

## Artificial Intelligence Course Curriculum by 10Pie

👉 Whether you want to start your IT career or looking for guidance on how to plan your future career path, [10Pie](#) is your learning hub for tech career knowledge.

Here's an [Artificial Intelligence](#) course syllabus at a glance:

S.No.	Module Name	Topics Covered	Main Projects
1	Introduction to Artificial Intelligence	Overview of AI, Definition and History of AI, Types of AI, Applications of AI, Ethical Considerations	AI History Timeline, AI Types Comparison
2	Python Programming for AI	Python Basics, Data Manipulation with Pandas, Object-Oriented Programming, Python Libraries	Personal Expense Tracker, Weather Data Analysis
3	Mathematics for AI	Linear Algebra, Calculus, Probability and Statistics, Optimization Techniques	Image Transformation and Manipulation, Anomaly Detection
4	Machine Learning Fundamentals	Supervised, Unsupervised, Reinforcement Learning, Key Algorithms (Linear Regression, Decision Trees)	House Price Prediction, Customer Segmentation Using K-Means Clustering
5	Advanced Machine Learning Techniques	Ensemble Methods, Dimensionality Reduction, Anomaly Detection	Dimensionality Reduction and Visualization, Anomaly Detection in Credit Card Transactions
6	Deep Learning Foundations	Neural Network Basics, Activation Functions, Backpropagation	Image Classification, Binary Classification
7	Convolutional Neural Networks (CNNs)	Convolutional Layers, CNN Architectures, Transfer Learning	Handwritten Digit Classification, Facial Expression Recognition

8	Recurrent Neural Networks (RNNs)	Sequence Data, RNN Architectures, Applications in Text Generation and Sentiment Analysis	Stock Price Forecasting, Text Generation
9	Generative Models	Generative Adversarial Networks (GANs), Variational Autoencoders (VAEs), Applications of Generative Models	Face Generation using GANs, Data Augmentation using Generative Models
10	Natural Language Processing	Text Preprocessing, Word Embeddings, Text Classification	Sentiment Analysis of Movie Reviews, News Article Classification
11	Computer Vision	Image Preprocessing, Object Detection, Image Segmentation	Object Detection with YOLO or SSD, Image Segmentation for Medical Imaging
12	Reinforcement Learning	Markov Decision Processes, Q-Learning, Policy Gradient Methods	Deep Q-Networks (DQN) for Atari Games, Q-Learning for Grid World Navigation
13	AI Ethics and Governance	Bias and Fairness in AI, Explainable AI, AI Safety and Robustness, AI Governance	Bias Detection and Mitigation in AI Models, AI Ethics Playbook

## Module 1: Introduction to Artificial Intelligence

### Overview of AI

- Definition and History of AI
- Types of AI: Narrow vs. General AI

### Artificial Intelligence vs. Machine Learning vs. Deep Learning

- Definitions and Differences
- Applications and Use Cases

### Applications of AI in Various Industries

- Healthcare, Finance, and Transportation

- AI in Everyday Life

## Ethical Considerations and Societal Implications

- Bias in AI Systems
- Impact on Employment and Privacy

### ★ Hands-on projects to practice:

- **AI History Timeline:** Create an interactive timeline that highlights the key milestones in the history of AI.
- **AI Types Comparison:** Develop a comparative analysis of Narrow AI and General AI.
- **AI vs. Machine Learning vs. Deep Learning:** Create an infographic or a detailed report comparing AI, machine learning, and deep learning.

## Module 2: Python Programming for AI

### Python Basics

- Syntax, Data Types, and Control Structures
- Variables, Loops, and Conditionals
- Functions and Modules

### Python Libraries for AI

- Data Manipulation with Pandas
- Numerical Computing with NumPy

### Object-Oriented Programming in Python

- Classes and Objects
- Inheritance and Polymorphism

### ★ Hands-on projects to practice:

- **Personal Expense Tracker:** Develop a simple command-line application that tracks personal expenses.
- **Weather Data Analysis:** Analyze and visualize weather data using Python libraries.
- **Simple Chatbot:** Create a simple rule-based chatbot using Python.
- **Object-Oriented Library Management System:** Build a basic library management system using OOP principles.

## Module 3: Mathematics for AI

### Linear Algebra

- Matrices and Vectors
- Matrix Multiplication and Inversion
- Eigenvalues and Eigenvectors

### Calculus

- Derivatives, Integrals, and Optimization
- Partial Derivatives and Gradient
- Optimization Techniques

### Probability and Statistics

- Common Probability Distributions
- Statistical Inference Techniques
- Hypothesis Testing

### ★ Hands-on projects to practice:

- **Image Transformation and Manipulation:** Develop a program that performs various linear transformations on images using matrix operations.
- **Anomaly Detection:** Implement PCA to detect anomalies in a dataset using the concepts of linear algebra and probability.
- **Time Series Forecasting:** Implement an ARIMA model to forecast a time series using the concepts of calculus and probability.

