

# Artificial Intelligence Track Overview

Comprehensive Introduction to AI Concepts & Practical Application



## Program Goal

Master core AI concepts & build practical mini-projects to solve real-world problems.



## Core Topics

Search

KR

ML

Deep Learning

NLP

AI Ethics



## Two-Phase Learning Approach

A blended model combining flexible **Online Foundational** learning with intensive **Offline Project Application**.

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# Phase 1: Foundational & Core Concepts (Months 1 & 2)

## Month 1: AI Foundations & Problem Solving

The first month establishes the critical bedrock for understanding Artificial Intelligence. Participants will delve into core AI concepts, develop robust problem-solving methodologies, and acquire the essential programming proficiency in Python required for advanced AI development.



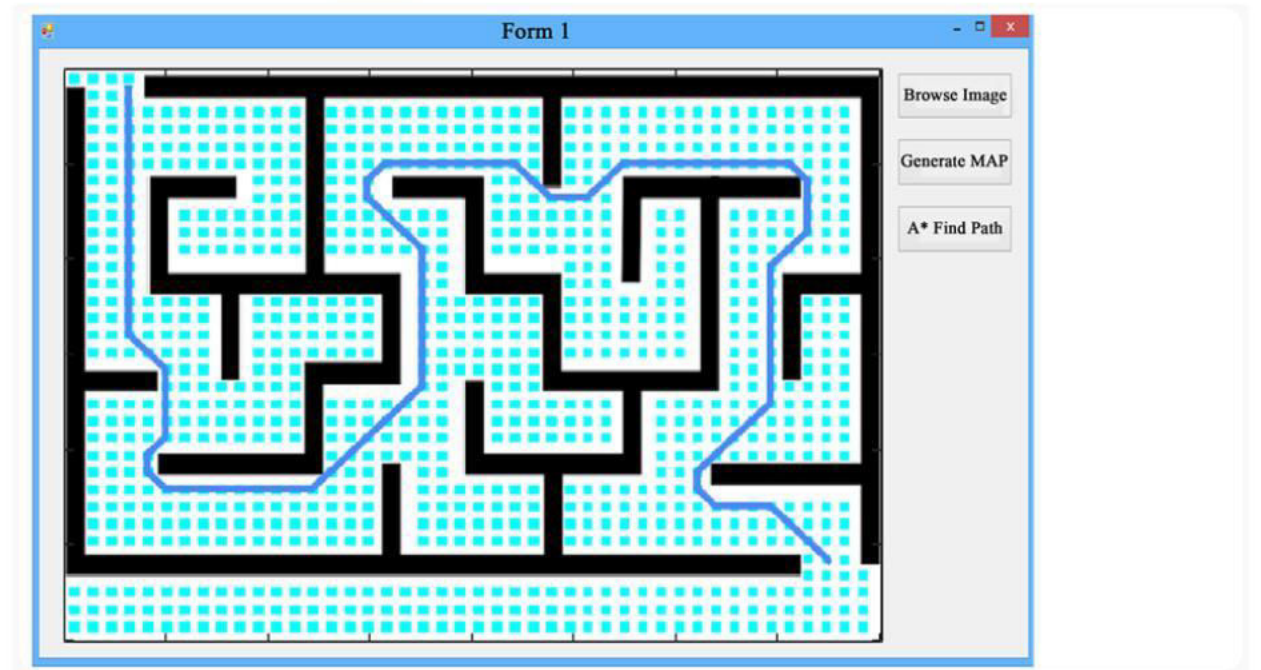
### Week 1: Introduction to AI & Intelligent Agents

**Concepts:** Grasp fundamental AI principles, agent architectures, and environments. Develop essential skills with `Python for AI`.



### Week 2: Uninformed Search Algorithms

**Algorithms:** Master systematic problem-solving using `BFS` to find shortest paths and `DFS` for deep exploration.



### Week 3: Informed Search Algorithms

# Phase 1: Knowledge, Learning & Language Basics (Months 1 & 2)



## Month 2 Goal: Deepening AI Understanding

This month marks a significant pivot into core modern AI paradigms. Participants will be introduced to the fundamental concepts of Machine Learning, delve into the architecture and function of Neural Networks, explore the foundational aspects of Natural Language Processing, and build a strong understanding of Knowledge Representation strategies. This phase is crucial for developing practical AI applications.

5

Week 5

6

Week 6

7

Week 7

8

Week 8



### Knowledge Representation & Reasoning

**Formalizing Intelligence:** Learn how to represent knowledge in a structured, machine-readable format, enabling AI systems to reason and make intelligent decisions.

**Key Concepts:** Explore **Logic & Inference** and discover the role of **Ontologies** in defining concepts, properties, and relationships for sophisticated knowledge systems.



### Machine Learning Foundations

**Learning from Data:** Gain a comprehensive understanding of Machine Learning (ML), the field dedicated to enabling systems to learn from data without explicit programming.

**Core Paradigms:** Differentiate between **Supervised** vs. **Unsupervised** learning and explore foundational algorithms like **Regression** & **Decision Trees**.



