Module 1: Getting Started with Images

1. Image Basics
   - Geometry of Image Formation
   - Digital Image Formation
   - Image Formats

2. Getting Started with Images
   - Reading, Displaying and Saving images
   - Color Images
   - Basic Image Manipulations
   - Annotating Images

Module 2: Basic Image Operations

1. Arithmetic Operations on Images
   - Arithmetic Operations on Images
   - Thresholding in Images
   - Logical Operations on Images

2. Alpha Channel
   - Understanding and Using the Alpha Channel

3. Applications
   - Application 1: Creating Watermarks
• Application 2: Creating Digital Signature

Module 3 : Histograms and Color Segmentation

1. Histograms and Color Segmentation
   • Histograms
   • Color Segmentation

2. Applications
   • Deforestation using Color Segmentation
   • Analyzing Satellite Imagery using GeoTIFF Images

Module 4 : Video Processing and Analysis

1. Video Processing
   • Reading and Streaming Videos
   • Writing Videos
   • Motion Detection in Videos

Module 5 : Contour and Shape Analysis

1. Contour and Shape Analysis
   • Finding and Drawing Contours

2. Applications
   • Application: Intruder Detection
   • Notification using a Telegram Bot

Module 6 : Playing Games Using CV (HCI)

1. PyAutoGUI Overview
   • Introduction to HCI with PyAutoGUI

2. Applications
Module 7: Building and Deploying Web Apps with Streamlit

1. Creating Web Applications using Streamlit
   - Introduction to Streamlit
   - Face Detection Web App using Streamlit
2. Deploy Streamlit Applications to cloud
   - App Deployment using Streamlit Share
   - App Deployment using Heroku

Module 8: Image Filtering and Enhancement

1. Introduction to Image Filtering
   - Basics of Image Filtering
   - What is Convolution
2. Image Smoothing and Sharpening
   - Image Smoothing and Sharpening using Convolution
3. Edge Detection
   - Edge Detection Methods: Sobel and Canny
4. Application: Build Photoshop-like Filters
   - Photoshop-like Artistic Filters
   - Build a Web App for Artistic Filters

Module 9: Lane Detection using Hough Transform

1. Lane Detection using Hough Transform
   - Detecting Lines using Hough Transform in images
   - Lane Detection in Videos
Module 10: Image Restorations Techniques

1. Image Restorations using Filtering and Inpainting
   • Noise Reduction using Filtering and Inpainting
   • Fix Images using Inpainting
2. Application: Image Restoration App

Module 11: Image Registration Techniques

1. Geometric Transformations and Image Features
   • Color Photography and Image Alignment
   • Affine Transformations
   • Homography / Perspective Transform
   • Image Features
2. Image Registration using Homography and Feature Matching
   • Image Alignment Demo
3. Applications
   • Virtual Billboard
   • Creating Panoramas

Module 12: ArUco Markers for Augmented Reality

1. Introduction to ArUco Markers
   • ArUco Markers Overview
2. Application: Augmented reality using ArUco Markers

Module 13: Deep Learning with OpenCV

1. OpenCV DNN Module
   • Introduction to Deep Learning with OpenCV
   • Image Classification using OpenCV DNN Module
2. Application: Build A Web App to Classify Images
Module 14: Face and Landmark Detection

1. Face Detection in OpenCV
   • Face detection using OpenCV DNN Module
2. Detecting Facial Landmarks
   • Facial Landmark Detection using OpenCV
   • Application: Blink Detection

Module 15: Object Detection

1. Object Detection in OpenCV
   • Object detection using SSD MobileNet
   • Object detection using YOLOv4
   • Object detection using YOLOv5
2. Application
   • Social Distance Monitoring

Module 16: Object Tracking

1. Object Tracking in OpenCV
   • Introduction to Object Tracking
   • Analyzing Object Tracking methods

Module 17: Human Pose Estimation

1. Human Pose Estimation using Mediapipe
   • Introduction to Mediapipe for Human Pose Estimation
2. Application: Sport Analysis
   • Golf Swing analysis and Training

Module 18: Person Segmentation

1. Person Segmentation using Mediapipe
   • Implementing Portrait Mode and Color Pop
Module 19: Text Detection and OCR

1. Text Detection and Recognition
   - Text Detection using OpenCV DNN
   - Text Recognition using Natural Scenes
2. Application: Build a Language translation App
   - Translate language in images

Module 20: Super Resolution

1. Super Resolution in OpenCV

Module 21: Deploying Applications on the Cloud

1. Google Cloud Deployment
   - GCP Account Setup
   - Deploy Web App on AWS
2. Amazon Web Services
   - AWS Account Setup
   - Deploy Web App on AWS
3. Microsoft Azure
   - Azure Account Setup
   - Deploy Web APP on Azure