# Syllabus

## 19AD784IMAGE ANALYSIS AND COMPUTER VISION

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**Course Objective:**

To impart knowledge on
- To become familiar with digital image fundamentals.
- To get exposed to simple image enhancement techniques in Spatial and Frequency domain.
- To learn concepts of degradation function, restoration, image segmentation and representation techniques.
- To apply three-dimensional image analysis techniques.
- To Study real world applications of computer vision algorithms.

**Course Outcome:**

At the end of the course, the students will be able to
- Understand the fundamentals of digital image processing
- Apply Image Enhancement techniques in Spatial and Frequency Domain
- Apply Image Restoration and Segmentation techniques
- Illustrate 3D vision process and motion estimation techniques.
- Apply vision techniques to real time applications

**Tools and Languages Needed:**

1. Python – Numpy, Scikit, pandas, cv2
2. Anaconda framework
3. Jupyter, Spyder –IDE
4. Google Colab – Cloud online browser-based python notebook environment
5. Visual Studio.

**Practical Experiments:**

1. Read & Write Images using different Color models
2. Implementation of various Image Processing operations
3. Implementation of Image Enhancement techniques like sharpening and thresholding
4. Implementation of Image Enhancement in Spatial Domain
5. Implementation of Intensity Transformation Operations on Images
6. Implementation of Image Restoration Techniques
7. Implementation of Image Segmentation Techniques
8. Implementation of 3D Vision Techniques
9. Implementation of 3D Vision – Structure From Motion
10. Implementation of Real Time Applications – Document Image Analysis, Video Tracking
11. Implementation of Real Time Applications - Object Recognition, Content-Based Image Retrieval

**TOTAL: 39 PERIODS**