**POORNIMA COLLEGE OF ENGINEERING, JAIPUR**

**DEPARTMENT OF COMPUTER ENGINEERING**

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| **Campus: Poornima College of Engineering** | **Year/Section: 3rd** | **Date: 21 Jan 2021** |
| **Course: B.Tech.** | **Semester/ Section – VI C** |  |
| **Name of Faculty: Sonam Gour** | **Name of Subject : Digital Image Processing** | **Code: 6CS3-01** |

# **Zero Lecture**

Name of Faculty: **Sonam Gour** Branch: Computer Engineering

**1). Name of Subject with Code**:  **Digital Image Processing (6CS3-01)**

**2). Self-Introduction**:

*a).* Name: **Sonam Gour**

b). Qualification: BE (ECE), M Tech (VLSI), Pursuing PhD

c). Designation: Assistant Professor

d). Research Area: Low Power circuit design, Antenna, Biomedical Engineering

e). E-mail Id: sonam..gour@poornima.org

f). Other details*:*

**3).** **Introduction of Students: III year VI Semester (Computer Engineering)**

a). Identifying and keeping records of students based on meritorious/weak in academics.

b). Achievement of students in previous years:-

**4). Instructional Language: - 100% English**

**5). Introduction to subject: -**

***a). Relevance to Branch****:* Digital image processing deals with manipulation of digital images through a digital computer. It is a subfield of signals and systems but focus particularly on images. DIP focuses on developing a computer system that is able to perform processing on an image. The input of that system is a digital image and the system process that image using efficient algorithms, and gives an image as an output. The most common example is Adobe Photoshop. It is one of the widely used applications for processing digital images.

***b). Relevance to Society****:* This subject is also useful in day to day life. This subject provided flawless communication between different images. It also helpful for providing pictorial information and processing of image data for data interpretation.

***c). Relevance to Self***: Since I am from electronics & Communication department, and this subject is related to communication engineering, so I have great interest in this subject. This subject has great importance in making image processing projects and also useful for comparative studies.

**d). *Relation with lab*:** - In labs we learn to image enhancement, histogram and image resolution.

**6). Syllabus of Rajasthan Technical University, Kota**

1. **Index Terms/ Key Words:** Image Processing, color image transform, Image Enhancement, Image Compression and Segmentation etc.
2. **RTU Syllabus with Name of Subject & Code**: **Digital Image Processing (6CS3-01)**

UNIT I: **Objective, scope and outcome of the course.**

UNIT II: **Introduction to Image Processing:**

Digital Image representation, Sampling & Quantization, Steps in image Processing, Image acquisition, color image representation.

UNIT III: **Image Transformation & Filtering:**

Intensity transform functions,histogram processing, Spatial filtering, Fourier transforms and itsproperties, frequency domain filters, colour models, Pseudocolouring, colour transforms, Basics of Wavelet Transforms.

UNIT IV**: Image Restoration:**

Image degradation and restoration process, Noise Models, Noise Filters, degradation function, Inverse Filtering, Homomorphism Filtering.

UNIT V: **Image Compression:**

Coding redundancy, Interpixel redundancy, Psychovisual redundancy, Huffman Coding, Arithmetic coding,

Lossy compression techniques, JPEG Compression.

UNIT VI: **Image Segmentation & Representation:**

Point, Line and Edge Detection, Thresholding, Edge and Boundary linking, Hough transforms, Region Based Segmentation, Boundary representation, Boundary Descriptors.

