



# Course Brochure: Artificial Intelligence (AI) & Machine Learning (ML) with Python

## Course by:

**IT Business Incubator, CUET**

Chattogram-4349, Bangladesh.

Website: [itbi-cuet.com](http://itbi-cuet.com)

Last Updated: 1 September 2026

## Summary

| No. | Particulars          | Information                                            |
|-----|----------------------|--------------------------------------------------------|
| 1   | Course Duration      | 78 Hours (26 Sessions, 13 Weeks)                       |
| 2   | Course Fee           | BDT 12,000                                             |
| 3   | Course Certification | Certificate awarded by IT Business Incubator, CUET     |
| 4   | Eligibility          | Above HSC, Basic Programming Knowledge                 |
| 5   | Lab Facilities       | Required lab facilities will be provided by ITBI, CUET |

## Schedule

Offline Batch: Friday & Saturday 10 am to 1 pm

Online Batch: Friday & Saturday 7 pm to 10 pm

## Coordinator & Master Trainer

**Professor Dr. M. Moshikul Hoque**

Professor, Dept of CSE, CUET

Director, IT Business Incubator, CUET

Director, Institute of Information and Communication Technology (IICT), CUET

Former Dean, Faculty of Electrical & Computer Engineering, CUET

Former Chair, IEEE Bangladesh Section

## Trainers

**Md. Asif Iqbal**

Sr. Assessment Developer, Workera.ai

Head of R&D, Diligite Ltd

Trainer, BDSET Project (AI & ML), BHTPA.

**Fatima Jahara**

Alpha Testing Consultant, DeepLearning.AI

**Dipon Talukder**

Sr. Assessment Developer, Workera.ai

Adjunct Lecturer, Dept. of CSE, East Delta University

Trainer, EDGE IICT CUET DST

**Md. Refaj Hossan**

Lecturer, Dept. of CSE, CUET



## Learning Outcomes

By the end of this course, participants will:

- Gain proficiency in essential AI concepts, including machine learning, NLP, and computer vision, to enhance employability.
- Develop foundational skills in probability, statistics, basic linear algebra, and programming necessary for AI applications.
- Engage in in-depth sessions covering AI fundamentals, machine learning algorithms, NLP techniques, and computer vision principles.
- Apply acquired knowledge and skills to real-world problems through a capstone project, preparing for internships and job opportunities in the AI industry.

## Course Modules

This course is divided into the following six modules to address the concept of AI better.

- 1) AI & ML Essentials
- 2) Artificial Intelligence
- 3) Machine Learning
- 4) Natural Language Processing (NLP)
- 5) Computer Vision
- 6) Capstone Project

### Module - 1: AI & ML Essentials

| No. | Topic                                | Session Duration (Hours) |
|-----|--------------------------------------|--------------------------|
| 1.  | Basics of Probability and Statistics | 3                        |
| 2.  | Basic Linear Algebra                 | 3                        |
| 3.  | Basic Programming Skills             | 8                        |

### Module - 2: Artificial Intelligence

Artificial Intelligence (AI) refers to the simulation of human intelligence processes by machines, especially computer systems. It involves the development of computer systems that can perform tasks that typically require human intelligence, such as understanding natural language, recognizing patterns, solving complex problems, learning from experience, and making decisions. AI aims to create systems that can mimic human cognitive functions and automate tasks that would normally require human intelligence.

AI is based on four fundamental concepts: Machine Learning, Deep Learning, Natural Language Processing (NLP), and Computer vision. Artificial Intelligence short courses should be focused on these subjects.



| No. | Topic                                                         | Session Duration (Hours) |
|-----|---------------------------------------------------------------|--------------------------|
| 1.  | Introduction of AI and background: What is AI? Related fields | 1                        |
| 2.  | Preparatory Classes on Python for AI & ML                     | 3                        |
| 3   | Data Preprocessing with Python (Lab)                          | 3                        |
| 4.  | Data Visualization with Python Library (Lab)                  | 3                        |

