



In Pursuit of Excellence

Course and Faculty Details

SESSION-2019-2020

SEM- 8th

Faculty Details

Name of the Faculty: Himanshu Agarwal

Designation: Assistant Professor

Department: Computer Science & Engineering

Course Details

Name of the Programme: B.Tech.

Batch: 2016-2020

Branch: Computer Science & Engineering

Section: A,B

Name of Subject: Image Processing

Subject Code: RCS-082

Category of Course: Departmental Elective


Dr. Somesh Kumar
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Moradabad-244001



In Pursuit of Excellence


Index

SESSION-2019-2020
Image Processing RCS 082

SEM-8th

Course & Faculty Details	1
Index	2 -3
Vision & Mission of Institute	4
Vision & Mission of Department	5
Program Educational Objectives	6
Program Outcomes	7-8
Program Specific Outcomes	9
Academic calendar	10-12
Department Academic Calendar	13-14
Course Evaluation Scheme	15
Course Syllabus as per University	16
Syllabus adopted by the Program	17
Concept Map	17 a
Course Outcomes	18
Course Delivery Method	19
YouTube Links of Various lectures of NPTEL	19 a
Mapping	20
Time Table	21
Lecture Plan & Course Coverage	22-25
Assignments	26-30
List of Students	31-34
Class Test Papers with Solutions	35-49
Class Test Attendance	50-57
List of Student having short attendance	58
Class Test Marks	59-66
List of Weak Students	67-68
List of Bright Students	69-72
Previous Year Question Papers	73-90

Question Bank	91-92
Final Internal Marks	93-98
Course Outcome Attainment	99-102


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	Vision & Mission of Institute	SESSION-2019-2020
		SEM-VII

Vision of Institute

To develop industry ready professionals with values and ethics for global needs.

Mission of Institute

- To impart education through outcome based pedagogic principles.
- To provide conducive environment for personality development, training and entrepreneurial skills.
- To induct high professional ethics and accountability towards society in students.


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	Vision & Mission Of Department	SESSION-2019-2020
		SEM-VII


Vision of Department

To develop globally recognized computer science and engineering graduates with ethical values for need of software industries.

Mission of Department

- 1. To impart knowledge through well defined instructional objectives in the field of computer science and engineering.**
- 2. To provide learning ambiance for skills, innovation, leadership and overall personality development.**
- 3. To inculcate professional ethics, teamwork and responsiveness towards society.**


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	Program Education Objectives	SESSION-2019-2020
		SEM-8 th

Program Education Objectives

PEO 1 : The graduates will have entrepreneurial and employable skills in software industries, by adapting themselves in the corporate world by utilizing the defined instructional objectives learnt in the program.

PEO 2 : The graduates will engage in skill enhancement, that would help to work in their own area of interest, individually or in a team.

PEO 3 : The graduates will demonstrate ownership and responsiveness towards the profession and the society.


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Program Outcomes

SESSION-2019-2020

SEM- 8th

Program Outcomes

- 1. Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization for the solution of complex engineering problems.
- 2. Problem analysis:** Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- 3. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety, and cultural, societal, and environmental considerations.
- 4. Conduct investigations of complex problems:** Use research based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.
- 5. Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modeling to complex engineering activities, with an understanding of the limitations.
- 6. The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- 7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- 8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- 9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 10. Communication:** Communicate effectively on complex engineering activities with the engineering community and with the society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.


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Program Specific Outcomes

SESSION-2019-2020

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After completing their graduation, students of Computer Science and Engineering will be able to -

PSO1: Comprehend the core subjects of CSE and apply them to resolve domain specific tribulations.

PSO2: Extrapolate the fundamental concepts in engineering and to apply latest technology with programming language skills to develop, test, implement and maintain software products.


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Moradabad Institute of Technology

Ramganga Vihar Phase – II, Moradabad

ACADEMIC CALENDAR

ODD Semester

Session: 2019 – 2020

S. No.	Particulars	Date	Responsibility
1	Time Table (a) Display on Notice Boards (b) Distribution to concerned Teachers	29 July 2019 29 July 2019	O.C. Time – Table
2	Distribution of class lists to teachers	29 July 2019	O.C. Class / DR
3	Registrations (a) 3 rd / 5 th / 7 th Semester (b) List of unregistered students to various department (c) Notifying unregistered students for getting registered at the earliest (through class O.Cs, / Faculty)	1,2,3 Aug.2019 20 Aug 2019 22 Aug 2019	Concerned Teachers OS Academic Concerned HODs
4	Commencement of Classes 3 rd / 5 th / 7 th Semester	2,3,4 Aug.2019	Concerned Teachers
5	Blow up submission to HODs	30 July 2019	Concerned Teachers
6	Announcement of Test series dates	16 Aug 2019	Dean Academics
7	(a) Collection of Examination forms from University and announcement of date for availability of forms (b) Last date for submission of forms to office (c) Submission of forms to University	30 Aug 2019**	OS Academic to take timely action as per University directions.
8	Procurement of stationary & materials for Test Series for full semester (a) Requirement (b) Actual Procurement	31 Aug 2019 5 Sept 2019	Convener Test Series Committee O.S. Academics
9	(a) Short attendance compilation and information to parents and undertaking format handed over to students (b) Collection of Short attendance undertaking	09 Sept 2019 11 Sept 2019	O.C. Class
10.	1st Test Series Thu, Fri, Sat	12, 13, 14. Sept 2019	
	(a) Announcement of Test Series schedule, Invigilation Programme, Seating arrangement etc.	11 Sept 2019	Class Test Committee
	(b) After completion of Test Series- Evaluation of test copies & showing of copies to students	21 Sept 2019	Concerned Teachers
	(c) Submission of test copies in Nodal Centre	25 Sept 2019	Concerned Teachers
	(d) Report of poor performance of students to class OCs	26 Sept 2019	Concerned Teachers
	(e) Short attendance compilation, display on notice board and information to parents	19 Oct 2019	O.C. Class
11.	2nd Test Series Wed, Thus, Fri	23, 24, 25 Oct 2019	
	(a) Announcement of Test Series schedule, Invigilation Programme, seating arrangement etc	22 Oct 2019	Class Test Committee


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	(b) After completion of Test Series - Evaluation of test copies & showing of copies to students	02 Nov 2019	Concerned Teachers
	(c) Submission of test copies in Nodal Centre	04 Nov 2019	Concerned Teachers
	(d) Report of poor performance of students to class OCs	05 Nov 2019	Concerned Teachers
12.	Filling of student feedback forms for current semester	27 Nov 2019	Concerned HODs
13.	Requirement of additional Faculty (to be conveyed to Director) (for even semester)	30 Nov 2019	Concerned HODs
14.	(a) Floating the electives for even semester	26 Nov 2019	Concerned HODs
	(b) Last date for students choice	30 Nov 2019	
15.	Announcement of dues list and its last date for clearing dues (Current semester)	22 Oct 2019	Accounts/ OS Academic
16.	Date up to which final attendance is to be counted	29 Nov 2019	Concerned teachers
17.	Submission of consolidated list of shortage of attendance to Director and information to Parents	30 Nov 2019	Class O.Cs
18.	3rd Test Series Thu, Fri, Sat	28,29,30 Nov 2019	
	(a) Announcement of Test Series schedule, Invigilation Programme, Seating arrangement etc.	27 Nov 2019	Class Test Committee
	(b) After completion of Test Series- Evaluation of test copies & showing of copies to students	03 Dec 2019	Concerned Teacher
	(c) Submission of test copies in Nodal Centre	04 Dec 2019	Concerned Teachers
	(d) Report of poor performance of students to class OCs	04 Dec 2019	Concerned Teachers
19.	Submission of sessional marks:		
	(a) Meeting of Dean Academics, all HODs and Director regarding attendance and performance of students.	04 Dec 2019	Dean Academics
	(b) Checking of Teachers' Records by HODs	05 Dec 2019	Concerned HODs
	(c) Finalization of sessional marks	05 Dec 2019	Concerned Teachers
	(d) Submission of Award list after final checking and uploading to OS Academics for further necessary action	As per date announced by AKTU	HODs Concerned Teachers
20.	Theory Examinations:		
	(a) Collection of Admit Cards / Roll Nos. from University	As per AKTU schedule	OS Academics to take appropriate actions as per University directions.
	(b) Preparation of Roll lists		
	(c) Collection of stationery such as copies, practical copies drawing sheets, graph paper etc. from University.		
	(c) Procurement of stationery and other materials locally as necessary.		
21.	Practical Examinations:	As per AKTU schedule	Concerned HODs
	(a) Appointment of Internal Examiners	3 days before the practical exam schedule	Concerned HODs
	(b) Obtaining list of panel of External Examiners from AKTU & preparation of schedule of practical examination.	As per AKTU schedule	OS Academics
	(d) Dispatch of letters/contacting the external examiners	Within 2 days of list obtained from AKTU	HODs and concerned teachers


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22.	Preparation for Even Semester (a) Load Distribution by Department (b) Submission to O.C. Time-Table (c) Display of Time Table on Notice Board	10 Dec 2019 12 Dec 2019 18 Jan 2020	Concerned Coordinators O.C. Time Table
23.	Registration for Even semester [2019 – 20]	To be announced**	OS Academic
24.	Announcement of Academic calendar for Even semester [2019 – 20]	5 Days before the start of Even sem.	Dean Academics

**May be revised as per AKTU Schedule.

Nitin bl
27.7.2019
Dean Academics

Clay
Director

Copy to:

1. Chairman	2. Secretary	3. P.A. to Director for Director's folder
4. All HODs	5. DOSW	6. Controller Examination
7. Associate Dean Academics	8. Registrar	9. All Faculty Members through HODs
10. O.S. Academics	11. A.S. Examinations	12. Accounts Section
13. T & P Cell	14. Librarian	15. Convener Test Series/ O.C. Time Table

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VISION

To develop globally recognized computer science and engineering graduates with technical values for need of software industries.

MISSION

- M1:** To impart knowledge through well defined instructional objectives in the field of computer science and engineering.
- M2:** To provide a learning ambience for skills, innovation, leadership and overall personality development.
- M3:** To inculcate professional ethics, teamwork and responsiveness towards society.

JANUARY-2020							FEBRUARY-2020							MARCH-2020						
Su	M	T	W	Th	F	S	Su	M	T	W	Th	F	S	Su	M	T	W	Th	F	S
			1	2	3	4							1	1	2	3	4	5	6	7
5	6	7	8	9	10	11	2	3	4	5	6	7	8	8	9	10	11	12	13	14
12	13	14	15	16	17	18	9	10	11	12	13	14	15	15	16	17	18	19	20	21
19	20	21	22	23	24	25	16	17	18	19	20	21	22	22	23	24	25	26	27	28
26	27	28	29	30	31		23	24	25	26	27	28	29	29	30	31				
APRIL-2020							MAY-2020							JUNE-2020						
Su	M	T	W	Th	F	S	Su	M	T	W	Th	F	S	Su	M	T	W	Th	F	S
			1	2	3	4						1	2		1	2	3	4	5	6
5	6	7	8	9	10	11	3	4	5	6	7	8	9	7	8	9	10	11	12	13
12	13	14	15	16	17	18	10	11	12	13	14	15	16	14	15	16	17	18	19	20
19	20	21	22	23	24	25	17	18	19	20	21	22	23	21	22	23	24	25	26	27
26	27	28	29	30			24	25	26	27	28	29	30	28	29	30				
							31													


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A	Time Table Display on Notice Boards
B	Blow Up Submission to HODs
C	4 th /6 th /8 th semester registration
D	4 th /6 th /8 th SEM Commencement of Classes
E	Republic Day
F	Expert Lecture on Machine Learning & IOT by Mr. Abhey Kumar Bains & Mr. Aman Kumar Singh, Scope Telecom, Chandigarh
G	Expert Lecture on Image Classification using Machine Learning by Mr. Rahul Pathak, CETPA Noida
H	Event 'Dosto ki Mehfil' by CSSS
I	Maha Shivratri
J	1 st Test Series
K	Submission of Test copies in Nodal Center
L	Event 'Filmy Bytes' by CSSS
M	Mid Semester Break(Holi and Birthday of Mohd. Hazrat Ali)
N	Classes Suspended due to Lockdown
O	New Time Table for Online Classes
P	Commencement of Online Classes

Q	Information of CTs to parents and students through Counsellors
R	2 nd Test Series
S	Information regarding filling of Examination Form to students
T	Submission of CT 2 Marks on MIT ERP
U	Departmental Meeting on Google Meet
V	Submission of Concept Map by Subject Coordinators
W	Online Conduction of Event 'Lockdown with Family' by CSSS
X	Online Conduction of Event 'MAA' by CSSS
Y	Webinar on 'Internet Routing' by Dr. Mahesh Kumar organized by CSE Deptt, MIT
Z	Webinar on 'Apache Airflow' by Shivam Saxena organized by CSE Deptt, MIT
AA	Submission of Sessional Marks on AKTU ERP

Month	Dates of Teaching Days (2 nd , 3 rd & 4 th Year)	No. of Teaching Days	No. of Lecture Hours
Jan-2020	22,23,24,25,27,28,29,30,31	09	76 × 6 = 456
Feb-2020	1,3,4,5,6,7,8,10,11,12,13,14,15,17,18,19,20,22,27,28,29	21	
Mar-2020	2,3,4,5,6,7,12,13,14,16,23,24,25,26,27,28,30,31	23	
Apr-2020	1,2,3,4,6,7,8,9,10,11,15,16,17,18,20,21,22,23,24,25,27,28,29,30	24	
May-2020	1,2,4,5,6,7,8,9,11,12,13,14,16	13	
	Total	70	
	Sessional Examinations	06	
	Total Teaching Days	76	456


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B.Tech. (Computer Science and Engineering)
VIII SEMESTER

Sl. No.	Subject Code	Subject Name	L-T-P	Th/Lab Marks	Sessional		Total	Credit
				ESE	CT	TA		
1	Open Elective-2	Open Elective Course-2	3--0--0	70	20	10	100	3
2	CS Elective-5	Deptt Elective Course-5	3--1--0	70	20	10	100	4
3	CS Elective-6	Deptt Elective Course-6	3--0--0	70	20	10	100	3
4	RCS851	Seminar	0--0--3			100	100	2
5	RCS852	Project	0--0--12	350		250	600	12
	TOTAL			560	60	380	1000	24

CS-ELECTIVE-5:

1. RCS080 Machine Learning (Mapping with MOOCS: https://onlinecourses.nptel.ac.in/noc17_cs17/preview
https://onlinecourses.nptel.ac.in/noc17_cs26/preview)
2. RCS081 Game Programming
3. **RCS082 Image Processing (Mapping with MOOCS: https://onlinecourses.nptel.ac.in/noc18_ee40/preview
<https://nptel.ac.in/courses/106105032/>)**
4. RCS083 Parallel and Distributed Computing (Mapping with MOOCS: <https://nptel.ac.in/courses/106102114/>,
<https://nptel.ac.in/courses/106104024/>)


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 In Pursuit of Excellence	Course Syllabus as per University (Image Processing)	SESSION-2019-2020 RCS 082
		SEM- 8 th

Unit I

DIGITAL IMAGE FUNDAMENTALS: Steps in Digital Image Processing – Components – Elements of Visual Perception – Image Sensing and Acquisition – Image Sampling and Quantization – Relationships between pixels – Color image fundamentals – RGB, HSI models, Two-dimensional mathematical preliminaries, 2D transforms – DFT, DCT.

Unit II

IMAGE ENHANCEMENT : Spatial Domain: Gray level transformations – Histogram processing – Basics of Spatial Filtering– Smoothing and Sharpening Spatial Filtering, Frequency Domain: Introduction to Fourier Transform– Smoothing and Sharpening frequency domain filters – Ideal, Butterworth and Gaussian filters, Homomorphic filtering, Color image enhancement.

Unit III

IMAGE RESTORATION : Image Restoration – degradation model, Properties, Noise models – Mean Filters – Order Statistics – Adaptive filters – Band reject Filters – Band pass Filters – Notch Filters – Optimum Notch Filtering – Inverse Filtering – Wiener filtering

Unit IV

IMAGE SEGMENTATION: Edge detection, Edge linking via Hough transform – Thresholding – Region based segmentation – Region growing – Region splitting and merging – Morphological processing- erosion and dilation, Segmentation by morphological watersheds – basic concepts – Dam construction – Watershed segmentation algorithm.

Unit V

IMAGE COMPRESSION AND RECOGNITION: Need for data compression, Huffman, Run Length Encoding, Shift codes, Arithmetic coding, JPEG standard, MPEG. Boundary representation, Boundary description, Fourier Descriptor, Regional Descriptors – Topological feature, Texture – Patterns and Pattern classes – Recognition based on matching.

Text books:

1. Rafael C. Gonzalez, Richard E. Woods, Digital Image Processing Pearson, Third Edition, 2010
2. Anil K. Jain, Fundamentals of Digital Image Processing Pearson, 2002.
3. Kenneth R. Castleman, Digital Image Processing Pearson, 2006.
4. Rafael C. Gonzalez, Richard E. Woods, Steven Eddins, Digital Image Processing using MATLAB Pearson Education, Inc., 2011.
5. D.E. Dudgeon and R.M. Mersereau, Multidimensional Digital Signal Processing Prentice Hall Professional Technical Reference, 1990.
6. William K. Pratt, Digital Image Processing John Wiley, New York, 2002
7. Milan Sonka et al Image processing, analysis and machine vision Brookes/Cole, Vikas Publishing House, 2nd edition, 1999


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Syllabus Adopted by the Program

SESSION-2019-2020

SEM-8th

Syllabus

Image Processing (RCS-082)

Unit I (DIGITAL IMAGE FUNDAMENTALS)

Steps in Digital Image Processing – Components – Elements of Visual Perception – Image Sensing and Acquisition – Image Sampling and Quantization – Relationships between pixels – Color image fundamentals – RGB, HSI models, Two-dimensional mathematical preliminaries, 2D transforms – DFT, DCT.

Beyond: Image processing vs. Computer Vision

Unit II (IMAGE ENHANCEMENT)

Review: Enhancement using Arithmetic Operations

Spatial Domain: Gray level transformations – Histogram processing – Basics of Spatial Filtering – Smoothing and Sharpening Spatial Filtering.

Frequency Domain: Introduction to Fourier Transform – Smoothing and Sharpening frequency domain filters – Ideal, Butterworth and Gaussian filters, Homomorphic filtering, Color image enhancement.

Beyond: Zooming and Shrinking of Digital Images

Unit III (IMAGE RESTORATION)

Review: Noise and its types

Image Restoration – degradation model, Properties, Noise models – Mean Filters – Order Statistics – Adaptive filters – Band reject Filters – Band pass Filters – Notch Filters – Optimum Notch Filtering – Inverse Filtering – Wiener filtering

Unit IV (IMAGE SEGMENTATION)

Review: Point Detection

Edge detection

Bridging: Canny edge detection technique

Edge linking via Hough transform – Thresholding – Region based segmentation – Region growing – Region splitting and merging – Morphological processing- erosion and dilation, Segmentation by morphological watersheds – basic concepts – Dam construction – Watershed segmentation algorithm.