## Module 4: Machine Learning Fundamentals

### Basics of Machine Learning

- Supervised,
- Unsupervised
- Reinforcement Learning
- Key Algorithms for Each Type

### Linear Regression

- Fitting Linear Models
- Evaluating Model Performance
- Residual Analysis

### Logistic Regression

- Model Evaluation
- Interpreting Coefficients
- Regularization Methods (Lasso and Ridge)

## Decision Trees and Random Forests

- Tree Structure and Splitting Criteria
- Ensemble Learning with Random Forests

## K-Nearest Neighbors (KNN) and Support Vector Machines (SVMs)

- Distance Metrics in KNN
- Hyperplane and Margin in SVM

### ★ Hands-on projects to practice:

- **House Price Prediction:** Build a supervised learning model to predict house prices based on various features.
- **Customer Segmentation Using K-Means Clustering:** Apply unsupervised learning techniques to segment customers based on purchasing behavior.
- **Credit Card Fraud Detection Using Logistic Regression:** Develop a model to detect fraudulent transactions using logistic regression.

## Module 5: Advanced Machine Learning Techniques

### Ensemble Methods

- Boosting, Bagging, and Stacking
- Key Algorithms: AdaBoost, Random Forests

### Dimensionality Reduction

- PCA(Principal Component Analysis) for Feature Reduction
- t-SNE for Visualization

### Anomaly Detection and Outlier Analysis

- Techniques for Identifying Outliers
- Applications in Fraud Detection

### Active Learning and Transfer Learning

- Concepts of Active Learning
- Transfer Learning in Deep Learning

### ★ Hands-on projects to practice:

- **Dimensionality Reduction and Visualization:** Use Principal Component Analysis (PCA) and t-SNE for dimensionality reduction and visualization of high-dimensional data.

- **Active Learning for Data Labeling:** Create an active learning framework to improve model performance with minimal labeled data.
- **Anomaly Detection in Credit Card Transactions:** Implement an anomaly detection system to identify fraudulent credit card transactions.

## Module 6: Deep Learning Foundations

### Neural Network Basics

- Perceptrons and Multilayer Perceptrons
- Structure of Neural Networks
- Activation Functions

### Activation Functions and Loss Functions

- Common Activation Functions (ReLU, Sigmoid)
- Loss Functions for Regression and Classification

### Backpropagation Algorithm and Gradient Descent

- Understanding Backpropagation
- Variants of Gradient Descent

### ★ Hands-on projects to practice:

- **Image Classification:** Implement a multilayer perceptron (MLP) to classify images into different categories using the concepts of neural networks and backpropagation.
- **Binary Classification:** Implement logistic regression to classify binary data using the concepts of neural networks and backpropagation.

## Module 7: Convolutional Neural Networks (CNNs)

### Convolutional Layers and Pooling Layers

- Convolution Operation Explained
- Importance of Pooling Layers

### CNN Architectures

- Overview of Key Architectures
- LeNet, AlexNet, VGGNet, ResNet
- Innovations in Each Architecture

### Transfer Learning with Pre-trained CNNs

- Benefits of Transfer Learning
- Fine-tuning Pre-trained Models

★ **Hands-on projects to practice:**

- **Handwritten Digit Classification:** Build a CNN model to classify handwritten digits using the MNIST dataset.
- **Facial Expression Recognition:** Develop a CNN model to classify facial expressions from images (e.g., happy, sad, angry).
- **Image Classification with Transfer Learning:** Use a pre-trained CNN model (e.g., VGGNet, ResNet) for image classification on a custom dataset.

## **Module 8: Recurrent Neural Networks (RNNs)**

### **Sequence Data and Time Series Modeling**

- Understanding Sequence Data
- Applications in Time Series Forecasting

### **RNN Architectures**

- Vanilla RNN, LSTM, and GRU
- Differences Between RNN, LSTM, and GRU
- Advantages of LSTM and GRU

### **Applications of RNNs**

- Text Generation and Sentiment Analysis
- Forecasting Stock Prices

★ **Hands-on projects to practice:**

- **Stock Price Forecasting:** Develop an RNN model to predict future stock prices based on historical data.
- **Text Generation:** Create an RNN model to generate text based on a given corpus.
- **Sentiment Analysis using RNNs:** Develop an RNN model to perform sentiment analysis on movie reviews.

