College of Engineering, Kottarakkara

Dept. of Computer Science and Engineering

Vacation courses

SL NO	Course Name	Duration	Topics Covered	Tools Used	Best For
1	**AI & Machine Learning for Beginners**	20 days	AI & ML Basics, Python, Image & Text Processing, Hands-on AI Projects	Google Colab, Jupyter Notebook	Students new to coding and AI
2	**AI with Python & ChatGPT**	20 days	AI & Chatbots, OpenAI APIs, AI Assistant Development, Ethics	Python, OpenAI API	Students interested in practical AI
3	**AI for Gaming & Robotics**	20 days	AI in Gaming, Robotics Basics, Virtual Robots, Game Bot Development	Scratch, TensorFlow Lite	Students interested in gaming & robotics
4	**Computer Vision & AI Applications**	20 days	AI in Image Processing, Face/Object Recognition, AI in Healthcare/Security	OpenCV, TensorFlow	Students who love visuals & AI apps
5	**AI & Data Science for Young Innovators**	20 days	Data Science Basics, AI in Everyday Life, Hands-on AI Models, Ethics	Google Colab, Pandas, Matplotlib	Students curious about AI's impact

Course 1: AI & Machine Learning for Beginners

Tools Used: Google Colab, Jupyter Notebook

Syllabus

Module 1: Introduction to AI & ML (Day 1-5)

- Overview of AI & ML
- Real-world Applications of AI
- Introduction to Python Programming
- Data Types, Loops, and Functions in Python
- Python Libraries for AI (NumPy, Pandas, Matplotlib)

Module 2: Supervised & Unsupervised Learning (Day 6-10)

- What is Machine Learning?
- Supervised vs. Unsupervised Learning
- Linear Regression & Logistic Regression
- Classification Algorithms (Decision Trees, KNN)
- Hands-on Project: Predicting House Prices

Module 3: AI in Image & Text Processing (Day 11-15)

- Image Processing with OpenCV
- Face Detection & Recognition
- Introduction to Natural Language Processing (NLP)
- Sentiment Analysis with Python
- Hands-on Project: AI-based Image/Text Processing

Module 4: Advanced AI Concepts (Day 16-20)

- Introduction to Deep Learning
- Neural Networks Basics
- AI Ethics & Challenges
- Building an AI Chatbot
- Final Project Presentation

Course 2: AI with Python & ChatGPT

Tools Used: Python, OpenAI API

Syllabus

Module 1: Python Basics for AI (Day 1-5)

- Introduction to AI-powered chatbots
- Basics of Python & API Calls
- Understanding JSON & REST APIs
- Introduction to OpenAI API
- Hands-on: Making API Requests

Module 2: AI Chatbots Development (Day 6-10)

- How Chatbots Work
- Natural Language Processing (NLP) Basics
- Building a Simple AI Chatbot
- Enhancing Chatbots with AI Models
- Hands-on Project: AI-Powered Virtual Assistant

Module 3: Advanced Chatbot Features (Day 11-15)

- Adding Memory to Chatbots
- Handling Conversations Effectively
- Voice-Enabled Chatbots
- Deploying AI Assistants on Websites
- Hands-on Mini Project (Custom AI Chatbot)

Module 4: Chatbot Deployment & Ethics (Day 16-20)

- AI Ethics & Bias in Chatbots
- Fine-tuning Chatbot Responses
- Business Applications of AI Assistants
- Deploying Chatbots on Various Platforms
- Final Chatbot Showcase & Feedback

Course 3: AI for Gaming & Robotics

Tools Used: Scratch, TensorFlow Lite

Syllabus

Module 1: AI in Gaming (Day 1-5)

- Introduction to AI in Games
- How AI Makes Game Decisions
- Creating a Simple Game Bot
- AI in Game Character Behaviour
- Hands-on: AI-based Game Mechanics

Module 2: Basics of Robotics & AI (Day 6-10)

- Introduction to Robotics
- Understanding Sensors & Actuators
- Programming Virtual Robots
- AI-driven Motion Planning
- Hands-on: Creating an AI-driven Robot

Module 3: AI in Game Development (Day 11-15)

- Machine Learning for Gaming Strategies
- AI in Multiplayer Games
- Reinforcement Learning for AI Players
- AI-based Game Level Generation
- Hands-on Mini Project (AI Game Bot)

Module 4: Robotics & Final Project (Day 16-20)

- AI in Automation & Robotics
- AI-powered Virtual Reality & Augmented Reality
- Self-learning Robots & AI Integration
- Project Implementation & Testing
- Final Presentation & Certification

Course 4: Computer Vision & AI Applications

Tools Used: OpenCV, TensorFlow

Syllabus

Module 1: Image Processing Basics (Day 1-5)

- Introduction to Computer Vision
- Understanding Images & Pixels
- Image Processing with OpenCV
- Edge Detection & Contour Detection
- Hands-on: Image Transformation Techniques

Module 2: Face & Object Recognition (Day 6-10)

- Face Detection using OpenCV
- Object Recognition using TensorFlow
- Training AI for Image Classification
- Real-time Object Tracking & Detection
- Hands-on Mini Project (Face/Object Recognition)

Module 3: AI in Security & Healthcare (Day 11-15)

- AI-powered Surveillance & Security Systems
- AI for Medical Image Analysis
- Gesture Recognition & Motion Detection
- AI in Autonomous Vehicles
- Hands-on Mini Project (AI for Healthcare/Security)

Module 4: Final Project & AI Innovations (Day 16-20)

- AI Integration with IoT
- AI-powered Augmented Reality & Virtual Reality
- Final Project Development & Deployment
- Testing AI Applications
- Final Presentation & Certification

Course 5: AI & Data Science for Young Innovators

Tools Used: Google Colab, Pandas, Matplotlib

Syllabus

Module 1: Introduction to Data Science & AI (Day 1-5)

- What is Data Science?
- AI's Role in Data Science
- Python Basics for Data Science
- Data Collection, Cleaning & Processing
- Hands-on: Data Preprocessing Techniques

Module 2: Data Analysis & Visualization (Day 6-10)

- Data Visualization Basics
- Creating Graphs with Matplotlib
- Data Analysis with Pandas
- Exploratory Data Analysis (EDA)
- Hands-on Mini Project (Data Visualization)

Module 3: AI-powered Data Science (Day 11-15)

- Machine Learning for Data Science
- AI-based Predictive Modeling
- AI in Business & Market Analytics
- AI in Environmental & Social Impact Analysis
- Hands-on Mini Project (Predictive Data Model)

Module 4: Final Project & Ethical AI (Day 16-20)

- Responsible AI & Data Ethics
- AI Bias & Data Privacy Concerns
- Final Data Science Project Work
- Project Refinement & Testing
- Final Presentation & Certification