

Machine Learning Engineering

Move beyond notebook models and learn the engineering workflow employers expect: features, evaluation, APIs, deployment and monitoring.



8 weeks

DURATION

74 hours

GUIDED LEARNING

2 projects

PORTFOLIO

ABOUT THE ACADEMY

Practical learning. Work you can demonstrate.

Brightnest AI Academy brings live instruction, guided practice and career preparation together for individuals and teams.

23

FOCUSED COURSES

6

FLAGSHIP PROGRAMMES

Noida

ACADEMY LOCATION

Our approach

1

Learn

Understand concepts through live instruction and current examples.

2

Build

Apply learning through labs, assignments and guided projects.

3

Explain

Document decisions, results, trade-offs and limitations.

4

Prepare

Connect completed work with CVs, interviews and workplace conversations.

PEOPLE BEHIND THE ACADEMY

Meet Ranjeet Kumar



ACADEMY ADVISER

Ranjeet Kumar

Innovation & Growth Leader

15+ years

Experience in data, artificial intelligence and machine learning leadership.

Areas of expertise

- Data science and machine learning solution leadership
- AI product strategy and scalable data platforms
- Technology team leadership and mentorship
- Practical AI and data adoption for business transformation

Education

Master of Information Systems, Anna University, Chennai
Bachelor of Computer Science Engineering

COURSE OVERVIEW

Build your next set of skills

Learn supervised, unsupervised, and applied ML with model evaluation and deployment. Progress from ML Problem Framing and Experiment Design to Monitoring, Responsible ML and Capstone through guided labs, assessed projects, and portfolio evidence.

Who this is for

Python users, analysts, data scientists and developers who want production-oriented ML skills.

Before you begin

Learners should be comfortable with Python, pandas, and basic statistics.

Many ML learners can reproduce a notebook model but cannot design, evaluate, deploy, or explain a reliable end-to-end system.



LEARNING OUTCOMES

What you will be able to do

01

Turn three business cases into ML problem statements with metrics, baselines and validation plans.

02

Build a reusable preprocessing pipeline for mixed numeric, categorical and temporal data.

03

Benchmark multiple regression models for demand or price prediction.

04

Build and tune a fraud, churn or lead-conversion classifier with threshold optimisation.

05

Create customer segments and anomaly flags, then explain business use cases.

06

Expose a trained model as a validated REST API and containerise it.

07

Deliver a production-style ML system with API, monitoring plan and model card.



CURRICULUM

Course curriculum

8 modules · 8 weeks · 74 hours of guided learning

01 ML Problem Framing and Experiment Design

6 hours

TOPICS

Business-to-ML translation · Target definition · Leakage prevention · Baselines · Offline versus online metrics · Experiment tracking plan · Reproducibility

PRACTICAL WORK

Turn three business cases into ML problem statements with metrics, baselines and validation plans.

Tools: Python, scikit-learn, MLflow

Assessment: Case-study assessment

Portfolio evidence: ML problem-framing document

02 Feature Engineering and Data Pipelines

8 hours

TOPICS

Missing data · Categorical encoding · Scaling · Text/date features · Feature selection · Pipelines · Class imbalance · Data leakage controls

PRACTICAL WORK

Build a reusable preprocessing pipeline for mixed numeric, categorical and temporal data.

Tools: pandas, scikit-learn, imbalanced-learn

Assessment: Pipeline lab

Portfolio evidence: Reusable feature pipeline



CURRICULUM

Course curriculum

8 modules · 8 weeks · 74 hours of guided learning

03 Regression Engineering

8 hours

TOPICS

Linear models · Regularisation · Tree ensembles · Gradient boosting · Loss functions · Residual diagnostics · Business metrics · Uncertainty awareness

PRACTICAL WORK

Benchmark multiple regression models for demand or price prediction.

Tools: scikit-learn, XGBoost/LightGBM

Assessment: Model benchmark report

Portfolio evidence: Regression comparison notebook

04 Classification Engineering

10 hours

TOPICS

Logistic regression · Trees · Random forests · Boosting · Probability calibration · Threshold tuning · ROC/PR curves · Cost-sensitive classification

PRACTICAL WORK

Build and tune a fraud, churn or lead-conversion classifier with threshold optimisation.

Tools: scikit-learn, XGBoost/LightGBM

Assessment: Classification lab

Portfolio evidence: Decision-focused classifier



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Course curriculum

8 modules · 8 weeks · 74 hours of guided learning

05 Unsupervised Learning and Representation

8 hours

TOPICS

Clustering · Dimensionality reduction · Anomaly detection · Similarity · Segmentation · PCA · Practical evaluation without labels

PRACTICAL WORK

Create customer segments and anomaly flags, then explain business use cases.

