Frequently Asked Questions (**FAQ**) for Artificial Intelligence (**AI**) **Deep Dive course** at

Bedrock4™ A.I.

This document consists of responses for most frequently asked questions from prospective candidates who are planning to take up the AI Deep Dive course available at Bedrock4AI. If there is any further clarification needed beyond the responses provided in this document, please contact us directly.

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Our Team

Bedrock4AI is run currently by a small but highly competent team. Firdaus Fraz (LinkedIn) is the **Founder and the Chief Instructor**. After working for more than 10 years in companies like Oracle and Simeio Solutions, she has been a pioneering STEM educator since 2017. She is currently pursuing Statistics and Data Science Micro Masters from Massachusetts Institute of Technology (MIT).

Firdaus is assisted by another professional who is an **acting CTO for Bedrock4AI**. He has been in IT industry for more than 20 years and is currently a Cloud Security Strategist with Oracle. He also holds M.S. from IIT Madras.

Third person on the team is a member of Bedrock4AI in an **advisory** role. She is a professor in a reputed engineering college in New Delhi with 24 years of work experience. She also holds M.Tech. from IIT Delhi and PhD from Jamia Millia Delhi. Being an expert in multiple computing technologies, she has done impressive research work in cutting edge technology (Google Scholar citations).

In case if anyone is interested in talking directly with Firdaus' extended team, they will be available on demand, for a phone conversation.

Why Bedrock4AI?

Numerous courses are available in India, mostly as summer programs to teach Computer Programming, Robotics Robotics and AI. None of these courses are doing required justice in setting up the foundation concepts within a child, on the top of which she can plan to become a future expert in AI. An ideal course should comprise of a comprehensive curriculum which starts ground up and gradually grows the bedrock of relevant concepts of programming, algorithms, mathematics, data analysis and data science in a child's brain. This is exactly the purpose of AI Deep Dive course available at Bedrock4AI.

Even CBSE is working on the same pattern by introducing AI as a skill subject (check details) so that a child can study it from Grade 8 to Grade 12, investing 5 precious years.

What do you gain?

Bedrock4AI AI Deep dive course benefits the participants in the following manner:

- Provides a solid foundation of relevant concepts to those who want to build a career in future, in AI. Also through practical exposure and project work, we will help such children build an impressive profile for future college admissions.
- Any field today or in future will be leveraging AI. This course will help those become strongly acquainted with AI, who are inclined towards non-computing streams in future, like Music, Healthcare etc.

Course Details

Structure of Bedrock4AI AI Deep dive course is as follows - There are four dimensions of AI exploration which will be covered in each and every session, during first phase:

Concept - Session will begin with this section, where a particular concept of AI will be covered. E.g. What is Computer Vision, or How does AI help us build Smart Cities etc.

Activity - This part of the session will help students practically understand and appreciate the application of AI - by walking thru and playing a game which other experienced professionals (say, from Google) have built and published on internet, or walking thru an experiment which uses AI. This part of the session may also include a classroom activity like building an idea of smart home/city etc. Additionally, the experiments/ demos which are built using AI, but for topics from other domains like Physics, Maths, English (Story reader), Biology etc. will also be covered in this section

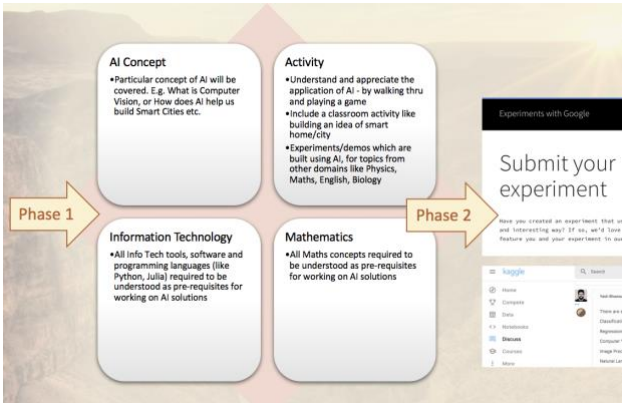
Mathematics - All Maths concepts required to be understood as pre-requisites for working on AI solutions are included here.

Info Tech - All Info Tech tools, software and programming languages (like Python, Julia) required to be understood as pre-requisites for working on AI solutions are included here.

Phase 1 could take anytime from 6 months to a year, or even more than that, for very young children. Once Phase 1 is complete and a student is comfortable with the idea of AI, we will commence Phase 2 - which will involve working on a near real life project based on Machine Learning or Deep learning. If the work done is impressive, we could target submissions to google experiments or participation in Kaggle competitions.

Special attention would be provided to younger students of Grade 6/7-

- We will go slow on the concepts and ensure they take their time to grasp.
- We will focus in a more detailed manner on concepts of python programming, statistics etc. as they would not be as much aware of these topics as the grade 10 or 12th students.
- A number of concepts will be skipped for them, e.g. Calculus in Maths etc. The knowledge sharing for ML would be adjusted consequently.
- Even during hands on, unless a student is comfortable working on practicing Machine Learning Algorithms independently, we will be executing most of the things and demonstrating.



