CS314: Data Compression	L	T	P	Nil
	3	1	0	

Course Objective: To study various data/image compression techniques in detail.

S. No.	Course Outcomes (CO)
CO1	Apply lossless and lossy compression techniques and understand performance measures.
CO2	Implement Huffman coding and its applications in various compression scenarios.
CO3	Utilize arithmetic coding and dictionary techniques for effective data compression.
CO4	Apply image compression methods and standards for efficient image and modem compression.
CO5	Understand distortion criteria and quantization techniques for lossy compression.
CO6	Implement vector quantization methods for improved compression efficiency.

S. No	Contents	Contact Hours
UNIT 1	Introduction: 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.	**8**
UNIT 2	Huffman coding: 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.	**10**
UNIT 3	Arithmetic Coding: 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.	**12**
UNIT 4	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 Markoy Compression.	**8**
UNIT 5	Mathematical Preliminaries for Lossy Coding: Distortion criteria, Models, Scalar Ouantization: The Quantization problem, Uniform Quantizer, Adaptive Quantization, Non uniform Quantization.	**6**
UNIT 6	Vector Quantization: Advantages of Vector Quantization over Scalar	**4**
	Total	**48**

dtuelectives.in