Shaikh Kamal IT Business Incubator
Chittagong University of Engineering & Technology (CUET)

diligite

Course Outline: Artificial Intelligence (AI) & Machine Learning with Python

Course by:

Sheikh Kamal IT Business Incubator, CUET
Chattogram-4349, Bangladesh.

Course Summary

No.	Subject	Comments
1	Course Duration	72 Hours (24 Classes, 12 Weeks)
2	Pre-requisites	Yes (Probability and Statistics, Linear Algebra (basics), Programming Knowledge (in Python).
3	Lab Facilities	SKITBI, CUET will provide.
4	Special Device	Depends on Capstone Project.

Schedule

Batch - 01 (Online): Friday & Saturday 10 am to 1 pm
Batch - 02 (Offline): Friday & Saturday 3 pm to 6 pm

Coordinator

Professor Dr. M. Moshiul Hoque
Professor, Dept of CSE, CUET
Director, Sheikh Kamal IT Business Incubator in CUET
Former Dean, Faculty of Electrical & Computer Engineering, CUET
Chair, IEEE Bangladesh Section

Trainers

MD. Asif Iqbal
Assessment developer, Workera.ai
Head of R&D, Diligite Ltd
Trainer, BDSET Project (AI & ML), BHTPA.

Dipon Talukder
Data & AI Specialist, Workera.ai

Saadman Sakib
Faculty member, Dept of CSE, CUET

Md. Mosharraf Hossain
CEO, Diligite Ltd.
Trainer, 8IT Project, BHTPA.

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) The Pre-Requisites Session
2) Artificial Intelligence
3) Machine Learning
4) Natural Language Processing (NLP)
5) Computer Vision
6) Capstone Project

Module - 1: Prerequisites Session

No.	Topic	Session Duration (Hour)	Resource Person
1.	Basics of Probability and Statistics	2	
2.	Basic Linear Algebra	2	
3.	Basic Programming Skills	4	

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 (Hour)	Resource Person
1.	Introduction of AI and background: What is AI? Related fields	2	
2.	Preparatory Classes on Python for AI & ML	2	
3	Data Preprocessing with Python (Lab)	2	
4.	Data Visualization with Python Library (Lab) Data Visualization with Tableau (Lab)	4	

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 (Hour)	Resource Person
1.	Introduction, Learning Paradigms	2	
2.	Concept Learning		
3.	Bayes Classifier	2	
4.	k-Nearest Neighbor (Lab)		
5.	Regression Model (Lab)	2	

6.	Decision Tree (Lab)	2	
7.	Support Vector Machines with kernels (Lab)	2	
8.	Dimensionality Reduction (Lab)		
9.	Ensemble Learning, Boosting (Lab)	3	
10.	Unsupervised Learning, Clustering (Lab)	2	
11.	Classifier Evaluation (Lab)		
12	Neural Networks, Perceptron (Lab)	2	

Module - 4: Natural Language Processing (NLP)

No.	Topic	Session Duration (Hour)	Resource Person
1.	Fundamentals of NLP	2	
2.	Tokenization and text preprocessing (Lab)		
3.	Language modeling (Lab)	2	
4.	Text classification and sentiment analysis (Lab)	2	
5.	Named entity recognition (Lab)	2	
6.	NLP applications		

Module - 5: Computer Vision

No.	Topic	Session Duration (Hour)	Resource Person

1.	Introduction to Computer Vision	2	
2.	Image preprocessing and augmentation (Lab)		
3.	Detection and Recognition Concepts (Lab)	2	
4.	Image classification (Lab)		
5.	Convolutional neural networks (Lab)	2	
6.	Deep Learning Model with TensorFlow (Lab)	2	

Module - 6: Capstone Project

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

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.

Frequently Asked Questions (FAQ)

Can I register for multiple courses?
-Yes, participants can register for multiple courses.

Will there be an overlap in class schedules for multiple courses
-There may be minimal overlap in class schedules, Please check the routine available at the notice board.

What are the available payment methods for online enrollment?
-Payment can be made via cash or online using the "Bkash to Bank" option.

Are there evening batches available for job holders?
-Yes, evening batches will be available. Please check the routine available on the notice board of the website.

Can I switch between online and offline classes?
-Online and offline classes are separate batches, and transfer depends on seat availability.

How will admission be confirmed?
-Admission will be confirmed upon payment; no separate admission exam will be conducted.

Will classes be conducted in locations other than the chosen one?
-No, classes will only be conducted at the chosen location, not in other cities.

What is the profile of the trainers?
-Faculty members will include both academic and industry experts.

What is the last date of enrollment?
-There is no last date of admission. After filling out the batches, enrollment will be closed.

Can I admit physically?
-Yes, Come to the third floor (Room no: 301,302) at the Multipurpose Building of Sheikh Kamal IT Business Incubator, CUET.

Will classes be held during Ramadan?
-Yes, they will.

Will a recorded version be available?
Yes, you will get lifetime access to the recorded version of the classes.