

Alva's Institute of Engineering & Technology

Shobhavana Campus, Mijar, Moodbidri, D.K - 574225

Phone: 08258-262725, Fax: 08258-262726

**DEPARTMENT OF ELECTRONICS AND COMMUNICATION
ENGINEERING**

Course File

Course Name	:	Digital Image Processing
Course Code	:	17EC72
Semester / Section	:	VII A,B
Academic Year	:	2020-21 Odd Semester
Duration	:	Sep, 2020 to Jan, 2021

Revised Academic Calendar of VTU, Belagavi for ODD Semester of 2020-21 (Tentative)

	I Sem B. E. / B. Tech. / B. Arch./B. Plan	I sem M.Tech./MBA /MCA/M.Arch.	III, V B. E. /B. Tech./B. Plan/ B.Arch. & VII sem BPlan /BArch & IX Sem B. Arch.	VII Sem B. E. /B. Tech	III & V Sem MCA	III Sem MBA	III Sem M. Tech.	III Sem M. Arch.
Commencement of ODD Semester	14.12.2020	Will be announced later	01.09.2020	01.09.2020	01.09.2020	01.09.2020	01.09.2020	01.09.2020
Last Working day of ODD Semester	25.03.2021		16.01.2021	16.01.2021	16.01.2021	16.01.2021	16.01.2021	16.01.2021
Practical Examinations	29.03.2021 Onwards#		21.01.2021 Onwards#	21.01.2021 Onwards#	08.02.2021 Onwards#	--	21.01.2021 Onwards#	--
Theory Examinations	12.04.2021 To 30.04.2021		08.02.2021 To 27.03.2021	08.02.2021 To 27.03.2021	21.01.2021 To 06.02.2021	21.01.2021 To 19.02.2021	28.01.2021 To 13.02.2021	21.01.2021 To 06.02.2021
Internship			---	29.03.2021 To 10.04.2021	---	---	---	---
Internship Viva- Voce			---	---	---	---	15.02.2021 To 22.02.2021	---
Professional training / Organization study			---	---	---	22.02.2021 To 03.04.2021	---	---
Commencement of EVEN Semester	03.05.2021		29.03.2021	12.04.2021	15.02.2021	05.04.2021	23.02.2021	08.02.2021

NOTE:

- VII Semester B. E. / B. Tech. students shall have to undergo Internship as per circular of University VTU/Aca/2019-20/85, dated 12.05.2020.
- I Semester B. E/ B. Tech / B. Arch Students shall compulsorily undergo Induction Program for 01 Weeks.
- The classroom sessions for all the semesters would be in ONLINE mode/blended mode until further orders.
- The Institute needs to function for six days a week with additional hours (Saturday is a full working day).
- The faculty/staff shall be available to undertake any work assigned by the university.
- If any of the above dates are declared to be a holiday then the corresponding event will come into effect on the next working day.
- (#) Notification regarding the Calendar of Events relating to the conduct of University Examinations will be issued by the Registrar (Evaluation) from time to time.
- Academic Calendar may be modified based on guidelines/directions issued in the future by MHRD/UGC/AICTE/State Government.
- Revised Academic Calendar is also applicable for Autonomous Colleges.
- The MBA students are permitted to carry out project work in blended mode (ONLINE/OFFLINE). More emphasis on OFFLINE mode wherever feasible.

04.12.2020
REGISTRAR



ALVA'S
Education Foundation

Alva's Institute of Engineering & Technology

Sobhavana Campus, Mijar, Moodbidri, D.K - 574225

Phone: 08258-262725, Fax: 08258-262726

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Faculty Personal Time Table

Mrs. Nishma

Designation: Assistant Professor

Academic Year: 2020-21						Effective form: 23/11/2020			
	9.00 To 9.55	9.55 To 10.50	10.50 To 11.10	11.10 To 12.00	12.00 To 12.55	12.55 To 2.00	2.00 To 3.00	3.00 To 4.00	4.00 To 5.00
MON		DIP-A							
TUE	DIP-A			DIP-B					
WED	ADC LAB(SS)							ADC LAB(VTS)	
THU	DIP-A						DIP-B		
FRI				DIP-A			DIP-B		
SAT	DIP-B			DIP-A				ADC LAB(VTS)	

Time Table with effect from 23/11/2020
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Academic Year		Scheme		Semester		Section		Class Coordinator		Room No
2020-21		2017		7 TH		B		Mrs. Nishma K		203
Time Day	9.00 To 9.55	9.55 To 10.50	10.50 To 11.40	11.10 To 12.00	12.00 To 12.55	12.55 To 02.00	02.00 To 3.00	3.00 To 4.00	4.00 To 5.00	
MON	DSPA	PE	B R E A K	MWA	DIP	L U N C H	RTS	PROJECT WORK		
TUE	MWA	DSPA		DIP	PE		ADC LAB(VTS+ NI) VLSI LAB(DRJ +AJ)			
WED	PE	SEMINA R(SSJ)		SEMINA R(SSJ)	RTS		DIP	PROJECT WORK		
THU	ADC LAB(SS+ SSJ) VLSI LAB(DRJ +AJ)				RTS		DIP	BASIC CLASS		
FRI	MWA	DSPA	BREA K	RTS	PE		PE	DSPA	MWA	
SAT	DIP	MWA		SEMINAR(BG)						

Allocation of Subjects

Subjects			Staffs	Staff Code
MWR	17EC71	Microwave and Antenna	Mr. Sree Sankar	SSJ
DIP	17EC72	Digital image processing	Mrs. Nishma K	NI
PE	17EC73	Power electronics	Mr. Sudhakar H M	SHM
RTS	17EC743	Real time systems	Mr.Sachin K	SK
DSPAA	17EC751	DSP Algorithm and Architecture	Mr. Sushanth Anil Lobo	SAL
ADC-LAB	17ECL76	Advanced Communication Lab	Mr.Santhosh S +Mrs. Vijetha T S +Mrs. Nishma K + Mr. Sree Sankar	SS+VT S+NI+S SJ
VLSI-LAB	17ECL77	VLSI Laboratory	Mr. Anish jain	AJ .
PW	17ECP78	Project Work Phase-I	Mr.Santhosh S	SS


Time Table Coordinator


MOD.

Dept. Of Electronics & Communication
Alva's Institute of Engg. & Technology
Mijar, MOODBIDRI - 574225


Principal

Alva's Institute of Engg. & Technol
Mijar, MOODBIDRI - 574 225, D

Time Table with effect from 23/11/2020

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Academic Year		Scheme		Semester		Section		Class Coordinator		Room No	
2020-21		2017		7 TH		A		Mr. Sudhakar.H.M		204	
Time Day	9.00 To 9.55	9.55 To 10.50	10.50 To 11.10	11.10 To 12.00	12.00 To 12.55	12.55 To 2.00	2.00 To 3.00	3.00 To 4.00	4.00 To 5.00		
MON	MWA	DIP	BREAK	RTS	DSPA	L U N C H	PE	SEMINAR(KS)			
TUE	DIP	PE		RTS	MWA		MWA	BASIC CLASS			
WED	ADC LAB(SS+ NI) VLSI LAB(DRJ +SK)				DSPA		MWA	PROJECT WORK			
THU	DIP	SEMIN AR(BG)	B R E A K	SEMINA R(BG)	PE		DSPA	PROJECT WORK			
FRI	RTS	PE		DIP	DSPA		ADC LAB(VTS+ NI) VLSI LAB(DRJ +SK)				
SAT	PE	RTS		DIP	MWA		PROJECT WORK				

Allocation of Subjects

Subjects			Staffs	Staff Code
MWR	17EC71	Microwave and Antenna	Mr. Sree Sankar	SSJ
DIP	17EC72	Digital image processing	Mrs. Nishma K	NI
PE	17EC73	Power electronics	Mr. Sudhakar H M	SHM
RTS	17EC743	Real time systems	Mr.Sachin K	SK
DSPAA	17EC751	DSP Algorithm and Architecture	Mrs. Vijetha T S	VTS
ADC-LAB	17ECL76	Advanced Communication Lab	Mr.Santhosh S +Mrs. Vijetha T S +Mrs. Nishma K	SS+VT S+NI
VLSI-LAB	17ECL77	VLSI Laboratory	Mr. Deepak Raj	DRJ
PW	17ECP78	Project Work Phase-I	Mr.Santhosh S	SS

Time Table Coordinator

H.O.D.

