



ARTIFICIAL INTELLIGENCE - I

Foundation Skills for Artificial Intelligence (FSAI)

Program Uniqueness

1. First of its kind Skill Development Portal, thus, live interactive sessions
2. Program taught end to end by IIT Kanpur Faculty
3. Query sessions : 6 hours
4. Most Unique Boot Camp : Get assessed as per the HR norms of companies
5. Program Fee Subsidized i.e. $\frac{1}{2}$ or $\frac{1}{4}$ th. the cost of any similar hybrid, blended course anywhere in the world
6. Certification by IIT Kanpur & Innovation & Research Foundation
7. One day at IIT Kanpur as part of relevant event
8. Self Learning time of 9 hours / week includes 3 hours on the IIT K portal
9. All 3 components : Know How, Do How & Show How (Others mostly cover know how, less on Do How, Show How is totally missing)

Synopsis

The India, with its 30% population as youth (18-25 years) has tremendous potential to develop into the hub of expert workforce for the world. This can be fulfilled through skill development for everyone in that age bracket across the region. But, the access of various sections of population to such skill development activities limits the potential of the youth. Another intriguing choice for such population cross-section is the lack of guidance on the type of skills to be developed so that they can be relevant and competent in the global market.

The solution to this tricky problem lies in the intelligent usage of Information and Communication Technology (ICT) to deliver quality skill education opportunity to this population. The main purpose of such intervention is to provide the fundamental knowledge (know-how) to the participants so that they can understand relevant concepts for further development of their Skills in it (do-how). However, mere skill development will not suffice because to be industry relevant; one should be able to demonstrate their ability to put the skills into practice (show-how). In this regard, Indian Institute of Technology Kanpur (IITK) propose the development and delivery of cutting edge skill oriented courses, e.g. (i) analytics for business decisions, and (ii) artificial intelligence for business applications.

Course Description

Artificial intelligence (AI) focuses on realizing intelligent human behaviors on a computer, where the ultimate goal is to make a computer that can learn, plan, and solve problems autonomously. The main purpose of this course is to provide the fundamental knowledge (know-how) to the participants so that they can understand the concept of AI and further develop their Skills in it (do-how). Since the course content is vast, theoretic proofs and formal notations are eliminated (or minimized) as far as possible, so that participants can develop skills and put their skills into practice (show-how). This course is the first course of the series, which has minimal pre-requisites. However, exposure to computer programming in the form of a formal course, understanding of basic probability & statistics in the form of a formal course, and some exposure to business decision making are the pre-requisites.

Goals and objectives

The course aims providing an understanding about the human decision making where many cognitive tasks that people can do easily and almost unconsciously but that are extremely difficult to program on a computer. Artificial intelligence is the problem of developing computer systems that can carry out such tasks (or at least mimic the human decision making process). This course will cover the basics of AI so that further skill buildings are based on the fundamentals learnt in this course.

- Programming capabilities using LISP
- Programming capabilities using ProLog
- Scripting capabilities using Python to solve simple AI problems

Learning Activities

The first part of this course will be learning-based, requiring participants to embrace the concept of Artificial Intelligence. We will go through all major aspects of AI, especially the traditional AI that is based on the knowledge representation, and the more recent statistical AI that is based on automated extraction of patterns from data. The major topics are as follows.

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- Introduction to AI, Agents, Environment
- Problem formulation techniques
- Problem solving by search
- Uninformed search
- Informed search
- Review of probability and statistics
- Optimization and AI

- Heuristics and AI
- Constraints
- Uncertainty and approaches in AI
- Probabilistic reasoning in AI
- Machine learning - (i) Supervised learning techniques using decision trees, (ii) Unsupervised learning techniques using Markov chains

Self Learning

This course also expects a significant amount of self-learning through homework and other assigned work throughout the duration of the course. The course focuses on rapid acquiring of know-how and do-how and quickly translate to show-how so that skill development is possible. Development and assessment of skills will be an ongoing process through assigned problems and projects. The commitment from the participant to dedicate time necessary to complete these tasks within the stipulated duration is must for the successful completion of the course.

Program at a Glance

Lesson: Foundation Skills for Artificial Intelligence (FSAI) Program Directors: Dr. Deepu Philip, Dr. Ashutosh Khanna

Course: Short term skill certification course offered by IIT Kanpur Time allotted: Portal time (including video lectures recorded lectures): 35hrs
 Self-learning (including assignments): 108 hrs
 Query time: 6hrs (1day)
 Bootcamp: 6hrs (1day)
 Visit to IITK : 2 days intensive workshop

Learning Objectives:

- Understand two major paradigms of AI: (i) Traditional AI following the knowledge-based approach, based on large symbolic representations of knowledge of the relevant domain, and (ii) Statistical approach in which simple patterns are automatically extracted from data corpora, and applied to the problem.
- Exposure to programming using LISP and ProLog
- Python programming for AI
- Concepts of AI for business decision making and simple examples for understanding and implementing these concepts

Preparations Necessary: Completing the assigned reading of text, study the problems/cases that are assigned, completing the assignments, complete the programming language learning, being cordial and accommodative when working in teams, professional conduct.



Foundation Skills for Artificial Intelligence –Schedule

Week	Skilling Topic	Portal Time (minutes)	Break (minutes)	Portal Time (minutes)	Break (minutes)	Portal Time (minutes)	Self- study and assignments completion (hours)
1	Introduction to AI, Agents, Environment	50	10	50	15	50	9
2	Problem Formulation Techniques	50	10	50	15	50	9
3	Problem Solving by Search	50	10	50	15	50	9
4	Problem Solving by Search	50	10	50	15	50	9
5	Review of Probability and Statistics	50	10	50	15	50	9
6	Review of Probability and Statistics	50	10	50	15	50	9
7	Heuristics and AI	50	10	50	15	50	9
8	Heuristics and AI	50	10	50	15	50	9
9	Probabilistic Reasoning in AI	50	10	50	15	50	9
10	Probabilistic Reasoning in AI	50	10	50	15	50	9
11	Supervised Learning Techniques using Decision Trees	50	10	50	15	50	9
12	Unsupervised Learning Techniques using Markov Chains	50	10	50	15	50	9
x	Query Time	6 hours (2 weekends – 3 hrs per day)					
y	“Bootcamp” (online – show-how)	6 hours (1 day)					
z	Visit to IITK : 2 days intensive workshop	All cost to be borne by the practitioner (travel, stay, food)					



For more information:

For more Information, you can contact:



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IIT Kanpur

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Happiness is when what you think, what you say and what you do are in Harmony – Mahatma Gandhi