CODE: Multimedia Processing and Applications

Programme: B.Tech (CSE) Year: 3 Semester: 5
Course: Program Elective Credits: 3 Hours: 40

Course Context and Overview (100 words):

The course aims to provide an introduction to this multidisciplinary field in which students will be able to understand and process different types of media like images, videos and audio. It will start with the basics, cover theoretical concepts in detail, and for better understanding implementation for designing real-world applications will be done. Application-oriented assignments and projects using OpenCV will be an integral part of the course.

Prerequisites Courses:
Basics of Computer Programming (C, C++ is preferred)

Course outcomes (COs):

The Outcomes of this Course are
CO1 Understand fundamental concepts to process different types of media (image, video and audio)
CO2 Explain compression algorithms on the basis of different types of media (image, video and audio)
CO2 Apply theoretical concepts for designing and developing real-world applications

Course Topics:

Topics	Lecture Hours
UNIT – I **Introduction**	
1. Fundamentals of Digital Images	1
2. Basic Image Processing Operations	4
3. Introduction to OpenCV library	2
UNIT – II **Image Transformations**	
1. Euclidean, Shear, Affine and Projective	3
2. Image Mosaic	1
UNIT – III **Image Restoration**	
1. Noise Models	1
2. Noise reduction by spatial domain filtering	1
3. Noise reduction by frequency domain filtering	1
4. Minimum mean square error filtering	1
UNIT – IV **Image Compression**	
1. Loss-less compression	2

2. Lossy Compression	2
UNIT – V **Video Processing**	
1. Video basics, video coding	5
2. Video compression	5
3. Motion Segmentation	4
UNIT – VI **Audio Processing**	
1. Audio coding	2
2. Audio Compression	3
UNIT – VII	
1. Multimedia network and communication	2

Textbook references (IEEE format):

Text Book:

1. Rafael C. Gonzalez and Richard E. Woods, *Digital Image Processing,* 3rd edition, Prentice Hall.
2. Ze-Nian. Li, Mark S. Drew, Jiangchuan Liu. Fundamentals of Multimedia Pearson/Prentice-Hall, 2014.

Reference books:

1. Y. Wang, J. Ostermann, Y. Zhang. Video Processing and Communications, Prentice-Hall, 2002.
2. Anil K. Jain, *Fundamentals of Digital Image Processing,* Prentice Hall.

Evaluation Methods:

Item	Weightage
Internal Assessment (*Quizzes, Assignments and Class participation*)	30
Team Project	20
Mid-Term Examination	20
End-Term Examination	30

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