Dept. Of Electronics & Communication
Alva's Institute of Engg. & Technology
Mijar, MOODBIDRI - 574 225

Principal
Alva's Institute of Engg. & Tech
Mijar, MOODBIDRI - 574 225

DIGITAL IMAGE PROCESSING

B.E., VII Semester, Electronics & Communication Engineering
[As per Choice Based Credit System (CBCS) Scheme]

Course Code	17EC72	CIE Marks	40
Number of Lecture Hours/Week	04	SEE Marks	60
Total Number of Lecture Hours	50 (10 Hours / Module)	Exam Hours	03

CREDITS - 04

Course Objectives: The objectives of this course are to:

- Understand the fundamentals of digital image processing
- Understand the image transform used in digital image processing
- Understand the image enhancement techniques used in digital image processing
- Understand the image restoration techniques and methods used in digital image processing
- Understand the Morphological Operations and Segmentation used in digital image processing

Module-1

Digital Image Fundamentals: What is Digital Image Processing?, Origins of Digital Image Processing, Examples of fields that use DIP, Fundamental Steps in Digital Image Processing, Components of an Image Processing System, Elements of Visual Perception, Image Sensing and Acquisition, Image Sampling and Quantization, Some Basic Relationships Between Pixels, Linear and Nonlinear Operations.
[Text: Chapter 1 and Chapter 2: Sections 2.1 to 2.5, 2.6.2] **L1, L2**

Module-2

Spatial Domain: Some Basic Intensity Transformation Functions, Histogram Processing, Fundamentals of Spatial Filtering, Smoothing Spatial Filters, Sharpening Spatial Filters

Frequency Domain: Preliminary Concepts, The Discrete Fourier Transform (DFT) of Two Variables, Properties of the 2-D DFT, Filtering in the Frequency Domain, Image Smoothing and Image Sharpening Using Frequency Domain Filters, Selective Filtering.

[Text: Chapter 3: Sections 3.2 to 3.6 and Chapter 4: Sections 4.2, 4.5 to 4.10]

L1, L2, L3

Module-3

Restoration: Noise models, Restoration in the Presence of Noise Only using Spatial Filtering and Frequency Domain Filtering, Linear, Position-Invariant Degradations, Estimating the Degradation Function, Inverse Filtering, Minimum Mean Square Error (Wiener) Filtering, Constrained Least Squares Filtering.

[Text: Chapter 5: Sections 5.2, to 5.9] **L1, L2, L3**

Module-4

Color Image Processing: Color Fundamentals, Color Models, Pseudocolor Image Processing.

Wavelets: Background, Multiresolution Expansions.

Morphological Image Processing: Preliminaries, Erosion and Dilation, Opening and Closing, The Hit-or-Miss Transforms, Some Basic Morphological Algorithms.

[Text: Chapter 6: Sections 6.1 to 6.3, Chapter 7: Sections 7.1 and 7.2, Chapter 9: Sections 9.1 to 9.5] **L1, L2, L3**

Module-5

Segmentation: Point, Line, and Edge Detection, Thresholding, Region-Based Segmentation, Segmentation Using Morphological Watersheds.

Representation and Description: Representation, Boundary descriptors.

[Text: Chapter 10: Sections 10.2, to 10.5 and Chapter 11: Sections 11.1 and 11.2]

L1, L2, L3

Course Outcomes: At the end of the course students should be able to:

- Understand image formation and the role human visual system plays in perception of gray and color image data.
- Apply image processing techniques in both the spatial and frequency (Fourier) domains.
- Design image analysis techniques in the form of image segmentation and to evaluate the Methodologies for segmentation.
- Conduct independent study and analysis of Image Enhancement techniques.

Text Book:

Digital Image Processing- Rafael C Gonzalez and Richard E. Woods, PHI 3rd Edition 2010.

Reference Books:

1. **Digital Image Processing-** S.Jayaraman, S.Esakkirajan, T.Veerakumar, Tata McGraw Hill 2014.
2. **Fundamentals of Digital Image Processing-**A. K. Jain, Pearson 2004.

Department of Electronics and Communication

SEMESTER - VII

2020-21

Course Code: 17EC72

Course Name: Digital Image Processing

Course Teacher: Mrs. Nishma

Course Outcomes: After studying this course, students will be able to,

CO Numbers	Course Outcomes	Blooms Level	Target Level
17EC72.1	Review the fundamental concepts of a digital image processing system.	L1, L2	2
17EC72.2	Apply image processing techniques in both the spatial and frequency (Fourier) domains.	L1, L2, L3	2
17EC72.3	Conduct independent study and analysis of Image Enhancement techniques.	L1, L2, L3	2
17EC72.4	Explain the fundamental concepts involved in color image processing and utility of wavelet decompositions and Morphological Operations in image processing systems.	L1, L2	2
17EC72.5	Analyze various segmentation techniques applied on images and also to represent images using boundary descriptors.	L1, L2, L3	2

CO-PO/PSO Mapping Matrix:

CO Number	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
15EC72.1	2	1			1				2				1	1	1
15EC72.2	2	1	1		1	1			2				1	1	1
15EC72.3	2	2	1		1	1			2				1	1	1
15EC72.4	1	2			1	1			2				1	1	1
15EC72.5	1	2			1	1			2				1	1	1
SUM	8	8	2		5	4			10				5	5	5
Average	2	2	2		1	1			2				1	1	1

Department of Electronics and Communication

SEMESTER – VII		2020-21	
Course Code: 17EC72		Course Name: Digital Image Processing	
Course Teacher: Mrs. Nishma			
Course Outcomes: After studying this course, students will be able to,			
CO Numbers	Course Outcomes	Blooms Level	Target Level
17EC72.1	Review the fundamental concepts of a digital image processing system.	L1, L2	2
17EC72.2	Apply image processing techniques in both the spatial and frequency (Fourier) domains.	L1, L2, L3	2
17EC72.3	Conduct independent study and analysis of Image Enhancement techniques.	L1, L2, L3	2
17EC72.4	Explain the fundamental concepts involved in color image processing and utility of wavelet decompositions and Morphological Operations in image processing systems.	L1, L2	2
17EC72.5	Analyze various segmentation techniques applied on images and also to represent images using boundary descriptors.	L1, L2, L3	2

CO-PO/PSO Mapping Matrix:

CO Number	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
15EC72.1	2	1			1				2				1	1	1
15EC72.2	2	1	1		1	1			2				1	1	1
15EC72.3	2	2	1		1	1			2				1	1	1
15EC72.4	1	2			1	1			2				1	1	1
15EC72.5	1	2			1	1			2				1	1	1
SUM	8	8	2		5	4			10				5	5	5
Average	2	2	2		1	1			2				1	1	1

I - Internal

Semester: VII

Date: 17/11/2020

Subject: Digital Image Processing

Time: 3.00pm-4.30pm

Faculty Name: Mrs. Nishma

Max. Marks: 30

Note: Answer any TWO full Questions.

Questions

Marks CO BT/CL

- 1** a. Discuss briefly the fundamental steps in digital image processing.
b. Consider the image segment given in the fig below. Let $V = \{2,3,4\}$, compute the lengths of the shortest 4,8,m-paths between p and q.

7 1 L1

$$\begin{array}{ccccc}
 & 3 & 4 & 1 & 2 & 0 \\
 & 0 & 1 & 0 & 4 & 2 \text{ (q)} \\
 & 2 & 2 & 3 & 1 & 4 \\
 \text{(p)} & 3 & 0 & 4 & 2 & 1
 \end{array}$$

8 1 L3

OR

- 2** a. Illustrate the process of image acquisition by sensor strips.
b. Let p and q be the pixels at coordinates (10,12) and (15,20) respectively. Compute D_e , D_4 , D_8 , D_m between the pixels.

7 1 L2

8 1 L3

- 3** a. Discuss the procedure to perform histogram matching.
b. Perform histogram equalization of the image segment given.

7 2 L2

$$\begin{bmatrix}
 0 & 0 & 0 & 1 & 1 \\
 1 & 1 & 1 & 1 & 1 \\
 2 & 2 & 2 & 2 & 3 \\
 3 & 3 & 3 & 3 & 3 \\
 0 & 0 & 0 & 7 & 7
 \end{bmatrix}$$

8 2 L3

OR

- 4** a. With the necessary graph, illustrate the following spatial image enhancement operations:
a. Image negative
b. Log Transformation.
c. Power Law Transformation
b. For the following image data given below, perform histogram equalization.

7 2 L2

2 L3

r_k	0	1	2	3	4	5	6	7
n_k	790	1023	850	656	329	245	122	81



ALVA'S INSTITUTE OF ENGINEERING & TECHNOLOGY,
MOODBIDRI

Department of Electronics and Communication Engineering

Semester

VII

Internal Assessment

1-1A

SCEHEME OF EVALUATION

DIGITAL IMAGE PROCESSING - 17EC72

Note: Answer any TWO full questions.