**ABC analysis (RGB method) of unit & topics** :-

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Unit No.** | **A**  **(Hard Topics)** | **B**  **(Topics with average hardness level)** | **C**  **(Easy to understand topics)** | **Preparedness for ‘A’ topics** |
| **I** | Sampling & Quantization | Steps in image Processing, Image acquisition, color image representation. | Digital Image  representation | More Numericals will be solved |
| **II** | Histogram processing, Spatial filtering, Fourier transforms and its properties, | colour models, Pseudo colouring, colour transforms, Basics of Wavelet Transforms. | Intensity transform functions, | Revision & taking test |
| **III** | Noise Models, Noise Filters, degradation function | Image degradation and restoration process. | Homomorphism Filtering. | Revision & taking test |
| **IV** | Interpixel redundancy, Psychovisual redundancy | Huffman Coding, Arithmetic coding,  Lossy compression techniques, | Coding redundancy, | Revision with the students |
| **V** | Thresholding, Edge and Boundary linking, Hough transforms | Region Based Segmentation, Boundary representation, | Point, Line and Edge Detection | Power point Presentation & Revision |

**7). Books/ Website/Journals & Handbooks/ Association & Institution:**

1. **Recommended Text & Reference Books and Websites:-**

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| --- | --- | --- | --- | --- |
| S. No. | Title of Book | Authors | Publisher | No. of books in Library |
| **Text Books** | | | |  |
| 1. | Digital Image Processing Using MATLAB | Rafael C. Gonalez | TMH | 16 |
| 2. | Digital Image Processing | S. Sridhar | Oxford University Press | 12 |
| **Reference Books** | | | |  |
| 1. | Digital Image Processing | Simon Haykins | TMH | 14 |
| **Websites related to subject** | | | | |
| 1 | [www.youtube.com](http://www.youtube.com) | | | |
| 2 | [www.nptel.iitm.ac.in](http://www.nptel.iitm.ac.in) | | | |

b). **Journals: -**

1 IEEE communication system magazine ( international ) [www.ieee.explore.com](http://www.ieee.explore.com)

2 Institute of Engineers (national) www.ie.org.in

3 IETE publications

c). **Association and Institution**: -

1)IETE

2)IEEE

**8). Syllabus Deployment: -** Total no of Lectures: - 42

Unit 1: **Introduction to Image Processing:**- 9 lectures

Unit 2: **Image Transformation & Filtering:** - 10 lectures

Unit 3: **Image Restoration:**- 8 lectures

Unit 4: **Image Compression:** - 8 lecture

Unit 5: **Image Segmentation & Representation:** - 7 lectures

1. Special Activities (To be approved by HOD, Dean & Campus Director & must be mentioned in deployment):

* Open Book Test- Once in a semester
* Quiz (100% Technical)- One in a semester
* Special Lectures (SPL)- 10% of total no. of lectures including following

1. Few PPT Lecture

* Revision classes:- 1 to 3 turn at the end of semester (Before II Mid Term Exam)
* Solving Important Question Bank- 1 Turn before I & II Mid Term Exam (each) - Total Two turn.

1. **Lecture schedule per week:**

i). University scheme (L+T+P) = 2L+0T+0P

ii). PGC scheme (L+T+P) = 3L+0T+0P

1. **Introduction & Conclusion:** Each subject, unit and topic shall start with introduction & close with conclusion.
2. **Time Distribution in lecture class:**  **-** Number of chapters is beginning with objective and end of course/chapter/lecture with summary and quiz (Time allotted: 60 min.)

* First 5 min. should be utilized for paying attention towards students who were absent for last lecture or continuously absent for many days + taking attendance by calling the names of the students and also sharing any new/relevant information.
* Actual lecture delivery should be of 45 minutes
* Last 5 min. should be utilized by recapping of the topic. Providing brief introduction of the coming up lecture and suggesting portion to read.
* After completion of any Unit/Chapter a short quiz should be organized
* During lecture student should be encouraged to ask the question.

**11). University Examination systems: -**

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| --- | --- | --- | --- | --- | --- | --- |
| **Sr. No.** | **Name of the exam** | **Max. Marks** | **passing marks** | **Nature of paper** | **Syllabus Coverage** | **Conducted by** |
| 1. | I Mid Term Exam | 20 | 8 | 100% theoretical | 60% | PCE |
| 2. | IIMid Term Exam | 20 | 8 | 100% theoretical | 40% | PCE |
| 3. | University (End)Term exam | 80 | 32 | 100% theoretical | 100% | RTU |

Place: - Jaipur Sonam Gour

Date: - 21/01/2022 Asst. Professor, CS Department