Beyond: Region filling

Unit V (IMAGE COMPRESSION AND RECOGNITION)

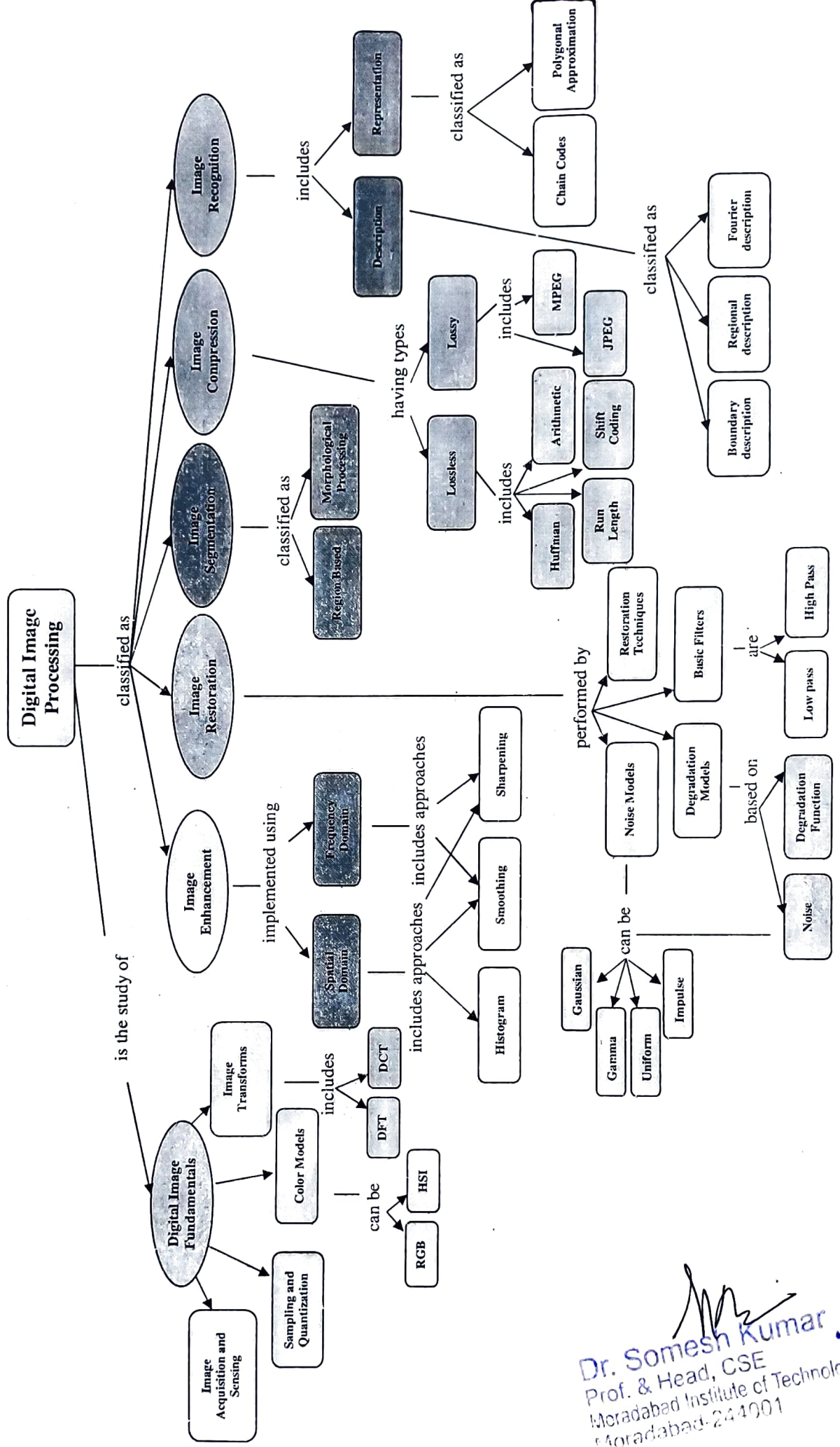
Review: Data and information processing

Need for data compression, Huffman, Run Length Encoding, Shift codes, Arithmetic coding, JPEG standard, MPEG. Boundary representation, Boundary description, Fourier Descriptor, Regional Descriptors – Topological feature, Texture – Patterns and Pattern classes – Recognition based on matching.

Beyond: MPEG Standards


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Concept Map



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Course Outcomes


SESSION-2019-2020


SEM- 8th

Course Outcomes

Upon successful completion of this course student will be able to :

1. Demonstrate the fundamental concepts of a digital image processing system and also inspect various color models.
2. Identify the image enhancement techniques used in digital image processing.
3. Identify the image restoration techniques.
4. Categorize various Image Segmentation and morphological Techniques.
5. Identify the image compression techniques.


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 In Pursuit of Excellence	Course Delivery Method	SESSION-2019-2020
		SEM-8th

Name of Subject: Image Processing

Subject Code: RC 082

Branch: Computer Science & Engineering

Course Plan

Delivery Methods: Chalk & Talk, Power Point Presentation, Tutorials, Video Lectures, Analogy, solving, Numerical/Design exercises, Practical's, assignments, seminar, Brainstorming, Group Discussion/Interactive session, Delivery through Simulation Software/CAD Tools, Mini project, Quiz.

Coverage of

Unit 1 by: - Chalk & Talk, Power Point Presentation and Video lectures.

Unit 2 by: - Chalk & Talk, Power Point Presentation and Video lectures.

Unit 3 by: - Chalk & Talk, Power Point Presentation and Video lectures.

Unit 4 by: - Chalk & Talk, Power Point Presentation and Video lectures.

Unit 5 by: - Chalk & Talk, Power Point Presentation and video lectures.


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YouTube Links of Various lectures of NPTEL on different Topics

Introduction to Digital Image Processing

<https://www.youtube.com/watch?v=DSGHkvQBMbs>

Signal Reconstruction From Samples : Convolution Concept

<https://www.youtube.com/watch?v=fHkHREudLxc>

Signal Reconstruction from Image

<https://www.youtube.com/watch?v=ptAXuvnlvFY>

Relationship of Adjacency and Connected Components Labeling

<https://www.youtube.com/watch?v=CdUJbfA7Z9w>

Histogram Equalization and Specifications – I

<https://www.youtube.com/watch?v=kN0FwnaY7qk>

Histogram Equalization and Specification – I

<https://www.youtube.com/watch?v=M7JxDHUW5cc>

Image Enhancement Mask Processing Techniques – I


<https://www.youtube.com/watch?v=9NG8CThRJgl>

Image Restoration Techniques – I

<https://www.youtube.com/watch?v=MrNafUqh860>

Different Approaches for Image Segmentation

https://www.youtube.com/watch?v=j3_Ck5oP5ol


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Mapping

SESSION-2019-2020

SEM-8th

Mapping of Course Outcomes with POs & PSOs:

Sr. No	Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	CO 1	3	3	1					1					3	3
2	CO 2	3	3	3					1					3	3
3	CO 3	2	2	2					1					3	3
4	CO 4	2	2	1					1					3	3
5	CO 5	3	3	3										3	3
	Avg	2.6	2.6	2					1					3	3

- CO1.** Demonstrate the fundamental concepts of a digital image processing system and also inspect various color models.
- CO2.** Identify the image enhancement techniques used in digital image processing.
- CO3.** Identify the image restoration techniques.
- CO4.** Categorize various Image Segmentation and morphological Techniques.
- CO5.** Identify the image compression techniques.



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Time Table



In Pursuit of Excellence

Day	I	II	III	IV	V	VI	VII
MON		RCS-082 (L) 8 TH B B-301		RCS-082 (L) 8 TH A B-301			
TUE		RCS-082 (L) 8 TH A B-301		RCS-082 (L) 8 TH A B-301			
WED		RCS-082 (L) 8 TH B B-301	RCS-082 (L) 8 TH A B-301	RCS-082 (L) 8 TH B B-301			
THU	RCS-852 8 TH A/B/C B-102/109/117			RCS-082 (L) 8 TH B B-301			
FRI		RCS-852 8 TH A/B/C B-102/109/117					
SAT							


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Lecture Plan & Course Coverage

SESSION-2019-2020

SEM- 8th
SEC- A

Total Period: 48

Sr. No.	No. of Periods	Topics/Sub Topics	Reference Books	CO Covered	Planned Date	Coverage Date	Sign
1	1	Introduction to Course Educational Objective, Course Outcomes, Scheme, Adopted Syllabus, PEOs, POs,PSOs Pre-requisite, Vision & Mission of Institute and Department			22/01/20	22/01/20	H.Agg
2	1	Steps in Digital Image Processing - Components	[1,7]	CO1	27/01/20	27/01/20	H.Agg
3	1	Elements of Visual Perception -	[1,7]	CO1	28/01/20	28/01/20	H.Agg
4	1	Image Sensing and Acquisition - Image Sampling and Quantization	[1,7]	CO1	28/01/20	28/01/20	H.Agg
5	1	Relationships between pixels	[1,7]	CO1	29/01/20	29/01/20	H.Agg
6	2	Color image fundamentals - RGB, HSI models, Two-dimensional mathematical preliminaries 2D transforms - DFT, DCT.	[1,4,7]	CO1	03/02/20 04/02/20	03/02/20 04/02/20	H.Agg H.Agg
7	1	Image Processing vs. Computer Vision	[1,4,7]	CO1	04/02/20	04/02/20	H.Agg
8	3	Enhancement using Airthmetic Operations, Spatial Domain: Gray level transformations, Histogram processing - Basics of Spatial Filtering	[1,7]	CO2	05/02/20	05/02/20	H.Agg
9	1	Smoothing Spatial Filters, Sharpening Spatial Filters	[1,7]	CO2	10/02/20	10/02/20	H.Agg
10	3	Frequency Domain: Introduction to Fourier Transform- Smoothing and Sharpening frequency domain filters	[1,7]	CO2	11/02/20, 11/02/20 12/02/20	11/02/20 11/2/20 12/02/20	H.Agg H.Agg H.Agg
11	3	Ideal, Butterworth and Gaussian filters, Homomorphic filtering, Color image enhancement. Zooming and Shrinking of digital images.	[1,2]	CO2	17,18, 19/02/2020	17/2/20 18/2/20 18/2/20	H.Agg H.Agg H.Agg
12	3	Noise and it types , Image Restoration - degradation model, Properties, Noise models - Mean Filters - Order Statistics Adaptive filters	[3,4]	CO3	24/02/2020 25/02/2020 25/02/2020	19/2/20 19/2/20 22/2/20	H.Agg H.Agg H.Agg


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13	3	Band reject Filters - Band pass Filters - Notch Filters, Optimum Notch	[2,3]	CO3	26/02/2020 02/03/2020 03/03/2020	22/2/20 24/2/20 25/2/20	H.A.G. H.A.G. H.A.G.
14	2	Filtering, Inverse Filtering, Wiener Filtering.	[2,3]	CO3	02/03/2020 04/03/2020	25/2/20 26/2/20	H.A.G. H.A.G.
15	2	Point detection, Edge detection, Canny edge detection, Edge linking via Hough transform - Thresholding -	[1, 2]	CO4	09/03/2020 10/03/2020	2/3/20 3/3/20	H.A.G. H.A.G.
16	2	Region based segmentation - Region growing	[1, 2]	CO4	11/03/2020 16/03/2020	3/3/20 4/3/20	H.A.G. H.A.G.
17	1	Region splitting and merging -	[1, 2, 3]	CO4	23/03/2020	23/3/20 24/3/20	H.A.G.
18	2	Morphological processing- erosion and dilation,	[1, 2, 3]	CO4	24/03/2020 25/03/2020	25/3/20 26/3/20 27/3/20 28/3/20	H.A.G. H.A.G. H.A.G. H.A.G.
19	2	Segmentation by morphological watersheds - basic concepts - Dam construction -	[1,5]	CO4	30/03/2020 06/04/2020	30/3/20 31/3/20 01/04/20 2/4/20	H.A.G. H.A.G. H.A.G. H.A.G.
20	1	Watershed segmentation algorithm, Region Filling	[1,5]	CO4	07/04/2020	3/4/20 4/4/20	H.A.G. H.A.G.
21	2	Introduction to Data and Information Processing, Need for data compression, Huffman, Run Length Encoding, Shift codes	[1, 5]	CO5	08/04/2020 15/04/2020	6/4/20 7/4/20 8/4/20 9/4/20	H.A.G. H.A.G. H.A.G. H.A.G.
22	2	Arithmetic coding, JPEG standard, MPEG. Boundary representation,	[1, 2]	CO5	20/04/2020 21/04/2020	10/4/20 15/4/20 16/4/20 17/4/20	H.A.G. H.A.G. H.A.G. H.A.G.
23	2	Boundary description, Fourier Descriptor, Regional Descriptors	[1, 2]	CO5	22/04/2020 27/04/2020	18/4/20 20/4/20 21/4/20 22/4/20	H.A.G. H.A.G. H.A.G. H.A.G.
24	2	Topological feature, Texture	[1, 2]	CO5	28/04/2020 29/04/2020	23/4, 24/4 25/4, 27/4	H.A.G.
25	2	Patterns and Pattern classes	[1, 2]	CO5	04/05/2020 05/05/2020	28/4/20 29/4/20	H.A.G. H.A.G.
26	2	Recognition based on matching. Various MPEG Standards	[1, 2]	CO5	06/05/2020 11/05/2020	30/4/20 01/05/20	H.A.G. H.A.G.

Himanshu Agarwal H.A.G.
Name & Sign. of Faculty 20/01/2020


Sign. of Reviewer


Sign. of Head
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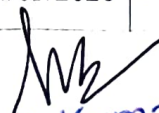
Lecture Plan & Course Coverage

SESSION-2019-2020

SEM- 8th
SEC- B

Total Period: 48

Sr. No.	No. of Periods	Topics/Sub Topics	Reference Books	CO Covered	Planned Date	Coverage Date	Sign
1	1	Introduction to Course Educational Objective, Course Outcomes, Scheme, Adopted Syllabus, PEOs, POs,PSOs Pre-requisite, Vision & Mission of Institute and Department			22/01/2020	22/01/20	H.A.S
2	1	Steps in Digital Image Processing – Components	[1,7]	CO1	23/01/2020	22/01/20	H.A.S
3	1	Elements of Visual Perception –	[1,7]	CO1	27/01/2020	23/01/20	H.A.S
4	1	Image Sensing and Acquisition – Image Sampling and Quantization	[1,7]	CO1	29/01/2020	27/01/20	H.A.S
5	1	Relationships between pixels	[1,7]	CO1	29/01/2020	29/01/20	H.A.S
6	2	Color image fundamentals – RGB, HSI models, Two-dimensional mathematical preliminaries 2D transforms – DFT, DCT.	[1,4,7]	CO1	30/01/2020	29/01/20	H.A.S
7	1	Image Processing vs. Computer Vision	[1,4,7]	CO1	03/02/2020	30/01/20	H.A.S
8	3	Enhancement using Airthmetic Operations, Spatial Domain: Gray level transformations, Histogram processing – Basics of Spatial Filtering	[1,7]	CO2	05/02/2020 05/02/2020 06/02/2020	03/02/20 05/02/20 06/02/20	H.A.S H.A.S H.A.S
9	1	Smoothing Spatial Filters, Sharpening Spatial Filters	[1,7]	CO2	10/02/2020	10/2/20	H.A.S
10	3	Frequency Domain: Introduction to Fourier Transform– Smoothing and Sharpening frequency domain filters	[1,7]	CO2	12/02/2020 13/02/2020 17/02/2020	12/2/20 12/2/20 13/2/20	H.A.S H.A.S H.A.S
11	3	Ideal, Butterworth and Gaussian filters, Homomorphic filtering, Color image enhancement. Zooming and Shrinking of digital images.	[1,2]	CO2	19/02/2020 19/02/2020 20/02/2020	17/02/20 19/2/20 19/2/20	H.A.S H.A.S H.A.S
12	3	Noise and it types , Image Restoration – degradation model, Properties, Noise models – Mean Filters – Order Statistics Adaptive	[3,4]	CO3	27/02/2020 02/03/2020 04/03/2020	20/2/20 22/2/20 22/2/20	H.A.S H.A.S H.A.S


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		filters					
13	3	Band reject Filters – Band pass Filters – Notch Filters, Optimum Notch	[2,3]	CO3	04/03/2020 05/03/2020 12/03/2020	H.A.A. 24/2/20 25/2/20 25/2/20	H.A.A. H.A.A. H.A.A.
14	2	Filtering, Inverse Filtering, Wiener Filtering.	[2,3]	CO3	16/03/2020 23/03/2020	20/2/20 27/2/20 21/3/20	H.A.A. H.A.A. H.A.A.
15	2	Point detection, Edge detection, Canny edge detection, Edge linking via Hough transform – Thresholding –	[1, 2]	CO4	25/03/2020 25/03/2020	4/3/20 04/3/20	H.A.A. H.A.A.
16	2	Region based segmentation – Region growing	[1, 2]	CO4	26/03/2020 30/03/2020	5/3/20 23/3/20 24/3/20	H.A.A. H.A.A. H.A.A.
17	1	Region splitting and merging –	[1, 2, 3]	CO4	01/04/2020	25/3/20 26/3/20	H.A.A. H.A.A.
18	2	Morphological processing- erosion and dilation,	[1, 2, 3]	CO4	01/04/2020 02/04/2020	27/3, 28/3 30/3, 31/3	H.A.A. H.A.A.
19	2	Segmentation by morphological watersheds – basic concepts – Dam construction –	[1,5]	CO4	06/04/2020 08/04/2020	1/4/20 2/4/20 3/4/20 4/4/20	H.A.A. H.A.A. H.A.A. H.A.A.
20	1	Watershed segmentation algorithm, Region Filling	[1,5]	CO4	08/04/2020	6/4/20 7/4/20	H.A.A. H.A.A.
21	2	Introduction to Data and Information Processing, Need for data compression, Huffman, Run Length Encoding, Shift codes	[1, 5]	CO5	09/04/2020 15/04/2020	6/4/20 9/4/20 10/4/20 15/4/20	H.A.A. H.A.A. H.A.A. H.A.A.
22	2	Arithmetic coding, JPEG standard, MPEG. Boundary representation,	[1, 2]	CO5	15/04/2020 16/04/2020	16/4/20 17/4/20 18, 20/4/20	H.A.A. H.A.A. H.A.A.
23	2	Boundary description, Fourier Descriptor, Regional Descriptors	[1, 2]	CO5	20/04/2020 22/04/2020	21/4/20 22/4/20 23/4/20	H.A.A. H.A.A. H.A.A.
24	2	Topological feature, Texture	[1, 2]	CO5	22/04/2020 23/04/2020	24/4/20 25/4/20	H.A.A. H.A.A.
25	2	Patterns and Pattern classes	[1, 2]	CO5	27/04/2020	27/4/20 28/4/20	H.A.A. H.A.A.
26	2	Recognition based on matching. Various MPEG Standards	[1, 2]	CO5	29/04/2020 29/04/2020	29/4/20 30/4/20 01/5/20	H.A.A. H.A.A. H.A.A.

Himanshu Aggarwal H.A.A.
Name & Sign. of Faculty 20/01/2020

Sign. of Reviewer

Sign. of HOD

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Assignment- 1

SESSION-2019-2020

SEM- 8th
SUB: IP, RCS-082

Unit-1 [CO-1]

1. Explain with block diagram, the fundamental steps in image processing.
2. Explain the need of sampling and quantization. How it is implemented in digital image processing system.
3. Elaborate on the components of an image processing system
4. Explain in brief various image file formats.
5. Explain discrete cosine transform and its properties.
6. Define 4 and 8 neighbours of a pixels.
7. Explain image formation in the eye.
8. Define 4-connectivity, 8-connectivity and m-connectivity.
9. What is called Euclidean distance?
10. What is called D4 distance or city-block distance?


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Assignment- 2

SESSION-2019-2020

SEM- 8th
SUB: IP, RCS-082

Unit-2 [CO-2]

1. Define–Spatial Filtering.
2. Write the steps involved in frequency domain filtering.
3. What is image negative?
4. What is meant by median filter?
5. What are maximum filter and minimum filter?
6. Explain the spatial domain methods for image enhancement.
7. Write the applications of sharpening filters.
8. Explain histogram processing.
9. Explain homomorphic filtering.
10. How are image subtraction and image averaging is used to enhance the image?


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Assignment- 3

SESSION-2019-2020

SEM- 8th
SUB: IP, RCS-082

Unit-3 [CO-3]

1. What is meant by image restoration?
2. Differentiate enhancement from restoration.
3. How a degradation process is modeled?
4. What are the types of noise models?
5. What is inverse filtering?
6. Write the expression for gamma noise, uniform noise and Impulse noise.
7. What is the use of wiener filter in image restoration. Explain.
8. What is meant by least mean square filter?


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Assignment- 4

SESSION-2019-2020

SEM- 8th
SUB: IP, RCS-082

Unit-4 [CO-4]

1. What is segmentation? Write the applications of segmentation.
2. What are the three types of discontinuity in digital image?
3. What is edge? What are the two properties used for establishing similarity of edge pixels?
4. Define Gradient Operator?
5. What is global, Local and dynamic or adaptive threshold?
6. Define region growing? Specify the steps involved in splitting and merging?
7. What is meant by markers? What are the 2 principles steps involved in marker selection?
8. What is meant by least mean square filter?
9. Explain about basic adaptive thresholding process used in image segmentation.
10. Explain in detail the threshold selection based on boundary characteristics.


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Assignment- 5

SESSION-2019-2020

SEM- 8th
SUB: IP, RCS-082

Unit-5 [CO-5]

1. Name few boundary descriptors.
2. Define chain codes? What are the demerits of chain code?
3. Describe Fourier descriptors
4. Describe texture
5. What is image compression? What is the need for Compression?
6. What is Data Compression? What are two main types of Data compression?
7. What are different Compression Methods?
8. What is run length coding?
9. Define compression ratio.
10. Define encoder. Define source encoder and channel encoder.