## **Module 9: Generative Models**

### **Generative Adversarial Networks (GANs)**

- Structure of GANs: Generator and Discriminator
- Training Challenges and Techniques

## Variational Autoencoders (VAEs)

- Understanding VAEs and Applications
- Differences Between VAEs and GANs

## Applications of Generative Models

- Image Generation,
- Text Generation
- Data Augmentation
- Use Cases in Art and Design
- Augmenting Datasets for Training

### ★ Hands-on projects to practice:

- **Face Generation using GANs:** Generate realistic human faces using a Generative Adversarial Network (GAN).
- **Data Augmentation using Generative Models:** Augment a dataset using generative models to improve machine learning model performance.
- **Text Generation with Variational Autoencoders:** Generate coherent text using a Variational Autoencoder (VAE).
- **Image-to-Image Translation using Conditional GANs:** Translate images from one domain to another using a cGAN.

## Module 10: Natural Language Processing

### Text Preprocessing and Feature Extraction

- Techniques for Text Cleaning and Tokenization
- Bag of Words and TF-IDF

### Word Embeddings

- Understanding Word Representations
- Word2Vec, GloVe, and FastText
- Applications of Word Embeddings

### Text Classification and Sentiment Analysis

- Techniques for Classifying Text
- Building Sentiment Analysis Models

### ★ Hands-on projects to practice:



- **Sentiment Analysis of Movie Reviews:** Build a sentiment analysis model to classify movie reviews as positive or negative.
- **News Article Classification:** Create a text classification model to categorize news articles into predefined categories (e.g., sports, politics, technology).

## Module 11: Computer Vision

### Image Preprocessing and Augmentation

- Techniques for Enhancing Image Data
- Importance of Data Augmentation

### Object Detection and Localization

- Techniques for Object Detection (YOLO, SSD)
- Bounding Box Regression

### Image Segmentation and Instance Segmentation

- Semantic vs. Instance Segmentation
- Applications in Medical Imaging

### ★ Hands-on projects to practice:

- **Object Detection with YOLO or SSD:** Implement an object detection system using either the YOLO (You Only Look Once) or SSD (Single Shot Detector) algorithm.
- **Image Segmentation for Medical Imaging:** Develop a model for semantic or instance segmentation in medical images (e.g., tumor detection in MRI scans).

## Module 12: Reinforcement Learning

### Markov Decision Processes and Dynamic Programming

- Understanding MDPs and Their Components
- Dynamic Programming Techniques (Memoization, Tabulation)

### Q-Learning and Deep Q-Networks (DQN)

- Q-Learning Algorithm
- Implementing DQNs for Complex Environments

### Policy Gradient Methods and Actor-Critic Algorithms

- Understanding Policy Gradients
- Actor-Critic Framework Overview

★ **Hands-on projects to practice:**

- **Deep Q-Networks (DQN) for Atari Games:** Develop a DQN to play an Atari game (e.g., Breakout, Pong) using a deep learning framework.
- **Q-Learning for Grid World Navigation:** Implement a Q-learning algorithm to navigate an agent through a grid world environment.
- **Implementing an Actor-Critic Algorithm for CartPole Balancing:** Develop an Actor-Critic model to balance a pole on a moving cart using reinforcement learning techniques.

## **Module 13: AI Ethics and Governance**

### **Bias and Fairness in AI Systems**

- Identifying and Mitigating Bias
- Fairness Metrics and Evaluation

### **Explainable AI and Interpretability**

- Importance of Interpretability in AI
- Techniques for Explainable AI( LIPE, SHAM, CAV and more)

### **AI Safety and Robustness**

- Ensuring Safety in AI Systems
- Robustness Against Adversarial Attacks

### **AI Governance and Regulations**

- Overview of AI Regulations
- Ethical Guidelines for AI Deployment

★ **Hands-on projects to practice:**

- **Bias Detection and Mitigation in AI Models:** Develop a framework to identify and mitigate bias in an AI model.
- **Explainable AI (XAI) for a Classification Model:** Implement explainability techniques for an AI model to enhance interpretability.
- **AI Ethics Playbook:** Create an AI Ethics Playbook for a hypothetical organization.

## **B.Sc Artificial Intelligence Syllabus**

The BSc (Hons) in Artificial Intelligence is a 3-year undergraduate program designed to equip students with a foundation in artificial intelligence principles and practices.

The average fees for the BSc (Hons) in Artificial Intelligence typically range from INR 30,000 to 3,00,000 per annum, depending on the institution and its location.

