MU5091 MULTIMEDIA COMPRESSION TECHNIQUES - DETAILED SYLLABUS

OBJECTIVES:

- To understand the basic ideas of compression algorithms related to multimedia components – Text, speech, audio, image and Video.
- To understand the principles and standards and their applications with an emphasis on underlying technologies, algorithms, and performance.
- To appreciate the use of compression in multimedia processing applications
- To understand and implement compression standards in detail.

UNIT I FUNDAMENTALS OF COMPRESSION

Introduction To multimedia – Graphics, Image and Video representations – Fundamental concepts of video, digital audio – Storage requirements of multimedia applications – Need for compression – Taxonomy of compression Algorithms - Elements of Information Theory – Error Free Compression – Lossy Compression.

UNIT II TEXT COMPRESSION

Huffman coding – Adaptive Huffman coding – Arithmetic coding – Shannon-Fano coding – Dictionary techniques – LZW family algorithms.

UNIT III IMAGE COMPRESSION

Image Compression: Fundamentals –– Compression Standards – JPEG Standard – Sub-band coding – Wavelet Based compression – Implementation using Filters – EZW, SPIHT coders – JPEG 2000 standards – JBIG and JBIG2 standards.

UNIT IV AUDIO COMPRESSION

Audio compression Techniques – law, A-Law companding – Frequency domain and filtering – Basic sub-band coding – Application to speech coding – G.722 – MPEG audio – progressive encoding – Silence compression, Speech compression – Formant and CELP vocoders.

UNIT V VIDEO COMPRESSION

Video compression techniques and Standards – MPEG video coding: MPEG-1 and MPEG2 video coding: MPEG-3 and MPEG-4 – Motion estimation and compensation techniques – H.261 Standard – DVI technology – DVI real time compression – Current Trends in Compression standards.

REFERENCES:

1. David Solomon, “Data Compression – The Complete Reference”, Fourth Edition, Springer Verlog, New York, 2006.

2. Darrel Hankerson, Greg A Harris, Peter D Johnson, „Introduction to Information Theory and Data Compression‟ Second Edition, Chapman and Hall, CRC press, 2003.

3. Khalid Sayood: Introduction to Data Compression”, Morgan Kauffman Harcourt India, Third Edition,

4. Mark S. Drew, Ze-Nian Li, “Fundamentals of Multimedia”, PHI, 2009.

5. Peter Symes: Digital Video Compression, McGraw Hill Pub., 2004.

6. Yun Q.Shi, Huifang Sun, “Image and Video Compression for Multimedia Engineering, Algorithms and Fundamentals”, CRC Press, 2003.