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LIST OF STUDENTS

SESSION-2019-2020

SEM- 8th
Subject : IP, RCS-082

4th Year 8th Semester Batch 2016

Computer Science & Engineering

Section -A

S.No.	Student No	Roll No.	Name of Students		
1.	1610362	1608210001	Aarush Gupta		
2.	1610327	1608210002	Aashish Sharma		
3.	1610397	1608210003	Abdul Azeem		
4.	1610420	1608210004	Abhay Vishnoi		
5.	1610386	1608210005	Abhishek Khatri		
6.	1610339	1608210006	Abhishek Kumar		
7.	1610022	1608210007	Abhishek Singh		
8.	1610112	1608210008	Akanksha Gupta		
9.	1610224	1608210009	Akansha Bhatnagar		
10.	1610401	1608210010	Akash Gupta		
11.	1610117	1608210011	Akash Patel		
12.	1610054	1608210012	Akshita Sharma		
13.	1610300	1608210013	Alvina Aslam		
14.	1610063	1608210014	Aman Choudhary		
15.	1610360	1608210015	Aman Dhariwal		
16.	1610382	1608210016	Aman Singh S/O J S		
17.	1610146	1608210017	Aman Singh S/O U S		
18.	1610175	1608210018	Anannya Saxena		
19.	1610425	1608210019	Anirudh Chauhan S/O Ps		
20.	1610336	1608210020	Anirudh Chauhan S/O Skac		
21.	1610007	1608210021	Ankit Agarwal		
22.	1610400	1608210022	Ankit Kumar		
23.	1610226	1608210023	Ankit Verma		
24.	1610065	1608210024	Ankita Saxena		
25.	1610351	1608210025	Anmol Arora		
26.	1610247	1608210026	Anmol Vaish		
27.	1610315	1608210027	Anshika Raj		
28.	1610268	1608210028	Anshul Yadav		
29.	1610194	1608210029	Antra Gupta		
30.	1610044	1608210030	Antriksh Singh		
31.	1610409	1608210031	Anubhav Baliyan		
32.	1610102	1608210032	Anukriti Agarwal		
33.	1610328	1608210033	Anushka Krishnatreya		
34.	1610057	1608210034	Arjun		
35.	1610029	1608210035	Arpit Chauhan		
36.	1610344	1608210036	Arun Kumar Gautam		
37.	1610338	1608210037	Ashi Verma		
38.	1610313	1608210038	Ashish		
39.	1610380	1608210039	Ashish Trivedi		
40.	1610080	1608210040	Ashmit Narayan Rai		
41.	1610235	1608210041	Astha Saxena		
42.	1610178	1608210042	Ayush Gupta		
43.	1610027	1608210043	Ayush Rastogi		
44.	1610267	1608210044	Ayushi Gupta		
45.	1610093	1608210045	Ayushi Mathur		


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LIST OF STUDENTS

SESSION-2019-2020

SEM- 8th
Subject : IP, RCS-082

46.	1610002	1608210046	Ayushi Saxena		
47.	1610140	1608210048	Bharat Bajaj		
48.	1610217	1608210050	Deepansh Saran		
49.	1610373	1608210051	Dev Karan Singh		
50.	1610432	1608210052	Devanshu Agarwal		
51.	1610416	1608210053	Devanshu Varshney		
52.	1610384	1608210054	Dhruv Bhatt		
53.	1610050	1608210055	Diti Gupta		
54.	1610040	1608210056	Divyang Mehrotra		
55.	1610387	1608210057	Falak Mujeeb		
56.	1610415	1608210058	Gaurav Yadav		
57.	1610201	1608210059	Geetanjali Wadhwa		
58.	1610394	1608210060	Gunjan Radhawal		
59.	1610445	1608210061	Hannan Tanveer		
60.	1610155	1608210062	Harsh Choudhary		
61.	1610353	1608210063	Harsh Verma		
62.	2171034	1708210901	Abhiv Kumar Yadav		

Batch No.	S. No. in each section
A-1	1-21
A-2	22-42
A-3	43-Rest


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In Pursuit of Excellence

LIST OF STUDENTS

SESSION-2019-2020


SEM- 8th
Subject : IP, RCS-082

4th Year 8th Semester Batch 2016

Computer Science & Engineering

Section -B

S.No.	Student No.	Roll No.	Name of Students		
1.	1610089	1608210064	Harshita Madhok		
2.	1610103	1608210066	Himanshu Agnihotri		
3.	1610366	1608210068	Hrithik Sisodia		
4.	1610340	1608210069	Isha Sethi		
5.	1610064	1608210070	Jaideep Choudhary		
6.	1610311	1608210071	Juhi Rastogi		
7.	1610402	1608210073	Kshitiz Saxena		
8.	1610303	1608210074	Lalit Gupta		
9.	1610453	1608210075	Manas Munjial		
10.	1610229	1608210076	Manik Agarwal		
11.	1610006	1608210077	Manish Singh Bisht		
12.	1610207	1608210078	Manisha Singh		
13.	1610310	1608210079	Mansi Tyagi		
14.	1610260	1608210080	Milan Vishnoi		
15.	1610246	1608210081	Mohammad Anas		
16.	1610424	1608210082	Mohammad Anzar		
17.	1610354	1608210084	Mohd. Aqduş		
18.	1610348	1608210086	Mohd. Bilal		
19.	1610215	1608210088	Mohd. Tabrez Khan		
20.	1610411	1608210089	Mohd Umar		
21.	1610317	1608210090	Mukti		
22.	1610150	1608210092	Muskan		
23.	1610033	1608210093	Muskan Chaddha		
24.	1610035	1608210094	Muskan Mathur		
25.	1610234	1608210095	Nandni Shishodiya		
26.	1610343	1608210096	Neelendra Kumar		
27.	1610012	1608210097	Neetesh		
28.	1610061	1608210098	Neha Srivastava		
29.	1610111	1608210099	Nidhi Patel		
30.	1610136	1608210100	Nikhil Kumar S/O PK		
31.	1610186	1608210101	Nikhil Kumar S/O RK		
32.	1610206	1608210102	Nimisha		
33.	1610212	1608210103	Nishant Pal		
34.	1610038	1608210104	Nishkarsh Krishan		
35.	1610372	1608210105	Nishtha Varshney		
36.	1610398	1608210106	Nusrat Ali		
37.	1610388	1608210107	Paras Dhawan		
38.	1610271	1608210108	Parth Garg		
39.	1610419	1608210109	Piyush Diwaker		
40.	1610138	1608210110	Piyushi Saraswat		
41.	1610008	1608210111	Prakhar Agarwal		
42.	1610376	1608210112	Prakhar Kumar Gautam		
43.	1610248	1608210113	Prashant Varshney		
44.	1610046	1608210114	Pratham Kumar Singh Rathore		
45.	1610423	1608210115	Pratiksha Sahani		
46.	1610004	1608210116	Prerna Arya		


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LIST OF STUDENTS

SESSION-2019-2020

SEM- 8th
Subject : IP, RCS-082

47.	1610019	1608210117	Priyam Tyagi		
48.	1610141	1608210118	Puru Raj Singh		
49.	1610056	1608210119	Rachit Gahlot		
50.	1610274	1608210120	Rajat Diwakar		
51.	1610184	1608210122	Rashi Sharma		
52.	1610011	1608210123	Ravi Kumar Sagar		
53.	1610230	1608210124	Reetika Gupta		
54.	1610005	1608210125	Rishabh Agarwal		
55.	1610228	1608210126	Rishabh Chandok		
56.	1610174	1608210127	Rishabh Chauhan		
57.	1610333	1608210128	Rishav Chaba		
58.	1610295	1608210129	Ritik Gupta		

Batch No.	S. No. in each section
B-1	1-18
B-2	19-39
B-3	40-Rest


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MORADABAD INSTITUTE OF TECHNOLOGY
DEPTT. NAME: COMPUTER SCIENCE AND ENGINEERING
SESSIONAL TEST 1

Course: B.Tech.

Semester: 8TH

Session: 2019-20

Section: A/B/C

Subject: Image Processing

Subject Code: RCS-082

Max. Marks: 20

Time: 01Hr 15 Min.

Q. No. :	1	2	3	4	5	6
CO No. :	1	1	2	3	2	3

[SET-1]

Note: All questions are compulsory.

Section A

- Q1. Define the fundamental steps of Digital Image Processing. [2]
- Q2. Illustrate image sampling and quantization using an example. [2]

Section B

- Q3. Calculate the equalize histogram for the following: [3]


Gray Level (r)	0	1	2	3	4	5	6	7
Number of pixels	0	0	0	600	800	1000	800	600

- Q4. Describe Gaussian, Salt & Peeper and Uniform Noise Models also draw their distribution graphs. [3]

Section C

- Q5. Summarize the concept of Homomorphic Filtering. [5]
- Q6. Explain Minimum Mean Square Error filtering procedure. [5]

Approved



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MORADABAD INSTITUTE OF TECHNOLOGY
DEPTT. NAME: COMPUTER SCIENCE AND ENGINEERING
SESSIONAL TEST 1

Course: B.Tech.

Semester: 8TH

Session: 2019-20

Section: A/B/C

Subject: Image Processing

Subject Code: RCS-082

Max. Marks: 20

Time: 01Hr 15 Min.

Q. No. :	1	2	3	4	5	6
CO No. :	1	1	2	3	2	3

[SET-2]

Note: All questions are compulsory.

Q1. Explain the term Scotopic, Photopic and mesopic Vision. [2]

Q2. What is the significance of log transformation? [2]

Section B

Q3. Discuss fundamental steps of Digital Image Processing [3]

Q4. Equalize the following histogram. [3]

Gray Level (r)	0	1	2	3	4	5	6	7
Number of pixels	0	0	0	600	800	1000	800	600

Section C

Q5. Explain the Concept of RGB color model. [5]

Q6. Explain the procedure of Inverse filtering. [5]

Not approved
KS



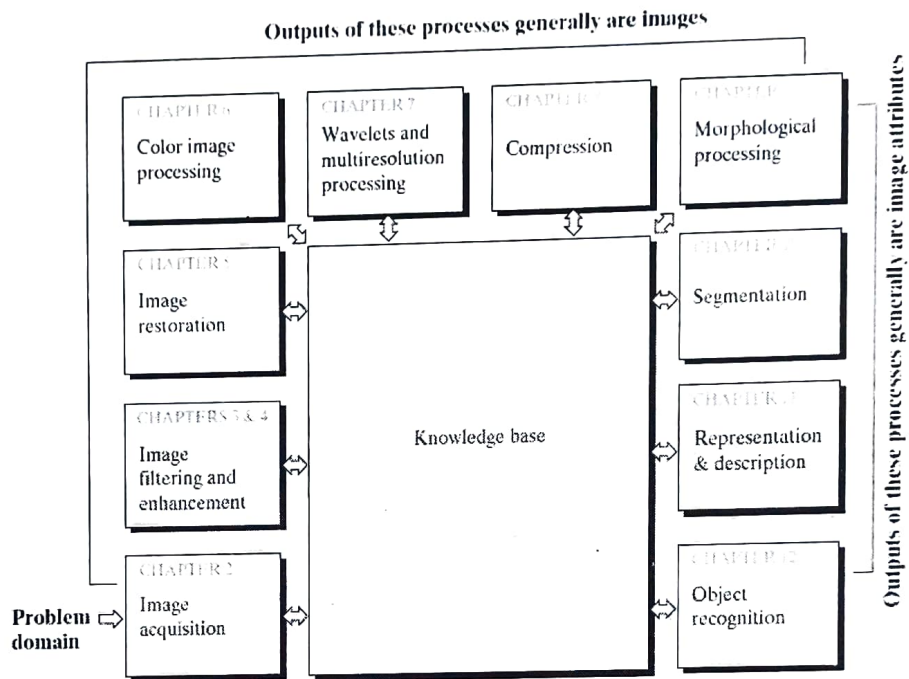
In Pursuit of Excellence

SOLUTION CT-1

SESSION-2019-2020
SUBJECT: IMAGE PROCESSING
CODE:RCS-082

SEM-8th

Q1. Define the fundamental steps of Digital Image Processing

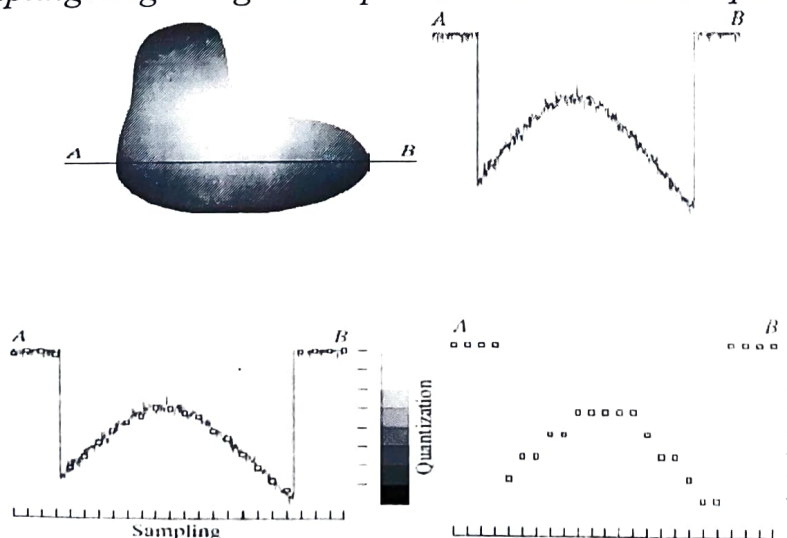


Solu:

Q2. Illustrate image sampling and quantization using an example

Solu. Image Sampling and Quantization

An image may be continuous with respect to the x - and y -coordinates, and also in amplitude. To convert it to digital form, we have to sample the function in both coordinates and in amplitude. Digitizing the coordinate values is called *sampling*. Digitizing the amplitude values is called *quantization*.



Q3. Calculate the equalize histogram for the following:

Gray Level (r)	0	1	2	3	4	5	6	7
Number of pixels	0	0	0	600	800	1000	800	600

- Hint: A technique by which we can generate a flat histogram i.e. equal no. of pixels in all the gray levels.
- A perfect image is one, which has equal no. of pixels in all its gray levels.
- This method is useful to better view the bone structure in X-ray images.

Q5. Summarize the concept of Homomorphic Filtering.

Homomorphic filtering is a generalized technique for signal and image processing, involving a nonlinear mapping to a different domain in which linear filter techniques are applied, followed by mapping back to the original domain.



Homomorphic Filtering

Q6. Explain Minimum Mean Square Error filtering procedure.

Minimum Mean Square Error (Wiener) Filtering

It incorporates both degradation function and statistical characteristics of noise for restoration.

- Minimize

$$e^2 = E\{(f - \hat{f})^2\}$$

- Terms

– $H(u, v)$ = degradation function

– $H^*(u, v)$ = complex conjugate of $H(u, v)$

– $|H(u, v)|^2 = H^*(u, v)H(u, v)$

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

$$= \left[\frac{H^*(u, v)}{|H(u, v)|^2 + S_n(u, v) / S_f(u, v)} \right] G(u, v)$$

$$= \left[\frac{1}{H(u, v)} \frac{|H(u, v)|^2}{|H(u, v)|^2 + S_n(u, v) / S_f(u, v)} \right] G(u, v) \dots \dots \dots \text{Eq (1)}$$

- If the noise is zero, then the noise power spectrum is zero and Wiener filter is reduces to inverse filter

$$\hat{F}(u, v) = \left[\frac{1}{H(u, v)} \frac{|H(u, v)|^2}{|H(u, v)|^2 + 0} \right] G(u, v)$$

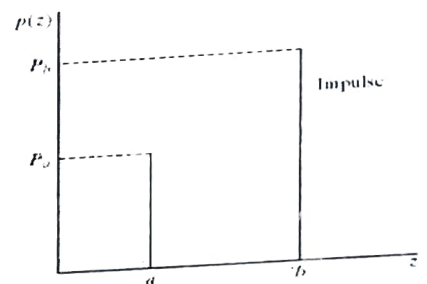
$$\hat{F}(u, v) = \frac{G(u, v)}{H(u, v)} \dots \dots \dots \text{Eq(2)}$$

Q4. Describe Gaussian, Salt & Peeper and Uniform Noise Models also draw their distribution graphs.

o Impulse (salt-and-pepper) noise

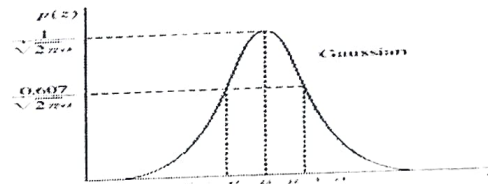
The PDF of (bipolar) impulse noise,

$$p(z) = \begin{cases} P_a & \text{for } z = a \\ P_b & \text{for } z = b \\ 0 & \text{otherwise} \end{cases}$$



$b > a$: gray-level b will appear as a light dot, while level a will appear like a dark dot

Unipolar: either P_a or P_b is zero



• Gaussian noise

- The PDF of a Gaussian random variable, z ,

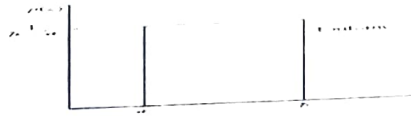
$$p(z) = \frac{1}{\sqrt{2\pi}\sigma} e^{-(z-\mu)^2 / 2\sigma^2}$$

- Mean: μ

- Standard deviation: σ

- Variance: σ^2

- Here z is a random variable represents the gray level



- Uniform noise
 - The PDF of uniform noise,

$$p(z) = \begin{cases} \frac{1}{b-a} & \text{if } a \leq z \leq b \\ 0 & \text{otherwise} \end{cases}$$

- Mean: $\mu = \frac{a+b}{2}$
- Variance: $\sigma^2 = \frac{(b-a)^2}{12}$


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SESSIONAL TEST 2

Course: B.Tech.

Semester: 8TH

Session: 2019-20

Section: A/B/C

Subject: Image Processing

Subject Code: RCS-082

Max. Marks: 20

Time: 01Hr 15 Min.

Q. No. :	1	2	3	4	5	6
CO No. :	3	4	4	4	4	5

Note: All questions are compulsory.

Section A

- Q1. Summarize the concept of Inverse Filtering [2]
- Q2. Explain Dilation and Erosion operations of morphological processing. [2]

Section B

- Q3. What is HIT or MISS transform? [3]
- Q4. Explain edge linking using Hough transform. [3]

OR


Name various approaches used for edge detection. Explain the process of canny edge detection method?

Section C

- Q5. Write short notes on Region Growing and Region Split and Merge techniques of image segmentation. [5]
- Q6. Write a short note on [5]

- i. JPEG Standard
- ii. MPEG

Approved
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MORADABAD INSTITUTE OF TECHNOLOGY, Moradabad
Department of Computer Science & Engineering

Sem/Sections: 8th / B, C
Max Marks: 15
Max Time: 1 Hrs.

Subject: Digital Image Processing
Class Test 2
Code: NCS-801

Q. No. :	1	2	3	4	5	6	7
CO No. :	4	4	5	5	5	5	5

Note: All questions are compulsory.

- Q1. Define Opening and Closing process of morphology. [1]
Q2. What is HIT or MISS transform? [2]

OR

- Explain convex hull with the help of an example
Q3. Classify the segmentation process with an example [1]
Q4. State various approaches used for edge detection. Explain the process of canny edge detection method? [3]

OR

- Explain edge linking using Hough transform.
Q5. Write short notes on Region Growing and Region Split and Merge techniques of image segmentation. [2]
Q6. What do you mean by Stereo Imaging. How depth can be recovered in stereo imaging? [3]
Q7. Explain Image Registration? Explain various types of geometric transformation. [3]

Not approved

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In Pursuit of Excellence

SOLUTION CT-2

SESSION-2019-2020
SUBJECT: IMAGE PROCESSING
CODE:RCS-082

SEM-8th

Q1. Summarize the concept of Inverse Filtering

- Direct inverse filtering
 - Limiting the analysis to frequencies near the origin

$$\hat{F}(u, v) = \frac{G(u, v)}{H(u, v)}$$

$$= F(u, v) + \frac{N(u, v)}{H(u, v)}$$

Q2. Explain Dilation and Erosion operations of morphological processing

Erosion and Dilation

- Erosion:
 - With A and B as sets in Z^2 , the erosion of A by B is defined as

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

- Erosion of A by B is the set of all points z such that B, translated by z, is contained in A.