Semester	Subject Name	Topics Covered
1	Discrete Structures for Computer Science	Sets, Relations, Functions, Graph Theory, Combinatorics, Logic and Proof Techniques
	Statistical Data Analysis	Descriptive Statistics, Probability Theory, Statistical Distributions, Hypothesis Testing
	Introduction to Python Programming	Python Basics and Syntax, Data Structures in Python, Functions and Modules, File Handling
2	Data Structures and Algorithms	Arrays, Linked Lists, Stacks, Queues, Trees, Graphs, Searching and Sorting Algorithms, Algorithm Complexity Analysis
	Database Management Systems	Introduction to Databases, SQL Basics, Advanced Queries, Normalization, ER Models, Database Design Concepts
	Introduction to Artificial Intelligence	History and Applications of AI, Problem Solving and Search Algorithms, Knowledge Representation, Introduction to Machine Learning
	Mathematics for Computer Science	Linear Algebra, Calculus, Probability and Statistics, Mathematical Foundations of AI
3	Machine Learning	Supervised Learning Algorithms, Unsupervised Learning Algorithms, Model Evaluation Techniques, Overfitting and Regularization
	Natural Language Processing	Text Preprocessing Techniques, Language Models, Sentiment Analysis, Applications of NLP
	Computer Vision	Image Processing Basics, Object Detection and Recognition, Convolutional Neural Networks (CNNs), Applications in Real-World Scenarios

	Ethics in Artificial Intelligence	Ethical Considerations in AI, Bias and Fairness, Privacy and Security Issues, Governance and Regulations
4	Deep Learning	Introduction to Neural Networks, Training Deep Neural Networks, Advanced Architectures (CNNs, RNNs), Applications of Deep Learning
	Reinforcement Learning	Markov Decision Processes, Q-Learning and Deep Q-Networks, Policy Gradient Methods, Applications in Robotics and Gaming
	Data Mining and Warehousing	Data Preprocessing and Cleaning, Data Warehousing Concepts, Data Mining Techniques, Applications in Business Intelligence
	Project Work	Hands-on Project in AI, Application of Learned Concepts, Team Collaboration and Reporting
5	Advanced Topics in AI	Generative Adversarial Networks (GANs), Transfer Learning, Explainable AI Techniques, AI in Healthcare and Finance
	Capstone Project	Comprehensive Project in AI, Real-World Problem Solving, Presentation and Documentation
	Internship/Industrial Training	Practical Experience in AI Industry, Application of Skills in Real-World Scenarios
6	Emerging Trends in AI	AI in IoT and Edge Computing, AI for Social Good, Future Directions in AI Research
	Electives (Choose any two)	AI in Robotics, AI for Cybersecurity, AI in Autonomous Systems, Advanced Data Analytics
	Research Methodology	Research Design and Methods, Data Collection and Analysis, Writing Research Proposals

	Final Project Presentation	Presentation of Capstone Project, Evaluation by Faculty and Industry Experts
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## M.sc Artificial Intelligence Syllabus

The M.Sc. in Artificial Intelligence is a 2-year postgraduate program focused on advanced concepts in artificial intelligence, machine learning, and deep learning technologies.

This program is designed for graduates with a relevant background in computer science, mathematics, or engineering.

Semester	Subject Name	Topics Covered
1	Artificial Intelligence & Intelligent Systems	Introduction to AI, Intelligent Agents, Problem Solving, Search Algorithms, Knowledge Representation and Reasoning
	Machine Learning	Supervised Learning (Regression, Classification), Unsupervised Learning (Clustering, Dimensionality Reduction), Model Evaluation and Selection
	Natural Language Processing	Text Processing, Feature Extraction, Language Modeling, Sentiment Analysis, NLP Applications
	Elective I	Advanced Machine Learning Techniques, Probabilistic Graphical Models, Reinforcement Learning
	Elective II	Computer Vision, Robotics and Control Systems, Fuzzy Systems and Fuzzy Logic
	AI Programming Lab	Hands-on programming in AI, Implementing AI algorithms
	Research Methodology	Research Design and Methods, Literature Review and Critique
2	Deep Learning	Neural Networks, Convolutional Neural Networks (CNNs), Recurrent Neural Networks (RNNs), Deep Learning Applications

