliance with LMS usage rules and program policies
- Final capstone/project submission and review, wherever applicable

## OUR PARTNERS & ECOSYSTEM



## RECOGNITION, CERTIFICATE & ECOSYSTEM

The following page can be used as a credibility page in the candidate-facing brochure. It includes the sample certificate format, the startup recognition article, and the partner ecosystem references shared for Careerpedia.

<h3>Certificate Preview</h3> 	<h3>News Article / Recognition</h3> <h2>Hyd edtechs dominate list</h2> <h3>Start-ups helps in transforming Hyderabad's innovation landscape</h3> <p><b>RACHEL DAMMALA   DC HYDRABAD, OCT. 10</b></p> <p>Edtech start-ups have emerged as the best growing sector among LinkedIn's 2024 list of Top Start-ups in Hyderabad, which marks a significant shift in the city's innovation landscape.</p> <p>The list, which ranks start-ups based on parameters like employment growth, jobseeker interest, engagement on LinkedIn, and their ability to attract top talent, highlights how education technology firms are leading the way in transforming traditional learning models.</p> <p>At the forefront is Bhanu, an AI-powered platform founded by the city-based Neelakantha Bhanu, which endeavours to make mathematics more enjoyable and accessible.</p> <p>"We are not just digitising education but revolutionising pedagogy. Our goal is to create deeper, empowering learning experiences that go beyond just the classroom," Bhanu told <i>Aavaz Chronicle</i>.</p> <p>Unlike earlier edtechs, Bhanu focuses on transforming the manner students engage with math, making it more interactive and enjoyable. Bhanu has enrolled over 30,000 students across 10 courses.</p> <p>"We focus on long-term success and global impact, while ensuring sustainable growth and profitability. Ultimately, parents and students value the tangible impact we bring to their learning journeys," Bhanu added.</p> <p>Start-ups like Bhanu are offering what previous companies, like Bhanu's, struggled with—engagement and long-term focus. While many edtech firms digitised traditional teaching methods, newer companies are creating transformative learning experiences.</p> <p>Bhanu's story-driven curriculum and interactive learning sessions focus on developing a passion for learning rather than short-term memorisation.</p> <p>These start-ups' personalised and interactive sessions offer students an engaging alternative to rote learning in coaching centres.</p> <p>"We're prioritising personalised, deeper learning journeys instead of the one-size-fits-all approach," Bhanu added.</p> <p>This tailored, immersive experience helps students build confidence and develop a genuine love for mathematics, he said. Coschool is another key player, using AI to personalise the learning experience for school students. "Learning through AI feels more engaging and targeted than traditional coaching," shared Anjali P Viswanath, a high school student from the city, noting that many of her friends are also turning to these platforms for a more effective and personalised approach to learning.</p> <p>Another one that figures in the list, Careerpedia further highlights Hyderabad's edtech dominance by offering hands-on training in design and development. It bridges the gap between education and employment by providing mentor-led programmes in high-demand fields such as UI/UX design, development, and QA, ensuring that students acquire the skills necessary for real-world applications.</p> <p>Education-centric start-ups, GradRight, uses AI to assist students in finding the right programmes and securing funding for higher education, adding further momentum to the city's status as an edtech hub.</p> <p>While the edtech sector dominates, LinkedIn's list also features start-ups from other sectors like Recykal.com in waste management and Kous Smart Home, which focuses on smart home automation solutions.</p> <p><b>7 HYD START-UPS IN TOP 10 LIST</b></p> <ul style="list-style-type: none"> <li>• RECYKAL.COM Higher education</li> <li>• KOUS SMART HOME Appliances, electrical and electronics manufacturing</li> <li>• CAREERPEDIA Higher education Hyderabad</li> <li>• COSCHOOL E-learning providers</li> <li>• BHANU Hospitality</li> <li>• GOKHANA Hospitality</li> <li>• COSCHOOL E-learning providers</li> </ul> <p>Courtesy: LinkedIn</p>
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## OUR PARTNERS & ECOSYSTEM



## Final Program Notes

- The course duration is 4 months of online live training.
- LMS access may be provided for up to 1 year for recordings, assignments, notices, and selected learning resources.
- Certificates are issued subject to attendance, assignment/project completion, fee clearance, and compliance with program rules.
- Careerpedia is an edtech and upskilling platform. It does not guarantee placement, employment, internship, interview calls, or salary outcome.