Q. NO.	Scheme of Evaluation	Marks	CO's
1a.	Block diagram Explanation	4 3 <u>7</u>	1
1b.	① No 4 path b/w P & q. (2) ② Length of shortest 2 path b/w (3) P & q is <u>4</u> ③ length of shortest m-path b/w (3) P & q is <u>7</u>	8	1
2a.	Sensor strip diagram - (4) Explanation - (3)	7	1

$$b. \quad D_e = \left[(x-s)^2 + (y-t)^2 \right]^{1/2}$$

$$(x, y) = (10, 12) \quad (s, t) = (15, 20)$$

$$D_e = \left[(10-15)^2 + (12-20)^2 \right]^{1/2}$$

$$= (25 + 64)^{1/2}$$

$$D_e = \underline{9.54} \quad (3)$$

$$D_4 = |x-s| + |y-t|$$

$$= |10-15| + |12-20|$$

$$= 5 + 8$$

$$D_4 = \underline{13} \quad (3)$$

$$D_8 = \max(|x-s|, |y-t|)$$

$$= \max(|10-15|, |12-20|)$$

$$= \max(5, 8)$$

$$D_8 = \underline{8} \quad (2)$$

D_m - Not possible.

8 1

3a.

1. Obtain transformation func $T(r)$
2. Obtain transformation func $G(z)$
3. Obtain inverse of G^{-1}
4. Obtain the o/p image by applying eqn $z = G^{-1}(s) = G^{-1}(T(r))$

7 2

b.

r_k	n_k	$P_r(r_k)$	$\sum_{j=0}^k P_r(r_j)$	$s_k = L-1 \sum_{j=0}^k P_r(r_j)$
0	6	0.24	0.24	2
1	7	0.28	0.52	4
2	4	0.16	0.68	5
3	6	0.24	0.92	6
4	0	0	0.92	6
5	0	0	0.92	6
6	0	0	0.92	6
7	2	0.08	1	7

8 2

graph for $\rightarrow r_k$ Vs $P_r(r_j)$

r_k Vs s_k

s_k Vs $P_s(s)$

4a.

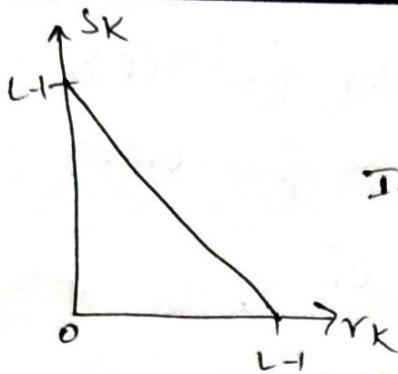
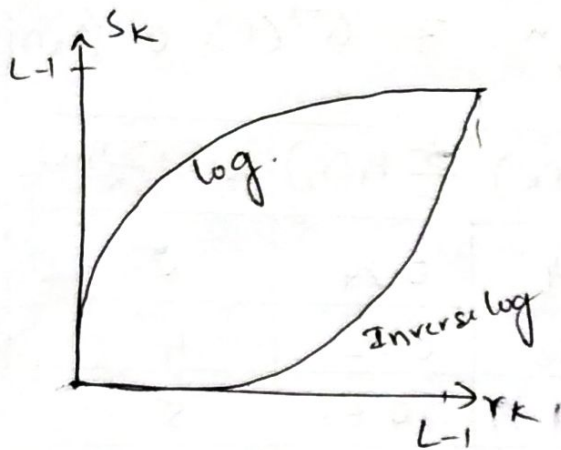


Image negative

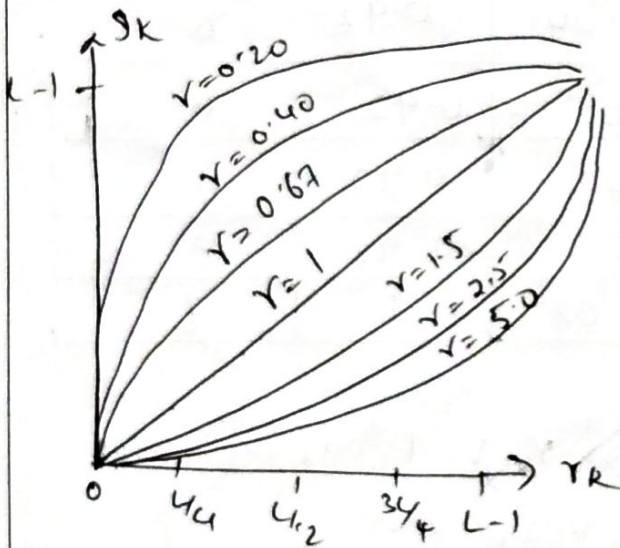
$$s = L-1-r$$



$$s = C \log(1+r)$$

C is const

$$r \geq 0$$



$$s = C r^\gamma$$

(γ & r are positive

constant)

4b.

r_k	n_k	$P_r(r_k)$	$\sum_{j=0}^k P_r(r_j)$	$S_k = L - 1 - \sum_{j=0}^k P_r(r_j)$
0	720	0.1788	0.18	1
1	1023	0.2540	0.43	3
2	850	0.2111	0.64	4
3	656	0.1629	0.81	6
4	329	0.0817	0.89	6
5	245	0.0608	0.95	7
6	122	0.0303	0.98	7
7	81	0.0201	1	7

8

2.

Graph for

r_k vs $P_r(r)$

r_k vs S_k

S_k vs $P_s(s)$

—*—

D.V. 9 →

II – Internal

Semester: VII

Date: 21/12/2020

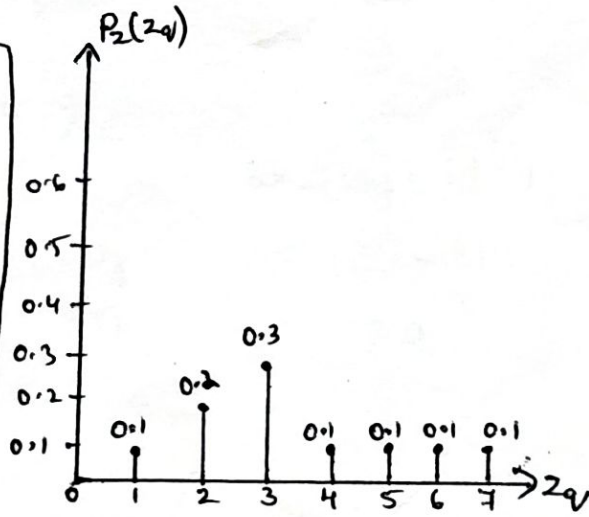
Subject: Digital Image Processing

Time: 3.00pm-4.30pm

Faculty Name: Mrs. Nishma

Max. Marks: 30

Note: Answer any TWO full Questions.

Sl.No	Questions	Marks	CO	BT/CL																									
1	a. With necessary graphs, explain the basic intensity transformation functions.	7	2	L2																									
	b. Perform histogram equalization for the following image data below and sketch the histogram of equalized image.	8	2	L2																									
	<table border="1"><tr><td>r_k</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr><tr><td>n_k</td><td>790</td><td>1023</td><td>850</td><td>656</td><td>329</td><td>245</td><td>122</td><td>81</td></tr></table>	r_k	0	1	2	3	4	5	6	7	n_k	790	1023	850	656	329	245	122	81										
r_k	0	1	2	3	4	5	6	7																					
n_k	790	1023	850	656	329	245	122	81																					
	OR																												
2	a. Explain how sharpening of images can be achieved by using first order derivatives.	7	2	L2																									
	b. Perform histogram matching for the following image segment given.	8	2	L2																									
	<table border="1"><tr><td>3</td><td>2</td><td>2</td><td>2</td><td>7</td></tr><tr><td>2</td><td>2</td><td>2</td><td>7</td><td>7</td></tr><tr><td>2</td><td>2</td><td>2</td><td>7</td><td>7</td></tr><tr><td>1</td><td>1</td><td>1</td><td>2</td><td>2</td></tr><tr><td>1</td><td>1</td><td>1</td><td>2</td><td>2</td></tr></table> 	3	2	2	2	7	2	2	2	7	7	2	2	2	7	7	1	1	1	2	2	1	1	1	2	2			
3	2	2	2	7																									
2	2	2	7	7																									
2	2	2	7	7																									
1	1	1	2	2																									
1	1	1	2	2																									
3	a. Explain any 5 noise probability density functions.	8	3	L2																									
	b. Illustrate how adaptive median filter is used for restoring images.	7	3	L2																									
	OR																												
4	a. Discuss order statistics filter for restoring images in the presence of noise.	8	3	L2																									
	b. Illustrate the method to reduce periodic noise in frequency domain using optimum notch filter.	7	3	L2																									

D.V. [Signature]



ALVA'S INSTITUTE OF ENGINEERING & TECHNOLOGY, MOODBIDRI

Department of Electronics and Communication Engineering

Semester

VII

Internal Assessment

II-IA

SCEHEME OF EVALUATION

DIGITAL IMAGE PROCESSING - 17EC72

Note: Answer any TWO full questions.

