MASTER OF COMPUTER APPLICATIONS (MCA_NEW)

ASSIGNMENTS
OF MCA_NEW (2Yrs) PROGRAMME
SEMESTER-IV

(July - 2024 & January - 2025)

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/2024-25**
Maximum Marks	:	**100**
Weightage	:	**30%**
Last Dates for Submission	:	**31st October, 2024 (For July, 2024 Session)**
		15th April, 2025 (For January, 2025 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: What is image acquisition? Explain Optical, Analog and Digital image processing in brief.

(5 Marks)

Q2: 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 size 512×512 be enough? **(5 Marks)**

Q3: Explain the types of Images based on (i) Attributes (ii) Based on Colour **(5 Marks)**

Q4: Solve the following problems: **(5 Marks)**

a. What is the storage requirement for a 2024 x 2024, 24-bit colour image?
b. Calculate pixel resolution of a camera in mega pixels, capturing an image of dimension: 3000 X 4000
c. Given an image is a gray scale image with aspect ratio of 8:2 and pixel resolution of 1000000 pixels, calculate the dimensions and the size of the image.

Q5: Explain how image enhancement is better in the frequency domain as compared to spatial domain. **(5 Marks)**

Q6: 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)

Q7: Explain the following Image Sharpening Filter(s): **(5 Marks)**

(i) Ideal High Pass Filters (ILPF) (ii) Butterworth High Pass Filters (BLPF) (iii) Gaussian High Pass filters (GLPF)

Q8: Explain Mean Filters, and Median Filter with the help of a suitable example for each. **(5 Marks)**

Q9: 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)**

Q10: Explain optical flow, in context of motion perception in computer vision. **(5 Marks)**

Q11: Explain epipolar geometry with the help of a suitable diagram in stereo vision system. **(5 Marks)**

Q12: What is camera calibration? Explain how it helps to estimate the intrinsic and extrinsic parameters of a camera. **(5 Marks)**

Q13: 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)**

Q14: 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	8
3	10	10
4	4	4
5	6	6
6	14	12
7	20	18
8	22	20

Q15: Explain agglomerative hierarchical clustering and its types with the help of a suitable example.
          (5 Marks)

Q16: Explain Bayes classifier with the help of a suitable example. Also discuss its properties.
          (5 Marks)

Course Code	:	**MCS-231**
Course Title	:	**Mobile Computing**
Assignment Number	:	**MCA_NEW(IV)/231/Assign/2024-25**
Maximum Marks	:	**100**
Weightage	:	**30%**
Last Dates for Submission	:	**31ˢᵗ October, 2024 (For July, 2024 Session)**
		15ᵗʰ April, 2025 (For January, 2025 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 the explanations, if necessary. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation.

Q1: What is a 5G Network? What are its limitations? How can they be overcome?　　**(20 Marks)**

Q2: List the features of any two Programming Languages that can be used to develop Mobile Applications.　　**(20 Marks)**

Q3: What is a Virtual Cloud Network? What are its advantages and disadvantages?　　**(20 Marks)**

Q4: What is a Mobile Adhoc Network? What are its advantages and disadvantages?　　**(20 Marks)**