	Big Data Analytics	Big Data Technologies, Hadoop and Spark, Data Processing Techniques
	Speech Information Processing	Speech Recognition, Speech Synthesis, Feature Extraction and Representation
	Elective III	Quantum Computing for AI, Neuromorphic Computing, Generative Adversarial Networks
	Elective IV	Explainable AI, AI Ethics and Governance, AI for Social Good
	Deep Learning & Data Analytics Lab	Practical applications of Deep Learning, Big Data Analytics projects
	Seminar and Presentation	Presentation of research ideas and proposals
<b>3</b>	Advanced Machine Learning	Ensemble Methods, Support Vector Machines, Neural Architecture Search
	Cognitive Science and Human-AI Interaction	Cognitive Architectures, Human-Computer Interaction, Ethical and Social Implications of AI
	Elective V	AI in Healthcare, AI in Finance, AI in Manufacturing
	Elective VI	Automated Reasoning, Automated Planning and Scheduling, Multi-Agent Systems
	M.Sc. Dissertation	Research Project, Thesis Writing
<b>4</b>	M.Sc. Dissertation (Continued)	Completion of Research Project, Final Thesis Submission and Defense

## B.Tech in Artificial Intelligence Syllabus

The B.Tech in Artificial Intelligence is a 4-year undergraduate program designed to equip students with the knowledge and skills necessary to develop intelligent systems that can analyze data, learn from it, and make informed decisions.

To enroll in the B.Tech in Artificial Intelligence program, students must have completed 12th grade with a minimum of 45-60% marks, including Mathematics.

Semester	Subject Name	Topics Covered
1	Mathematics I	Linear Algebra, Calculus, Probability Theory
	Programming Fundamentals	Basics of C/C++, Data Types, Control Structures, Functions
	Engineering Physics	Mechanics, Waves, Optics, Thermodynamics
	Communication Skills	Effective Communication, Technical Writing, Presentation Skills
2	Mathematics II	Advanced Calculus, Statistics, Numerical Methods
	Data Structures and Algorithms	Arrays, Linked Lists, Stacks, Queues, Trees, Graphs, Sorting and Searching Algorithms
	Digital Logic Design	Number Systems, Boolean Algebra, Logic Gates, Combinational and Sequential Circuits
	Computer Organization	Basic Computer Architecture, Memory Hierarchy, I/O Devices
3	Discrete Mathematics	Set Theory, Combinatorics, Graph Theory, Logic
	Database Management Systems	Introduction to Databases, SQL, Normalization, ER Models
	Software Engineering	Software Development Life Cycle, Agile Methodologies, Software Testing
	Introduction to Artificial Intelligence	History of AI, Problem Solving, Search Algorithms, Knowledge Representation
4	Machine Learning	Supervised Learning, Unsupervised Learning, Regression, Classification, Clustering
	Computer Vision	Image Processing, Feature Extraction, Object Detection, Convolutional Neural Networks (CNNs)

	Natural Language Processing	Text Preprocessing, Language Models, Sentiment Analysis
	Web Technologies	HTML, CSS, JavaScript, Web Frameworks, RESTful Services
5	Deep Learning	Neural Networks, Training Deep Learning Models, Recurrent Neural Networks (RNNs), Generative Models
	Reinforcement Learning	Markov Decision Processes, Q-Learning, Deep Q-Networks, Policy Gradient Methods
	Big Data Technologies	Introduction to Big Data, Hadoop, Spark, Data Processing Techniques
	Cloud Computing	Cloud Service Models, Cloud Architecture, Security in Cloud
6	AI Ethics and Governance	Ethical Considerations in AI, Bias and Fairness, Privacy Issues
	Advanced Topics in AI	Explainable AI, Transfer Learning, AI Applications in Healthcare and Finance
	Capstone Project	Comprehensive Project in AI, Real-World Problem Solving, Presentation and Documentation
	Internship/Industrial Training	Practical Experience in AI Industry, Application of Skills in Real-World Scenarios
7	Advanced Machine Learning	Ensemble Methods, Support Vector Machines, Neural Architecture Search
	Data Mining and Warehousing	Data Preprocessing, Data Warehousing Concepts, Data Mining Techniques
	Human-Computer Interaction	User Interface Design, Usability Testing, Interaction Techniques
	Emerging Trends in AI	AI in IoT, AI for Social Good, Future Directions in AI Research



8	Research Methodology	Research Design, Data Collection and Analysis, Writing Research Proposals
	Final Project Presentation	Presentation of Final Project, Evaluation by Faculty and Industry Experts
	Electives (Choose any two)	AI in Robotics, AI for Cybersecurity, AI in Autonomous Systems, Advanced Data Analytics

## M.Tech Artificial Intelligence Syllabus

The M.Tech in Artificial Intelligence is a 2-year postgraduate program designed to provide students with a strong foundation in AI principles, algorithms, and applications.

To be eligible for the M.Tech in Artificial Intelligence program, candidates must have:

- A bachelor's degree in Computer Science, Information Technology, or a related field with a minimum of 50-60% marks.
- A valid GATE score in Computer Science or a related discipline.
- Qualifying in an interview conducted by the university.