Q. NO.	Scheme of Evaluation	Marks	CO's
1a.	Image negative $s = L-1-r$ log $s = c \log(1+r)$ c is const $r \geq 0$ Inverse log. $s = c r^\gamma$ c & γ are positive constants	7	2

1b.

r_k	n_k	$Pr(r)$	$\sum_{j=0}^k Pr(r_j)$	$S_k = L-1 - \sum_{j=0}^k Pr(r_j)$
0	720	0.1788	0.18	1
1	1023	0.2540	0.43	3
2	850	0.2111	0.64	4
3	656	0.1629	0.81	6
4	329	0.0817	0.89	6
5	245	0.0608	0.95	7
6	122	0.0303	0.98	7
7	81	0.0201	1	7

Graph for r_k Vs $Pr(r)$

r_k Vs S_k

S_k Vs $P_s(s)$

—*

2a.

$$\nabla f = \text{grad}(f) = \begin{bmatrix} g_x \\ g_y \end{bmatrix} = \begin{bmatrix} \partial f / \partial x \\ \partial f / \partial y \end{bmatrix}$$

$$M(x, y) \propto |g_x| + |g_y|$$

-1	0
0	1

0	-1
1	0

Robert's cross
gradient

1st order:-

$$g_x = z_8 - z_5$$

$$g_y = z_6 - z_5$$

Robert cross gradient

$$g_x = z_9 - z_5$$

$$g_y = z_8 - z_6$$

-1	-2	-1
0	0	0
1	2	1

-1	0	1
-2	0	2
-1	0	1

Sobel operator

$$g_x = (z_7 + 2z_8 + z_9) - (z_1 + 2z_2 + z_3)$$

$$g_y = (z_3 + 2z_6 + z_9) - (z_1 + 2z_4 + z_7)$$

=

2b.

3	2	2	2	7
2	2		2	7
2	2		2	7
1	1	1	2	2
1	1	1	2	2

r_k	$P_r(r)$	$\sum_{j=0}^k P_r(r_j)$	$S_k = L-1 \sum_{j=0}^k P_r(r_j)$
0	0	0	0
1	0.24	0.24	2
2	0.52	0.76	5
3	0.04	0.80	6
4	0	0.80	6
5	0	0.80	6
6	0	0.80	6
7	0.2	1	7

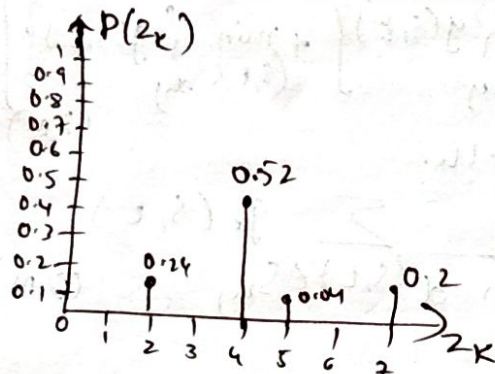
3

z_q	$P_z(z)$	$\sum_{j=0}^q P(z_q)$	$G(z)$
0	0	0	0
1	0.1	0.1	1
2	0.2	0.3	2
3	0.3	0.6	4
4	0.1	0.7	5
5	0.1	0.8	6
6	0.1	0.9	6
7	0.1	1	7

2

3

r_k	S_k	$G(z)$	Z_a	r_k	Z_k
0	0	0	0	0	0
1	2	1	1	1	2
2	5	2	2	2	4
3	6	4	3	3	5
4	6	5	4	4	5
5	6	6	5	5	5
6	6	6	6	6	5
7	7	7	7	7	7



3a.

5 probability density functions of noise $\rightarrow$ each carrying (1.5M)

b.

Algorithm of adaptive median filter (5M)
Explanation (2M)

2 3

7 3

4a. Median filter; $\hat{f}(x,y) = \text{median} \left\{ g(s,t) \right\}_{(s,t) \in S_{xy} \quad (2M)}$

Max & min filter;

$$\hat{f}(x,y) = \max \left\{ g(s,t) \right\}_{(s,t) \in S_{xy}}$$

$$\hat{f}(x,y) = \min \left\{ g(s,t) \right\}_{(s,t) \in S_{xy} \quad (2M)}$$

mid point filter; $\hat{f}(x,y)$

$$\hat{f}(x,y) = \frac{1}{2} \left[\max \left\{ g(s,t) \right\}_{(s,t) \in S_{xy}} + \min \left\{ g(s,t) \right\}_{(s,t) \in S_{xy} \quad (2M)} \right]$$

Alpha-trimmed filter

$$\hat{f}(x,y) = \frac{1}{mn-d} \sum_{(s,t) \in S_{xy}} g_r(s,t) \quad (2M)$$

4b. $N(u,v) = H_{NP}(u,v) G(u,v)$

$$\hat{f}(x,y) = g(x,y) - w(x,y) \eta(x,y) \quad (2M)$$

$$\sigma^2(x,y) = \frac{1}{(2a+1)(2b+1)} \sum_{s=-a}^a \sum_{t=-b}^b \left[\hat{f}(x+s,y+t) - \bar{\hat{f}}(x,y) \right]^2 \quad (1M)$$

$$w(x,y) = \frac{g(x,y) \eta(x,y) - \bar{g}(x,y) \bar{\eta}(x,y)}{\eta^2(x,y) - \bar{\eta}^2(x,y)} \quad (3M)$$

D.V.

III – Internal

Semester: VII

Date: 13/01/20201

Subject: Digital Image Processing

Time: 3.00pm-4.30pm

Faculty Name: Mrs. Nishma

Max. Marks: 30

Note: Answer any TWO full Questions.

Sl.No	Questions	Marks	CO	BT/CL
1	a. Derive the expression for observed image when the degradation is linear and position invariant.	8	3	L3
	b. Illustrate the morphological operation thinning with an example.	7	4	L2
OR				
2	a. With relevant mathematical expression, explain how a Weiner filter achieves restoration of a given degraded image.	8	3	L3
	b. Illustrate the morphological operation thickening with an example.	7	4	L2
3	a. What is pseudo color image processing? Explain intensity slicing as applied to pseudo color image processing	7	4	L2
	b. Explain the concept of Hit and Miss Transformation.	8	4	L2
OR				
4	a. Write the steps involved in converting colors from HSI to RGB.	7	4	L2
	b. Explain Erosion and Dilation operations used for morphological processing.	8	4	L2

D.V. g



ALVA'S INSTITUTE OF ENGINEERING & TECHNOLOGY,
MOODBIDRI

Department of Electronics and Communication Engineering

Semester

VII

Internal Assessment

III - 1A

SCEHEME OF EVALUATION

DIGITAL IMAGE PROCESSING - 17EC72

Note: Answer any TWO full questions.

