(Deemed to be University under section 3 of UGC Act, 1956)

SCHOOL OF HEALTHCARE SCIENCE AND ENGINEERING
CONTINUOUS ASSESSMENT TEST - II
WINTER SEMESTER 2025-2026

Programme Name & Branch : B.Tech BHT
Course Code and Course Name : BHST303L Image Processing and Data Analysis
Faculty Name(s) : Dr. Kishor Lakshminarayanan
Class Number(s) : VL2025260500995
Date of Examination : 16/03/2026
Exam Duration : 90 minutes **Maximum Marks: 50**

General instruction(s):

- Answer All Questions
- M - Max mark; CO – Course Outcome; BL – Blooms Taxonomy Level (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)
- Course Outcomes (Type the CO statements covered in this question paper. Use the CO number as per the syllabus copy)

3. Explain the effects and uses of the various image processing techniques on digital images

4. To align two or more images from different sources to create a unified view

Q. No	Question	Module	Marks
1.	Explain how using different color models (RGB, HSI, YUV) affects the design of a color segmentation algorithm for images with non-uniform illumination and noise. Discuss which model you would prefer in this situation and why, with at least two clear reasons.	3	10
2.	Design a pseudo-color image processing scheme to enhance important structures in a grayscale medical image. Briefly describe your gray-to-color mapping and then evaluate two advantages and two limitations of your design.	3	10
3.	Explain how the choice and ordering of dilation, erosion, opening, and closing affect the result of a morphological processing pipeline designed for removing small noise while preserving object shape. Identify one suitable sequence of operations for this task and justify your choice.	4	10
4.	Design a morphological algorithm to obtain a clean skeleton of binary objects and then refine it. Outline the main steps using basic operations and/or algorithms (e.g., thinning, pruning, boundary extraction), and briefly discuss two possible limitations or artefacts that may still remain in the final skeleton.	4	10
5.	The carpal tunnel lecture describes image-to-probe calibration using digitizer points and least-squares fitting for 3D ultrasound registration. Explain the purpose of this registration step and evaluate one advantage and one limitation of this calibration approach for accurate carpal tunnel morphometry.	6	10

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