ALTALUNE TECHNOLOGY

MATLAB AND IMAGE PROCESSING

OVERVIEW

- MATLAB's Power of Computational Mathematics
- Features of MATLAB
- Uses of MATLAB

MATRIX

- Referencing the Elements of a Matrix
- Deleting a Row or a Column in a Matrix
- Matrix Operations
- Addition and Subtraction of Matrices
- Division (Left, Right) of Matrix
- Scalar Operations of Matrices
- Transpose of a Matrix
- Concatenating Matrices
- Matrix Multiplication
- Determinant of a Matrix
- Inverse of a Matrix

GRAPHICS

- Adding Title, Labels, Grid Lines, and Scaling onthe Graph
- Drawing Multiple Functions on the Same Graph
- Setting Colors on Graph
- Setting Axis Scales
- Generating Sub-Plots

STATISTICS

- Mean
- Median
- Mode
- Variance
- Standard Deviation

ALTALUNE TECHNOLOGY

DECISION MAKING

- if...end Statement
- if...else...end Statement
- if...elseif...elseif...else...end Statements
- The Nested if Statements
- The switch Statement
- The Nested Switch Statements

LOOPS

- The while Loop
- The for Loop
- The Nested Loops
- Loop Control Statements
- The break Statement
- The continue Statement

IMAGE PROCESSING INTRODUCTION

- History of Photography & Camera
- What is an Image
- Analog Image Processing
- Digital Image Processing

PIXELS

- What are Pixels?
- Size of Image
- Image Storage Requirements

CONCEPT OF COLOURS

- Understanding the E-M Spectrum
- Primary Colours
- Secondary Colours
- Visual Perception of Colours
- Colour Inversion

TYPES OF IMAGES

- Gray Scale Images

- Coloured Images
- Understanding the Relationship Between Grayscale and Coloured Images
- Colour Code Conversion
- RGB to Gray Conversion
- Gray to RGB Conversion
- Conversion to Various Colour Spaces
- Creating Black & White Images

BORDERING

- Creating Lines on Images
- Creating Borders on Images
- Concept of Cropping
- Deleting Some Parts of Image

IMAGE ENHANCEMENT

- Brightness & Contrast Adjustment
- Colour Inversion
- Colour Highlights
- Creation of Editing Filters

IMAGE FILTERING

- Concept of Filtering
- Types of Noises
- Adding Noise to Image
- Types of Filters
- Removing Noise Using Filters
- Creating Your Own Filters

IMAGE COMPRESSION

- Understanding the Concept of Compression
- Various Types of Compression

- Understanding File Extensions (png, jpeg, bmpetc)

IMAGE SEGMENTATION

- Concept and Uses of Segmentation
- Creating Color Thresholds

EDGE DETECTION

- Understanding Edges in an Image
- Creating Edge Thresholds
- Identifying Edges
- **PROJECT BASED ON UNDERWATER IMAGE PROCESSING**
- **PROJECT BASED ON FIRE & SMOKE DETECTION**

Day 20

- Project based on Image Compression

Day 21

- Project based on Optical Illusion