



GUJARAT TECHNOLOGICAL UNIVERSITY

Master of Engineering

Subject Code: 3725611

Semester – II

Subject Name: Steganography and Digital Watermarking

Type of course: Elective

Prerequisite: Image and Video Processing, Linear Algebra

Rationale: The objective of course is to provide a insight to steganography techniques. Watermarking techniques along with attacks on data hiding and integrity of data is included in this course.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	2	4	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs	% Weightage
1	Steganography: Overview, History, Methods for hiding (text, images, audio, video, speech etc.), Issues: Security, Capacity and Imperceptibility, Steganalysis: Active and Malicious Attackers, Active and passive steganalysis	8	17%
2	Frameworks for secret communication (pure Steganography, secret key, public key steganography), Steganography algorithms (adaptive and non-adaptive),	8	17%
3	Steganography techniques: Substitution systems, Spatial Domain, Transform domain techniques, Spread spectrum, Statistical steganography, Cover Generation and cover selection, Tools: EzStego, FFEncode, Hide 4 PGP, Hide and Seek, S Tools etc.)	9	19%
4	Detection, Distortion, Techniques: LSB Embedding, LSB Steganalysis using primary sets, Texture based	6	12%
5	Digital Watermarking: Introduction, Difference between Watermarking and Steganography, History, Classification (Characteristics and Applications), Types and techniques (Spatial-domain, Frequency-domain, and Vector quantization based watermarking), Attacks and Tools (Attacks by Filtering, Remodulation, Distortion, Geometric Compression, Linear Compression etc.), Watermark security & authentication.	12	25%
6	Recent trends in Steganography and digital watermarking techniques. Case study of LSB Embedding, LSB Steganalysis using primary sets.	5	10%
	Total	48	100%



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Reference Books:

1. Peter Wayner, "Disappearing Cryptography–Information Hiding: Steganography & Watermarking", Morgan Kaufmann Publishers, New York, 2002.
2. Ingemar J. Cox, Matthew L. Miller, Jeffrey A. Bloom, Jessica Fridrich, TonKalker, "Digital Watermarking and Steganography", Margan Kaufmann Publishers, New York, 2008.
3. Information Hiding: Steganography and Watermarking-Attacks and Countermeasures by Neil F. Johnson, ZoranDuric, SushilJajodia.
4. Information Hiding Techniques for Steganography and Digital Watermarking by Stefan Katzenbeisser, Fabien A. P. Petitcolas

Course Outcomes:

At the end of the module the student will be able to:

Sr. No.	CO statement	Marks % weightage
CO-1	Learn the concept of information hiding.	20%
CO-2	Survey current techniques of steganography and learn how to detect and extract hidden Information.	40%
CO-3	Learn watermarking techniques and through examples understand the concept.	40%

List of Experiments:

1. To perform steganography in text, image and audio.
2. To implement any steganography algorithm
3. Case study on cover generation and cover detection technique.
4. To implement digital watermarking and specify the difference between steganography and watermarking
5. Case study on attacks on watermarks
6. Case study on LSB embedding and LSB steganalysis.

Major Equipment: --

List of Open Source Software/learning website: C, C++, Python