

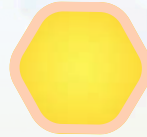


**ICT  
ACADEMY  
OF KERALA**



**INDUSTRY READINESS PROGRAM**

# **CERTIFIED SPECIALIST IN ARTIFICIAL INTELLIGENCE & MACHINE LEARNING**



**REGISTER  
NOW!**

<https://ictkerala.org/registration>





**CERTIFIED SPECIALIST IN  
ARTIFICIAL INTELLIGENCE  
& MACHINE LEARNING**

## About the program

Whether you're a student, developer, or technology consultant, mastering AI/ML and creating real-time applications can significantly boost your career. This program equips learners with a comprehensive understanding of AI/ML technologies and their practical applications, covering essential concepts, tools, and techniques to advance your skills in this dynamic field.



**OFFLINE**  
**3 Months**  
(375 Hrs.)



**INTERNSHIP DURATION**  
**125 Hrs.**  
(With Mentor Support)



**ONLINE**  
**6 Months**  
(375 Hrs.)

- ✔ **Online and Offline sessions tailored for graduates and professionals**
- ✔ **Scholarships and cashbacks for meritorious candidates via ICTAK**
- ✔ **Three to six-month access to LinkedIn Learning included**
- ✔ **Comprehensive employability skills training offered**
- ✔ **100% placement assistance guarantee for the eligible candidates**



The ICT Academy of Kerala (ICTAK) offers hands-on training sessions aimed at bridging the skill gap in the information and communication technology (ICT) domain. These online or offline sessions provide job-oriented courses in information technology (IT), furnishing participants with the essential skills and certifications required for various IT job roles. This proactive approach has proven instrumental in assisting numerous individuals in securing employment within the ICT sector.

## Job Roles

Candidates participating in this program can anticipate a wide range of potential career paths upon completion.

Machine Learning Engineer	~4 L	Data Scientist	~6 L
AI Engineer	~4 L	Data Engineer	~9 L

## Learning Outcome

Upon completion of the program, participants will be equipped with:

- **Comprehensive ML/AI Knowledge:** Solid foundation in machine learning and artificial intelligence concepts, including generative and discriminative models, recommendation systems, and advanced machine learning techniques.
- **Practical Skills:** Proficiency in Python, TensorFlow, Keras, and scikit-learn, enabling effective model building, evaluation, and deployment in real-world scenarios. Skills in using cloud platforms such as AWS and Azure for scalable AI/ML solutions.
- **Analytical Thinking and Problem-solving:** Enhanced ability to think analytically and logically, solve complex problems, and apply machine learning techniques to extract insights from data and develop innovative solutions.
- **Ethical and Responsible AI:** Preparedness to address ethical considerations in AI and machine learning, ensuring responsible development and deployment of AI systems, with an understanding of fairness, transparency, and bias mitigation.
- **Career Readiness:** Equipped with the skills and knowledge to enter the ML/AI field with a competitive edge, capable of handling real-world challenges and contributing to various domains using advanced AI and machine learning techniques.

## Agenda

- Introduction to Machine Learning and Artificial Intelligence
- Python for AI and ML
- Machine Learning Life Cycle
- Mathematics for Machine Learning: Linear Algebra, Multivariate Calculus, Principal Component Analysis (PCA)
- Revisiting Supervised and Unsupervised Learning
- Recommended Systems
- Discriminative and Generative Models
- Introduction to Neural Networks and Deep Learning
- Computer Vision
- Natural Language Processing
- Project Work





## About ICTAK



The ICT Academy of Kerala (ICTAK) is a not-for-profit organization formed by the Government of India, the Government of Kerala, and leading IT industry players like TCS, UST, IBS, and Quest Global. ICTAK offers various ICT and life skills programs such as Microsoft, Java, DevOps, Cyber Security, Artificial Intelligence/Machine Learning, and so on. Recognized by the Government of Kerala's Department of Electronics & IT, ICTAK provides comprehensive training with capstone projects and internships to prepare the next generation of ICT professionals. In the 2023-24 period, it expanded its partner network to 282 academic institutions, impacting over 12,000 students and 600 faculties. With 182 corporate partners, ICTAK organizes events, hackathons, and conferences to develop new ICT courses and promote digital literacy. Through partnerships with the government, it focuses on capacity building and project execution. Over the last decade, ICTAK has trained 1,20,000 participants and received national recognition for its innovative training practices from the Indian Society for Training & Development (ISTD).



