

Data Compression (KCS-064)		
Course Outcome (CO)		Bloom's Knowledge Level (KL)
At the end of course , the student will be able to		
CO 1	Describe the evolution and fundamental concepts of Data Compression and Coding Techniques.	K ₁ , K ₂
CO 2	Apply and compare different static coding techniques (Huffman & Arithmetic coding) for text compression.	K ₂ , K ₃
CO 3	Apply and compare different dynamic coding techniques (Dictionary Technique) for text compression.	K ₂ , K ₃
CO 4	Evaluate the performance of predictive coding technique for Image Compression.	K ₂ , K ₃
CO 5	Apply and compare different Quantization Techniques for Image Compression.	K ₂ , K ₃
DETAILED SYLLABUS		3-0-0
Unit	Topic	Proposed Lecture
I	Compression Techniques: Loss less compression, Lossy Compression, Measures of performance, Modeling and coding, Mathematical Preliminaries for Lossless compression: A brief introduction to information theory, Models: Physical models, Probability models, Markov models, composite source model, Coding: uniquely decodable codes, Prefix codes.	08
II	The Huffman coding algorithm: Minimum variance Huffman codes, Adaptive Huffman coding: Update procedure, Encoding procedure, Decoding procedure. Golomb codes, Rice codes, Tunstall codes, Applications of Hoffman coding: Loss less image compression, Text compression, Audio Compression.	08
III	Coding a sequence, Generating a binary code, Comparison of Binary and Huffman coding, Applications: Bi-level image compression-The JBIG standard, JBIG2, Image compression. Dictionary Techniques: Introduction, Static Dictionary: Diagram Coding, Adaptive Dictionary. The LZ77 Approach, The LZ78 Approach, Applications: File Compression-UNIX compress, Image Compression: The Graphics Interchange Format (GIF), Compression over Modems: V.42 bits, Predictive Coding: Prediction with Partial match (ppm): The basic algorithm, The ESCAPE SYMBOL, length of context, The Exclusion Principle, The Burrows-Wheeler Transform: Move-to-front coding, CALIC, JPEG-LS, Multi-resolution Approaches, Facsimile Encoding, Dynamic Markov Compression.	08
IV	Distortion criteria, Models, Scalar Quantization: The Quantization problem, Uniform Quantizer, Adaptive Quantization, Non uniform Quantization.	08
V	Advantages of Vector Quantization over Scalar Quantization, The Linde-Buzo-Gray Algorithm, Tree structured Vector Quantizers. Structured Vector Quantizers.	08
Text books: 1. Khalid Sayood, Introduction to Data Compression, Morgan Kaufmann Publishers 2. Elements of Data Compression, Drozdek, Cengage Learning 3. Introduction to Data Compression, Second Edition, Khalid Sayood, The Morgan Kaufmann Series 4. Data Compression: The Complete Reference 4th Edition by David Salomon, Springer 5. Text Compression 1st Edition by Timothy C. Bell Prentice Hall		