### Module - 3: Machine Learning

Machine learning is concerned with the question of how to make computers learn from experience. The ability to learn is not only central to most aspects of intelligent behavior, but machine learning techniques have become key components of many software systems. For example, machine learning techniques are used to create spam filters, analyze customer purchase data, or detect fraud in credit card transactions. The field of Machine Learning, which addresses the challenge of producing machines that can learn, has become an extremely active, and exciting area, with an ever-expanding inventory of practical (and profitable) results, many enabled by recent advances in the underlying theory. This course will introduce the fundamental set of techniques and algorithms that constitute machine learning.

| No. | Topic                                      | Session Duration (Hours) |
|-----|--------------------------------------------|--------------------------|
| 1.  | Introduction, Learning Paradigms           | 3                        |
| 2.  | Concept Learning                           |                          |
| 3.  | Bayes Classifier                           | 3                        |
| 4.  | k-Nearest Neighbor (Lab)                   |                          |
| 5.  | Regression Model (Lab)                     | 3                        |
| 6.  | Decision Tree (Lab)                        | 3                        |
| 7.  | Ensemble Learning, Boosting (Lab)          |                          |
| 8.  | Support Vector Machines with kernels (Lab) | 3                        |
| 9.  | Dimensionality Reduction (Lab)             |                          |
| 10. | Unsupervised Learning, Clustering (Lab)    | 3                        |
| 11. | Classifier Evaluation (Lab)                |                          |
| 12  | Neural Networks, Perceptron (Lab)          | 6                        |



#### Module - 4: Natural Language Processing (NLP)

| No. | Topic                                     | Session Duration (Hours) |
|-----|-------------------------------------------|--------------------------|
| 1.  | Fundamentals of NLP                       | 3                        |
| 2.  | Tokenization and text preprocessing (Lab) |                          |
| 3.  | Language modeling (Lab)                   | 3                        |
| 4.  | Text classification (Lab)                 | 3                        |
| 5.  | Named entity recognition (Lab)            |                          |
| 6.  | NLP applications                          |                          |

#### Module - 5: Computer Vision

| No. | Topic                                      | Session Duration (Hours) |
|-----|--------------------------------------------|--------------------------|
| 1.  | Introduction to Computer Vision            | 3                        |
| 2.  | Image preprocessing and augmentation (Lab) |                          |
| 3.  | Deep Learning Model with TensorFlow (Lab)  | 3                        |
| 4.  | Detection and Recognition Concepts (Lab)   | 3                        |
| 5.  | Image classification (Lab)                 |                          |
| 6.  | Convolutional neural networks (Lab)        | 3                        |

#### Module - 6: Capstone Project

| No. | Topic                                                     | Session Duration (Hour) |
|-----|-----------------------------------------------------------|-------------------------|
| 1.  | Breast Cancer Classification                              | 3                       |
| 2.  | Binary, Multi-class, and Multi-label Image Classification |                         |
| 3.  | Semantic Similarity                                       | 3                       |
| 4.  | Object Detection and Recognition                          | 3                       |



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## AI Tools and Libraries

- Introduction to AI frameworks (TensorFlow, PyTorch, etc.)
- Using pre-trained models
- Hands-on programming and implementation

## Book Recommendation

- 1) **The Hundred-Page Machine Learning Book** by Andriy Burkov
- 2) **Hands-On Computer Vision with TensorFlow 2: Leverage deep learning to create powerful image processing apps with TensorFlow 2.0 and Keras**, by Benjamin Planche, Eliot Andres.

## Contact Information

Course Coordination Team

IT Business Incubator, CUET

3<sup>rd</sup> Floor, Multipurpose Building

Phone: +88 01731-711434, +88 01980-314972

Email: [itbicuet@gmail.com](mailto:itbicuet@gmail.com) | [training@itbi-cuet.com](mailto:training@itbi-cuet.com) | [itbi@cueta.ac.bd](mailto:itbi@cueta.ac.bd)