



TIME TO LEARN

Data Science & Machine Learning with Python

সম্পূর্ণ মেশিন লার্নিং কোর্স

(NEW Module)

Total Class: 23; **Total Hours:** ~50 hours

Class time: 9:00 PM, **Class Per Week:** 2

Total Fees: 7,000 BDT

Course Instructor:

Rashedul Alam Shakil

M. Sc. in Data Science

Friedrich Alexander University, Germany

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www.aiquest.org



Course Plan: Approx Duration: 50 Hours, Total Live Class: 23, Watch [Demo Class!](#)

Facilities: Live Class, Separate Classroom, Recording Class Access for Lifetime, Certificate

Any Questions? +8801704265972 (Call/WhatsApp)

Course Instructor:

[Rashedul Alam Shakil](#)

Founder of aiQuest Intelligence & [Study Mart](#)

M. Sc. In Data Science (Major Machine Learning)

FAU Erlangen Nuremburg, Germany

AiQuest.org – ML Module Summary

Module 01: Introduction to Data Science & AI

Module 02: Basics Python

Module 03: Regression Algorithms

Module 04: Feature Engineering

Module 05: Basics of Linear Algebra

Module 06: Statistics for Data Science

Module 07: Classification Algorithms

Module 08: ML Model Evaluation

Module 09: Unsupervised Learning [**Demo Class**]

Module 10: Hyperparameter Optimization

Module 11: Deep Learning & Neural Networks

Let's get into the details.....

Module 01: Introduction to Data Science & Artificial Intelligence (01 - Class & 2.0 hours plan)

- Introduction to Data Science & Artificial Intelligence
- Details Explanation & the Definition of –
 - Data, Information, Database, Data Warehouse
 - Machine Learning
 - Neural Networks
 - Supervised & Unsupervised Learning
 - Regression, Classification, Clustering
 - NLP, LLMs & Generative AI
- Future of AI
- Job Market Research
- Data Science Tools

Questions & Answer Session!

Module 02: Basic Python (02 - Class & 5.0 hours plan)

- IDE Installation
- Variables & Data Types
- Loops & Control Flow
- Functions
- Data Structures
- Intro to -
 - Pandas
 - Numpy
 - Matplotlib & Seaborn
- Discussion on –
 - Scikit-learn
 - Keras, TensorFlow & Pytorch

***Assignment on 100 Basic Python Problem Solving**

Questions & Answer Session!

Module 03: Regression Algorithms (04 - Class & 8.0 hours plan)

1. Linear Regression:

- Linear Equations
- Lines: Straight, Curve
- Terminologies: Slope/Gradient, Intercept
- Regularizations:
 - L1 Regularization / Lasso
 - L2 Regularization / Ridge
- Loss & Cost Functions:
 - MSE
 - MAE
 - RMSE
- In-depth Mathematical Intuition of Least Square Method
- Implementing Everything with Python, Pandas, Numpy & Sklearn
- **Complete the Assignment within the Deadline!**

2. Gradient Decent:

- Differential Calculus Basics
- Convex Vs. Non-convex Functions
- In-depth Mathematical Intuition of Gradient Decent for Regression
- Implementing Regression with Gradient Decent with Python & Numpy
- **Complete the Assignment within the Deadline!**

***Project on: Time Series Forecasting using Linear Regression**

3. K-Nearest Neighbors Regressor (KNN):

- Distance Algorithms & Norms
 - Manhattan Distance / L1 Norm
 - Euclidean Distance / L2 Norm
 - Minkowski Distance
- In-depth Mathematical Intuition of KNN Regressor
- Implementing Everything with Python & Sklearn
 - Project
- **Complete the Assignment within the Deadline!**

4. Bayesian Interface in Neural Networks (BNNs):

- Bayesian Interface
- Typical Neural Networks
- BNNs
- Typical Neural Networks Vs. BNNs
- Uncertainty Estimation
- Mathematical Foundation of BNNs:
 - Variational Distribution
 - Variational Posterior
 - True Posterior
 - KL-Divergence
 - Monte-Carlo approximation
 - Local Reparameterization Trick
- Python Implementations of BNNs for Regression
- *We will Learn it in Module no 09: Deep Learning*
- **I will Suggest some Playlists. Which are Important for Deep Learning & Bayesian NNs.**

Module 04: Feature Engineering (04 - Class & 8.0 hours plan)

1. Categorical Data Encoding:

- Type of Variables
- Measure of Central Tendency
- NaN Handling
- Label Encoder
- One Hot Encoder
 - Dummy Variable Trap
 - Multicollinearity Problem
- Binary Encoding
- Ordinal Encoding
- Implementing with Python & Pandas
- **Complete the Assignment within the Deadline!**

2. Feature Transformation / Data Scaling:

- Concepts of Scaling
- Standardization
 - Mean
 - Standard Deviation
 - Variance
- Normalization
- MaxAbsScaler
- Robust Scaler
 - Q1
 - Q2
 - Q3
 - IQR
- Power Transformation
- Log Transformation
- Implementing with Python & Pandas
- **Complete the Assignment within the Deadline!**