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

- B has to be contained in A is equivalent to B not sharing any common elements with the background

- Dilation:
 - With A and B as sets in Z^2 , the dilation of A by B is defined as $A \oplus B = \{z \mid (B)_z \cap A \neq \emptyset\}$
 - Reflecting B about its origin, and shifting this reflection by z
 - The dilation of A by B then is the set of all displacements, z, such that B^{\wedge} and A overlap by at least one element

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

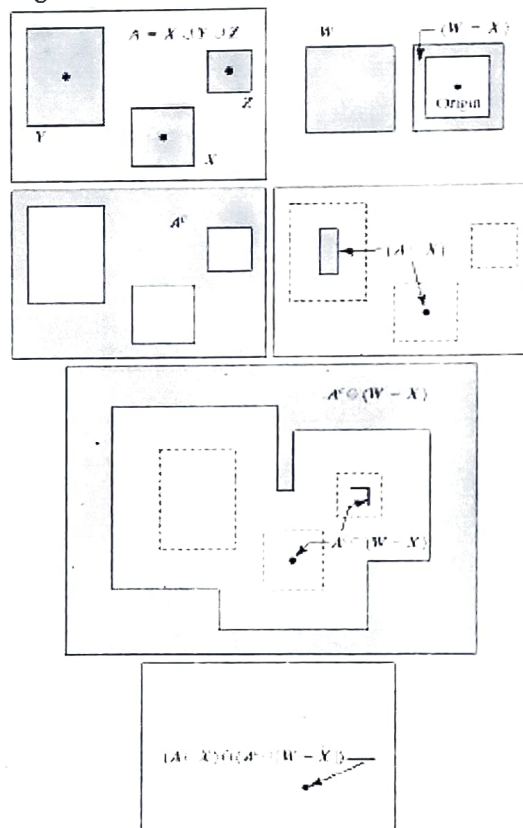
- Dilation:
 - Unlike erosion, dilation “grows” or “thickens” objects in a binary image
 - The specific manner and extent of this thickening is controlled by the shape of the structuring element used

Q3 What is HIT or MISS transform?

- The hit-or-miss transform is a general binary morphological operation that can be used to look for particular patterns of foreground and background pixels in an image.
- The hit-and-miss transform is a basic tool for shape detection.
- Concept: To detect a shape:

Hit object

Miss background



- The structural elements used for Hit-or-miss transforms are an extension to the ones used with dilation, erosion etc.
- The structural elements can contain both foreground and background pixels, rather than just foreground pixels, i.e. both ones and zeros.
- The structuring element is superimposed over each pixel in the input image, and if an exact match is found between the foreground and background pixels in the structuring element and the image, the input pixel lying below the origin of the structuring element is set to the foreground pixel value. If it does not match, the input pixel is replaced by the boundary pixel value.

Q4. Explain edge linking using Hough transform

Hough Transforms takes the images created by the edge detection operators

Most of the time, the edge map generated by the edge detection algorithms is disconnected

HT can be used to connect the disjointed edge points

It is used to fit the points as plane curves

Plane curves are lines, circles, and parabolas

The line equation is $y = mx + c$

However, the problem is that there are infinite line passing through one points

Therefore, an edge point in an x-y plane is transformed to a c-m plane

Now equation of line is $c = (-x)m + y$

Hough Transform steps:

- 1) Load the image
- 2) Find the edges of the image using any edge detector
- 3) Quantize the parameter space P
- 4) Repeat the following for all the pixels of the image:
if the pixel is an edge pixel, then
 - (a) $c = (-x)m + y$ or calculate p
 - (b) $P(c,m) = P(c,m) + 1$ or increment position in P
- 5) Show the Hough Space
- 6) Find the local maxima in the parameter space
- 7) Draw the line using the local maxima

The major problem with this algorithm is that it does not work for vertical lines, as they have a slope of infinity

Convert line into polar coordinates $\rho = x \cos\theta + y \sin\theta$, where θ is the angle between the line and x-axis, and ρ is the diameter

Name various approaches used for edge detection. Explain the process of canny edge detection method?

1. Robert edge detection
2. Prewitt edge detection
3. Sobel edge detection

Roberts cross-gradient operators

-1	0	0	-1
0	1	1	0

Roberts

Prewitt operators

-1	-1	-1	-1	0	1
0	0	0	-1	0	1
1	1	1	-1	0	1

Prewitt

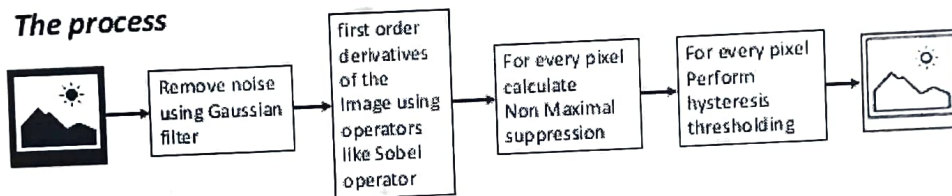
Sobel operators

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

Sobel

The Canny Edge Detector

The process



Canny is Optimal because:

- Less sensitive to noise
- It removes streaking by using two thresholds t_{high} t_{low}
- Offers good localization of edges and utilizes gradient of the edge to generate thin, one-pixel wide edges

Q5. Write short notes on Region Growing and Region Split and Merge techniques of image segmentation.

Region Growing

- Thresholding still produces isolated image
- Region growing algorithms works on **principle of similarity**
- It states that a region is coherent if all the pixels of that region are **homogeneous with respect to some characteristics such as colour, intensity, texture, or other statistical properties**
- Thus idea is to pick a pixel inside a region of interest as a starting point (also known as a **seed point**) and allowing it to grow
- **Seed point is compared with its neighbours, and if the properties match, they are merged together**
- This process is repeated till the regions converge to an extent that no further merging is possible

Region Growing Algorithm

- It is a process of grouping the pixels or subregions to get a bigger region present in an image
- **Selection of the initial seed:** Initial seed that represent the ROI should be given typically by the user. Can be chosen automatically. The seeds can be either single or multiple
- **Seed growing criteria:** Similarity criterion denotes the minimum difference in the grey levels or the average of the set of pixels. Thus, the initial seed 'grows' by adding the neighbours if they share the same properties as the initial seed
- **Terminate process:** If further growing is not possible then terminate region growing process

Split and Merge Algorithm

- Region growing algorithm is slow
- So seed point can be extended to a seed region
- Instead of a single pixel, a node of a Regional adjacency graph (RAG) a region itself is now considered as a starting point.
- The split process can be stated as follows:
 - 1) Segment the image into regions R_1, R_2, \dots, R_n using a set of thresholds
 - 2) Create RAG. Use a similarity measure and formulate a homogeneity test
 - 3) The homogeneity test is designed based on the similarity criteria such as intensity or any image statistics
 - 4) Repeat step 3 until no further region exists that requires merging

Q6. Write a short note on

- i. JPEG Standard
- ii. MPEG

The JPEG Standard

- JPEG is an image compression standard that was developed by the "Joint Photographic Experts Group". JPEG was formally accepted as an international standard in 1992.
- JPEG is a **lossy** image compression method. It employs a **transform coding** method using the DCT (*Discrete Cosine Transform*).
- An image is a function of i and j (or conventionally x and y) in the *spatial domain*.

The 2D DCT is used as one step in JPEG in order to yield a frequency response which is a function $F(u, v)$ in the *spatial frequency domain*, indexed by two integers u and v .

Main Steps in JPEG Image Compression

- Transform RGB to YIQ or YUV and subsample color.
- DCT on image blocks.
- Quantization.
- Zig-zag ordering and run-length encoding.
- Entropy coding.


MPEG : The MPEG standards are an evolving set of standards for video and audio compression and for multimedia delivery developed by the Moving Picture Experts Group (MPEG).

MPEG-1 was designed for coding progressive video at a transmission rate of about 1.5 million bits per second. It was designed specifically for Video-CD and CD-i media. MPEG-1 audio layer-3 (MP3) has also evolved from early MPEG work.

MPEG-2 was designed for coding interlaced images at transmission rates above 4 million bits per second. MPEG-2 is used for digital TV broadcast and DVD. An MPEG-2 player can handle MPEG-1 data as well.

MPEG-1 and -2 define techniques for compressing digital video by factors varying from 25:1 to 50:1. The compression is achieved using five different compression techniques:

1. The use of a frequency-based transform called Discrete Cosine Transform (DCT).
2. Quantization, a technique for losing selective information (sometimes known as lossy compression) that can be acceptably lost from visual information.
3. Huffman coding, a technique of lossless compression that uses code tables based on statistics about the encoded data.
4. Motion compensated predictive coding, in which the differences in what has changed between an image and its preceding image are calculated and only the differences are encoded.
5. Bi-directional prediction, in which some images are predicted from the pictures immediately preceding and following the image.


 In Pursuit of Excellence			Attendance CT-1	SESSION-2019- 2020
Subject : Image Processing			Section: B	SEM-8TH
			Date:	
S. No.	Student Id	Roll No.	Name	Attendance
1	1610089	1608210064	Harshita Madhok	P
2	1610103	1608210066	Himanshu Agnihotri	A
3	1610366	1608210068	Hrithik Sisodia	A
4	1610340	1608210069	Isha Sethi	A
5	1610064	1608210070	Jaideep Choudhary	A
6	1610311	1608210071	Juhi Rastogi	P
7	1610402	1608210073	Kshitiz Saxena	P
8	1610303	1608210074	Lalit Gupat	P
9	1610453	1608210075	Manas Munjial	P
10	1610229	1608210076	Manik Agarwal	P
11	1610006	1608210077	Manish Singh Bisht	A
12	1610207	1608210078	Manisha Singh	A
13	1610310	1608210079	Mansi Tyagi	P
14	1610260	1608210080	Milan Vishnoi	P
15	1610246	1608210081	Mohd Anas	P
16	1610424	1608210082	Mohammad Anzar	P
17	1610354	1608210084	Mohd Aqduş	P
18	1610348	1608210086	Mohd Bilal	A
19	1610215	1608210088	Mohd Tabrez Khan	P
20	1610411	1608210089	Mohd Umar	P
21	1610317	1608210090	Mukti	A
22	1610150	1608210092	Muskan	A
23	1610033	1608210093	Muskan Chadda	P
24	1610035	1608210094	Muskan Mathur	A
25	1610234	1608210095	Nandni Shishodiya	P
26	1610343	1608210096	Neelendra Kumar	A
27	1610012	1608210097	Neetesh	P
28	1610061	1608210098	Neha Srivastava	P
29	1610111	1608210099	Nidhi Patel	A
30	1610136	1608210100	Nikhil Kumar	A
31	1610186	1608210101	Nikhil Kumar	A
32	1610206	1608210102	Nimisha	A
33	1610212	1608210103	Nishant Pal	A
34	1610038	1608210104	Nishkarsh Krishan	A
35	1610372	1608210105	Nishtha Varshney	A
36	1610398	1608210106	Nusrat Ali	A
37	1610388	1608210107	Paras Dhawan	P
38	1610271	1608210108	Parth Garg	A
39	1610419	1608210109	Piyush Diwakar	P

40	1610138	1608210110	Piyushi Saraswat	P
41	1610008	1608210111	Prakhar Agarwal	P
42	1610376	1608210112	Prakhar Kumar Gautam	A
43	1610248	1608210113	Prashant Varshney	A
44	1610046	1608210114	Pratham Kumar Singh Rathore	A
45	1610423	1608210115	Pratiksha Sahani	P
46	1610004	1608210116	Prerna Arya	P
47	1610019	1608210117	Priyam Tyagi	P
48	1610141	1608210118	Puru Raj Singh	A
49	1610056	1608210119	Rachit Gahlot	A
50	1610274	1608210120	Rajat Diwakar	A
51	1610184	1608210122	Rashi Sharma	A
52	1610011	1608210123	Ravi Kumar Sagar	A
53	1610230	1608210124	Reetika Gupta	A
54	1610005	1608210125	Rishabh Agarwal	A
55	1610228	1608210126	Rishabh Chandok	P
56	1610174	1608210127	Rishabh Chauhan	P
57	1610333	1608210128	Rishav Chaba	A
58	1610295	1608210129	Ritik Gupta	P

* A: Absent	
* P: Present	


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 In Pursuit of Excellence			Attendance CT-1	SESSION-2019- 2020
Subject : Image Processing				SEM-VII
				Date:
S. No.	Student Id	Roll No.	Name	Attendance
1	1610362	1608210001	Aarush Gupta	A
2	1610327	1608210002	Aashish Sharma	A
3	1610397	1608210003	Abdul Azeem	P
4	1610420	1608210004	Abhay Vishnoi	A
5	1610386	1608210005	Abhishek Khatri	A
6	1610339	1608210006	Abhishek Kumar	A
7	1610022	1608210007	Abhishek Singh	P
8	1610112	1608210008	Akanksha Gupta	P
9	1610224	1608210009	Akansha Bhatnagar	P
10	1610401	1608210010	Akash Gupta	A
11	1610117	1608210011	Akash Patel	A
12	1610054	1608210012	Akshita Sharma	P
13	1610300	1608210013	Alvina Aslam	A
14	1610063	1608210014	Aman Choudhary	A
15	1610360	1608210015	Aman Dhariwal	A
16	1610382	1608210016	Aman Singh	A
17	1610146	1608210017	Aman Singh	A
18	1610175	1608210018	Anannya Saxena	P
19	1610425	1608210019	Anirudh Chauhan	A
20	1610336	1608210020	Anirudh Chauhan	A
21	1610007	1608210021	Ankit Agarwal	P
22	1610400	1608210022	Ankit Kumar	P
23	1610226	1608210023	Ankit Verma	P
24	1610065	1608210024	Ankita Saxena	P
25	1610351	1608210025	Anmol Arora	P
26	1610247	1608210026	Anmol Vaish	P
27	1610315	1608210027	Anshika Raj	A
28	1610268	1608210028	Anshul Yadav	P
29	1610194	1608210029	Antra Gupta	A
30	1610044	1608210030	Antriksh Singh	P
31	1610409	1608210031	Anubhav Baliyan	A
32	1610102	1608210032	Anukriti Agarwal	P
33	1610328	1608210033	Anushka Krishnatreya	A
34	1610057	1608210034	Arjun	A
35	1610029	1608210035	Arpit Chauhan	P
36	1610344	1608210036	Arun Kumar Gautam	A
37	1610338	1608210037	Ashi Verma	P
38	1610313	1608210038	Ashish	P

39	1610380	1608210039	Ashish Trivedi	P
40	1610080	1608210040	Ashmit Narayan Rai	P
41	1610235	1608210041	Astha Saxena	A
42	1610178	1608210042	Ayush Gupta	A
43	1610027	1608210043	Ayush Rastogi	A
44	1610267	1608210044	Ayushi Gupta	P
45	1610093	1608210045	Ayushi Mathur	P
46	1610002	1608210046	Ayushi Saxena	P
47	1610140	1608210048	Bharat Bajaj	A
48	1610217	1608210050	Deepansh Saran	A
49	1610373	1608210051	Dev Karan Singh	A
50	1610432	1608210052	Devanshu Agarwal	P
51	1610416	1608210053	Devanshu Varshney	P
52	1610384	1608210054	Dhruv Bhatt	A
53	1610050	1608210055	Diti Gupta	P
54	1610040	1608210056	Divyang Mehrotra	P
55	1610387	1608210057	Falak Mujéeb	P
56	1610415	1608210058	Gaurav Yadav	A
57	1610201	1608210059	Geetanjali Wadhwa	P
58	1610394	1608210060	Gunjan Radhawal	A
59	1610445	1608210061	Hannan Tanveer	P
60	1610155	1608210062	Harsh Choudhary	A
61	1610353	1608210063	Harsh Verma	A
62	2171034	1708210901	Abhiv Kumar Yadav	A

* A: Absent
* P: Present


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In Pursuit of Excellence

CT-2 Attendance

SESSION-2019-2020

SEM-8TH
SUB: IP (RCS 082)
SECTION: A

S. No.	Student Id	Roll No.	Name	Attendance
				A/P
1	1610362	1608210001	Aarush Gupta	P
2	1610327	1608210002	Aashish Sharma	P
3	1610397	1608210003	Abdul Azeem	P
4	1610420	1608210004	Abhay Vishnoi	P
5	1610386	1608210005	Abhishek Khatri	P
6	1610339	1608210006	Abhishek Kumar	P
7	1610022	1608210007	Abhishek Singh	P
8	1610112	1608210008	Akanksha Gupta	P
9	1610224	1608210009	Akansha Bhatnagar	P
10	1610401	1608210010	Akash Gupta	P
11	1610117	1608210011	Akash Patel	P
12	1610054	1608210012	Akshita Sharma	P
13	1610300	1608210013	Alvina Aslam	P
14	1610063	1608210014	Aman Choudhary	P
15	1610360	1608210015	Aman Dhariwal	P
16	1610382	1608210016	Aman Singh	P
17	1610146	1608210017	Aman Singh	P
18	1610175	1608210018	Anannya Saxena	P
19	1610425	1608210019	Anirudh Chauhan	P
20	1610336	1608210020	Anirudh Chauhan	P
21	1610007	1608210021	Ankit Agarwal	P
22	1610400	1608210022	Ankit Kumar	P
23	1610226	1608210023	Ankit Verma	P
24	1610065	1608210024	Ankita Saxena	P
25	1610351	1608210025	Anmol Arora	P
26	1610247	1608210026	Anmol Vaish	P
27	1610315	1608210027	Anshika Raj	P
28	1610268	1608210028	Anshul Yadav	P
29	1610194	1608210029	Antra Gupta	P
30	1610044	1608210030	Antriksh Singh	P
31	1610409	1608210031	Anubhav Baliyan	P
32	1610102	1608210032	Anukriti Agarwal	P
33	1610328	1608210033	Anushka Krishnatreya	P
34	1610057	1608210034	Arjun	P
35	1610029	1608210035	Arpit Chauhan	P
36	1610344	1608210036	Arun Kumar Gautam	P
37	1610338	1608210037	Ashi Verma	P

38	1610313	1608210038	Ashish	P
39	1610380	1608210039	Ashish Trivedi	P
40	1610080	1608210040	Ashmit Narayan Rai	P
41	1610235	1608210041	Astha Saxena	P
42	1610178	1608210042	Ayush Gupta	P
43	1610027	1608210043	Ayush Rastogi	P
44	1610267	1608210044	Ayushi Gupta	P
45	1610093	1608210045	Ayushi Mathur	P
46	1610002	1608210046	Ayushi Saxena	P
47	1610140	1608210048	Bharat Bajaj	P
48	1610217	1608210050	Deepansh Saran	P
49	1610373	1608210051	Dev Karan Singh	P
50	1610432	1608210052	Devanshu Agarwal	P
51	1610416	1608210053	Devanshu Varshney	P
52	1610384	1608210054	Dhruv Bhatt	P
53	1610050	1608210055	Diti Gupta	P
54	1610040	1608210056	Divyang Mehrotra	P
55	1610387	1608210057	Falak Mujeeb	P
56	1610415	1608210058	Gaurav Yadav	P
57	1610201	1608210059	Geetanjali Wadhwa	P
58	1610394	1608210060	Gunjan Radhawal	P
59	1610445	1608210061	Hannan Tanveer	P
60	1610155	1608210062	Harsh Choudhary	P
61	1610353	1608210063	Harsh Verma	P
62	2171034	1708210901	Abhiv Kumar Yadav	P