Semester	Subject Name	Topics Covered
1	Artificial Intelligence & Intelligent Systems	Introduction to AI, Intelligent Agents, Problem Solving, Search Algorithms
	Machine Learning	Supervised Learning, Unsupervised Learning, Regression, Classification Techniques
	Natural Language Processing	Text Processing, Language Modeling, Sentiment Analysis, NLP Applications
	Program Elective – I	Elective topics (varies by institution)
	Program Elective – II	Elective topics (varies by institution)
	AI-based Programming Lab	Hands-on programming in AI, Implementing AI algorithms
	Research Methodology	Research Design, Data Collection Methods, Literature Review

2	Deep Learning	Neural Networks, Convolutional Neural Networks (CNNs), Recurrent Neural Networks (RNNs), Applications
	Big Data Analytics	Big Data Technologies, Data Processing, Hadoop, Spark
	Speech Information Processing	Speech Recognition, Speech Synthesis, Feature Extraction
	Program Elective – III	Elective topics (varies by institution)
	Program Elective – IV	Elective topics (varies by institution)
	Deep Learning & Data Analytics Lab	Practical applications of Deep Learning and Data Analytics
3	Advanced Machine Learning	Ensemble Methods, Support Vector Machines, Neural Architecture Search
	MTech Dissertation	Research Project, Thesis Writing, Presentation
	Elective I	Elective topics (varies by institution)
	Elective II	Elective topics (varies by institution)
4	MTech Dissertation	Continuation of Research Project, Final Submission, and Defense

## BCA Artificial Intelligence syllabus

The BCA in Artificial Intelligence is a 3-year undergraduate program designed to equip students with the knowledge and skills necessary to develop intelligent systems and applications.

You must have completed 12th grade with a minimum of 45-60% marks, including Mathematics as a subject.

Here are some key details about the BCA Artificial Intelligence program:

Semester	Subject Name	Topics Covered
1	Linux Lab	Introduction to Linux, Basic Commands, Shell Scripting

	Programming in C	C Language Fundamentals, Data Types, Control Structures, Functions
	Programming in C Lab	Practical Implementation of C Programs, Hands-on Exercises
	Web Technologies	HTML, CSS, JavaScript, Introduction to Web Development
	Web Technologies Lab	Practical Web Development Projects
	Problem Solving	Problem-Solving Techniques, Algorithm Development, Flowcharts
	Living Conversation	Communication Skills, Public Speaking, Presentation Skills
	Basic Mathematics I	Algebra, Trigonometry, Basic Calculus
<b>2</b>	Data Structures and Algorithms	Basic Data Structures (Arrays, Linked Lists, Stacks, Queues), Algorithms (Sorting, Searching)
	Data Structures and Algorithms Lab	Practical Implementation of Data Structures and Algorithms
	Databases	Introduction to Databases, SQL, Database Design Concepts
	Databases Lab	Practical SQL Queries, Database Management
	Python Programming	Python Basics, Data Types, Control Structures, Functions
	Python Programming Lab	Hands-on Python Programming Projects
	Critical Thinking and Writing	Critical Thinking Skills, Academic Writing, Research Methodologies
	Basic Mathematics II	Probability, Statistics, Discrete Mathematics
<b>3</b>	Object-Oriented Programming	OOP Concepts, Classes and Objects, Inheritance, Polymorphism, Exception Handling

	Object-Oriented Programming Lab	Practical Implementation of OOP Concepts
	Applied Machine Learning	Introduction to Machine Learning, Supervised and Unsupervised Learning, Model Evaluation Techniques
	Applied Machine Learning Lab	Practical Implementation of Machine Learning Algorithms
	Computer Networks	Networking Fundamentals, OSI Model, TCP/IP, Network Protocols
	Computer Networks Lab	Practical Networking Setup, Network Configuration
	Mathematics for Computer Science	Discrete Mathematics, Graph Theory, Combinatorics
<b>4</b>	Web Development	Advanced Web Technologies, Server-Side Scripting (PHP, Node.js), RESTful Services
	Web Development Lab	Hands-on Projects in Web Development
	Data Mining	Data Mining Concepts, Techniques, and Applications
	Data Mining Lab	Practical Implementation of Data Mining Techniques
	Introduction to Artificial Intelligence	AI Fundamentals, Intelligent Agents, Search Algorithms, Knowledge Representation
	Artificial Intelligence Lab	Practical AI Projects, Implementing AI Algorithms
	Software Engineering	Software Development Life Cycle, Agile Methodologies, Software Testing
<b>5</b>	Deep Learning	Neural Networks, Convolutional Neural Networks (CNNs), Recurrent Neural Networks (RNNs)
	Deep Learning Lab	Practical Implementation of Deep Learning Projects

