NUST

PAKISTAN NAVY
ENGINEERING COLLEGE

JAUHAR

PDC
NUST-PNEC

# AI AND MACHINE LEARNING USING MATHEMATICS AND PYTHON

## INTRODUCTION:

AI STEM course will provide immersive experience for participants to the emerging trend of AI and Machine Learning through interactive teaching and team working. The aim is to ignite a passion for STEM, equipping students with foundational engineering skills while fostering creativity and innovation. This camp is a unique opportunity for young minds to become technically proficient and develop a strong understanding of engineering principles. Join us for a week of fun, learning, and discovery, and take the first step towards a future in STEM.

The contents cover will be
- **What is AI**

What do we mean by Artificial Intelligence?
- **What AI Does Well and Does Not**

Exploration of AI in Action
- **How Does AI Works**

Introduction to Algorithm and its implementation
Mathematical Magic behind AI
Software implementation using Python
- **How Do Machines Learn**

Basics of Machine Learning
Machine Learning using Python and its different libraries
Basics of Deep Learning
DL implementation using Neural Networks
- **Hardware implementation**

Introduction to hardware boards
Hands-on sensor interfacing
Practical Implementation of ML on hardware
Final Project

The course has been designed considering the emerging field of STEM (Science, Technology, Engineering and Math) being the core and most effective way to engage students in high-level thinking, and problem-solving skills. Moreover, the experimental implementation will provide the opportunity to obtain hands-on experiences to gain meaningful learning in the engineering aspect.

The course will start from the science perspective with data science, artificial intelligence and machine learning using essentials of mathematics such as linear algebra & calculus followed by both software implementation using Python language and hardware platforms such as Arduino and Raspberry boards.

The course is divided into four essential components

1. Artificial Intelligence, Machine Learning and its Applications – 2 x weeks
2. Mathematics for Data Science and Machine learning – 2 x weeks
3. Software Implementation using Python – 2 x weeks
4. Hardware Implementation using Arduino and Respberry Pi – 2 x weeks