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CT-2 Attendance

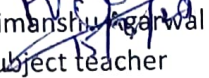
SESSION-2019-2020

SEM-8TH
SUB: IP (RCS 082)
SECTION: B

S. No.	Student Id	Roll No.	Name	Attendance
				A/P
1	1610089	1608210064	Harshita Madhok	P
2	1610103	1608210066	Himanshu Agnihotri	P
3	1610366	1608210068	Hrithik Sisodia	P
4	1610340	1608210069	Isha Sethi	P
5	1610064	1608210070	Jaideep Choudhary	P
6	1610311	1608210071	Juhi Rastogi	P
7	1610402	1608210073	Kshitiz Saxena	P
8	1610303	1608210074	Lalit Gupat	P
9	1610453	1608210075	Manas Munjial	P
10	1610229	1608210076	Manik Agarwal	P
11	1610006	1608210077	Manish Singh Bisht	P
12	1610207	1608210078	Manisha Singh	P
13	1610310	1608210079	Mansi Tyagi	P
14	1610260	1608210080	Milan Vishnoi	P
15	1610246	1608210081	Mohd Anas	P
16	1610424	1608210082	Mohammad Anzar	P
17	1610354	1608210084	Mohd Aqduş	P
18	1610348	1608210086	Mohd Bilal	P
19	1610215	1608210088	Mohd Tabrez Khan	P
20	1610411	1608210089	Mohd Umar	P
21	1610317	1608210090	Mukti	P
22	1610150	1608210092	Muskan	P
23	1610033	1608210093	Muskan Chadda	P
24	1610035	1608210094	Muskan Mathur	P
25	1610234	1608210095	Nandni Shishodiya	P
26	1610343	1608210096	Neelendra Kumar	P
27	1610012	1608210097	Neetesh	P
28	1610061	1608210098	Neha Srivastava	P
29	1610111	1608210099	Nidhi Patel	P
30	1610136	1608210100	Nikhil Kumar	P
31	1610186	1608210101	Nikhil Kumar	P
32	1610206	1608210102	Nimisha	P
33	1610212	1608210103	Nishant Pal	P
34	1610038	1608210104	Nishkarsh Krishan	P
35	1610372	1608210105	Nishtha Varshney	P
36	1610398	1608210106	Nusrat Ali	P
37	1610388	1608210107	Paras Dhawan	P


38	1610271	1608210108	Parth Garg	P
39	1610419	1608210109	Piyush Diwakar	P
40	1610138	1608210110	Piyushi Saraswat	P
41	1610008	1608210111	Prakhar Agarwal	P
42	1610376	1608210112	Prakhar Kumar Gautam	P
43	1610248	1608210113	Prashant Varshney	P
44	1610046	1608210114	Pratham Kumar Singh Rathore	P
45	1610423	1608210115	Pratiksha Sahani	P
46	1610004	1608210116	Prerna Arya	P
47	1610019	1608210117	Priyam Tyagi	P
48	1610141	1608210118	Puru Raj Singh	P
49	1610056	1608210119	Rachit Gahlot	P
50	1610274	1608210120	Rajat Diwakar	P
51	1610184	1608210122	Rashi Sharma	P
52	1610011	1608210123	Ravi Kumar Sagar	P
53	1610230	1608210124	Reetika Gupta	P
54	1610005	1608210125	Rishabh Agarwal	P
55	1610228	1608210126	Rishabh Chandok	P
56	1610174	1608210127	Rishabh Chauhan	P
57	1610333	1608210128	Rishav Chaba	P
58	1610295	1608210129	Ritik Gupta	P

	List of Students having Short Attendance	SESSION-2019-2020 SUB: IP (RCS-082) SEC:A
		SEM-8TH
S.No.	Roll No.	Name of Students
1	1608210003	Abdul Azeem
2	1608210007	Abhishek Singh
3	1608210011	Akash Patel
4	1608210016	Aman Singh
5	1608210018	Anannya Saxena
6	1608210051	Dev Karan Singh
7	1608210055	Diti Gupta


 Himanshu Aggarwal
 Subject teacher

Att < 60


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 In Pursuit of Excellence			CT-1 MARKS	SESSION-2019-2020							
				SEM-8TH SUB: IP (RCS 082)							
S. No.	Student Id	Roll No.	Name	Max. Marks							
				Q. 1	Q. 2	Q. 3	Q. 4	Q. 5	Q. 6	Total	
				2	2	3	3	5	5	20	
1	1610362	1608210001	Aarush Gupta	A						-	
2	1610327	1608210002	Aashish Sharma	A						-	
3	1610397	1608210003	Abdul Azeem		2	2	2	1	1	1	9
4	1610420	1608210004	Abhay Vishnoi	A							-
5	1610386	1608210005	Abhishek Khatri	A							-
6	1610339	1608210006	Abhishek Kumar	A							-
7	1610022	1608210007	Abhishek Singh		2	2	1	3	2	2	12
8	1610112	1608210008	Akanksha Gupta		2	2	3	3	4	5	19
9	1610224	1608210009	Akansa Bhatnagar		2	2	3	3	5	5	20
10	1610401	1608210010	Akash Gupta	A							-
11	1610117	1608210011	Akash Patel	A							-
12	1610054	1608210012	Akshita Sharma		0	2	2	0	0	2	6
13	1610300	1608210013	Alvina Aslam	A							-
14	1610063	1608210014	Aman Choudhary	A							-
15	1610360	1608210015	Aman Dhariwal	A							-
16	1610382	1608210016	Aman Singh	A							-
17	1610146	1608210017	Aman Singh	A							-
18	1610175	1608210018	Anannya Saxena		2	2	3	3	2	5	17
19	1610425	1608210019	Anirudh Chauhan	A							-
20	1610336	1608210020	Anirudh Chauhan	A							-
21	1610007	1608210021	Ankit Agarwal		2	2	3	3	4	4	18
22	1610400	1608210022	Ankit Kumar		1	1	3	3	4	1	13
23	1610226	1608210023	Ankit Verma		2	2	3	1	5	2	15
24	1610065	1608210024	Ankita Saxena		2	2	2	3	5	5	19
25	1610351	1608210025	Anmol Arora		2	2	2			5	11
26	1610247	1608210026	Anmol Vaish		1	1	1	0	1	1	5
27	1610315	1608210027	Anshika Raj	A							-
28	1610268	1608210028	Anshul Yadav		1	1	1	0	1		4
29	1610194	1608210029	Antra Gupta	A							-
30	1610044	1608210030	Antriksh Singh		2	2	2	2	2		10
31	1610409	1608210031	Anubhav Baliyan	A							-
32	1610102	1608210032	Anukriti Agarwal		2	2	2	3	5	5	19
33	1610328	1608210033	Anushka Krishnatreya	A							-
34	1610057	1608210034	Arjun	A							-
35	1610029	1608210035	Arpit Chauhan		2	1	0	1			4
36	1610344	1608210036	Arun Kumar Gautam	A							-

37	1610338	1608210037	Ashi Verma	2	2	3	3	5	5	20
38	1610313	1608210038	Ashish	2	0	1				3
39	1610380	1608210039	Ashish Trivedi	2	2	3	3	5	5	20
40	1610080	1608210040	Ashmit Narayan Rai	2	2	3	3	4	5	19
41	1610235	1608210041	Astha Saxena	A						-
42	1610178	1608210042	Ayush Gupta	A						-
43	1610027	1608210043	Ayush Rastogi	A						-
44	1610267	1608210044	Ayushi Gupta	2	1	2	3	4	4	16
45	1610093	1608210045	Ayushi Mathur	2	2	3	3	5	5	20
46	1610002	1608210046	Ayushi Saxena	2	2	3	3	4	5	19
47	1610140	1608210048	Bharat Bajaj	A						-
48	1610217	1608210050	Deepansh Saran	A						-
49	1610373	1608210051	Dev Karan Singh	A						-
50	1610432	1608210052	Devanshu Agarwal	2	2	3		4	5	16
51	1610416	1608210053	Devanshu Varshney	2	1	3	0	1	1	8
52	1610384	1608210054	Dhruv Bhatt	A						-
53	1610050	1608210055	Diti Gupta	2	2	1	3	5		13
54	1610040	1608210056	Divyang Mehrotra	0	1	2	3	4		10
55	1610387	1608210057	Falak Mujeeb	2	2	3	3	4	5	19
56	1610415	1608210058	Gaurav Yadav	A						-
57	1610201	1608210059	Geetanjali Wadhwa	2	2	0	3	5	5	17
58	1610394	1608210060	Gunjan Radhawal	A						-
59	1610445	1608210061	Hannan Tanveer	2	2	3	3	5	5	20
60	1610155	1608210062	Harsh Choudhary	A						-
61	1610353	1608210063	Harsh Verma	A						-
62	2171034	1708210901	Abhiv Kumar Yadav	A						-

H.A.99
Himanshu Agarwal
Subject Teacher



In Pursuit of Excellence

CT-1 MARKS

SESSION-2019-2020


SEM-8TH
SUB: IP (RCS 082) Section:
B

S. No.	Student Id	Roll No.	Name	Max. Marks						Total
				Q. 1	Q. 2	Q. 3	Q. 4	Q. 5	Q. 6	
				2	2	3	3	5	5	
1	1610089	1608210064	Harshita Madhok	1	1	0	0	2	2	6
2	1610103	1608210066	Himanshu Agnihotri	A						-
3	1610366	1608210068	Hrithik Sisodia	A						-
4	1610340	1608210069	Isha Sethi	A						-
5	1610064	1608210070	Jaideep Choudhary	A						-
6	1610311	1608210071	Juhi Rastogi	2	2	0	3	5	3	15
7	1610402	1608210073	Kshitiz Saxena	2	2	0	2			6
8	1610303	1608210074	Lalit Gupat							-
9	1610453	1608210075	Manas Munjial	2	2	0	2	2		8
10	1610229	1608210076	Manik Agarwal	1	2	1	2	0	0	6
11	1610006	1608210077	Manish Singh Bisht	A						-
12	1610207	1608210078	Manisha Singh	A						-
13	1610310	1608210079	Mansi Tyagi	2	2	3	3	5	5	20
14	1610260	1608210080	Milan Vishnoi	2	2	3	3	5	5	20
15	1610246	1608210081	Mohd Anas	2	2	3	3	2	0	12
16	1610424	1608210082	Mohammad Anzar	2	2	0	3		0	7
17	1610354	1608210084	Mohd Aqdu	1	1	0	3	1	2	8
18	1610348	1608210086	Mohd Bilal	A						-
19	1610215	1608210088	Mohd Tabrez Khan	2	1	2	0	0	0	5
20	1610411	1608210089	Mohd Umar	2	2	2	0	0	0	6
21	1610317	1608210090	Mukti	A						-
22	1610150	1608210092	Muskan	A						-
23	1610033	1608210093	Muskan Chadda	2	2	3	3	4		14
24	1610035	1608210094	Muskan Mathur	A						-
25	1610234	1608210095	Nandni Shishodiya	0	2	2	3	5	5	17
26	1610343	1608210096	Neelendra Kumar	A						-
27	1610012	1608210097	Neetesh	2	2	2	0	0	0	6
28	1610061	1608210098	Neha Srivastava		2	3	3	5		13
29	1610111	1608210099	Nidhi Patel	A						-
30	1610136	1608210100	Nikhil Kumar	A						-
31	1610186	1608210101	Nikhil Kumar	A						-
32	1610206	1608210102	Nimisha	A						-
33	1610212	1608210103	Nishant Pal	A						-
34	1610038	1608210104	Nishkarsh Krishan	A						-
35	1610372	1608210105	Nishtha Varshney	A						-
36	1610398	1608210106	Nusrat Ali	A						-

37	1610388	1608210107	Paras Dhawan	2	2	3	3	5	2	17
38	1610271	1608210108	Parth Garg	A						-
39	1610419	1608210109	Piyush Diwakar	2	2					4
40	1610138	1608210110	Piyushi Saraswat	2	2	3	3	4	5	19
41	1610008	1608210111	Prakhar Agarwal	2	1	3	1		2	9
42	1610376	1608210112	Prakhar Kumar Gautam	A						-
43	1610248	1608210113	Prashant Varshney	A						-
44	1610046	1608210114	Pratham Kumar Singh Rathore	A						-
45	1610423	1608210115	Pratiksha Sahani	2	2	0	3	3	1	11
46	1610004	1608210116	Prerna Arya	2	2	2	3	1	4	14
47	1610019	1608210117	Priyam Tyagi	2	1	0	0	2		5
48	1610141	1608210118	Puru Raj Singh	A						-
49	1610056	1608210119	Rachit Gahlot	A						-
50	1610274	1608210120	Rajat Diwakar	A						-
51	1610184	1608210122	Rashi Sharma	A						-
52	1610011	1608210123	Ravi Kumar Sagar	A						-
53	1610230	1608210124	Reetika Gupta	A						-
54	1610005	1608210125	Rishabh Agarwal	A						-
55	1610228	1608210126	Rishabh Chandok	2	2	2	0	1		7
56	1610174	1608210127	Rishabh Chauhan	2	2	1	3	1	5	14
57	1610333	1608210128	Rishav Chaba	A						-
58	1610295	1608210129	Ritik Gupta	2	2	3	1	4	1	13

H.A.S.
Himanshu Agarwal
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 In Pursuit of Excellence			CT-2 MARKS	SESSION-2019-2020						
				SEM-8TH SUB: IP (RCS 082) SECTION: A						
S. No.	Student Id	Roll No.	Name	Max. Marks						Total
				Q. 1	Q. 2	Q. 3	Q. 4	Q. 5	Q. 6	
				2	2	3	3	5	5	20
1	1610362	1608210001	Aarush Gupta	1	2	3	2	4	4	16
2	1610327	1608210002	Aashish Sharma	1	2	3	2	4	4	16
3	1610397	1608210003	Abdul Azeem	2	2	3	2	5	4	18
4	1610420	1608210004	Abhay Vishnoi	2	1	3	3	4	4	17
5	1610386	1608210005	Abhishek Khatri	2	1	3	2	5	4	17
6	1610339	1608210006	Abhishek Kumar	2	2	3	2	4	4	17
7	1610022	1608210007	Abhishek Singh	2	2	2	3	4	4	17
8	1610112	1608210008	Akanksha Gupta	2	2	3	3	4	5	19
9	1610224	1608210009	Akansha Bhatnagar	2	2	3	3	4	4	18
10	1610401	1608210010	Akash Gupta	2	1	3	2	5	4	17
11	1610117	1608210011	Akash Patel	2	1	2	3	4	4	16
12	1610054	1608210012	Akshita Sharma	2	2	3	2	4	5	18
13	1610300	1608210013	Alvina Aslam	2	2	3	3	4	4	18
14	1610063	1608210014	Aman Choudhary	2	1	3	2	4	4	16
15	1610360	1608210015	Aman Dhariwal	2	2	3	2	4	4	17
16	1610382	1608210016	Aman Singh	2	2	2	2	4	4	16
17	1610146	1608210017	Aman Singh	2	2	3	2	4	4	17
18	1610175	1608210018	Anannya Saxena	2	2	3	3	4	5	19
19	1610425	1608210019	Anirudh Chauhan	2	2	3	2	4	5	18
20	1610336	1608210020	Anirudh Chauhan	2	1	3	2	4	4	16
21	1610007	1608210021	Ankit Agarwal	2	2	3	3	4	5	19
22	1610400	1608210022	Ankit Kumar	2	1	3	3	4	4	17
23	1610226	1608210023	Ankit Verma	2	1	3	2	5	4	17
24	1610065	1608210024	Ankita Saxena	2	2	2	3	4	5	18
25	1610351	1608210025	Anmol Arora	2	2	3	3	4	4	18
26	1610247	1608210026	Anmol Vaish	2	2	3	3	4	4	18
27	1610315	1608210027	Anshika Raj	2	2	2	3	4	5	18
28	1610268	1608210028	Anshul Yadav	2	2	3	3	4	5	19
29	1610194	1608210029	Antra Gupta	2	2	3	2	4	4	17
30	1610044	1608210030	Antriksh Singh	2	2	3	3	4	4	18
31	1610409	1608210031	Anubhav Baliyan	2	1	3	3	4	5	18
32	1610102	1608210032	Anukriti Agarwal	2	2	2	2	5	4	17
33	1610328	1608210033	Anushka Krishnatreya	2	1	3	2	4	5	17
34	1610057	1608210034	Arjun	2	2	2	2	4	4	16
35	1610029	1608210035	Arpit Chauhan	2	2	2	2	4	4	16
36	1610344	1608210036	Arun Kumar Gautam	2	1	3	2	4	4	16


37	1610338	1608210037	Ashi Verma	2	2	3	3	4	5	19
38	1610313	1608210038	Ashish	2	2	3	3	4	4	18
39	1610380	1608210039	Ashish Trivedi	2	2	2	2	5	4	17
40	1610080	1608210040	Ashmit Narayan Rai	2	2	3	2	5	4	18
41	1610235	1608210041	Astha Saxena	2	1	3	3	4	5	18
42	1610178	1608210042	Ayush Gupta	2	2	2	3	4	4	17
43	1610027	1608210043	Ayush Rastogi	2	2	2	2	4	4	16
44	1610267	1608210044	Ayushi Gupta	2	2	2	3	4	5	18
45	1610093	1608210045	Ayushi Mathur	2	2	3	2	5	5	19
46	1610002	1608210046	Ayushi Saxena	2	2	3	3	5	4	19
47	1610140	1608210048	Bharat Bajaj	2	1	2	3	4	4	16
48	1610217	1608210050	Deepansh Saran	2	1	3	2	4	4	16
49	1610373	1608210051	Dev Karan Singh	2	2	3	2	4	4	17
50	1610432	1608210052	Devanshu Agarwal	1	1	2	3	4	4	15
51	1610416	1608210053	Devanshu Varshney	2	1	2	2	5	5	17
52	1610384	1608210054	Dhruv Bhatt	2	1	2	3	4	4	16
53	1610050	1608210055	Diti Gupta	2	1	3	2	5	4	17
54	1610040	1608210056	Divyang Mehrotra	2	1	3	2	4	4	16
55	1610387	1608210057	Falak Mujeeb	2	2	3	2	4	4	17
56	1610415	1608210058	Gaurav Yadav	2	1	3	3	4	4	17
57	1610201	1608210059	Geetanjali Wadhwa	2	1	3	3	4	4	17
58	1610394	1608210060	Gunjan Radhawal	2	1	2	2	5	4	16
59	1610445	1608210061	Hannan Tanveer	2	1	2	3	5	4	17
60	1610155	1608210062	Harsh Choudhary	2	1	2	2	4	4	15
61	1610353	1608210063	Harsh Verma	2	2	2	2	4	4	16
62	2171034	1708210901	Abhiv Kumar Yadav	2	1	3	2	5	4	17


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 In Pursuit of Excellence			CT-2 MARKS	SESSION-2019-2020						
				SEM-8TH SUB: IP (RCS 082) SECTION: B						
S. No.	Student Id	Roll No.	Name	Max. Marks						Total
				Q. 1	Q. 2	Q. 3	Q. 4	Q. 5	Q. 6	
				2	2	3	3	5	5	20
1	1610089	1608210064	Harshita Madhok	2	2	2	3	4	5	18
2	1610103	1608210066	Himanshu Agnihotri	1	2	3	2	4	5	17
3	1610366	1608210068	Hrithik Sisodia	1	2	3	2	4	4	16
4	1610340	1608210069	Isha Sethi	2	2	3	2	4	5	18
5	1610064	1608210070	Jaideep Choudhary	1	1	2	3	4	5	16
6	1610311	1608210071	Juhi Rastogi	2	1	3	2	4	4	16
7	1610402	1608210073	Kshitiz Saxena	2	1	3	2	4	4	16
8	1610303	1608210074	Lalit Gupat	1	2	2	2	4	5	16
9	1610453	1608210075	Manas Munjial	2	1	3	2	4	4	16
10	1610229	1608210076	Manik Agarwal	2	2	3	2	4	5	18
11	1610006	1608210077	Manish Singh Bisht	2	1	3	2	4	4	16
12	1610207	1608210078	Manisha Singh	2	1	3	3	4	5	18
13	1610310	1608210079	Mansi Tyagi	2	2	3	3	4	5	19
14	1610260	1608210080	Milan Vishnoi	2	2	3	3	5	4	19
15	1610246	1608210081	Mohd Anas	2	1	3	3	4	5	18
16	1610424	1608210082	Mohammad Anzar	1	1	2	3	4	5	16
17	1610354	1608210084	Mohd Aqdu	1	2	2	3	4	4	16
18	1610348	1608210086	Mohd Bilal	1	1	2	3	4	5	16
19	1610215	1608210088	Mohd Tabrez Khan	1	2	2	3	4	4	16
20	1610411	1608210089	Mohd Umar	1	2	2	3	4	4	16
21	1610317	1608210090	Mukti	2	1	3	2	4	4	16
22	1610150	1608210092	Muskan	1	1	2	3	4	5	16
23	1610033	1608210093	Muskan Chadda	1	2	3	3	4	4	17
24	1610035	1608210094	Muskan Mathur	1	2	2	3	4	4	16
25	1610234	1608210095	Nandni Shishodiya	2	1	2	3	4	4	16
26	1610343	1608210096	Neelendra Kumar	1	1	2	2	4	4	14
27	1610012	1608210097	Neetesh	1	2	2	3	4	4	16
28	1610061	1608210098	Neha Srivastava	2	1	2	3	4	5	17
29	1610111	1608210099	Nidhi Patel	2	1	3	2	4	4	16
30	1610136	1608210100	Nikhil Kumar	2	1	3	3	4	5	18
31	1610186	1608210101	Nikhil Kumar	1	1	2	3	4	4	15
32	1610206	1608210102	Nimisha	1	2	2	3	4	5	17
33	1610212	1608210103	Nishant Pal	2	1	3	2	5	4	17
34	1610038	1608210104	Nishkarsh Krishan	2	1	3	2	4	4	16
35	1610372	1608210105	Nishtha Varshney	2	1	3	3	4	5	18