	Natural Language Processing	Text Processing, Language Models, Sentiment Analysis, NLP Applications
	Natural Language Processing Lab	Hands-on Projects in NLP
	Capstone Project I	Initiation of a Comprehensive Project in AI, Application of Learned Concepts
	Elective I	Specialized Topics (e.g., AI in Healthcare, AI in Finance, or AI Ethics)
<b>6</b>	Capstone Project II	Continuation and Completion of the Comprehensive Project in AI
	Industry Internship	Practical Experience in AI Industry, Application of Skills in Real-World Scenarios
	Elective II	Advanced Topics (e.g., Reinforcement Learning, Computer Vision, or Robotics)
	Entrepreneurship and Innovation	Basics of Entrepreneurship, Business Models, Innovation in Technology
	Research Methodology	Research Design, Data Collection Methods, Writing Research Proposals

## Diploma in Artificial Intelligence:

The Diploma in Artificial Intelligence is a comprehensive program designed to provide practical skills in AI concepts, machine learning, and data management.

Typically lasting 6 months to 1 year, this course is suitable for individuals seeking a focused introduction to artificial intelligence and its applications.

Module	Subject Name	Topics Covered
<b>1</b>	Introduction to Artificial Intelligence	Overview of AI, History of AI, Applications of AI, Intelligent Agents, Problem Solving Techniques
<b>2</b>	Programming for AI	Python Programming, Data Structures, Algorithms, Libraries for AI (NumPy, Pandas)

3	Data Handling and Preprocessing	Data Collection Techniques, Data Cleaning, Data Transformation, Feature Engineering
4	Machine Learning Fundamentals	Introduction to Machine Learning, Supervised Learning, Unsupervised Learning, Model Evaluation
5	Deep Learning	Neural Networks, Convolutional Neural Networks (CNNs), Recurrent Neural Networks (RNNs), Applications
6	Natural Language Processing (NLP)	Text Processing, Language Models, Sentiment Analysis, NLP Applications
7	AI Ethics and Governance	Ethical Considerations in AI, Bias and Fairness, Privacy Issues, AI Regulations
8	Capstone Project	Hands-on Project in AI, Application of Learned Concepts, Presentation of Project Findings

## Artificial intelligence course subjects and topics to learn

### Python Programming

AI experts must learn Python programming language for automating tasks, and writing algorithms to create machines and train them. Python has extensive libraries and frameworks like Scikit-learn, TensorFlow, and PyTorch for AI tasks.

You must learn about the variables, operators, data types, object-oriented programming, control flow, functions, and other concepts of Python.

### Mathematics for AI

Basic knowledge of mathematics is essential for AI learners to create algorithms and models that enable machines to handle, examine, and understand an extensive volume of data efficiently. Linear algebra is used in developing neural networks of deep learning, while topics like matrices and vectors are utilized in those neural networks to manipulate data, perform complex calculations, and extract valuable insights from the data.

Working on machine learning algorithms requires your knowledge of linear algebra, calculus, statistics, and probability. They use different equations and functions in mathematics to detect hidden patterns in data, make predictions, and categorize information efficiently.

## Data structures and algorithms

Knowledge of data structures and algorithms is fundamental to artificial intelligence development. It provides essential tools to optimize your AI algorithms, manage data efficiently, and improve the overall performance of your AI systems.

A few things you need to know are arrays, linked lists, Binary Search Trees, and Hash tables.

## Data analysis and data visualization

Data is an essential part of artificial intelligence that provides necessary input for algorithms and drives decision-making processes.

Learners need to understand data analysis and visualization topics and the use of Python libraries like Pandas and NumPy for collecting, cleaning, and analyzing data for feeding machines. By using exploratory data analysis and visualization techniques you can reveal hidden patterns, trends, and insights within data that enhance your ability to extract valuable information from the raw data.

## Machine Learning

[Machine learning](#) is the subfield of artificial intelligence. It allows experts to focus on the development of algorithms and models that enable machines to learn and make predictions or decisions like humans without being explicitly programmed.

You need to learn four main types of machine learning techniques: supervised learning, semi-supervised, unsupervised, and reinforcement learning.

## Deep Learning

Deep Learning is a part of ML that trains machines on how to process data in a way that human brains do. You need to learn how to implement deep learning models to recognize complex patterns in images, texts, sounds, and other forms of data and produce accurate insights and predictions.

