MASTER OF COMPUTER APPLICATIONS (MCA_NEW)

ASSIGNMENTS
OF MCA_NEW (2Yrs) PROGRAMME
SEMESTER-IV

(July - 2025 & January - 2026)

MCS-230, MCS-231

SCHOOL OF COMPUTER AND INFORMATION SCIENCES
INDIRA GANDHI NATIONAL OPEN UNIVERSITY
MAIDAN GARHI, NEW DELHI – 110 068

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Important Notes

1. Submit your assignments to the Coordinator of your Study Centre on or before the due date.
2. Assignment submission before due dates is compulsory to become eligible for appearing in corresponding Term End Examinations. For further details, please refer to Programme Guide of MCA (2Yrs).
3. To become eligible for appearing the Term End Practical Examination for the lab courses, it is essential to fulfill the minimum attendance requirements as well as submission of assignments (on or before the due date). For further details, please refer to the Programme Guide of MCA (2yrs).
4. The viva voce is compulsory for the assignments. For any course, if a student submitted the assignment and not attended the viva-voce, then the assignment is treated as not successfully completed and would be marked as ZERO.

Course Code	**:**	**MCS-230**
Course Title	**:**	**Digital Image Processing and Computer Vision**
Assignment Number	**:**	**MCA_NEW(IV)/230/Assign/2025-26**
Maximum Marks	**:**	**100**
Weightage	**:**	**30%**
Last Dates for Submission	**:**	**31st October, 2025 (For July, 2025 Session)** **15th April, 2026 (For January, 2026 Session)**

This assignment has sixteen questions of 5 Marks each, answer all questions. Rest 20 marks are for viva voce. You may use illustrations and diagrams to enhance the explanations. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation.

Q1: Explain the Optical, Analog and Digital Image processing. **(5 Marks)**

Q2: (i) What should be the physical size of a 2D image of a document with dimensions is 3200x2400, when scanned at 400dpi.Here dpi stands for dots per inch. **(2x2.5=5 Marks)**

(ii) If the physical size of a medical image is 4×4 inches and the sampling resolution is 5 cycles/mm, then how many pixels per cycle are required to have a better-quality image? Will an image of size512×512 be enough?

Q3: (i) What is the storage requirement for a 2048 x 2048, 24-bitcolour image? **(2+3=5 Marks)**

(ii) Explain Intensity, Contrast, Brightness, Noise and Resolution with respect to Images.

Q4: (i) Check whether the matrix $A = \frac{1}{\sqrt{2}}\begin{pmatrix} 1 & 2 \\ -2 & 1 \end{pmatrix}$ is unary or not? **(2.5+2.5=Marks)**

(ii) Perform the transformation $g_1(v) = 3v$ on the image $f(x,y) = \begin{bmatrix} -2 & -1 & 0 \\ 0 & 1 & 2 \end{bmatrix}$

Q5: Apply given 3x3 mask w on the following image F (x, y) to generate the new image. **(5 Marks)**

$$F(x, y) = \begin{bmatrix} 10 & 3 & 1 & 2 & 20 \\ 2 & 4 & 7 & 2 & 2 \\ 5 & 2 & 2 & 4 & 6 \\ 1 & 4 & 5 & 3 & 7 \\ 6 & 1 & 6 & 5 & 8 \end{bmatrix}, \quad w(i, j) = \frac{1}{9} * \begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$$

Q6: What is a histogram? Find histogram of image given below: **(5 Marks)**

0	0	0	0
0	1	2	3
0	2	4	6

Q7: Why is DCT important for image compression? Explain with the help of an example. **(5 Marks)**

Q8: What do you understand by Image enhancement? Explain the techniques of image enhancement with a suitable example. Also discuss the advantages of image enhancement. **(5 Marks)**

Q9: Explain the following Smoothing Filter(s): **(5 Marks)**

(i) Ideal Low Pass Filters (ILPF) (ii) Butterworth Low Pass Filters (BLPF)

(iii) Gaussian Low Pass filters (GLPF)

Q10: What do you understand by feature extraction? What are its applications? Also discuss few traditional methods of feature extraction. **(5 Marks)**

Q11: Explain image degradation and its types. **(5 Marks)**

Q12: Transform the RGB cube by its CMY cube. Label all the vertices. Also, interpret the colours at the edges with respect to saturation. **(5 Marks)**

Q13: Do you mean by Camera Calibration? Explain how intrinsic and extrinsic parameters of a camera are estimated? **(5 Marks)**

Q14: Explain Bayesian Classification with the help of a suitable example. **(5 Marks)**

Q15: Explain K-means clustering methods with the help of a suitable example. Also, discuss the advantages and disadvantages of k -means clustering methods. **(5 Marks)**

Q16: Perform partitional clustering using Frogy's method for the data given in the table below with k-2 (two clusters). Use first two sample points (3,3) and (6,8) as seed points. **(5 Marks)**

S. No.	X	Y
1	3	3
2	6	7
3	8	10
4	4	5
5	6	6
6	12	10
7	15	14
8	18	16

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Course Code	**:**	**MCS-231**
Course Title	**:**	**Mobile Computing**
Assignment Number	**:**	**MCA_NEW(IV)/231/Assign/2025-26**
Maximum Marks	**:**	**100**
Weightage	**:**	**30%**
Last Dates for Submission	**:**	**31st October, 2025 (For July, 2025 Session)** **15th April, 2026 (For January, 2026 Session)**

There are four questions in this assignment, which carry 80 marks. Each question carries 20 marks. Rest 20 marks are for viva voce. You may use illustrations and diagrams to enhance theexplanations, if necessary. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation.

Q1: Explain Thick Client Architecture and Thin Client Architecture. Also, explain the differences between them. **(20 Marks)**

Q2: What are Smart Sensors? What are Actuators? Explain the differences between them. **(20 Marks)**

Q3: What is the need for Mobile IP? Explain the working of Mobile IP. **(20 Marks)**

Q4: What is Adaptive Clustering? Explain it. **(20 Marks)**