36	1610398	1608210106	Nusrat Ali	1	1	2	2	4	4	14
37	1610388	1608210107	Paras Dhawan	2	1	3	2	4	4	16
38	1610271	1608210108	Parth Garg	1	1	2	2	4	4	14
39	1610419	1608210109	Piyush Diwakar	2	1	2	3	4	4	16
40	1610138	1608210110	Piyushi Saraswat	1	2	3	3	4	4	17
41	1610008	1608210111	Prakhar Agarwal	2	1	3	2	4	4	16
42	1610376	1608210112	Prakhar Kumar Gautam	2	1	3	2	4	5	17
43	1610248	1608210113	Prashant Varshney	1	2	3	2	4	4	16
44	1610046	1608210114	Pratham Kumar Singh Rathore	2	2	3	2	4	4	17
45	1610423	1608210115	Pratiksha Sahani	2	2	3	2	4	5	18
46	1610004	1608210116	Prerna Arya	2	1	3	3	4	5	18
47	1610019	1608210117	Priyam Tyagi	1	2	3	2	4	4	16
48	1610141	1608210118	Puru Raj Singh	1	2	3	2	4	5	17
49	1610056	1608210119	Rachit Gahlot	1	2	2	3	4	4	16
50	1610274	1608210120	Rajat Diwakar	2	1	3	3	4	4	17
51	1610184	1608210122	Rashi Sharma	2	2	3	2	4	4	17
52	1610011	1608210123	Ravi Kumar Sagar	1	1	2	2	2	3	11
53	1610230	1608210124	Reetika Gupta	2	1	2	3	4	4	16
54	1610005	1608210125	Rishabh Agarwal	2	2	3	2	4	4	17
55	1610228	1608210126	Rishabh Chandok	1	2	2	3	4	4	16
56	1610174	1608210127	Rishabh Chauhan	1	2	3	3	4	4	17
57	1610333	1608210128	Rishav Chaba	1	2	3	3	4	4	17
58	1610295	1608210129	Ritik Gupta	2	1	3	3	4	5	18


Himanshu Agarwal
Subject Teacher


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 In Pursuit of Excellence	List of Weak Students (Action taken for Improvement)	SESSION-2019-2020 SUB: IP (RCS-082) SEC:A
		SEM-8TH
LIST OF WEEK STUDENTS AS PER PERFORMANCE IN CT1		
S.No.	Roll No.	Name of Students
1	1608210012	Akshita Sharma
2	1608210028	Anshul Yadav
3	1608210035	Arpit Chauhan
4	1608210038	Ashish

Action Taken:	
1. Personal meeting to discuss the reasons of poor performance	
2. Regularly focus on the students in the lectures	
3. Call the students in Interaction hours to discuss the problems	
4. Provide Video Lectures of NPTEL and other experts	

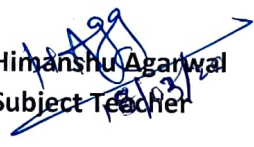

 Himanshu Agarwal
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*Marks<40%


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 In Pursuit of Excellence	List of Weak Students (Action taken for Improvement)	SESSION-2019-2020 SUB: IP (RCS-082) SEC:B
		SEM-8TH
LIST OF WEEK STUDENTS AS PER PERFORMANCE IN CT1		
S.No.	Roll No.	Name of Students
1	1608210064	Harshita Madhok
2	1608210073	Kshitiz Saxena
3	1608210076	Manik Agarwal
4	1608210082	Mohammad Anzar
5	1608210088	Mohd Tabrez Khan
6	1608210089	Mohd Umar
7	1608210097	Neetesh
8	1608210109	Piyush Diwakar
9	1608210117	Priyam Tyagi
10	1608210126	Rishabh Chandok

Action Taken:
1. Personal meeting to discuss the reasons of poor performance
2. Regularly focus on the students in the lectures
3. Call the students in Interaction hours to discuss the problems
4. Provide Video Lectures of NPTEL and other experts


 Himanshu Agarwal
 Subject Teacher

*Marks<40%


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 In Pursuit of Excellence	List of Bright Students (Action taken for Improvement)	SESSION-2019-2020 SUB: IP (RCS-082) SEC:A
		SEM-8TH
LIST OF BRIGHT STUDENTS AS PER PERFORMANCE IN CT1		
S.No.	Roll No.	Name of Students
1	1608210008	Akanksha Gupta
2	1608210009	Akansha Bhatnagar
3	1608210021	Ankit Agarwal
4	1608210024	Ankita Saxena
5	1608210032	Anukriti Agarwal
6	1608210039	Ashish Trivedi
7	1608210040	Ashmit Narayan Rai
8	1608210045	Ayushi Mathur
9	1608210046	Ayushi Saxena
10	1608210057	Falak Mujeeb
11	1608210061	Hannan Tanveer

Action Taken:
1. Discuss the recent research papers and motivate them to work on them
2. Provide some video lectures on the selected topics
3. Explain the procedure of GATE and also motivate the students to attend all the activities organised by T&P department regularly.


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*Marks>80%


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 In Pursuit of Excellence	List of Bright Students (Action taken for Improvement)	SESSION-2019-2020 SUB: IP (RCS-082) SEC:B
		SEM-8TH


LIST OF BRIGHT STUDENTS AS PER PERFORMANCE IN CT1


S.No.	Roll No.	Name of Students
1	1608210079	Mansi Tyagi
2	1608210080	Milan Vishnoi
3	1608210095	Nandni Shishodiya
4	1608210107	Paras Dhawan
5	1608210110	Piyushi Saraswat

Action Taken:
1. Discuss the recent research papers and motivate them to work on them
2. Provide some video lectures on the selected topics
3. Explain the procedure of GATE and also motivate the students to attend all the activities organised by T&P deparment refulalty.


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 Subject Teacher

*Marks>80%


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 In Pursuit of Excellence	List of Bright Students (Action taken for Improvement)	SESSION-2019-2020 SUB: IP (RCS-082) SEC:A
		SEM-8TH
LIST OF BRIGHT STUDENTS AS PER PERFORMANCE IN CT2		
S.No.	Roll No.	Name of Students
1	1608210008	Akanksha Gupta
2	1608210018	Anannya Saxena
3	1608210021	Ankit Agarwal
4	1608210028	Anshul Yadav
5	1608210037	Ashi Verma
6	1608210045	Ayushi Mathur
7	1608210046	Ayushi Saxena


Action Taken:

1. Discuss the recent research papers and motivate them to work on them
2. Discuss some question based on previous year papers


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 Subject Teacher

*Marks>90%


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 In Pursuit of Excellence	List of Bright Students (Action taken for Improvement)	SESSION-2019-2020 SUB: IP (RCS-082) SEC:B
		SEM-8TH
LIST OF BRIGHT STUDENTS AS PER PERFORMANCE IN CT2		
S.No.	Roll No.	Name of Students
1	1608210079	Mansi Tyagi
2	1608210080	Milan Vishnoi

Action Taken:
1. Discuss the recent research papers and motivate them to work on them
2. Discuss some question based on previous year papers


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*Marks>90%


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(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 2716

Roll No.

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B.Tech.

(SEM. VII) ODD SEMESTER THEORY

EXAMINATION 2013-14

DIGITAL IMAGE PROCESSING

Time : 3 Hours

Total Marks : 100

Note :- Attempt all questions.

1. Attempt any four parts of the following : (5×4=20)

- (a) Describe in detail the elements of digital image processing system and describe Sampling and Quantization.
- (b) Explain the properties of images which can be described by histogram. Also explain Normalized Histogram.
- (c) Explain histogram matching. Perform the histogram equalization for 8×8 image shown below :

Gray levels	0	1	2	3	4	5	6	7
No. of pixels	9	8	11	4	10	15	4	3

- (d) Explain the 4, 8 and m connectivity of pixels. Explain region, edge in context with connectivity of pixels.
- (e) Explain the need of Histogram Matching (specification). Deduce the formula for Histogram Matching.

(f) The following matrix defines a 5×5 image $f(x,y)$. Suppose smoothing is done to the image using 3×3 neighbourhood in the spatial domain. Then what will be the new value of $f(2,2)$ using the :

- (i) Mean filter
- (ii) Max filter
- (iii) Median filter
- (iv) Min filter.

2	3	2	4	5
1	3	5	4	5
2	1	2	7	6
3	6	5	6	4
3	5	6	4	7

2. Attempt any four parts of the following : (5x4=20)

- (a) Discuss Image smoothing with the following:
 - (i) Low pass spatial filtering
 - (ii) Median filtering.
- (b) Distinguish between spatial domain techniques and frequency domain techniques of image enhancement.
- (c) An image segment is shown below. Let V be the set of gray level values used to define connectivity in the image. Compute D4, D8 and Dm distances between pixel

p and q for :

- (i) $v = \{2,3\}$
- (ii) $v = \{2,6\}$.

	P	2	3	2	6	1
	6	2	3	6	2	
	5	3	2	3	5	
	2	4	3	5	2	
	4	5	2	3	6	q

(d) Consider a 3×3 spatial mask that averages the four closest neighbours of a point (x,y) , but excludes the point itself from the average.

- (i) Find the equivalent filter, $H(u,v)$ in the frequency domain.
- (ii) Show that your result is low pass filter.
- (e) Find the equivalent filter $H(u,v)$, that implements in the frequency domain the spatial operation performed by the laplacian mask.
- (f) Prove that 2-D continuous and discrete Fourier transforms are linear operations.
- 3. Attempt any two parts of the following : (10x2=20)
 - (a) Explain Image degradation/Restoration Process. Explain all noises with their PDF.
 - (b) Explain why Band Reject filters are best suitable for reducing Periodic noise. Explain all Band Reject filters in detail. Obtain corresponding expression for Band pass filters.


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- (c) Explain the following :
- (i) Wiener filter with SNR, MSE ratio for spatial and frequency domain
 - (ii) Local noise reduction adaptive filter.
4. Attempt any two parts of the following : (10×2=20)
- (a) Explain morphological image processing in context with set theory. Explain erosion, dilation, opening and closing with proper example.
 - (b) Prove the following properties :
 - (i) $(A \cdot B)^c = (A^c \circ B^{\wedge})$ and $(A \circ B)^c = (A^c \cdot B^{\wedge})$
 - (ii) $(A \circ B) \circ B = A \circ B$ and $(A \cdot B) \cdot B = A \cdot B$
 - (c) Explain the following Morphological Algorithms :
 - (i) Thinning
 - (ii) Thickening
 - (iii) Convex Hull
 - (iv) Extraction of Connected Components
 - (v) Region Filling.
5. Attempt any two parts of the following : (10×2=20)
- (a) How many degrees of freedom are there in a plane projective transformation ? Name the properties preserved under such transformation. Explain Projective and Affine transformation.
 - (b) Discuss parametric and non-parametric methods in optimal thresholding algorithms. Discuss Region Growing Approach. Also explain split and merge algorithm with Quadtree.
 - (c) Discuss various Edge detectors in detail. What is Image Registration ? Explain stereo imaging in detail.



(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 110702

Roll No.

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B.Tech.
 (SEM. VII) (ODD SEM.) THEORY
 EXAMINATION, 2014-15
DIGITAL IMAGE PROCESSING

Time : 3 Hours] [Total Marks : 100

Note : Attempt all questions.

- 1 Attempt any **four** parts of the following : (5×4=20)
- a. What is Digital Image Processing ? Discuss some of its major applications.
 - b. Consider two image subsets S_1 & S_2 as shown in the following figure. For $V=\{0\}$ determine whether the regions are: i) 4-Adjacent ii) 8-Adjacent iii) m-Adjacent . Give reasons for your answer.

S_1		S_2					
1	1	1	1	1	0	0	
1	1	0	1	1	0	1	1
1	1	0	1	0	0	1	1
1	0	0	0	1	1	1	1

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c. Write short notes on :

- i. Sampling and Quantization
- ii. Homomorphic filtering.

d. Given $h(u, v)$ as follows, discuss its frequency response.

	$\frac{1}{6}$	
$\frac{1}{6}$	$\frac{1}{3}$	$\frac{1}{6}$
	$\frac{1}{6}$	

e. Find the DFT of $f(x) = \{0, 1, 2, 1\}$.

2. Attempt any four parts of the following : (5×4=20)

a. What is Bit-plane Slicing ? Given the following 3×3 image, find its bit planes.

1	2	3
4	5	0
7	2	1

b. Write short notes on the following :

- i. Gamma correction
- ii. Piece-wise linear transformation.

c. Consider the following image. What will be the new value of the pixel (2, 2) if smoothing is done using a 3×3 :

0	1	0	2	7
2	7	7	4	0
5	6	4	3	3
1	1	0	7	5
5	4	2	2	5

- i. Mean filter
- ii. Weighted average filter
- iii. Median filter
- iv. Min filter
- v. Max filter.

d. Briefly explain the working of a Laplacian mask. What will be the effect of applying the filter (a) on the image (b) ?

1	1	1
1	-8	1
1	1	1

50	50	50	50	50	50
50	50	50	50	50	50
50	50	50	50	50	50
100	100	100	100	100	100
100	100	100	100	100	100
100	100	100	100	100	100

(a)

(b)

- e. Perform histogram equalization on the following 8×8 image. The gray level distribution of the image is given below :

Gray levels (r_k)	0	1	2	3	4	5	6	7
Number of pixels (p_k)	8	10	12	16	4	2		

3 Attempt any four parts of the following : (5×4=20)

- a. In an image the gray scale spans from black to near white in only three increments. A certain noise has corrupted the image. The image and its histogram are as follows. What type of mean filters can you use to eliminate the noise? Explain.

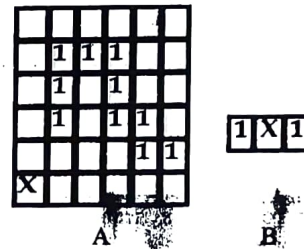


- b. Give a model for image Degradation/Restoration Process.

- c. What is the difference between image enhancement and image restoration? Mention some important causes of image degradation.
- d. Explain any two noise models in detail.
- e. What are order-statistic filters?

4 Attempt any four parts of the following : (5×4=20)

- a. Let A be an image and B a structuring element, given as follows. Find $A \oplus B$ and $A \ominus B$. Note: X denotes the origin, which is not part of the structuring element.



- b. Thin the following image. Show the image after each step.



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[Contd..

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5

[Contd..

- c. Extract the connected component from the following image.

0	0	0	0	0	0	0	0	0
0	0	1	1	1	0	0	0	0
0	0	1	1	0	1	1	0	0
0	1	1	1	1	1	1	1	0
0	1	1	1	0	1	1	0	0
0	0	0	0	0	0	0	0	0

- d. Explain the procedure of Region Filling with an example.
- e. Prove that Opening and Closing are Dual Transformations.

5 Attempt any four parts of the following : (5×4=20)

- a. Prove that rotation and translation are not commutative operations.
- b. What is shearing? Give the transformation matrix and its inverse to carry out shearing in both x- and y-directions with shearing factors 10 and 30.

- c. Find a matrix to perform the following transformations to an object:
- Scale in the x-direction using a scale factor 10.
 - Followed by a rotation about z-axis 30 degree
- d. Explain the process of image segmentation using region growing.
- e. Describe the technique of thresholding for image segmentation.

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6

[Contd...

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(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 210

Roll No.

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B.Tech.

(SEM. VII) ODD SEMESTER THEORY
EXAMINATION 2012-13

DIGITAL IMAGE PROCESSING

Time : 3 Hours

Total Marks : 100

Note :- Attempt all questions.

1. Attempt any four of the following :- (5×4=20)
- Explain sampling and quantization. Explain the effects of reducing sampling and quantization.
 - What do you mean by image processing? Explain the steps in image processing with the help of block diagram.
 - Give various grey level slicing techniques. What is Contrast Stretching?
 - Classify image restoration techniques. If a car is moving at a constant speed of 80 km/h and an image is taken, is it possible to use a wiener or inverse filter to restore the blurring of image?
 - Suppose that A, B, C are three points Prove that :

$$(((A \cdot B) \circ C) \cdot B) \circ C = (A \cdot B) \circ C$$
 - Explain the thresholding method of segmentation.

2. Attempt any two of the following : (10×2=20)

(a) Explain the steps involved in sampling and digitization of images. How many minutes are required for a 512×512 image with 256 grey levels at 300 baud rate for transmission ? The transmission is accomplished using packets consisting of a start bit, a byte (8 bits) of information and a stop bit. Baud rate means number of bits per second.

(b) (i) Explain the action of the following spatial mask on an image.

0	-1	0
-1	4	-1
0	-1	0

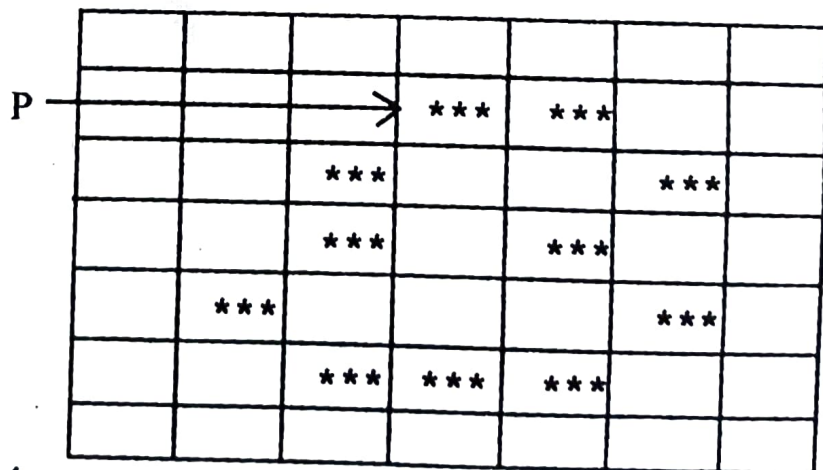
(ii) Write short note on mean filter.

(c) Describe any one image sharpening method in detail.

3. Attempt any two of the following : (10×2=20)

(a) Write a note on Noise Models in image restoration. Describe WIENER Filter and Inverse Filtering.

(b) Given an image, write down the 8 chain code and find Shape Number of it.



- (c) Suppose two discrete one dimensional functions are represented by the sequences :

$$f = [5 \ 7 \ 11 \ 8 \ 2 \ 6 \ 8 \ 9 \ 7 \ 4 \ 3]$$

$$h = [1 \ 2 \ 1].$$

Compute $f + h$, $f \ominus h$, $f \circ h$, $f \cdot h$

4. Attempt any **two** of the following : (10×2=20)

(a) Discuss the following :

(i) Convex HUQ

(ii) Logic operations involving binary images.

(b) What do you mean by thinning and thickening of an image ? Discuss the method for thinning of an image.

(c) What do you mean by morphology ? Discuss any one morphological algorithm with suitable example.

5. Attempt any **two** of the following : (10×2=20)

(a) Write short notes on :

(i) Watershed Segmentation Algo

(ii) Feature Thresholding in Pixel Based Approach.

(b) Describe the region based segmentation. Apply the region splitting on following image. Assume the threshold value be ≤ 3 .

5	6	4	7	4	5	5	3
6	7	7	6	3	3	2	1
6	6	4	4	3	2	5	6
4	5	4	5	4	6	2	3
3	2	3	0	7	5	3	2
1	0	1	0	2	2	6	5
1	0	1	1	3	0	4	4
0	2	1	0	2	3	5	4

(c) Describe any one depth recover algorithm in detail.

(Following Paper ID and Roll No. to be filled in your Answer Book)

Paper ID : 110702

Roll No.