**INFORMATION &  
COMMUNICATION TECHNOLOGY  
ACADEMY OF KERALA**  
**ICTAK**

**CERTIFIED SPECIALIST IN  
ARTIFICIAL INTELLIGENCE  
& MACHINE LEARNING**

## Eligibility

- Engineering or science graduates / three-year diploma in any engineering branches, having a foundation level knowledge (plus two equivalent) in Mathematics and Computer fundamental skills.
- Students who have completed their graduation but are awaiting the final results can also apply.

*\*Please note that the ICT Academy of Kerala will have the right to cancel the candidature at any point if found ineligible.*



G1, GROUND FLOOR, THEJASWINI BUILDING  
TECHNOPARK CAMPUS, THIRUVANANTHAPURAM  
+91 75 940 51437 | 471 270 0811

[info@ictkerala.org](mailto:info@ictkerala.org) | <https://ictkerala.org>

## Appendix: Detailed Program Curriculum

Module	Duration
<b>Module 1 -Problem Solving and Design Thinking</b> <ul style="list-style-type: none"><li>Understanding the Problem, Analytical thinking, Creativity and Innovation, Decision-Making skills, Troubleshooting Skills, Logical Reasoning.</li><li>Design Thinking: Empathy, Defining the Problem, Ideation, Prototyping, Testing and Iterating, Case Studies.</li></ul>	<b>10 Hrs.</b>
<b>Module 2 -Machine Learning and Artificial Intelligence</b> <b>Unit 1</b> <ul style="list-style-type: none"><li>Introduction to Machine Learning and Artificial Intelligence, Historical Perspective and Evolution of Machine Learning and Artificial Intelligence, Demystifying the Terms - Data Science, Data Analytics, Machine Learning, Artificial Intelligence, Deep Learning.</li><li>Latest Trends in ML/AI, GenAI, Difference Between Normal AI and Gen AI, Chatgpt, Prompt Engineering, Ethical Considerations.</li></ul> <b>Unit 2</b> <ul style="list-style-type: none"><li>Python Refresher, Python IDEs, Install Python/Anaconda, Introduction to GitHub , Introduction to Jupyter Notebook , Python Data structures and operators, Python loops and flow control statements, Python functions, Lambda functions, Python Object Oriented Programming Concepts.</li></ul>	<b>45 Hrs.</b>
<b>Module 3 - Python Libraries and Data Preprocessing</b> <b>Unit 1</b> <ul style="list-style-type: none"><li>Introduction to Numpy Library, Importing Numpy, Concept of Arrays, Arithmetic Operations Using Numpy, Introduction to Pandas, Importing Pandas, Concept of Series and Dataframes, Creating Series and Dataframes Using Lists and Dictionaries, Loading Different Files to Python Environment, Basic Pandas Operations (Head, Tail, Describe, Shape etc.) Data Visualization Using Matplotlib and Seaborn, Univariate and Bi-variate Analysis.</li></ul> <b>Unit 2</b> <ul style="list-style-type: none"><li>Basic Statistics for Machine Learning, Introduction to Basic Statistical Concepts, Measures of Central Tendency, Mean, median, mode, Standard Deviation, Variance, eigenvalue, Eigenvectors, Introduction, Conditional Probability, Bayesian Theorem.</li></ul> <b>Unit 3</b> <ul style="list-style-type: none"><li>Introduction to Data Preprocessing, Structured and Unstructured Data, Need of Preprocessing, Missing Values Handling and Outlier Handling, encoding, Scaling and Normalization, Correlation and Feature Engineering Techniques.</li></ul>	<b>45 Hrs.</b>



**Module**

**Duration**

**Module 4 - Supervised Learning and Unsupervised Learning**

**Unit 1**

- Introduction to Machine Learning Algorithms, Different Types of Machine Learning Algorithms, Supervised, Unsupervised, Reinforcement Learning Algorithms, Classification and Regression, Introduction to Linear Regression, Polynomial Regression, Evaluation Metrics, MSE, MAE, RMSE, R2 Score, classification Algorithms, Logistic Regression, kNN, SVM, Naive Bayes, Tree Based Algorithms, Decision Tree, Evaluation Metrics, Confusion Matrix, Accuracy, Precision, Recall, f1 Score, ROC.

