Basavarajeswari Group of Institutions **2024 SCHEME**

BALLARI INSTITUTE OF TECHNOLOGY & MANAGEMENT

(Autonomous Institute under Visvesvaraya Technological University, Belagavi)

USN | | | | | | | | | | | **Course Code** | M | M | C | A | 3 | 1 | 1 | D |

Third Semester MCA Degree Examinations, January 2026

COMPUTER VISION

Duration: 3 hrs **Max. Marks: 100**

Note: ***1. Answer any* FIVE *full questions, choosing* ONE *full question from each module.***
2. Missing data, if any, may be suitably assumed

Q. No		*Question*	*Marks*	*(RBTL:CO: PI)*
		MODULE – 1		
1.	**a.**	Define computer vision and demonstrate its applications in real-world scenarios.	**10**	**(2:1:1.4.1)**
	b.	Explain the digital camera image formation pipeline with a diagram and demonstrate the image formation process.	**10**	**(2:1:1.4.2)**
		(OR)		
2.	**a.**	Describe the concept Bidirectional Reflectance Distribution Function (BRDF) and explain any two reflection models with computational equation.	**10**	**(2:1:1.4.1)**
	b.	Explain linear filtering and demonstrate different linear filters with their effects.	**10**	**(2:1:1.4.2)**
		MODULE – 2		
3.	**a.**	Illustrate the meaning of geometric transformations and discuss various geometric transformations and their effect on digital images.	**10**	**(3:2:3.1.1)**
	b.	Explain the concept of image pyramids, describe why pyramids are needed in image processing, and illustrate the steps involved in their construction.	**10**	**(2:2:4.2.3)**
		(OR)		
4.	**a.**	Define non-linear neighbourhood operators and demonstrate commonly used non-linear operators in image processing with construction steps.	**10**	**(2:2:3.1.4)**
	b.	Explain the concept of Fourier Transformation (FT) and describe in detail its computational equation and characteristics.	**10**	**(3:2:3.1.2)**
		MODULE – 3		
5.	**a.**	Describe image degradation/restoration process model and explain spatial and frequency-domain representations.	**10**	**(2:3:3.1.4)**
	b.	Define the concept of thresholding and explain basic global thresholding, and demonstrate the algorithm steps with a suitable example.	**10**	**(2:3:3.1.4)**
		(OR)		

Note: (**RBTL - Revised Bloom's Taxonomy Level: CO - Course Outcome: PI - Performance Indicator)**

6.	**a.**	Explain image restoration in the presence of noise only and describe how periodic noise is reduced using frequency domain filtering techniques.	**10**	**(2:3:3.1.2)**
	b.	Illustrate the concept of region-based segmentation and explain region splitting and merging approach along with its advantages and disadvantages.	**10**	**(3:3:3.1.4)**

MODULE – 4

7.	**a.**	Illustrate the human vision system by applying its functional components and explain their roles with a neat diagram.	**10**	**(3:4:5.3.2)**
	b.	Explain the concept of color models and describe any two color models used in digital image processing in detail.	**10**	**(2:4:5.3.2)**

(OR)

8.	**a.**	Illustrate the concept of color image processing and explain the attributes of chromatic light with suitable examples.	**10**	**(3:4:5.3.4)**
	b.	Explain the different types of noise present in color images and describe their characteristics and causes.	**10**	**(2:4:5.3.4)**

MODULE – 5

9.	**a.**	Describe morphological image processing and discuss the functions of HIT, MISS, and FIT operations associated with structuring elements.	**10**	**(2:5:6.4.4)**
	b.	Explain the hit-and-miss transform in detail and demonstrate its working procedure.	**10**	**(2:5:6.4.3)**

(OR)

10.	**a.**	Illustrate the concept of chain codes. Describe the algorithm for generating chain codes and solve an example problem.	**10**	**(4:5:5.3.4)**
	b.	Illustrate any two morphological image processing algorithms. Explain their underlying principles and provide the step-by-step algorithms for each.	**10**	**(3:5:5.3.4)**

** ** **

Note: (**RBTL - Revised Bloom's Taxonomy Level: CO - Course Outcome: PI - Performance Indicator)**