B. Tech.

(SEM. VII) THEORY EXAMINATION, 2015-16

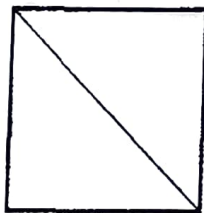
DIGITAL IMAGE PROCESSING

[Time:3 hours]

[Maximum Marks:100]

Section - A

1. Attempt all parts. All parts carry equal marks. Write answer of each part in short : (2x10=20)
- (a) What do you understand by Weber Ratio ? What does a low value for Weber Ratio indicate ?
- (b) Consider the following two 8-bit images;



Each of these images has dimensions 20x20. Show the histograms of these images. Please note that the borders of the images shown in black are just to highlight the boundaries. The border is not a part of the image.

15800

(1)

P.T.O.


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- (c) What would happen to the dynamic range of an image if all the slopes in the contrast stretched algorithm (l, m, n) are less than one.
- (d) Write down the filter mask for Sobel and Prewitt filters.
- (e) What are the different approaches for segmentation?
- (f) In which situation we use region merging and region splitting?
- (g) Derive, why we multiply with $(-1)^{x+y}$ in case of frequency domain filtering?
- (h) What steps are related with high level processing in digital image processing?
- (i) Draw the graph for Power law (Gamma) transformation (for gamma > 1).
- (j) What are the issues involved for stereo imaging problem?

(2)

Section - B

Note: Attempt any five questions from this section : (5x10=50)

2. What do you understand by digital image processing? Explain the components of an image processing system.
3. Given the image A:

0	0	0	0	0	0
0	0	1	1	0	0
0	1	1	1	1	0
0	0	1	1	0	0
0	0	0	0	0	0

And structuring element B:

1
1

Compute (i) A dilated by B

(ii) A^c eroded by B

15800

(3)

P.T.O.

85


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4. Consider the image segment :

3	4	1	2	0
0	1	0	4	2(q)
2	2	3	1	4
3(p)	0	4	2	1
1	2	0	3	4

Let $V = \{2, 3, 4\}$. Compute the lengths of the shortest-8 and path between p and q. If a particular path does not exist between these two points, explain why? What is the significance of 'm' path?

5. Derive the frequency domain transformation function $H(u, v)$ for the following spatial domain filter $h(x, y)$.

0	-1	0
-1	8	-1
0	-1	0

How homomorphic filtering is implemented?

- Draw the diagram for image resoration / degradation process. Explain the linear, position invariant property of degradation function.
- Explain periodic noise reduction using band reject filter.
- Explain convex hull with the help of an example.
- State and explain various approaches used for edge detection.

15800

(4)

Section - C

Note: Attempt any two questions from this section : (15x2=30)

10. What are the linear and non-linear smoothing filters in spatial domain? Compute the new pixel values after applying the 3*3 box filter on the following 5*5 matrix of an 8-bit image.

139	128	237	126	129
145	129	123	89	132
146	122	128	87	135
141	125	134	131	139
112	127	138	133	142

1/9*

1	1	1
1	1	1
1	1	1

- Write the procedures for boundary extraction and region filling. Mention atleast one real life application of both. What is the result of applying successive opening on the same set with the same structuring element?
- Write short notes on :
 - Chain code
 - Skeletons / MAT
 - Hough transform for boundary shape detection.

—x—

15800

(5)

(Following Paper ID and Roll No. to be filled in your Answer Books)

Paper ID : 2289465

Roll No.

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B.TECH

Regular Theory Examination (Odd Sem - VII), 2016 - 17 DIGITAL IMAGE PROCESSING

Time : 3 Hours

Max. Marks : 100

SECTION -A


1. Attempt all parts. All parts carry equal marks. Write answer of each part in short. (10×2=20)
- Define an image with spatial coordinates.
 - Name some types of Image file formats.
 - Generate hadamard matrix of 2nd order by Kronecker product.
 - List the drawbacks of wiener Filter
 - Mention some of the filters to reduce various noises in an Image.
 - Compare Noisy image and Blurred image.
 - Differentiate Reversible compression and irreversible compression.

032/12/2016/2280

(1)

[P.T.O.]

87


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NEC - 032

- h) Give the operating modes of JPEG format.
- i) Identify the problems in region based segmentation.
- j) How to determine the number of clusters in k-means segmentation algorithm?

SECTION - B

2. Note: Attempt any five questions from this section
(5×10=50)

- a) Summarize the concept of image processing components with simple block diagram.
- b) Write a technical note on image analysis with an example.
- c) State the convolution and correlation properties of 2D Fourier transform.
- d) Design a filter to avoid Speckle noise with an example.
- e) Compare RGB image, Gray scale image and Binary image.
- f) Classify the segmentation process with an example.
- g) Draw a neat block diagram for JPEG compression.
- h) How to detect a lines using Hough transform.

032/12/2016/2280

(2)

NEC - 032

SECTION - C


Note: Attempt any two Questions from this section.
(2×15=30)

- 3. Compute the Haar basis for $N = 4$ and interpret the reason for multiplied power of $\sqrt{2}$
- 4. a) Derive the expression for inverse filtering. (8)
b) How to avoid aliasing effect in an image. (7)
- 5. Explain the concepts behind data hierarchy, frame construction, Motion Estimation, and audio compression in MPEG Standard in detail with necessary expression and diagrams.

032/12/2016/2280

(3)

88


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Paper Id: Roll No.

B.TECH
(SEM. VII) THEORY EXAMINATION 2017-18
DIGITAL IMAGE PROCESSING

Time: 3 Hours

Total Marks: 100

- Note: 1. Attempt all Sections.
 2. Assume any missing data.

SECTION A

1. Attempt all questions in brief. 2 x 10 = 20
- a. Define Image?
 - b. What do you mean by Gray level?
 - c. Define Resolutions?
 - d. Write the properties of Hadamard transform?
 - e. Write down the type of image degradation?
 - f. Write short note on Image Restoration?
 - g. What is Data Compression?
 - h. Define Haar transform.
 - i. What is segmentation?
 - j. Why edge detection is most common approach for detecting discontinuities?

SECTION B

2. Attempt any three of the following: 10 x 3 = 30
- a. What are the various fundamental steps in digital image processing? Explain.
 - b. Why Hadamard Transform is most suitable for digital image processing? Discuss Hadamard Transform with the help mathematical expression.
 - c. Define and differentiate the inverse and wiener filter. Discuss the use of wiener filter in image processing. What do you mean by speckle? Describe a method for speckle reduction.
 - d. Explain Image Compression model in detail.
 - e. Define edge detection and edge linking. Also write the difference between them.

SECTION C

3. Attempt any one parts of the following: 10 x 1 = 10
- a. Explain sampling and quantization. What is the difference between uniform and non-uniform sampling and quantization?
 - b. Describe Physical Aspect of Image Acquisition. Also explain biological aspect of image acquisition.
4. Attempt any one parts of the following: 10 x 1 = 10
- a) Explain Image Enhancement Techniques and discuss the importance of spatial operations.
 - b) What do you mean by Gaussian noise and why is an averaging filter used to eliminate it?

5. Attempt any one parts of the following:

10 x 1 = 10

- a) What are the different ways to estimate the degradation function? Explain.
- b) Discuss image restoration techniques. Explain in detail the image restoration in presence of noise only.

6. Attempt any one parts of the following:

10 x 1 = 10

- a) Explain in detail the image compression algorithms and its types.
- b) Describe Inter-frame coding and predictive compression.

7. Attempt any one parts of the following:

10 x 1 = 10

- a) How can you control over segmentation problem? Explain it.
- b) Explain edge linking using Hough transform.



In Pursuit of Excellence

QUESTION BANK

SESSION-2019-2020
SUBJECT: IMAGE PROCESSING
CODE:RCS-082

SEM-8th

1. Explain by drawing diagram fundamental steps in image processing. [CO-1]
2. Describe the functions of elements of digital image processing system with a diagram.
3. Explain the basic relationships between pixels. [CO-1]
4. Distinguish between digital image, and binary image. Give suitable example to each type of images. [CO-1]
5. State and explain various applications of digital image processing. [CO-1]
6. Explain application of imaging which uses: a. Gamma-Rays b. X-Ray c. Ultraviolet d. Visible and Infrared band e. Microwave band f. Radio band [CO-1]
7. Write a note on image enhancement. [CO-2]
8. Write a note on representation and description in image processing. [CO-1]
9. Write a note on computer vision. Does it require image processing. [CO-1]
10. Summarize the application of digital image processing in society. [CO-1]
11. What do you mean sampling and quantization? Explain in detail. [CO-1]
12. What is the requirement of image sampling and quantization? Explain significant of spatial resolution. [CO-1]
13. How to measure distance between two pixels in an image? Explain with the help of example. [CO-1]
14. Explain with example a) Neighbors of pixel b) Connectivity. [CO-1]
15. What is m-connectivity among pixels? Give an example. [CO-1]
16. Explain any four metrics used to quantify the image quality. [CO-1]
17. Discuss any four low-level image-processing operations. [CO-1]
18. Explain relationship between image size, intensity resolution and image quality with example. [CO-1]
19. Explain false contouring with example. [CO-1]
20. Explain nearest neighbor interpolation method. Also give its disadvantage. [CO-1]
21. Explain bilinear and bi-cubic interpolation. [CO-1]
22. Explain neighbors of pixel and notations. [CO-1]
23. Write note on following, also give its application: a. Image Negatives b. Log Transformations c. Power-Law Transformations d. Contrast stretching e. Intensity-level slicing f. Bit-plane slicing g. Histogram processing [CO-2]
24. Compare spatial and frequency domain methods. [CO-2]

25. Give a single intensity transformation function for spreading the intensities of an image so that lowest intensity is 0 and the highest is $L-1$. [CO-3]
26. What effect would set to zero the lower-order bit planes have on the histogram of an image in general? [CO-3]
27. Explain why the discrete histogram equalization technique does not, in general, yield a flat histogram. [CO-3]
28. Two image $f(x,y)$ and $g(x,y)$ have histogram h_f and h_g . Give the condition under which you can determine the histogram of
 - a. $f(x, y) + g(x, y)$ [CO-3]
29. Explain the types of gray level transformation used for image enhancement. [CO-2]
30. What is histogram? Explain histogram equalization. [CO-2]
31. Discuss the image smoothing filter with its model in the spatial domain. [CO-2]
32. What are image sharpening filters? Explain the various types of it. [CO-2]
33. Explain spatial filtering in image enhancement [CO-2]
34. Explain correlation and convolution. [CO-2]
35. What is segmentation? [CO-4]
36. How the derivatives are obtained in edge detection during formulation? [CO-4]
37. What are the two properties used for establishing similarity of edge pixels? [CO-4]
38. Give the properties of the second derivative around an edge? [CO-4]
39. Specify the steps involved in splitting and merging? [CO-4]
40. Define pattern. Define pattern class. List the three pattern arrangements. [CO-4]
41. Write short notes on edge detection. [CO-4]
42. Discuss region oriented segmentation in detail [CO-4]
43. Discuss in detail on pattern and pattern classes. [CO-4]
44. What is data redundancy? Explain three basic data redundancy? [CO-5]
45. What is image compression? Explain any four variable length coding compression schemes. [CO-5]
46. Definition of image compression [CO-5]
47. Explain about Image compression model? [CO-5]
48. Explain about Error free Compression? [CO-5]
49. Explain about Lossy compression? [CO-5]
50. Explain the schematics of image compression standard JPEG. [CO-5]

In Pursuit of Excellence		Internal Marks					
S. No.	Student Id	Roll No.	Name	Total in CT (20)	Assignments (05)	Attendance (05)	Total (30)
1	1610362	1608210001	Aarush Gupta	16	5	5	26
2	1610327	1608210002	Aashish Sharma	16	4	4	24
3	1610397	1608210003	Abdul Azeem	18	5	5	28
4	1610420	1608210004	Abhay Vishnoi	17	4	4	25
5	1610386	1608210005	Abhishek Khatri	17	4	4	25
6	1610339	1608210006	Abhishek Kumar	17	5	4	26
7	1610022	1608210007	Abhishek Singh	17	5	5	27
8	1610112	1608210008	Akanksha Gupta	19	5	5	29
9	1610224	1608210009	Akansha Bhatnagar	20	5	5	30
10	1610401	1608210010	Akash Gupta	17	5	4	26
11	1610117	1608210011	Akash Patel	16	4	4	24
12	1610054	1608210012	Akshita Sharma	18	5	5	28
13	1610300	1608210013	Alvina Aslam	18	4	5	27
14	1610063	1608210014	Aman Choudhary	16	4	4	24
15	1610360	1608210015	Aman Dhariwal	17	4	4	25
16	1610382	1608210016	Aman Singh	16	5	4	25
17	1610146	1608210017	Aman Singh	17	5	4	26
18	1610175	1608210018	Anannya Saxena	19	4	5	28
19	1610425	1608210019	Anirudh Chauhan	18	4	4	26
20	1610336	1608210020	Anirudh Chauhan	16	4	4	24
21	1610007	1608210021	Ankit Agarwal	19	5	5	29
22	1610400	1608210022	Ankit Kumar	17	5	5	27
23	1610226	1608210023	Ankit Verma	17	5	5	27
24	1610065	1608210024	Ankita Saxena	19	5	5	29
25	1610351	1608210025	Anmol Arora	18	4	5	27
26	1610247	1608210026	Anmol Vaish	18	5	5	28
27	1610315	1608210027	Anshika Raj	18	5	4	27
28	1610268	1608210028	Anshul Yadav	19	5	4	28
29	1610194	1608210029	Antra Gupta	17	5	4	26


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30	1610044	1608210030	Antriksh Singh	18	5	5	28
31	1610409	1608210031	Anubhav Baliyan	18	5	5	28
32	1610102	1608210032	Anukriti Agarwal	19	5	5	29
33	1610328	1608210033	Anushka Krishnatreya	17	4	4	25
34	1610057	1608210034	Arjun	16	4	4	24
35	1610029	1608210035	Arpit Chauhan	16	5	4	25
36	1610344	1608210036	Arun Kumar Gautam	16	5	5	26
37	1610338	1608210037	Ashi Verma	20	5	5	30
38	1610313	1608210038	Ashish	18	5	5	28
39	1610380	1608210039	Ashish Trivedi	20	5	4	29
40	1610080	1608210040	Ashmit Narayan Rai	19	5	5	29
41	1610235	1608210041	Astha Saxena	18	5	5	28
42	1610178	1608210042	Ayush Gupta	17	4	4	25
43	1610027	1608210043	Ayush Rastogi	16	4	4	24
44	1610267	1608210044	Ayushi Gupta	18	5	4	27
45	1610093	1608210045	Ayushi Mathur	20	5	5	30
46	1610002	1608210046	Ayushi Saxena	19	5	5	29
47	1610140	1608210048	Bharat Bajaj	16	5	4	25
48	1610217	1608210050	Deepansh Saran	16	5	4	25
49	1610373	1608210051	Dev Karan Singh	17	5	4	26
50	1610432	1608210052	Devanshu Agarwal	16	5	4	25
51	1610416	1608210053	Devanshu Varshney	17	4	4	25
52	1610384	1608210054	Dhruv Bhatt	16	4	4	24
53	1610050	1608210055	Diti Gupta	17	5	5	27
54	1610040	1608210056	Divyang Mehrotra	16	4	5	25
55	1610387	1608210057	Falak Mujeeb	19	5	5	29
56	1610415	1608210058	Gaurav Yadav	17	4	4	25
57	1610201	1608210059	Geetanjali Wadhwa	17	5	5	27
58	1610394	1608210060	Gunjan Radhawal	16	4	4	24
59	1610445	1608210061	Hannan Tanveer	20	4	4	28
60	1610155	1608210062	Harsh Choudhary	15	5	5	25
61	1610353	1608210063	Harsh Verma	16	5	5	26
62	2171034	1708210901	Abhiv Kumar Yadav	17	4	4	25

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Internal Marks


SESSION-2019-2020
SUB: IP (RCS-082)
SEM-8TH
SEC:A

S. No.	Student Id	Roll No.	Name	CT Marks (20)	Attendance (05)	Assignment (05)	Total (30)
1	1610089	1608210064	Harshita Madhok	18	5	5	28
2	1610103	1608210066	Himanshu Agnihotri	17	4	4	25
3	1610366	1608210068	Hrithik Sisodia	16	5	4	25
4	1610340	1608210069	Isha Sethi	18	5	5	28
5	1610064	1608210070	Jaideep Choudhary	16	5	4	25
6	1610311	1608210071	Juhi Rastogi	16	5	5	26
7	1610402	1608210073	Kshitiz Saxena	16	5	5	26
8	1610303	1608210074	Lalit Gupat	16	4	4	24
9	1610453	1608210075	Manas Munjial	16	5	4	25
10	1610229	1608210076	Manik Agarwal	18	5	5	28
11	1610006	1608210077	Manish Singh Bisht	16	4	4	24
12	1610207	1608210078	Manisha Singh	18	4	4	26
13	1610310	1608210079	Mansi Tyagi	20	5	5	30
14	1610260	1608210080	Milan Vishnoi	20	5	5	30
15	1610246	1608210081	Mohd Anas	18	5	5	28
16	1610424	1608210082	Mohammad Anzar	16	5	4	25
17	1610354	1608210084	Mohd Aqduş	16	5	5	26
18	1610348	1608210086	Mohd Bilal	16	4	4	24
19	1610215	1608210088	Mohd Tabrez Khan	16	4	4	24
20	1610411	1608210089	Mohd Umar	16	4	5	25
21	1610317	1608210090	Mukti	16	4	5	25
22	1610150	1608210092	Muskan	16	4	5	25
23	1610033	1608210093	Muskan Chadda	17	5	4	26
24	1610035	1608210094	Muskan Mathur	16	5	5	26
25	1610234	1608210095	Nandni Shishodiya	17	4	4	25
26	1610343	1608210096	Neelendra Kumar	14	4	4	22
27	1610012	1608210097	Neetesh	16	5	4	25
28	1610061	1608210098	Neha Srivastava	17	5	5	27
29	1610111	1608210099	Nidhi Patel	16	4	5	25


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30	1610136	1608210100	Nikhil Kumar	18	4	4	26
31	1610186	1608210101	Nikhil Kumar	15	4	4	23
32	1610206	1608210102	Nimisha	17	4	4	25
33	1610212	1608210103	Nishant Pal	17	4	4	25
34	1610038	1608210104	Nishkarsh Krishan	16	4	4	24
35	1610372	1608210105	Nishtha Varshney	18	4	5	27
36	1610398	1608210106	Nusrat Ali	14	4	4	22
37	1610388	1608210107	Paras Dhawan	17	5	5	27
38	1610271	1608210108	Parth Garg	14	4	4	22
39	1610419	1608210109	Piyush Diwakar	16	5	4	25
40	1610138	1608210110	Piyushi Saraswat	19	5	5	29
41	1610008	1608210111	Prakhar Agarwal	16	4	4	24
42	1610376	1608210112	Prakhar Kumar Gautam	17	4	4	25
43	1610248	1608210113	Prashant Varshney	16	5	5	26
44	1610046	1608210114	Pratham Kumar Singh Rathore	17	4	5	26
45	1610423	1608210115	Pratiksha Sahani	18	5	5	28
46	1610004	1608210116	Prerna Arya	18	5	5	28
47	1610019	1608210117	Priyam Tyagi	16	5	5	26
48	1610141	1608210118	Puru Raj Singh	17	4	5	26
49	1610056	1608210119	Rachit Gahlot	16	4	5	25
50	1610274	1608210120	Rajat Diwakar	17	4	5	26
51	1610184	1608210122	Rashi Sharma	17	5	5	27
52	1610011	1608210123	Ravi Kumar Sagar	11	4	4	19
53	1610230	1608210124	Reetika Gupta	16	4	5	25
54	1610005	1608210125	Rishabh Agarwal	17	4	5	26
55	1610228	1608210126	Rishabh Chandok	16	5	5	26
56	1610174	1608210127	Rishabh Chauhan	17	5	5	27
57	1610333	1608210128	Rishav Chaba	17	4	5	26
58	1610295	1608210129	Ritik Gupta	18	5	5	28


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डा० ए०पी०जे० अब्दुल कलाम प्राविधिक विश्वविद्यालय, उत्तर प्रदेश, लखनऊ

Dr. A.P.J. Abdul Kalam Technical University, Uttar Pradesh, Lucknow

(Formerly Uttar Pradesh Technical University)

Sessional Marks Examination (सैत्रिक अंक)

Sessional Brief (सैत्रिक सक्षिप्त)

Institute Code & Name : MORADABAD INSTITUTE OF TECHNOLOGY, MORADABAD (082)
 Course Code & Name : B.Tech
 Branch Code & Name : Computer Science and Engineering
 Semester : 8
 Faculty Name : Manish Gupta
 Subject Code : RCS082
 Marks Type :
 Is Finally Submitted to University : True (* will be TRUE after submitting to university by your college.)