**45 Hrs.**

**Unit 2**

- Ensemble Learning Models and Hyperparameter Tuning, Bagging and Boosting Algorithms, Random Forest, and Other Bagging Algorithms, Cross Validation Techniques, Grid Search CV, Randomized Search CV, Hyper Parameter Tuning.

**Unit 3**

- Introduction to Unsupervised Learning, K-means Clustering, Agglomerative Hierarchical Clustering, Dimensionality Reduction, PCA

**Module 5 -Artificial Neural Networks and Deep Learning**

**Unit 1**

- Introduction to ANN, Perceptron, Multi Layer Perceptron, Activation Functions, Gradient Descent and Backpropagation, Introduction to Libraries for Deep Learning, Tensorflow and Keras, Hyper Parameter Tuning in Deep Learning, Regularization Technique, L1, L2 Regularization.

**45 Hrs.**

**Unit 2**

- Introduction to Computer Vision, Introduction to Unstructured Data, Working With Images, Basic Image Data Preparation Techniques, Convolution and Pooling, Introduction to Convolution Neural Networks, CNN Architecture, Back Propagation, Introduction to Pretrained Models, VGG, ResNet.

**Module 6 - Natural Language Processing and Advanced Machine Learning Techniques**

**Unit 1**

- Introduction to NLP, NLU, Handling With Text Data, Text Preprocessing Techniques, Libraries and Tools for Text Cleaning, Introduction to Vectorization Techniques, Bag of Words Models, TF-IDF Vectorizer, Word Embedding Models, Word2Vec Models, Sentiment Analysis and Text Classification, Deep Learning for NLP, Develop a Deep Learning Model for NLP With Keras, LSTM, GRU, Introduction to LLM, Introduction to Transformer Architecture.

**45 Hrs.**

Module	Duration
<b>Unit 2</b> <ul style="list-style-type: none"><li>Advanced Machine Learning Techniques, Discriminative and Generative Models, Common Generative Models: Gaussian Mixture Models (Gmm), Generative Adversarial Networks (Gans), Variational Autoencoders (Vaes).</li><li>Introduction to Recommender Systems, Types of Recommendation Systems, Content Based and Collaborative Filtering, Building Basic Recommendation Systems.</li></ul>	
<b>Module 7 - Model Deployment and Deep Dive Into Cloud Computing</b>	
<b>Unit 1</b> <ul style="list-style-type: none"><li>Introduction to Streamlit, Model Deployment Using Streamlit, Introduction to MLOps, Key Concepts in MLOps, MLOps Lifecycle, Version Control for ML Models, Model Training and Evaluation Pipelines, Model Deployment Strategies</li></ul>	
<b>Unit 2</b> <ul style="list-style-type: none"><li>Cloud Deployment Models (Public, Private, Hybrid, Community Clouds) Benefits of Cloud Computing: Cost Savings, Scalability, Flexibility, Reliability, Security challenges and Risks: Security Concerns, Data Privacy, Compliance, Vendor Lock-in Cloud Providers: Overview of Major Cloud Providers (AWS, Azure, Google Cloud, Etc.)</li><li>Use Cases: Common Use Cases for Cloud Computing Across Industries Future Trends: Serverless Computing, Edge Computing, AI/ML in Cloud Computing.</li></ul>	<b>40 Hrs.</b>
<b>Module 8 - Capstone Project</b> <ul style="list-style-type: none"><li>Applying Knowledge and Skills Acquired Throughout the Program to Solve a Real-world Problem Using Machine Learning/deep Learning.</li><li>Project Planning, Data Collection, Data Preparation, Model Development, Model Evaluation, Model Deployment, Analysis and Presentation</li></ul>	<b>100 Hrs.</b>
<b>Total</b>	<b>375 Hrs.</b>