Q. NO.	Scheme of Evaluation	Marks	CO's
1a.	$H[a f_1(x, y) + b f_2(x, y)] = a H[f_1(x, y)] + b H[f_2(x, y)]$ → Linear property $H[f(x-\alpha, y-\beta)] = g(x-\alpha, y-\beta)$ → position invariant $f(x, y)$ as impulse function $f(x, y) = \int_{-\infty}^{\infty} \int_{-\infty}^{\infty} f(\alpha, \beta) \delta(x-\alpha, y-\beta) d\alpha d\beta$ $g(x, y) = H[f(x, y)]$ $g(x, y) = \int_{-\infty}^{\infty} \int_{-\infty}^{\infty} f(\alpha, \beta) H[\delta(x-\alpha, y-\beta)] d\alpha d\beta$	8	3

$$g(x,y) = \int_{-\infty}^{\infty} \int_{-\infty}^{\infty} f(\alpha, \beta) h(x-\alpha, y-\beta) d\alpha d\beta + \eta(x,y)$$

$$1b. \quad A \otimes B = A - (A \otimes B) \\ = A \cap (A \otimes B)^c$$

7 4

$$\{B\} = \{B^1, B^2, \dots, B^n\}$$

$$A \otimes \{B\} = ((\dots (A \otimes B^1) \otimes B^2) \dots) \otimes B^n$$

$$29. \quad e^2 = E \left\{ [f(x) - \hat{f}(x)]^2 \right\}$$

$$\hat{F}(u,v) = \left[\frac{H^*(u,v) S_f(u,v)}{S_f(u,v) |H(u,v)|^2 + S_\eta(u,v)} \right] G(u,v)$$

8 8

$$\hat{F}(u,v) = \left[\frac{1}{H(u,v)} \cdot \frac{|H(u,v)|^2}{|H(u,v)|^2 + S_\eta(u,v)/S_f(u,v)} \right] G(u,v)$$

$$\hat{F}(u,v) = \left[\frac{1}{H(u,v)} \cdot \frac{|H(u,v)|^2}{|H(u,v)|^2 + k} \right] G(u,v)$$

2b.	$A \odot B = A \cup (A \otimes B)$ $B = \{B^1, B^2, B^3, \dots, B^n\}$ $A \odot \{B\} = ((\dots ((A \odot B^1) \odot B^2) \dots) \odot B^n)$	7	4
3a.	Graph of Intensity level vs Color $f(x, y) = c_k \text{ if } f(x, y) \in V_k.$	7	4
3b.	$A \otimes B = (A \ominus D) \cap [A^c \ominus (W - D)]$ $B_1 = D \quad B_2 = (W - D)$ $A \otimes B = (A \ominus B_1) \cap (A^c \ominus B_2)$ Example diagram.	8	4
4a.	Rh Sector ($0^\circ \leq H \leq 120^\circ$) $B \geq I(1 - S)$ $R = I \left[1 + \frac{S \cos H}{\cos(60^\circ - H)} \right]$		

$$G = 3I - (R+B)$$

ii) GB Sector ($120^\circ \leq H \leq 240^\circ$)

$$R = I(1-s)$$

$$G = I \left[1 + \frac{s \cos H}{\cos(60^\circ - H)} \right]$$

$$B = 3I - (R+G)$$

iii) BR Sector ($240^\circ \leq H \leq 360^\circ$)

$$G = I(1-s)$$

$$B = I \left[1 + \frac{s \cos H}{\cos(60^\circ - H)} \right]$$

4b. Erosion :-

$$A \ominus B = \{z \mid (B)_z \subseteq A\}$$

$$A \ominus B = \{z \mid (B)_z \cap A^c = \phi\}$$

A^c is complement of A

ϕ is the empty set.

Dilation

$$A \oplus B = \{z \mid (B)_z \cap A \neq \emptyset\}$$

$$A \oplus B = \{z \mid [(B)_z \cap A] \subseteq A\}$$

B is a structuring element

A is a set (image objects) to be dilated.

D.V.g

Digital Image Processing

Assignment-1

1. Write a Matlab code to input an image.
2. Write a Matlab code to display the size of the image.
3. Write a Matlab code to convert color image to gray scale image.
4. Write a Matlab code to convert gray scale image to binary image.
5. List the applications of image processing based on different electromagnetic spectrum.

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

7th B Groups

Sl.No	USN	Student Name	Group
1	4AL17EC063	Nishantha V R	Group 1
2	4AL17EC068	Pavithran S	
3	4AL16EC409	Rakshith B	
4	4AL16EC029	Karegowda K N	
5	4AL17EC064	P V Sai Suraksha	Group 2
6	4AL17EC062	Niharika Narayana L	
7	4AL17EC086	Shilpa C	
8	4AL16EC032	Krishna Swetha	
9	4AL17EC099	Yashwitha C N	Group 3
10	4AL17EC065	Padmashree B S	
11	4AL17EC071	Poorvi H J	
12	4AL16EC046	PoojarySushmita	
13	4AL17EC073	PrajwalKamagethiChakrav arthi P L	Group 4
14	4AL17EC069	Persis P	
15	4AL16EC101	Raviteja G	
16	4AL16EC035	Mamatha M	
17	4AL17EC079	Rohan Shetty	Group 5
18	4AL17EC074	PrashanthaNaik	
19	4AL16EC073	Shravan V Acharya	
20	4AL17EC105	Akash	
21	4AL17EC091	Swastik R Gowda	Group 6
22	4AL17EC101	Bindu N R	
23	4AL17EC106	Harshitha T	
24	4AL16EC065	Sathya B R	
25	4AL17EC092	Varshitha S	Group 7
26	4AL17EC090	Sushmitha R Naik	
27	4AL17EC096	YalpiNandika	
28	4AL17EC083	Sahana S R	
29	4AL17EC103	Sachin	Group 8
30	4AL17EC080	Roshni A B	
31	4AL17EC104	Nikhil	
32	4AL17EC097	Yamunashree N	
33	4AL16EC037	Mirza	Group 9
34	4AL18EC400	Sushanth Poojari	
35	4AL17EC072	Pragati M Kundalkar	

Assignment-2 Question Group wise:

Group 1	- Read an image and perform histogram equalization of the input image and analyze the result. - Read an image, convolve the image with a mask $1/9 *$ $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$ and show that it performs averaging operation which results in blurring of an image. - What is the value of the marked pixel after 5*5 median filter? $\begin{bmatrix} 2 & 1 & 3 & 4 & 5 \\ 1 & 1 & 0 & 2 & 3 \\ 2 & 0 & 0 & 1 & 2 \\ 5 & 1 & 2 & 3 & 1 \\ 4 & 3 & 1 & 2 & 0 \end{bmatrix}$ - Read an 8-bit grayscale image and extract 8-bit planes of the image.
Group 2	- Read a grayscale image and determine image negative of the input image. - Read an image and corrupt the image by gaussian noise. Then apply averaging filter of size 3*3 and 5*5 to this corrupted image and comment on the result. - Filter the following image using 3*3 neighborhood averaging by assuming - Zero padding $\begin{bmatrix} 1 & 2 & 3 & 2 \\ 4 & 2 & 5 & 1 \\ 1 & 2 & 6 & 3 \\ 2 & 6 & 4 & 7 \end{bmatrix}$ - Read an 8-bit image, set any of the bit planes from 0-7 to 0, and reconstruct the image. Comment on the impact of zeroing the least significant and most significant bit planes.
Group 3	- Write MATLAB code that performs threshold operation (consider a grayscale image). - Read an image and corrupt the image by salt and pepper noise. Then apply averaging filter of size 3*3 and 5*5 to this corrupted image and comment on the result. - Compute median value of the marked pixels in the given figure using 3*3 mask $\begin{bmatrix} 1 & 5 & 7 \\ 2 & 4 & 6 \\ 3 & 2 & 1 \end{bmatrix}$ - Read an 8-bit grayscale image and extract 8-bit planes of the image.
	- Write a MATLAB code to perform gray level slicing without preserving background. - Read an image and corrupt the image by salt and pepper noise.

Group 4	Then apply averaging filter of size 3*3 and 5*5 to this corrupted image and comment on the result. 3. Compute median value of the marked pixels in the given fig. using 3*3 mask $\begin{bmatrix} 18 & 22 & 33 & 25 & 32 & 24 \\ 34 & 128 & 24 & 172 & 26 & 23 \\ 22 & 19 & 32 & 31 & 28 & 26 \end{bmatrix}$ 4. Read an 8-bit image, set any of the bit planes from 0-7 to 0, and reconstruct the image. Comment on the impact of zeroing the least significant and most significant bit planes.
Group 5	1. Write a MATLAB code to perform gray level slicing with background. 2. Read an image and corrupt the image by gaussian noise. Then apply averaging filter of size 3*3 and 5*5 to this corrupted image and comment on the result. 3. Filter the following image using 3*3 neighborhood averaging by assuming $\begin{bmatrix} 1 & 2 & 3 & 2 \\ 4 & 2 & 5 & 1 \\ 1 & 2 & 6 & 3 \\ 2 & 6 & 4 & 7 \end{bmatrix}$ Pixel replication. 4. Read an 8-bit grayscale image and extract 8-bit planes of the image.
Group 6	1. Write a MATLAB code to perform logarithmic transform. 2. Read an image, convolve the image with a mask $1/9 *$ $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$ and show that it performs averaging operation which results in blurring of an image. 3. What is the value of the marked pixel after 5*5 median filter? $\begin{bmatrix} 2 & 1 & 3 & 4 & 5 \\ 1 & 1 & 0 & 2 & 3 \\ 2 & 0 & 0 & 1 & 2 \\ 5 & 1 & 2 & 3 & 1 \\ 4 & 3 & 1 & 2 & 0 \end{bmatrix}$ 4. Read an 8-bit image, set any of the bit planes from 0-7 to 0, and reconstruct the image. Comment on the impact of zeroing the least significant and most significant bit planes.
	1. Write a MATLAB code to perform power low transformation on an image. 2. Read an image and corrupt the image by gaussian noise. Then apply averaging filter of size 3*3 and 5*5 to this corrupted image and comment on the result. 3. Filter the following image using 3*3 neighborhood averaging by assuming