Print (प्रिंट करें)

Sessional Marks (सैत्रिक अंक)

Sr.no. (क्रम संख्या)	Roll No. (अनुक्रमंक)	Name (नाम)	Obt.(CT) प्राप्त (CT)	Max.(CT) अधिकतम (CT)	Obt. TA (Assign./Att.)	Max. TA (Assign./Att.)	Obt. CT+TA	Max. CT+TA	Remark (टिप्पणी)
1	1508210084	MOHD SHUAIB	15	20	6	10	21	30	
2	1508210137	SHUBHAM SAINI	16	20	8	10	24	30	
3	1508210156	TARUN SRIVASTAVA	16	20	6	10	22	30	
4	1608210001	AARUSH GUPTA	16	20	10	10	26	30	
5	1608210002	AASHISH SHARMA	16	20	8	10	24	30	
6	1608210003	ABDUL AZEEM	18	20	10	10	28	30	
7	1608210004	ABHAY VISHNOI	17	20	8	10	25	30	
8	1608210005	ABHISHEK KHATRI	17	20	8	10	25	30	
9	1608210006	ABHISHEK KUMAR	17	20	9	10	26	30	
10	1608210007	ABHISHEK SINGH	17	20	10	10	27	30	
11	1608210008	AKANKSHA GUPTA	19	20	10	10	29	30	
12	1608210009	AKANKSHA BHATNAGAR	20	20	10	10	30	30	
13	1608210010	AKASH GUPTA	17	20	9	10	26	30	
14	1608210011	AKASH PATEL	16	20	8	10	24	30	
15	1608210012	AKSHITA SHARMA	18	20	10	10	28	30	
16	1608210013	ALVINA ASLAM	18	20	9	10	27	30	
17	1608210014	AMAN CHOUDHARY	16	20	8	10	24	30	
18	1608210015	AMAN DHARIWAL	17	20	8	10	25	30	
19	1608210016	AMAN SINGH	16	20	9	10	25	30	
20	1608210017	AMAN SINGH	17	20	9	10	26	30	
21	1608210018	ANANNYA SAXENA	19	20	9	10	28	30	
22	1608210019	ANIRUDH CHAUHAN	18	20	8	10	26	30	
23	1608210020	ANIRUDH CHAUHAN	16	20	8	10	24	30	
24	1608210021	ANKIT AGARWAL	19	20	10	10	29	30	
25	1608210022	ANKIT KUMAR	17	20	10	10	27	30	
26	1608210023	ANKIT VERMA	17	20	10	10	27	30	
27	1608210024	ANKITA SAXENA	19	20	10	10	29	30	
28	1608210025	ANMOL ARORA	18	20	9	10	27	30	
29	1608210026	ANMOL VAISH	18	20	10	10	28	30	
30	1608210027	ANSHIKA RAJ	18	20	9	10	27	30	
31	1608210028	ANSHUL YADAV	19	20	9	10	28	30	
32	1608210029	ANTRA GUPTA	17	20	9	10	26	30	
33	1608210030	ANTRIKSH SINGH	18	20	10	10	28	30	
34	1608210031	ANUBHAV BALIYAN	18	20	10	10	28	30	
35	1608210032	ANUKRITI AGARWAL	19	20	10	10	29	30	
36	1608210033	ANUSHKA KRISHNATREYA	17	20	8	10	25	30	
37	1608210034	ARJUN	16	20	8	10	24	30	
38	1608210035	ARPIT CHAUHAN	16	20	9	10	25	30	
39	1608210036	ARUN KUMAR GAUTAM	16	20	10	10	26	30	
40	1608210037	ASHI VERMA	20	20	10	10	30	30	
41	1608210038	ASHISH	18	20	10	10	28	30	
42	1608210039	ASHISH TRIVEDI	20	20	9	10	29	30	
43	1608210040	ASHMIT NARAYAN RAI	19	20	10	10	29	30	
44	1608210041	ASTHA SAXENA	18	20	10	10	28	30	
45	1608210042	AYUSH GUPTA	17	20	8	10	25	30	
46	1608210043	AYUSH RASTOGI	16	20	8	10	24	30	
47	1608210044	AYUSHI GUPTA	18	20	9	10	27	30	
48	1608210045	AYUSHI MATHUR	20	20	10	10	30	30	
49	1608210046	AYUSHI SAXENA	19	20	10	10	29	30	
50	1608210048	BHARAT BAJAJ	16	20	9	10	25	30	
51	1608210050	DEEPANSH SARAN	16	20	9	10	25	30	
52	1608210051	DEV KARAN SINGH	17	20	9	10	26	30	
53	1608210052	DEVANSHU AGARWAL	16	20	9	10	25	30	
54	1608210053	DEVANSHU VARSHNEY	17	20	8	10	25	30	
55	1608210054	DHRUV BHATT	16	20	8	10	24	30	
56	1608210055	DITI GUPTA	17	20	10	10	27	30	
57	1608210056	DIVYANG MEHROTRA	16	20	9	10	25	30	
58	1608210057	FALAK MUJEEB	19	20	10	10	29	30	
59	1608210058	GAURAV YADAV	17	20	8	10	25	30	

Dr. Somesh Kumar
 Prof. & Head, CSE
 Moradabad Institute of Technology
 Moradabad-244001

60	1608210059	GEETANJALI WADHWA	17	20	10	10	27	30
61	1608210060	GUNJAN RADHAWAL	16	20	0	10	28	30
62	1608210061	HANNAN TANVEER	20	20	8	10	25	30
63	1608210062	HARSH CHOUDHARY	15	20	10	10	26	30
64	1608210063	HARSH VERMA	16	20	10	10	28	30
65	1608210064	HARSHITA MADHOK	18	20	10	10	25	30
66	1608210066	HIMANSHU AGNIHOTRI	17	20	8	10	25	30
67	1608210068	HRITHIK SISODIA	16	20	9	10	25	30
68	1608210069	ISHA SETHI	18	20	10	10	28	30
69	1608210070	JADEEP CHOUDHARY	16	20	9	10	25	30
70	1608210071	JUHI RASTOGI	16	20	10	10	26	30
71	1608210073	KSHITIZ SAXENA	16	20	10	10	26	30
72	1608210074	LALIT GUPTA	16	20	8	10	24	30
73	1608210075	MANAS MUNJAL	16	20	9	10	25	30
74	1608210076	MANIK AGARWAL	18	20	10	10	28	30
75	1608210077	MANISH SINGH BJSHT	16	20	0	10	24	30
76	1608210078	MANISHA SINGH	18	20	8	10	26	30
77	1608210079	MANSI TYAGI	20	20	10	10	30	30
78	1608210080	MILAN VISHNOI	20	20	10	10	30	30
79	1608210081	MOHAMMAD ANAS	18	20	10	10	28	30
80	1608210082	MOHAMMAD ANZAR	16	20	9	10	25	30
81	1608210084	MOHD AQDUS	16	20	10	10	26	30
82	1608210086	MOHD BILAL	16	20	8	10	24	30
83	1608210088	MOHD TABREZ KHAN	16	20	8	10	25	30
84	1608210089	MOHD UMAR	16	20	9	10	25	30
85	1608210090	MUKTI	16	20	9	10	25	30
86	1608210092	MUSKAN	16	20	9	10	26	30
87	1608210093	MUSKAN CHADDHA	17	20	9	10	26	30
88	1608210094	MUSKAN MATHUR	16	20	10	10	26	30
89	1608210095	NANDNI SHISHODIYA	17	20	8	10	25	30
90	1608210096	NEELENDRA KUMAR	14	20	8	10	22	30
91	1608210097	NEETESH	16	20	9	10	25	30
92	1608210098	NEHA SRIVASTAVA	17	20	10	10	27	30
93	1608210099	NIDHI PATEL	16	20	9	10	25	30
94	1608210100	NIKHIL KUMAR	18	20	8	10	26	30
95	1608210101	NIKHIL KUMAR	15	20	8	10	23	30
96	1608210102	NIMISHA	17	20	8	10	25	30
97	1608210103	NISHANT PAL	17	20	8	10	25	30
98	1608210104	NISHKARSH KRISHAN	16	20	8	10	24	30
99	1608210105	NISHITHA VARSHNEY	18	20	9	10	27	30
100	1608210106	NUSRAT ALI	14	20	0	10	22	30
101	1608210107	PARAS DHAWAN	17	20	10	10	27	30
102	1608210108	PARTH GARG	14	20	8	10	22	30
103	1608210109	PIYUSH DIWAKER	16	20	9	10	25	30
104	1608210110	PIYUSHI SARASWAT	19	20	10	10	29	30
105	1608210111	PRAKHAR AGARWAL	16	20	8	10	24	30
106	1608210112	PRAKHAR KUMAR GAUTAM	17	20	8	10	25	30
107	1608210113	PRASHANT VARSHNEY	16	20	10	10	26	30
108	1608210114	PRATHAM KUMAR SINGH RATHORE	17	20	9	10	26	30
109	1608210115	PRATIKSHA SAHANI	18	20	10	10	28	30
110	1608210116	PRERNA ARYA	18	20	10	10	28	30
111	1608210117	PRIYAM TYAGI	16	20	10	10	26	30
112	1608210118	PURU RAJ SINGH	17	20	9	10	26	30
113	1608210119	RACHIT GAHLOT	16	20	9	10	25	30
114	1608210120	RAJAT DIWAKAR	17	20	9	10	26	30
115	1608210122	RASHI SHARMA	17	20	10	10	27	30
116	1608210123	RAVI KUMAR SAGAR	11	20	8	10	19	30
117	1608210124	REETIKA GUPTA	16	20	9	10	25	30
118	1608210125	RISHABH AGARWAL	17	20	9	10	26	30
119	1608210126	RISHABH CHANDOK	16	20	10	10	26	30
120	1608210127	RISHABH CHAUHAN	17	20	10	10	27	30
121	1608210128	RISHAV CHABA	17	20	9	10	26	30
122	1608210129	PITIK GUPTA	18	20	10	10	28	30
123	1608210130	PITISH VARSHNEY	18	20	10	10	28	30
124	1608210131	PITVIK RASTOGI	19	20	10	10	29	30
125	1608210133	S.M.SHANAWAR	15	20	6	10	21	30
126	1608210134	SACHIN SINGH	18	20	9	10	27	30
127	1608210135	SAKSHI AGARWAL	18	20	9	10	27	30
128	1608210136	SAKSHI GAUR	19	20	10	10	29	30
129	1608210137	SAKSHI SAXENA	19	20	10	10	29	30
130	1608210138	SAMARTH GOEL	18	20	9	10	27	30
131	1608210139	SAMEEKSHA VISHNOI	18	20	9	10	27	30
132	1608210140	SAMRA AZIEM	18	20	9	10	27	30
133	1608210141	SARITHA AGARWAL	17	20	10	10	27	30
134	1608210142	SATYAM AGARWAL	18	20	7	10	25	30
135	1608210143	SAURYA AGARWAL	17	20	7	10	24	30
136	1608210145	SHATAQUE NAZ	19	20	7	10	26	30
137	1608210147	SHASHANK YADAV	17	20	7	10	24	30
138	1608210148	SHIPRA DHINGRA	17	20	8	10	25	30
139	1608210149	SHIVAM SRIVASTAVA	17	20	9	10	26	30
140	1608210150	SHIVAM ANAND	17	20	9	10	26	30
141	1608210151	SHIVANSH NARAYAN	17	20	9	10	26	30
142	1608210152	SHREYA MITHPA	18	20	7	10	25	30
143	1608210153	SHUBHAM	16	20	7	10	24	30
144	1608210154	SHUBHAM BHATT	17	20	9	10	27	30
145	1608210155	SHUBHAM CHAUDHARI	17	20	10	10	27	30
146	1608210156	SHUBHAM GUPTA	17	20	9	10	26	30
147	1608210157	SHUBHAM GUPTA	17	20	9	10	26	30
148	1608210158	SHUBHAM KUMAR	16	20	7	10	24	30
149	1608210159	SHUBHAM KUMAR CHITRAJEH	16	20	7	10	24	30
150	1608210160	SHUBHAM KUMAR SINGH	11	20	8	10	19	30
151	1608210161	SHUBHAM SHARMA	16	20	7	10	23	30

 In Pursuit of Excellence	Course Outcome Attainment	SESSION-2019-2020
		SEM- 8 th

Course Name	Image Processing
Course Code	RCS082
Batch	2016 2020
Semester	8
Session	2019 2020
L:T:P	3.0.0

CO Attainment and Analysis

Direct CO Attainment using Continuous Internal Examination (CIE)

Course Code	CO	CO Attained (% of students getting $\geq 60\%$ marks)	CO Attained (On Scale of 3)
RCS082	CO1	96.15	2.88
	CO2	91.76	2.75
	CO3	89.56	2.69
	CO4	98.35	2.95
	CO5	95.6	2.87

Direct CO Attainment using Semester End Examination (SEE)

Course Code	CO	CO Attained (% of students getting $\geq 60\%$ marks)	CO Attained (On Scale of 3)
RCS082	CO1	89.56	2.69
	CO2	89.56	2.69
	CO3	89.56	2.69
	CO4	89.56	2.69
	CO5	89.56	2.69

Direct CO Attainment (CO_Direct)

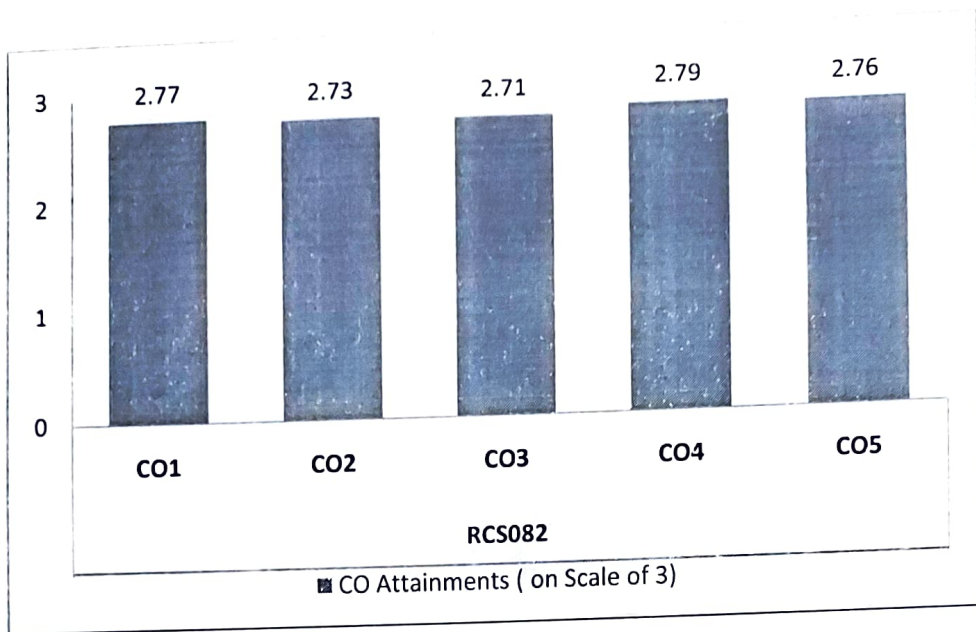
Course Code	CO	CO Attained Using CIE (CO_CIE)	CO Attained using SEE (CO_SEE)	Direct CO Attainment ($CO_Direct = 0.3 * CO_CIE + 0.7 * CO_SEE$)	Direct CO Attainment (On Scale of 3)
RCS082	CO1	96.15	89.56	91.54	2.75
	CO2	91.76	89.56	90.22	2.71
	CO3	89.56	89.56	89.56	2.69
	CO4	98.35	89.56	92.2	2.77
	CO5	95.6	89.56	91.37	2.74

Indirect CO Attainment (CO_Indirect)

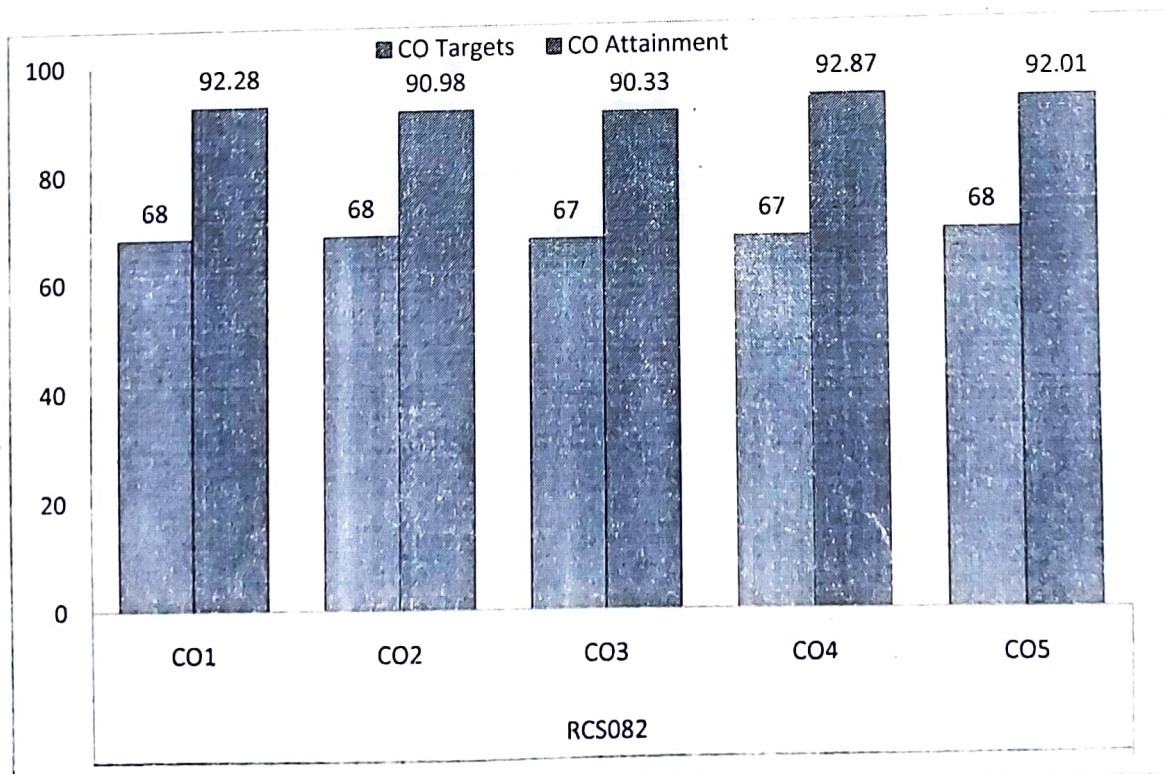
Course Code	CO	Indirect CO Attainment (CO_Indirect)	Indirect CO Attainment (On scale of 3)
RCS082	CO1	98.9	2.97
	CO2	97.8	2.93
	CO3	97.25	2.92
	CO4	98.9	2.97
	CO5	97.8	2.93

CO Attainment

Course Code	CO	Direct CO Attainment (CO_Direct)	Indirect CO Attainment (CO_Indirect)	CO Attainment ($CO = 0.9 * CO_Direct + 0.1 * CO_Indirect$)	CO Attainment (On scale of 3)	Y/N
RCS082	CO1	91.54	98.9	92.28	2.77	Y
	CO2	90.22	97.8	90.98	2.73	Y
	CO3	89.56	97.25	90.33	2.71	Y
	CO4	92.2	98.9	92.87	2.79	Y
	CO5	91.37	97.8	92.01	2.76	Y



Course Code	CO	CO Targets	CO Attainment	Y/N
RCS082	CO1	68	92.28	Y
	CO2	68	90.98	Y
	CO3	67	90.33	Y
	CO4	67	92.87	Y
	CO5	68	92.01	Y




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 Moradabad-244001

Closure of Quality Loop

Course Code	CO	CO Targets	CO Attainment Gap	Action proposed to bridge the gap where targets are not achieved	Modification of targets where Achieved
RCS082	CO1	68	-24.28		Target is increased to 70%
	CO2	68	-22.98		Target is increased to 70%
	CO3	67	-23.33		Target is increased to 68%
	CO4	67	-25.87		Target is increased to 68%
	CO5	68	-24.01		Target is increased to 70%


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