Tools: scikit-learn, UMAP optional

Assessment: Segmentation checkpoint

Portfolio evidence: Segmentation analysis

06 Model Evaluation, Tuning and Explainability

10 hours

TOPICS

Cross-validation · Hyperparameter search · Bias-variance · Calibration · Feature importance · SHAP · Fairness checks · Error analysis

PRACTICAL WORK

Compare candidate models using cross-validation, SHAP, and structured error analysis.

Tools: scikit-learn, Optuna, SHAP

Assessment: Evaluation report

Portfolio evidence: Model card + evaluation report



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07 Packaging, APIs and Production Inference

10 hours

TOPICS

Serialisation · FastAPI inference · Request validation · Batch versus online inference · Docker basics · Latency · Versioning · Logging

PRACTICAL WORK

Expose a trained model as a validated REST API and containerise it.

Tools: FastAPI, Pydantic, Docker

Assessment: Deployment lab

Portfolio evidence: Containerised ML API

08 Monitoring, Responsible ML and Capstone

14 hours

TOPICS

Data drift · Model drift · Performance monitoring · Feedback loops · Retraining triggers · Governance · Documentation · Capstone architecture

PRACTICAL WORK

Deliver a production-style ML system with API, monitoring plan and model card.

Tools: MLflow, Evidently optional, Docker, GitHub

Assessment: Capstone demo and technical defence

Portfolio evidence: Production ML engineering capstone

APPLIED PORTFOLIO

Projects you will build

Two portfolio projects supported by guided module work.

PORTFOLIO PROJECT 1

Production Churn Prediction API

Train, tune, explain and deploy a churn classifier as an API.

DELIVERABLES

ML pipeline · Model card · FastAPI endpoint · Dockerfile · Monitoring plan

PORTFOLIO PROJECT 2

Risk Scoring ML System

Develop a cost-sensitive classifier with threshold tuning and explainability.

DELIVERABLES

Experiment report · SHAP analysis · API · Deployment architecture

LEARNING EXPERIENCE

Learn, practise and present

- Live instructor-led sessions that connect concepts to real workplace decisions.
- Guided labs and workshops in every module.
- Assignments, checkpoints and practical feedback.
- Portfolio documentation, demonstrations and capstone review.
- Access to recordings and LMS resources according to the published batch policy.
- Career preparation based on completed work and target roles.

Tools you will work with

Python · scikit-learn · MLflow · pandas · imbalanced-learn · XGBoost · LightGBM · UMAP · Optuna · SHAP · FastAPI · Pydantic · Docker · Evidently · GitHub

CAREER PREPARATION

Build confidence for interviews

A structured process to connect your learning with your next career step.

01**Role clarity**

Identify roles that fit your background, interests and current skills.

02**Profile readiness**

Review your CV, LinkedIn, GitHub and project summaries.

03**Project proof**

Prepare to demonstrate completed work and explain your decisions.

04**Interview practice**

Practise technical questions, project walkthroughs and interviews.

05**Opportunity updates**

Receive relevant job openings and employer requirements, subject to availability and learner readiness.

Career support helps you prepare. Employment outcomes depend on experience, project quality, interview readiness and market conditions.

LEARNER JOURNEYS

Companies where our learners have been hired

Across the Brightnest AI Academy learner community



Learner employment history across the academy; not a placement guarantee for this course. Names and logos identify employers; they do not imply endorsement or a hiring partnership.

BEFORE YOU ENROL

Your questions, answered

Is the Machine Learning Engineering course suitable for beginners?

This is an intermediate-level course. Learners should be comfortable with Python, pandas, and basic statistics.

What will I build during the course?

You will complete guided labs in every module and build two portfolio projects: Production Churn Prediction API and Risk Scoring ML System. Deliverables include working files or code, documentation, testing or evaluation evidence, and a final presentation.

Which tools and platforms are covered?

Key tools include Python, scikit-learn, MLflow, pandas, imbalanced-learn, XGBoost, LightGBM, and UMAP. Additional platforms are introduced in relevant modules through practical tasks, and the toolset may evolve as industry practice changes.

How long does the course take?

The course includes approximately 74 guided learning hours across 8 modules, delivered over 8 weeks.

Which career paths can this course support?

The curriculum supports the development of skills relevant to roles such as Machine Learning Engineer, Applied ML Engineer, and Junior Data Scientist. Career outcomes depend on prior experience, project quality, interview readiness and market conditions; employment is not guaranteed.

BEFORE YOU ENROL

Your questions, continued

Will I receive mentor and career support?

The course includes live instruction, lab support, assignment feedback, project reviews and career preparation covering portfolio development, CV writing, LinkedIn profile improvement, and interview guidance.

FEES & ADMISSIONS

Plan your next step

COURSE FEE

INR 35,000 + GST

EMI and easy instalments available

Duration	8 weeks
Level	Intermediate
Learning format	Live mentor-led learning
Batch starts	Expected Saturday / Sunday starts

Check the live Batches page for the next expected weekend. Confirm the exact date, class times and availability with admissions.

Book a free demo class >

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