Group 7	Zero padding $\begin{bmatrix} 1 & 2 & 3 & 2 \\ 4 & 2 & 5 & 1 \\ 1 & 2 & 6 & 3 \\ 2 & 6 & 4 & 7 \end{bmatrix}$ 4. Read an 8-bit grayscale image and extract 8-bit planes of the image.
Group 8	1. Read an image and perform histogram equalization of the input image and analyze the result. 2. Read an image, convolve the image with a mask $1/9 *$ $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$ and show that it performs averaging operation which results in blurring of an image. 3. Compute median value of the marked pixels in the given figure using $3*3$ mask $\begin{bmatrix} 1 & 5 & 7 \\ 2 & 4 & 6 \\ 3 & 2 & 1 \end{bmatrix}$ 4. Read an 8-bit image, set any of the bit planes from 0-7 to 0, and reconstruct the image. Comment on the impact of zeroing the least significant and most significant bit planes.
Group 9	1. Write MATLAB code that performs threshold operation (consider a grayscale image). 2. Read an image and corrupt the image by salt and pepper noise. Then apply averaging filter of size $3*3$ and $5*5$ to this corrupted image and comment on the result. 3. Compute median value of the marked pixels in the given fig. using $3*3$ mask $\begin{bmatrix} 18 & 22 & 33 & 25 & 32 & 24 \\ 34 & 128 & 24 & 172 & 26 & 23 \\ 22 & 19 & 32 & 31 & 28 & 26 \end{bmatrix}$ 4. Read an 8-bit grayscale image and extract 8-bit planes of the image.
	1. Read a grayscale image and determine image negative of the input image. 2. Read an image, convolve the image with a mask $1/9 *$ $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$ and show that it performs averaging operation which results in blurring of an image. 3. Filter the following image using $3*3$ neighborhood averaging by assuming.

Group 10	Pixel replication. $\begin{bmatrix} 1 & 2 & 3 & 2 \\ 4 & 2 & 5 & 1 \\ 1 & 2 & 6 & 3 \\ 2 & 6 & 4 & 7 \end{bmatrix}$ 4. Read an 8-bit image, set any of the bit planes from 0-7 to 0, and reconstruct the image. Comment on the impact of zeroing the least significant and most significant bit planes.
Group 11	1. Write a MATLAB code to perform gray level slicing without preserving background. 2. Read an image and corrupt the image by gaussian noise. Then apply averaging filter of size 3*3 and 5*5 to this corrupted image and comment on the result. 3. Compute median value of the marked pixels in the given figure using 3*3 mask $\begin{bmatrix} 1 & 5 & 7 \\ 2 & 4 & 6 \\ 3 & 2 & 1 \end{bmatrix}$ 4. Read an 8-bit grayscale image and extract 8-bit planes of the image.
Group 12	1. Write a MATLAB code to perform gray level slicing with background. 2. Read an image and corrupt the image by salt and pepper noise. Then apply averaging filter of size 3*3 and 5*5 to this corrupted image and comment on the result. 3. Filter the following image using 3*3 neighborhood averaging by assuming Pixel replication. $\begin{bmatrix} 1 & 2 & 3 & 2 \\ 4 & 2 & 5 & 1 \\ 1 & 2 & 6 & 3 \\ 2 & 6 & 4 & 7 \end{bmatrix}$ 4. Read an 8-bit image, set any of the bit planes from 0-7 to 0, and reconstruct the image. Comment on the impact of zeroing the least significant and most significant bit planes.
Group 13	1. Write a MATLAB code to perform logarithmic transform. 2. Read an image and corrupt the image by gaussian noise. Then apply averaging filter of size 3*3 and 5*5 to this corrupted image and comment on the result. 3. What is the value of the marked pixel after 5*5 median filter? $\begin{bmatrix} 2 & 1 & 3 & 4 & 5 \\ 1 & 1 & 0 & 2 & 3 \\ 2 & 0 & 0 & 1 & 2 \\ 5 & 1 & 2 & 3 & 1 \\ 4 & 3 & 1 & 2 & 0 \end{bmatrix}$ 4. Read an 8-bit grayscale image and extract 8-bit planes of the image.

Assignment 3

1. Read an image and degrade the image using motion blur.
2. Read an image, then blur the image. Then add additive white gaussian noise (AWGN) to the degraded image. Apply inverse filter to restore the image.
3. Write a Matlab code that reads an image & degrades it. For this degraded image add gaussian noise. Then apply weiner filter to restore the image.
4. Explain Marr-Hildreth edge detection.
5. Explain Global thresholding using Otsu's method.
6. Write H matrix for Haar transform for $N=4$ & explain how it is constructed. [Module 4:- Multiresolution & Wavelets]

Note :- 1, 2, 3 $\rightarrow$ Module 3 [Matlab code]

4, 5 $\rightarrow$ Module 5. [Image segmentation]

6 $\rightarrow$ Module 4:- [Multiresolution & Wavelets]

Submission Date:- 23/01/2021



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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

INTERNAL MARKS REPORT OF VII SEM -'B'

Date: 13/02/2021

#	USN	Student Name	IA-1	IA-2	IA-3	IA-AVG
			Marks	Marks	Marks	Marks
1	4AL17EC001	Abhishek	25	28	22	25
2	4AL17EC002	Abhishek M Shastry K	29	29	30	30
3	4AL17EC003	Abhishek Vasudev Mahendrakar	28	22	26	26
4	4AL17EC004	Ajitha	19.2	23	23	22
5	4AL17EC005	Akshan Sandeep D Souza	19	27	24	22
6	4AL17EC006	Akshatha M Deshpande	29	30	29	30
7	4AL17EC007	Akshatha Ranganath	28	20	27	25
8	4AL17EC008	Akshay	29	23	26	26
9	4AL17EC009	Bhavith	28	21	28	26
10	4AL17EC010	Bhoomika Ramachandra Hebbar	28	27	27	28
11	4AL17EC011	Bindushri	28	28	28	28
12	4AL17EC012	Brunda H Y	21	20	27	23
13	4AL17EC013	Brunda P D	27	29	29	29
14	4AL17EC015	Chandan C	18	23	28	23
15	4AL17EC018	Chandana G S	24	28	29	27
16	4AL17EC020	Channabasava	20	30	21	24
17	4AL17EC021	Chethan Kumar	25	14	25	22
18	4AL17EC023	Darshan H B	22	27	20	23
19	4AL17EC025	Dhamini C L	26	23	24	25
20	4AL17EC026	Dhanya Shetty	23	20	28	24
21	4AL17EC027	Dhaval	26	22	22	24
22	4AL17EC029	Disha	25	26	27	26
23	4AL17EC030	Divyashree L V	24	26	26	26
24	4AL17EC031	Divyashree Bahubali Samajage	26	22	25	25
25	4AL17EC032	Gagan M K	28	24	22	25
26	4AL17EC034	Harsha P	20	25	20	22
27	4AL17EC035	Hemalatha Sanil	26	19	29	25
28	4AL17EC036	Jagadeesha Hegde	28	20	22	24
29	4AL17EC037	Jyoti S Donur	29	30	30	30
30	4AL17EC038	K Muthu	27	26	30	28
31	4AL17EC040	Kavya M M	30	29	30	30
32	4AL17EC041	Kishan Shetty	26	23	25	25
33	4AL17EC042	Kishore N	26	26	26	26
34	4AL17EC043	Lavanya B	29	24	27	27
35	4AL17EC044	Lepakshi T V	28	29	30	29
36	4AL17EC045	M V Ramya	29	30	29	30
37	4AL17EC046	Madiwalar Akshata Ningappa	30	28	30	30

38	4AL17EC047	MadugondeManjunatha	28	23	24	25
39	4AL17EC048	Mahesh H	24	23	24	24
40	4AL17EC050	Manjunatha H K	25	22	26	25
41	4AL17EC053	Mohanababu D G	23	13	28	22
42	4AL17EC055	Mounitha D M	19	26	19	22
43	4AL17EC057	NagaGanesh N	09	29	23	21
44	4AL17EC058	Namratha J Nair	26	29	29	28
45	4AL17EC060	Navya	30	29	29	30
46	4AL17EC061	Bhargavi	30	29	29	30
47	4AL15EC043	Madhu B Gurav	10	05	22	8
48	4AL15EC038	Mohith	15	01	20	9
49	4AL15EC100	Vijay C H	20	24	13	11


