# Getting Started With Computer Vision - Course Plan

**Instructor Name :** Ankit Raj
**Branch :** Computer Science
**Semester :** 4

**Prerequisites**: Python, Anaconda Environment

**Deliverable from the course:**
1. Understand how the facial features are detected using Voila Jones algorithm.
2. Be able to make a model to detect face in real time using OpenCV.
3. Understand the basics of Artificial Neural Network and Convolutional Neural Network.
4. Use SSD technique and detect various objects in a video.

**Final Project:**
-The student will have to build a smile detector and detect cars in traffic.

## Week I:

### Part 1: Voila Jones Algorithm and Haar Cascade features

**1. Topics to be taught**
- Voila Jones Algorithm
- Haar Cascading features
-Training Classifier
-Cascading

**2. Tasks to be completed**
- Share the understanding about the topic
- Quiz based on this topic

## Part 2:

**1. Topics to be taught**
- understand cascade files for different features
- detect the area of interest using an opencv method
- bound the area of interest
- work on real time video using webcam

2. **Tasks to be completed**
- write a code to detect a face and eyes
- comment the code explaining what happens where required

3. **Weekly project work**
- Build a Happiness detector

## Week II: Artificial neural network and convolutional neural network

### 1. Topics to be taught

**Part 1 : ANN**
- How does it work
- Activation function
- Gradient descent
- Backpropagation

**Part 2 : CNN**
- What is it?
- Convolution operation
- Pooling
- Flattening

### 2. Tasks to be completed
- Share the understanding about the topic
- quiz based on ANN and CNN

## Week III: Detect various objects using SSD Technique

### 1. Topics to be taught

**Part 1: Single shot detection model**
- how is it different from Voila Jones Algorithm
- Predicting object position
- Scale Problem

**Part 2: Detecting objects in a video**
- understanding the libraries involved
- creating the ssd neural network
- transforming the frame to fit into the neural network
- detecting the objects

### 2. Tasks to be completed
- share the understanding about SSD model
- write a code to create the ssd neural network which takes in a frame
- detect a dog and a human in a sample video

### 3. Weekly Project work
- Detect cars in a traffic