# Course Outline: Digital Image Processing and Application

## Course Title

Digital Image Processing and Application

## Instructor Name

Jun Albert Pardillo

## Credit Units

3

## Target Students

4th Year Electrical Engineering Students

## Total Hours

54

## Class Hours per Week

3

## Course Description

Digital Image Processing and Application is a course designed for 4th Year Electrical Engineering students who are interested in learning about the fundamentals of digital image processing and its applications. The course will cover the basic concepts of image processing, including image acquisition, image enhancement, image restoration, image segmentation, and image compression.   
  
The course will also focus on the practical applications of digital image processing in various fields, such as medical imaging, remote sensing, and computer vision. Students will learn how to use various software tools and programming languages, such as MATLAB, Python, and OpenCV, to implement digital image processing algorithms and analyze the results.   
  
Throughout the course, students will work on several projects that involve real-world applications of digital image processing. These projects will help students develop their problem-solving skills and gain hands-on experience in applying digital image processing techniques to solve real-world problems.   
  
By the end of the course, students will have a solid understanding of the principles of digital image processing and its applications. They will be able to apply their knowledge to solve complex problems in various fields and will be well-prepared for careers in industries such as medical imaging, robotics, and computer vision.

# Course Outline

## Introduction to Digital Image Processing

Hours: 10

Overview of digital image processing, history, and applications. Introduction to the basic concepts of digital imaging and the digital image processing pipeline. Understanding image acquisition and the types of images.

## Image Enhancement

Hours: 12

Techniques for improving the visual appearance of images. Exploring spatial domain methods including histogram equalization and spatial filtering, and frequency domain methods for image enhancement.

## Image Restoration

Hours: 10

Understanding the cause of image degradation and applying techniques to restore the original appearance of the image. Covering model-based and inverse filtering approaches.

## Image Segmentation

Hours: 11

Dividing an image into its constituent parts or objects. Techniques including thresholding, edge detection, and region-based segmentation. Practical applications of image segmentation.

## Image Compression and Representation

Hours: 11

Techniques for reducing the storage size of images. Exploring lossy and lossless compression methods, image file formats, and the basics of image representation in the digital domain.