(Nishma)



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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

INTERNAL MARKS REPORT OF VII SEM -'B'

Date: 13/02/2021

#	USN	Student Name	IA-1 Marks	IA-2 Marks	IA-3 Marks	IA-AVG Marks
1	4AL16EC037	Mirza	23	30	22	25
2	4AL16EC101	Raviteja G	19	23	27	23
3	4AL17EC024	Deeksha	22	16	24	21
4	4AL17EC062	Niharika Narayana L	22	26	28	26
5	4AL17EC063	Nishantha V R	26	22	25	25
6	4AL17EC064	P V Sai Suraksha	28	30	30	30
7	4AL17EC065	Padmashree B S	27	23	25	25
8	4AL17EC066	Padmini M	24	23	28	25
9	4AL17EC068	Pavithran S	13	30	24	23
10	4AL17EC069	Persis P	23	30	29	28
11	4AL17EC070	Pooja K S	19	22	24	22
12	4AL17EC071	Poorvi H J	23	19	26	23
13	4AL17EC072	Pragati M Kundalkar	29	29	30	30
14	4AL17EC073	Prajwal Kamagethi P L	25	16	28	23
15	4AL17EC074	Prashantha Naik	27	26	27	27
16	4AL17EC075	Princia Melita Dsouza	25	28	24	26
17	4AL17EC076	Rajeshwari Gadagi	19	27	23	23
18	4AL17EC077	Rashmitha	26	22	28	26
19	4AL17EC079	Rohan Shetty	30	30	28	29
20	4AL17EC080	Roshni A B	22	28	28	26
21	4AL17EC083	Sahana S R	22	27	28	26
22	4AL17EC084	Sanketha S Acharya	24	22	27	25
23	4AL17EC086	Shilpa C	30	29	29	30
24	4AL17EC090	Sushmitha R Naik	23	24	28	26
25	4AL17EC091	Swastik R Gowda	27	24	27	26
26	4AL17EC092	Varshitha S	19	26	25	24
27	4AL17EC093	Varun G Shetty	30	29	30	30
28	4AL17EC095	Vidul Sambhaji Chavan	28	28	27	28
29	4AL17EC096	Yalpi Nandika	30	29	30	30
30	4AL17EC097	Yamunashree N	20	22	27	23
31	4AL17EC098	Yashaswini R	29	24	25	24
32	4AL17EC099	Yashwitha C N	21	24	30	25
33	4AL17EC100	Yathish S Rao	28	20	27	25
34	4AL17EC101	Bindu N R	29	29	30	30
35	4AL17EC102	Sushmitha	24	26	30	27
36	4AL17EC103	Sachin	28	25	30	28
37	4AL17EC104	Nikhil	26	29	29	29

38	4AL17EC105	Akash	16	21	28	22
39	4AL17EC106	Harshitha T	23	28	24	25
40	4AL17EC107	K B Kushi	24	20	30	25
41	4AL17EC108	Rachana	14	23	27	22
42	4AL18EC400	Sushanth Poojari	22	25	26	25
43	4AL16EC032	Krishna Swetha	26	22	29	14
44	4AL16EC035	Mamatha M	12	23	26	13
45	4AL16EC046	Poojary Sushmita	18	24	29	14
46	4AL16EC065	Sathya B R	23	24	AB	12
47	4AL16EC029	Karegowda K N	17	08	25	11
48	4AL16EC409	Rakshith B	20	12	26	12
49	4AL16EC073	Shravan V Acharya	AB	24	24	12



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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

ASSIGNMENT MARKS REPORT OF VII SEM -'B'

Date: 20/02/2021

#	USN	Student Name	ASSGN1 Marks	ASSGN2 Marks	ASSGN3 Marks	ASSGN-AVG Marks
1	4AL17EC001	Abhishek	10	10	10	10
2	4AL17EC002	Abhishek M Shastry K	10	10	10	10
3	4AL17EC003	Abhishek Vasudev M	10	10	10	10
4	4AL17EC004	Ajitha	10	10	10	10
5	4AL17EC005	Akshan Sandeep D Souza	10	10	10	10
6	4AL17EC006	Akshatha M Deshpande	10	10	10	10
7	4AL17EC007	Akshatha Ranganath	10	10	10	10
8	4AL17EC008	Akshay	10	10	10	10
9	4AL17EC009	Bhavith	10	10	10	10
10	4AL17EC010	Bhoomika R H	10	10	10	10
11	4AL17EC011	Bindushri	10	10	10	10
12	4AL17EC012	Brunda H Y	10	10	10	10
13	4AL17EC013	Brunda P D	10	10	10	10
14	4AL17EC015	Chandan C	10	10	10	10
15	4AL17EC018	Chandana G S	10	10	10	10
16	4AL17EC020	Channabasava	10	10	10	10
17	4AL17EC021	Chethan Kumar	10	10	10	10
18	4AL17EC023	Darshan H B	10	10	10	10
19	4AL17EC025	Dhamini C L	10	10	10	10
20	4AL17EC026	Dhanya Shetty	10	10	10	10
21	4AL17EC027	Dhaval	10	10	10	10
22	4AL17EC029	Disha	10	10	10	10
23	4AL17EC030	Divyashree L V	10	10	10	10
24	4AL17EC031	Divyashri Bahubali S	10	10	10	10
25	4AL17EC032	Gagan M K	10	10	10	10
26	4AL17EC034	Harsha P	10	10	10	10
27	4AL17EC035	Hemalatha Sanil	10	10	10	10
28	4AL17EC036	Jagadeesha Hegde	10	10	10	10
29	4AL17EC037	Jyoti S Donur	10	10	10	10
30	4AL17EC038	K Muthu	10	10	10	10
31	4AL17EC040	Kavya M M	10	10	10	10
32	4AL17EC041	Kishan Shetty	10	10	10	10
33	4AL17EC042	Kishore N	10	10	10	10
34	4AL17EC043	Lavanya B	10	10	10	10
35	4AL17EC044	Lepakshi T V	10	10	10	10
36	4AL17EC045	M V Ramya	10	10	10	10
37	4AL17EC046	Madiwalar Akshata N	10	10	10	10

38	4AL17EC047	MadugondeManjunatha	10	10	10	10
39	4AL17EC048	Mahesh H	10	10	10	10
40	4AL17EC050	Manjunatha H K	10	10	10	10
41	4AL17EC053	Mohanababu D G	10	10	10	10
42	4AL17EC055	Mounitha D M	10	10	10	10
43	4AL17EC057	NagaGanesh N	10	10	10	10
44	4AL17EC058	Namratha J Nair	10	10	10	10
45	4AL17EC060	Navya	10	10	10	10
46	4AL17EC061	Bhargavi	10	10	10	10
47	4AL15EC043	Madhu B Gurav	5	5	5	5
48	4AL15EC038	Mohith	5	5	5	5
49	4AL15EC100	Vijay C H	5	5	5	5



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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

ASSIGNMENT MARKS REPORT OF VII SEM -'B'