Some of the fundamental concepts you need to know are Gradient Descent Algorithm, Backpropagation, hyperparameters, Artificial Neural Network, Convolutional Neural Network, Recurrent Neural Network, and Multilayer perceptron.

## Natural Language Processing

These experts need to know NLP to develop AI-powered applications. [Natural Language Processing](#) allows computers to understand, interpret, and generate human-like languages for better communication.

The main components to understand in NLP include text processing and representation, and lexical semantics. It includes tokenization, stemming, lemmatization, text normalization, Bag-of-Words, word sense disambiguation, etc.

## Computer Vision

Computer vision focuses on training machines to identify and understand visual information in the form of pictures and videos. Learners need to study computer vision techniques including image preprocessing, object detection, image segmentation, facial recognition, and feature extraction. They need to understand popular libraries like OpenCV, TensorFlow, and PyTorch for automating tasks like object detection, and image classification and segmentation.

## Generative AI

Generative AI is included in all modern syllabi which enables users to generate fresh content including images, text, audio, and other forms of data. You need to learn image generation architecture (like, variational autoencoders, generative adversarial networks, progressive GAN), text generation architecture (like transformers, BERT, and GPT), and audio generation techniques.

## Cloud computing services

Knowledge of Cloud computing services is important for all AI and ML developers to develop, deploy, and manage applications. You can learn the use of top cloud computing services like Amazon Web Services, Google Cloud Platform, and Microsoft Azure.

### Related Read:

- [Artificial Intelligence Career Paths](#)
- [Top Artificial Intelligence Companies In Chennai](#)

## Artificial Intelligence Course Fees and Duration 2024

Course name	Course provider	Course duration	Course fees	Training mode
Post Graduate Programme in Artificial Intelligence and Machine Learning	<a href="#">BITS Pilani</a>	11 months	₹2,45,000	Online and offline



Artificial Intelligence Engineering course	<a href="#">AnalytixLabs</a>	210 hrs+	₹48,000 onwards	Online and classroom
Artificial Intelligence and Machine Learning	<a href="#">National Institute of Electronics and Information Technology, Chandigarh</a>	6 months	₹18,900	Classroom
Basic Certificate Course in Artificial Intelligence	<a href="#">Ministry of Electronics &amp; Information Technology</a>	120 hrs	₹3,390 + 18% GST	Online
Professional Certificate Course In Generative AI and Machine Learning	<a href="#">Simplilearn</a>	11 months	₹1,53,400	Online Bootcamp

## What is the course fee for Artificial Intelligence courses?

The course fee of Artificial Intelligence courses ranges between ₹3,390 and ₹2,45,000 and can go beyond that. The course fees depend on multiple factors like the duration of the course, type of course(UG, PG, or certificate), location, teaching mode, course syllabus, and reputation of the institute.

For example, a self-paced AI course is usually cheaper than UG and PG-level courses. When you apply for a course make sure to check the fees and other services of the course before applying.

## Artificial Intelligence course duration

Artificial Intelligence course duration is usually between a few hours to 6 months and more. This course duration like the fees depends on multiple factors like the course curriculum, course hours, practical sessions, training pattern, and course training mode (online/offline, or self-paced courses).

For example, the duration of UG and PG level courses is 6 months whereas self-paced courses depend on the learners' ability to learn and implement the concepts in real-world AI applications.

## Who is eligible for Artificial Intelligence courses?

If you want to enroll in any online training course for Artificial Intelligence, there are no such criteria or eligibility. However, knowing the basics of computers and AI fundamentals will be helpful.

**For academic courses in India:** Students are eligible for Artificial Intelligence courses after completing their 12th grade, with specific criteria depending on the course type:

- **Diploma in Artificial Intelligence:** Open to any stream with 10+2 completion.
- **BTech in Artificial Intelligence:** Requires 10+2 with Physics, Chemistry, and Mathematics, along with a minimum of 50% marks.
- **B.Sc in Artificial Intelligence:** Eligible for students who have completed 10+2 with Mathematics, also need at least 50% marks.
- **Postgraduate Courses:** A bachelor's degree in IT or related fields is necessary, with a minimum of 50% marks required.

## Apply for Artificial Intelligence courses with 10Pie

10Pie offers you the proper guidance on which Artificial Intelligence courses to apply. We help you know the topics you need to learn to become an AI expert, different types of courses available like a degree or a diploma AI course, and their prerequisites to join along with the course curriculum and projects to be done.

This gives you a clear knowledge of how the AI market looks like in 2024 and ensures you get a job immediately after completing a course. We also guide you on what projects to do such that you can efficiently showcase your skills and expertise to potential recruiters. It is a great weapon to separate yourself from the masses.