3. Text Data Preprocessing & Feature Extraction / Vectorizer:

- Tokenization:
 - Word tokens
 - Character tokens
 - Sentence tokens
 - Named entity tokens.
 - Part-of-speech (POS) tags
 - Sub-word tokens
- Text Normalization:
 - Stemming
 - Lemmatization
- Vectorizer:
 - Bag of Words / Count Vectorizer
 - TF Idf Vectorizer:

- Term Frequency
- Inverse Document Frequency
 - Word2Vec
- Implementation of Text Normalization with Python & NLTK
- Implementation of Vectorizer with Python & NLTK
- **Complete the Assignment within the Deadline!**

4. Feature Selection for High Dimensionality Reduction:

- Filter Methods
- Wrapper Methods
- Embedded Methods
- Implementation of Everything with Python
- We will also Learn PCA Concepts
- **Complete the Assignment within the Deadline!**

Module 05: Basics of Linear Algebra (01 Class & 2.50 Hour Plan)

- Vectors
- Matrix
- Matrix Operation
- System of Linear Equations
- Determinants
- Gaussian Elimination
- Crammers Rules
- Eigenvalues and Eigenvectors
- Calculation Principal Component Analysis Step by Step
- Implementation of Everything with Python
- I will Suggest One Video Series for Linear Algebra
- **Complete the Assignment within the Deadline!**

Module 06: Statistics for Data Science (01 Class & 2 Hour Plan)

- Various Data Distributions
- Probability Theory
- Hypothesis Testing
- Z Scores
- P Value
- Analysis of Variance – ANOVA
- When to use / Where to use?
- Boxplot Concepts
- Outlier Detection
- Implementation of Everything with Python
- **Complete the Assignment within the Deadline!**

Module 07: Classification Algorithms (07 Class & 14 Hours Plan)

1. Decision Tree:

- Entropy
- Information Gain
- Tree Pruning
- Gini
- In-depth Mathematical Intuition of Decision Tree
- Implementing Decision Tree with Python, Tree & Sklearn
- **Complete the Assignment within the Deadline!**

2. Logistic Regression:

- Concept of Sigmoid
- In-depth Mathematical Intuition of Logistic Regression
- Implementing Logistic Regression with Python & Sklearn
- **Complete the Assignment within the Deadline!**

3. Ensemble Learning:

- Random Forest
- ExtraTreesClassifier
- Gradient Boosting
- Extreme Gradient Boosting (XGBoost)
- Adaptive Boosting (AdaBoost)
- Implementing Everything with Python
 - Project
- **Complete the Assignment within the Deadline!**

4. KNN Classifier:

- We will learn KNN Classifier and KNN Regressor in the Same Class.
- Implementing Everything with Python
- **Complete the Assignment within the Deadline!**

5. Naïve Bayes:

- Bayes Theorem
- In-depth Mathematical Intuition of Naïve Bayes
- Implementing Everything with Python
- Project on NLP
- **Complete the Assignment within the Deadline!**

6. Support Vector Machine (SVM):

- Hyperplane
- Support Vectors
- Hard Margin
- Soft Margin
- SVM Kernel Tricks
 - Radial Basis Function (RBF) Kernel
 - Linear Kernel
 - Sigmoid Kernel
 - Polynomial Kernel

- In-depth Mathematical Intuition of SVM
- Implementing Everything with Python
 - Project
- **Complete the Assignment within the Deadline!**

Module 08: ML Model Evaluation (01 Class & 02 Hours Plan)

- Confusion Matrix
- Accuracy
- Precision
- Recall
- F1-Score
- Area Under the Curve (AUC)
- Receiver Operating Characteristics (ROC)
- Calculating R Squared Value for Regression
- Implementing Everything with Python
 - Project
- **Complete the Assignment within the Deadline!**

Module 09: Unsupervised Learning (01 Class & 02 Hours Plan) [Watch Class]

- Unsupervised Learning Concepts
- Market Basket Analysis
- K-Means Cluster Algorithm
- Elbow Method for Optimal Cluster
- In-depth Mathematical Intuition of K-Means
- Implementing Everything with Python
 - Project
- **Complete the Assignment within the Deadline!**

Module 10: Hyperparameter Optimization (01 Class & 02 Hours Plan)

- Concept of ML Model Optimization
- Pre-Pruning
- Post-Pruning
- Grid Search
- Random Search
- Bayesian Optimization
- Implementing Everything with Python
 - Project
- **Complete the Assignment within the Deadline!**

Module 11: Deep Learning & Neural Networks (02 Classes & 04 Hour Plan)

- Concepts of Perceptron
- Perceptron Vs. MLPs
- Neural Network Architecture
- Activation Functions
- Optimizer
- ANNs Architecture
- Convolutional Neural Network – CNNs
- In-depth Discussion
- Bayesian Neural Network (Module: 03.04)

Guidelines for Future Research / Jobs / Study Abroad:

- Qualification Testing
- Job Searching
- CV Making Formats
- Resource Sharing for Further Learning

Note: We will increase the number of classes if required. After Completing this course, you will be able to understand everything which is mentioned in the module. You must submit all the assignments & projects to get course certificate.

How to Enroll?

Join Our Facebook Group: [Join Now!](#)

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