Date: 20/02/2021

#	USN	Student Name	ASSGN1	ASSGN2	ASSGN2	ASSGN-AVG
			Marks	Marks	Marks	Marks
1	4AL16EC037	Mirza	10	10	10	10
2	4AL16EC101	Raviteja G	10	10	10	10
3	4AL17EC024	Deeksha	10	10	10	10
4	4AL17EC062	Niharika Narayana L	10	10	10	10
5	4AL17EC063	Nishantha V R	10	10	10	10
6	4AL17EC064	P V Sai Suraksha	10	10	10	10
7	4AL17EC065	Padmashree B S	10	10	10	10
8	4AL17EC066	Padmini M	10	10	10	10
9	4AL17EC068	Pavithran S	10	10	10	10
10	4AL17EC069	Persis P	10	10	10	10
11	4AL17EC070	Pooja K S	10	10	10	10
12	4AL17EC071	Poorvi H J	10	10	10	10
13	4AL17EC072	Pragati M Kundalkar	10	10	10	10
14	4AL17EC073	Prajwal Kamagethi P L	10	10	10	10
15	4AL17EC074	Prashantha Naik	10	10	10	10
16	4AL17EC075	Princia Melita Dsouza	10	10	10	10
17	4AL17EC076	Rajeshwari Gadagi	10	10	10	10
18	4AL17EC077	Rashmitha	10	10	10	10
19	4AL17EC079	Rohan Shetty	10	10	10	10
20	4AL17EC080	Roshni A B	10	10	10	10
21	4AL17EC083	Sahana S R	10	10	10	10
22	4AL17EC084	Sanketha S Acharya	10	10	10	10
23	4AL17EC086	Shilpa C	10	10	10	10
24	4AL17EC090	Sushmitha R Naik	10	10	10	10
25	4AL17EC091	Swastik R Gowda	10	10	10	10
26	4AL17EC092	Varshitha S	10	10	10	10
27	4AL17EC093	Varun G Shetty	10	10	10	10
28	4AL17EC095	Vidul Sambhaji Chavan	10	10	10	10
29	4AL17EC096	Yalpi Nandika	10	10	10	10
30	4AL17EC097	Yamunashree N	10	10	10	10
31	4AL17EC098	Yashaswini R	10	10	10	10
32	4AL17EC099	Yashwitha C N	10	10	10	10
33	4AL17EC100	Yathish S Rao	10	10	10	10
34	4AL17EC101	Bindu N R	10	10	10	10
35	4AL17EC102	Sushmitha	10	10	10	10
36	4AL17EC103	Sachin	10	10	10	10
37	4AL17EC104	Nikhil	10	10	10	10
38	4AL17EC105	Akash	10	10	10	10
39	4AL17EC106	Harshitha T	10	10	10	10

40	4AL17EC107	K B Kushi	10	10	10	10
41	4AL17EC108	Rachana	10	10	10	10
42	4AL18EC400	Sushanth Poojari	10	10	10	10
43	4AL16EC032	Krishna Swetha	5	5	5	5
44	4AL16EC035	Mamatha M	5	5	5	5
45	4AL16EC046	Poojary Sushmita	5	5	5	5
46	4AL16EC065	Sathya B R	5	5	5	5
47	4AL16EC029	Karegowda K N	5	5	5	5
48	4AL16EC409	Rakshith B	5	5	5	5
49	4AL16EC073	Shravan V Acharya	5	5	5	5



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Phone: 08258-262725, Fax: 08258-262726

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

FINAL CONSOLIDATED INTERNAL MARKS REPORT OF VII SEM -'A'

Date: 13/02/2021

#	USN	Student Name	17EC72		
			IA	ASSG	TOT
1	4AL17EC001	Abhishek	25	10	35
2	4AL17EC002	Abhishek M Shastry K	30	10	40
3	4AL17EC003	AbhishekVasudevMahendrakar	26	10	36
4	4AL17EC004	Ajitha	22	10	32
5	4AL17EC005	AkshanSandeep D Souza	22	10	32
6	4AL17EC006	Akshatha M Deshpande	30	10	40
7	4AL17EC007	AkshathaRanganath	25	10	35
8	4AL17EC008	Akshay	26	10	36
9	4AL17EC009	Bhavith	26	10	36
10	4AL17EC010	BhoomikaRamachandraHebbbar	28	10	38
11	4AL17EC011	Bindushri	28	10	38
12	4AL17EC012	Brunda H Y	23	10	33
13	4AL17EC013	Brunda P D	29	10	39
14	4AL17EC015	Chandan C	23	10	33
15	4AL17EC018	Chandana G S	27	10	37
16	4AL17EC020	Channabasava	24	10	34
17	4AL17EC021	Chethan Kumar	22	10	32
18	4AL17EC023	Darshan H B	23	10	33
19	4AL17EC025	Dhamini C L	25	10	35
20	4AL17EC026	DhanyaShetty	24	10	34
21	4AL17EC027	Dhaval	24	10	34
22	4AL17EC029	Disha	26	10	36
23	4AL17EC030	Divyashree L V	26	10	36
24	4AL17EC031	DivyashriBahubaliSamajage	25	10	35
25	4AL17EC032	Gagan M K	25	10	35
26	4AL17EC034	Harsha P	22	10	32
27	4AL17EC035	HemalathaSanil	25	10	35
28	4AL17EC036	JagadeeshaHegde	24	10	34
29	4AL17EC037	Jyoti S Donur	30	10	40
30	4AL17EC038	K Muthu	28	10	38
31	4AL17EC040	Kavya M M	30	10	40
32	4AL17EC041	KishanShetty	25	10	35
33	4AL17EC042	Kishore N	26	10	36
34	4AL17EC043	Lavanya B	27	10	37
35	4AL17EC044	Lepakshi T V	29	10	32
36	4AL17EC045	M V Ramya	30	10	40
37	4AL17EC046	MadiwalarAkshataNingappa	30	10	40
38	4AL17EC047	MadugondeManjunatha	25	10	35
39	4AL17EC048	Mahesh H	24	10	34
40	4AL17EC050	Manjunatha H K	25	10	35
41	4AL17EC053	Mohanababu D G	22	10	32
42	4AL17EC055	Mounitha D M	22	10	32
43	4AL17EC057	NagaGanesh N	21	10	31
44	4AL17EC058	Namratha J Nair	28	10	38
45	4AL17EC060	Navya	30	10	40
46	4AL17EC061	Bhargavi	30	10	40

47	4AL15EC043	Madhu B Gurav	8	5	13
48	4AL15EC038	Mohith	9	5	14
49	4AL15EC100	Vijay C H	11	5	16

Mrs. Nishma
Class coordinator



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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

FINAL CONSOLIDATED INTERNAL MARKS REPORT OF VII SEM -'B'

Date: 13/02/2021

#	USN	Student Name	17EC72		
			IA	ASSG	TOT
1	4AL16EC037	Mirza	25	10	35
2	4AL16EC101	Raviteja G	23	10	33
3	4AL17EC024	Deeksha	21	10	31
4	4AL17EC062	Niharika Narayana L	26	10	36
5	4AL17EC063	Nishantha V R	25	10	35
6	4AL17EC064	P V Sai Suraksha	30	10	40
7	4AL17EC065	Padmashree B S	25	10	35
8	4AL17EC066	Padmini M	25	10	35
9	4AL17EC068	Pavithran S	23	10	33
10	4AL17EC069	Persis P	28	10	38
11	4AL17EC070	Pooja K S	22	10	32
12	4AL17EC071	Poorvi H J	23	10	33
13	4AL17EC072	Pragati M Kundalkar	30	10	40
14	4AL17EC073	Prajwal Kamagethi P L	23	10	33
15	4AL17EC074	Prashantha Naik	27	10	37
16	4AL17EC075	Princia Melita Dsouza	26	10	36
17	4AL17EC076	Rajeshwari Gadagi	23	10	33
18	4AL17EC077	Rashmitha	26	10	36
19	4AL17EC079	Rohan Shetty	27	10	37
20	4AL17EC080	Roshni A B	26	10	36
21	4AL17EC083	Sahana S R	26	10	36
22	4AL17EC084	Sanketha S Acharya	25	10	35
23	4AL17EC086	Shilpa C	30	10	40
24	4AL17EC090	Sushmitha R Naik	26	10	36
25	4AL17EC091	Swastik R Gowda	26	10	36
26	4AL17EC092	Varshitha S	24	10	34
27	4AL17EC093	Varun G Shetty	30	10	40
28	4AL17EC095	Vidul Sambhaji Chavan	28	10	38
29	4AL17EC096	Yalpi Nandika	30	10	40
30	4AL17EC097	Yamunashree N	23	10	33
31	4AL17EC098	Yashaswini R	24	10	34
32	4AL17EC099	Yashwitha C N	25	10	35
33	4AL17EC100	Yathish S Rao	25	10	35
34	4AL17EC101	Bindu N R	30	10	40
35	4AL17EC102	Sushmitha	27	10	37
36	4AL17EC103	Sachin	28	10	38
37	4AL17EC104	Nikhil	29	10	39
38	4AL17EC105	Akash	22	10	32
39	4AL17EC106	Harshitha T	25	10	35
40	4AL17EC107	K B Kushi	25	10	35
41	4AL17EC108	Rachana	22	10	32
42	4AL18EC400	Sushanth Poojari	25	10	35
43	4AL16EC032	Krishna Swetha	14	5	19
44	4AL16EC035	Mamatha M	13	5	18
45	4AL16EC046	Poojary Sushmita	14	5	19
46	4AL16EC065	Sathya B R	12	5	17
47	4AL16EC029	Karegowda K N	11	5	16
48	4AL16EC409	Rakshith B	12	5	17
49	4AL16EC073	Shravan V Acharya	12	5	17