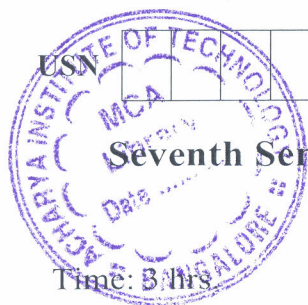


# CBCS SCHEME

21EC753



## Seventh Semester B.E./B.Tech. Degree Examination, June/July 2025 Basic Digital Image Processing

Time: 3 Hrs

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- 1 a. Explain with block diagram, the fundamental steps used in digital image processing. (10 Marks)
- b. Explain with relevant diagrams any two sensors arrangements. (10 Marks)

OR

- 2 a. Discuss the various fields of digital image processing based on EM wavelength. (10 Marks)
- b. Consider the image segment shown below :
  - i) Let  $V = \{0, 1\}$  and compute the length of shortest 4, 8 and m – path between p and q. If particular path does not exist between these two points explain why?
  - ii) Repeat for  $V = \{1, 2\}$ . (10 Marks)

### Module-2

- 3 a. With necessary graphs, explain the basic gray level transformation used for image enhancement. (10 Marks)
- b. Describe image sharpening in spatial domain using second order Laplacian derivative. (10 Marks)

OR

- 4 a. For a given  $4 \times 4$  image having gray scales between  $[0, 9]$ , perform histogram equalization and draw the histogram of image before and after equalization. (10 Marks)

2	3	3	2
4	2	4	3
3	2	3	5
2	4	2	4

- b. Discuss image subtraction and image averaging operations, with one example each. (10 Marks)

### Module-3

- 5 a. Discuss with relevant diagrams, the image smoothing using the frequency domain. (10 Marks)
- b. Explain the following filters in frequency domain :
  - i) High-boost filtering
  - ii) High frequency-emphasis filtering. (10 Marks)

OR

- 6 a. Describe the basic steps used for filtering in frequency domain. (10 Marks)  
b. With a neat block diagram and relevant filter response, explain homomorphic filtering approach for image enhancement. (10 Marks)

**Module-4**

- 7 a. Describe the CIE chromaticity diagram for color specification. (10 Marks)  
b. Discuss with neat diagrams RGB color model. (10 Marks)

OR

- 8 a. What is pseudo color image processing? Explain any one method with neat diagram. (10 Marks)  
b. Describe the conversion process of colors from HSI to RGB. (10 Marks)

**Module-5**

- 9 a. With necessary equations and graph, explain noise probability density functions. (10 Marks)  
b. Explain the process of restoration of images using inverse filtering technique. (10 Marks)

OR

- 10 a. Explain the following methods for estimating degradation function :  
i) Estimation by image observation  
ii) Estimation by experimentation. (10 Marks)  
b. Explain with relevant equations minimum mean square error (wiener) filtering. (10 Marks)

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