# Phase 2: Project Application & Industry Immersion (Month 3)

## Month 3 Goal: Capstone Mini Project & AI Ethics



Month 3 is dedicated to translating theoretical knowledge into tangible AI solutions. Participants will embark on a **Capstone Mini Project**, applying learned principles to real-world challenges, while critically engaging with the **ethical implications** of AI development.



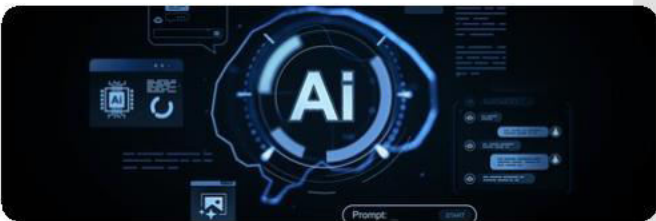
### Project Kick-off & Definition

The initial phase of your capstone project involves clearly defining the scope and objectives. This includes outlining functionalities, desired outcomes, and key performance indicators.



### Project Options

Teams choose between a **Chatbot** or **Image Recognition** system to apply AI principles in high-impact domains.



**Chatbot Focus:** Leverages NLP for text generation and intelligent conversational agents.



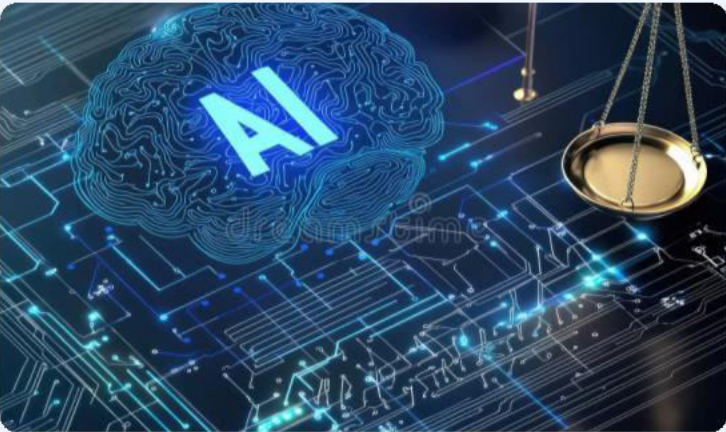
### Team Formation & Mentor Allocation



### Data Acquisition & Preparation



### Focus Area: AI Ethics



**Responsible AI Development:** AI Ethics is a fundamental component, integrated to ensure responsible development and deployment of AI technologies.

**Key Ethical Considerations:** Topics covered include bias in AI, fairness, accountability, transparency, and the societal impact of AI systems.

**Dedicated Learning:** IBM SkillsBuild offers a dedicated 'AI Ethics' module (1h 45m), underscoring its importance in practical AI

# Phase 2: Model Design, Development & Ethics (Month 3)

## Month 3: Bringing AI Models to Life with Ethical Responsibility



The third month shifts focus from foundational concepts to the practicalities of **AI Model Design and Development**, culminating in **hands-on iterative optimization**. Crucially, this phase deeply integrates **AI Ethics**, ensuring responsible and impactful AI creation for real-world applications.



### Week 10: Model Design & Development

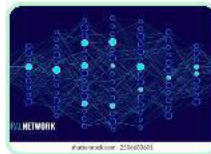
#### Dialogue Flow Design



Delve into designing interactive AI experiences. This involves mapping out **dialogue flows**, defining user intents, and response generation. NLP models work by finding relationships between the constituent parts of language.

#### CNN Architectures for Vision

Explore **CNN architectures**, fundamental to computer vision. Understand how CNNs learn hierarchical features from visual data, from basic edges to complex objects. Deep learning models can be pretrained on large amounts of data.



#### Hands-on Iterative Development

Engage in practical, hands-on development. This includes **prototyping, testing, and continuous refinement** of models to enhance performance, efficiency, and robustness for real-world problem-solving.



### Week 11: AI Ethics & Applications



#### Key Ethical Considerations in AI



**Bias:** Identifying and mitigating algorithmic bias for equitable outcomes.

**Fairness:** Designing AI systems that treat all individuals and groups fairly.

**Accountability:** Establishing clear responsibility for AI decisions and actions.

**Transparency:** Promoting explainability in AI models.

#### Applying Ethical Principles

Translate ethical theory into practice within AI projects. This involves embedding ethical design from data collection to deployment to build **'human-centric AI for societal good'** and promote 'trusted choices' in AI systems, guiding every stage of development.

# Phase 2: Project Showcase & Career Launchpad (Month 3)

## 🚩 Month 3: The Program Culmination & Your Future Launch

The final month is dedicated to showcasing your mastery, bridging the gap between learning and professional application, and preparing you for a successful career in AI. It culminates in a formal recognition of your achievements.



### Week 12: Final Project Presentation to Panel



#### Demonstrating Expertise:

Present your Capstone Mini Project



### Your Career Launchpad

#### Career Development Workshops:



#### Resume Enhancement:

Crafting impactful, AI-focused resumes.



#### Portfolio Development:

Curating and showcasing your AI projects effectively.



#### LinkedIn Optimization:

Building a strong professional



### Graduation & Certification



**Formal Recognition:** An official ceremony celebrating your successful completion of the