5 - Years Integrated M.Sc. (IT)/M.Sc.(IT) (Semester – 7/1) Practical List IT7040-Fundamentals of Digital Image Processing	
Practical No : 1	**Enrollment No:**
Pre-lab Exercise	• Install image processing library in Python
Practical Problems	1. Input an image and display. Also display image resolutions. Observe the variable editor and write your observation for binary image, grayscale image and color image. 2. Input an image as a grayscale and display. Manipulate pixel values and observe the changes in display. 3. Input a gray image, also input a pixel position and display 4-neighbors, diagonal neighbors, and 8-neighbors pixel positions and values. 4. Input a gray image, also input two pixel positions and display are they 4-adjacent, 8-adjacent and m-adjacent? 5. Input two pixels position and display D_e, D_4 and D_8 distances.
Objective(s)	To understand image representation. To read and display images. To manipulate images.
Pre-requisite	-
Duration for completion	4 hours
PEO(s) to be achieved	**PEO1**: To provide sound foundation in the fundamentals of computer application along with analytical, problem-solving, design and communication skill for life-long learning in chosen field. **PEO2**: To provide quality practical skill of tools and technologies to solve industry problems.
PO(s) to be achieved	**PO6**: Ability to use the techniques, skills and modern tools as necessary for software development.
CO(s) to be achieved	CO1: Describe digital image, its type and processing steps. CO2: Describe image resolutions, classification of image operations and fundamental tools require in digital image processing.
Solution must contain	Code
Nature of submission	Handwritten
Reference for solving the problem	Book: Gonzales R., Woods R., Digital Image Processing – Pearson Sridhar S., Digital Image Processing, OXFORD

5 - Years Integrated M.Sc. (IT)/M.Sc.(IT) (Semester – 7/1) Practical List IT7040-Fundamentals of Digital Image Processing	
Practical No : 2	**Enrollment No:**
Pre-lab Exercise	• Install image processing library in Python
Practical Problems	6. Write a program to input a grayscale image and display following. a. Brightness of an image. b. Contrast of an image. c. Histogram of an image. d. Minimum color and maximum color. 7. Write a program to perform following image operation on grayscale image. a. Image negative b. Log transformation c. Power low transformation
Objective(s)	To perform image enhancement
Pre-requisite	-
Duration for completion	4 hours
PEO(s) to be achieved	**PEO1**: To provide sound foundation in the fundamentals of computer application along with analytical, problem-solving, design and communication skill for life-long learning in chosen field. **PEO2**: To provide quality practical skill of tools and technologies to solve industry problems.
PO(s) to be achieved	**PO6**: Ability to use the techniques, skills and modern tools as necessary for software development.
CO(s) to be achieved	CO1: Describe digital image, its type and processing steps. CO2: Describe image resolutions, classification of image operations and fundamental tools require in digital image processing.
Solution must contain	Code
Nature of submission	Handwritten
Reference for solving the problem	Book: Gonzales R., Woods R., Digital Image Processing – Pearson Sridhar S., Digital Image Processing, OXFORD

5 - Years Integrated M.Sc. (IT)/M.Sc.(IT) (Semester – 7/1) Practical List IT7040-Fundamentals of Digital Image Processing	
Practical No : 3	**Enrollment No:**
Pre-lab Exercise	• Install image processing library in Python
Practical Problems	8. Write a program to perform contrast stretching on grayscale image. 9. Write a program to perform range normalization on grayscale image. 10. Write a program to perform intensity slicing with background and without background on grayscale image. 11. Write a program to perform histogram equalization on grayscale image. 12. Write a program to perform binarization on grayscale image using threshold based on middle value, average pixel value and Otsu method.
Objective(s)	To perform image enhancement based on intensity transformation.
Pre-requisite	-
Duration for completion	4 hours
PEO(s) to be achieved	**PEO1**: To provide sound foundation in the fundamentals of computer application along with analytical, problem-solving, design and communication skill for life-long learning in chosen field. **PEO2**: To provide quality practical skill of tools and technologies to solve industry problems.
PO(s) to be achieved	**PO6**: Ability to use the techniques, skills and modern tools as necessary for software development.
CO(s) to be achieved	CO1: Describe digital image, its type and processing steps. CO2: Describe image resolutions, classification of image operations and fundamental tools require in digital image processing. CO3: Describe and use image enhancement in spatial domain.
Solution must contain	Code
Nature of submission	Handwritten
Reference for solving the problem	Book: Gonzales R., Woods R., Digital Image Processing – Pearson Sridhar S., Digital Image Processing, OXFORD

5 - Years Integrated M.Sc. (IT)/M.Sc.(IT) (Semester – 7/1) Practical List IT7040-Fundamentals of Digital Image Processing	
Practical No : 3	**Enrollment No:**
Pre-lab Exercise	• Install image processing library in Python
Practical Problems	13. Write a program to perform standard averaging, weighted averaging on image and compare the results. 14. Write a program to perform blurring on an image with different type of mask size i.e. 3 X 3, 5 X 5, 7 X 7, 13 X 13 and 25 X 25. 15. Write a program to perform blurring on image as following: i) Apply 3 X 3 standard blurring mask 3 times on an image. ii) Apply 7 X 7 standard blurring mask and compare result with i). 16. Write a program to perform conservative smoothing. 17. Write a program to perform median filtering on image. 18. Write a program to perform min and max filter on an image. 19. Write a program to perform image sharpening using Laplacian filter. 20. Write a program to perform image sharpening using un-sharp masking. Show resultant image for different k value as given below: $mask = f(x,y) - \bar{f}(x,y)$ $g(x,y) = f(x,y) + k\ X\ mask$ k<1, k=1 and k>1
Objective(s)	To perform image enhancement using image sharpening.
Pre-requisite	-
Duration for completion	4 hours
PEO(s) to be achieved	**PEO1**: To provide sound foundation in the fundamentals of computer application along with analytical, problem-solving, design and communication skill for life-long learning in chosen field. **PEO2**: To provide quality practical skill of tools and technologies to solve industry problems.
PO(s) to be achieved	**PO6**: Ability to use the techniques, skills and modern tools as necessary for software development.
CO(s) to be achieved	CO1: Describe digital image, its type and processing steps. CO2: Describe image resolutions, classification of image operations and fundamental tools require in digital image processing. CO3: Describe and use image enhancement in spatial domain.
Solution must contain	Code
Nature of submission	Handwritten
Reference for solving the problem	Book: Gonzales R., Woods R., Digital Image Processing – Pearson Sridhar S., Digital Image Processing, OXFORD