# AI/ML Expert With Phitron Batch 01

Become an AI/ML Expert with Phitron

## Instructors

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## About this batch

Master Machine Learning, Deep Learning, Image Processing, Object Detection, and Natural Language Processing. Work under top university faculties and industry experts to build a standout thesis and publish a research paper, boosting your profile for higher studies. and develop projects ready to showcase on your resume to land your dream job.

# What you'll learn

## Python, Statistics, Math For Machine Learning

### Python Foundations & Workflow

- Install Python (Windows/Mac/Linux)
- Set up Virtual Environment (venv)
- Work with VS Code + Jupyter Notebooks
- Python data types & variables
- Control flow (if/else, loops)
- List & dictionary comprehensions
- Functions, *args & **kwargs, type hints
- File handling (CSV read/write, Pathlib)
- Errors & exception handling
- Mini-project: CSV cleaner skeleton
- Logging basics (debugging setup)
- Simple unit test with pytest

### NumPy, Pandas & Visualization

- NumPy arrays & data types
- Indexing, slicing & broadcasting
- Vectorization & performance tips
- Linear algebra quick tour
- Pandas DataFrame creation & indexing
- GroupBy, aggregate, apply & transform
- Merge, join, melt & pivot
- Handling dates, times & missing data
- Matplotlib basics (plots, subplots, styling)
- Seaborn for quick EDA

- ✓ Mini-lab: clean + join + plot dataset
- ✓ Week assignment notebook submission

## Data Cleaning, Feature Prep & EDA

- ✓ Data quality checklist
- ✓ Missing data patterns (MCAR, MAR, MNAR)
- ✓ Simple & group-wise imputation
- ✓ Outlier detection (IQR, z-score)
- ✓ Feature type fixing (dates, strings, categoricals)
- ✓ Scaling & normalization
- ✓ Encoding categoricals (one-hot, ordinal)
- ✓ Train-test-validation splits
- ✓ Question-driven EDA strategy
- ✓ Correlation heatmaps & caveats
- ✓ EDA report template & reproducibility
- ✓ Mini-project: full cleaning + EDA repo

## Linear Algebra, Probability & Statistics

- ✓ Vectors, matrices, tensors basics
- ✓ Matrix operations, norms & distances
- ✓ Projections & least squares
- ✓ Eigenvalues, SVD & PCA intuition
- ✓ Random variables, PMF, PDF, CDF
- ✓ Common probability distributions
- ✓ Conditional probability & Bayes rule
- ✓ Sampling, CLT intuition
- ✓ Hypothesis testing (t-test, chi-square)
- ✓ Correlation vs causation
- ✓ Gradient descent math & logistic regression

✓ Mini-lab: PCA + Logistic regression in NumPy

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