Curriculum

Course content for Deep Dive AI is comprehensive, phase 1 consists of (but not limited to) the following topics:

AI Concept
What is AI and not AI, History of AI
All Major sub-areas of AI
Smart Homes, Smart Cities
In which industries AI is applied, what is AI job skillset?
AI Ethics
AI Project cycle
Overview
Problem Scoping
Data Acquisition
Data Exploration
Modeling
Evaluation (Model)
Rollout
Data Science and Machine Learning
Working with scikit-learn package
Data Preprocessing
Supervised, Unsupervised Reinforced Learning
Regression, Classification Clustering, Anomaly Detection, Market Basket Analysis, Time Series
Algorithms - KMeans, KNN, Support Vector Machine
Algorithms - Decision Tree, Random Forest, Ensemble Learning
Principal Component Analysis
Recommendation systems (Amazon, Netflix) – User based, Item based Filtering.
Pre-requisite technical concepts for Processing Images, Speech, Text
Deep Learning
Working with keras package and Tensorflow
Artificial Neural Network
Computer Vision
Computational Neural Network
Natural Language Processing
Speech Recognition

AI Activity
Game - Rock, Paper, Scissors https://www.afiniti.com/corporate/rock-paper-scissors
Game - Mystery Animal https://experiments.withgoogle.com/mystery-animal
Game – Emoji Scavenger Hunt https://emojiscavengerhunt.withgoogle.com/
Game - Rock, Paper, Scissors https://www.afiniti.com/corporate/rock-paper-scissors
Smart Home Design
Smart City Design
Understanding Google story speaker https://www.youtube.com/watch?v=wsrzvYYvhH8
Teachable Machine https://teachablemachine.withgoogle.com/
https://quickdraw.withgoogle.com/
https://experiments.withgoogle.com/ai/drum-machine/view/
https://experiments.withgoogle.com/semantris
https://tinyurl.com/discanimal
https://en.akinator.com/
https://experiments.withgoogle.com/mixlab
https://experiments.withgoogle.com/collection/voice
https://experiments.withgoogle.com/collection/experimentsforlea
https://www.readyai.org/
https://experiments.withgoogle.com/collection/ar
https://botsify.com/
Infinite Drum Machine: https://experiments.withgoogle.com/ai/drum-machine/ https://youtu.be/9x-_My5yjQY
https://autodraw.com
https://interestingengineering .com/ai-might-be-the-future- for-weather-forecasting Data → http://www.imd.gov.in
https://lembergsolutions.com/blog/how-ai-can-help-monitor-han hygiene-compliance
https://datavizcatalogue.com/
Google maps effective use of AI → https://maps.google.com

Maths Concepts **for students>=Grade 8**
Linear Algebra
Simultaneous Equations
Linear and Quadratic functions
Analyzing Graphs
Vectors and Matrices
Geometrical Analysis
Calculus
Differentiation
Integration
Optimization using Calculus
Probability
Set Theory, Events and Outcomes
Conditioning and Bayes Theorem

Maths Concepts for students>=Grade 8
Probability
Permutations and Combinations
Probability Mass Functions and Discrete Random variables
Variance, joint and conditional PMF
Probability Density Functions
Normal Distribution and Central Limit Theorem
Statistics
Data Analysis fundamentals
Measure of Central Tendency, Percentile, Quartile
Measure of Dispersion
Frequency Distributions, Graphs and Plots
Predictive Modeling – Correlation Regression, Ordinary Least Square, Gradient Descent, r-squared, Polynomial Regression, Multivariate Regression

Maths Concepts for students < Grade 8
Linear Algebra
Probability basics
Statistics – Data Analysis fundamentals, Measure of Central Tendency & Dispersion

Info Tech Concepts
Microsoft Excel
Data manipulation
Customized formatting rules
Charts
Formulae
Python
Setting up Anaconda Jupyter
Programming fundamentals
Datatypes, variables, operators, Branching, loops, String Handling
Functions, Scoping, Iteration and Recursion
Datastructures
Implementing Searches
Exception handling
Testing, Debugging
Object Oriented Programming
Algorithm complexity
Python based packages used for ML
Numpy, scipy, pandas, matplotlib
Scikit-learn, keras API
Introduction to Julia

Phase 2 of this course will mainly involve working on near-real life problems that can be solved through ML and/or Deep Learning.
Every week 2 hours of classes will be conducted with the trainer driving the session, but the learning and interaction will be intensified with the use of Google classroom, which will be hosting regular assignments and quizzes. Please navigate to this demo to understand more about how we plan to use Google classroom.

Recognition

The efforts devoted by participants in attending this course, would be recognized and they will be provided with gleaming certificates:

Assumption is that Phase 1 will take 4 semesters/2 years, but if exceptional students are grasping faster, we will move them to a separate batch which will execute much faster.

- Those who will successfully finish Phase 1, **Semester 1 (first 6 months)**, will get a certificate for being ***AI Enthusiastic Learner***.
- Once Phase 1, **Semester 2** finishes, certificate of ***Active AI Practitioner*** will be awarded.
- After Phase 1, **Semester 3**, certificate of ***Proficient AI scholar*** is granted.
- After Phase 1, **Semester 4**, certificate for ***AI Expert*** will be granted.
- If a child enters **Phase 2** of the course, and carries out impressive work in Projects, she will be granted the certificate – ***AI Rockstar***.

Additionally, we will work with every participant to capture their AI exploration journey, on our YouTube channel. This could prove as a helpful asset to be included in their profile when they are applying for admission to reputed universities.