

## Elective Courses

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**Course Title:** Computer, Data and Network Security

**Code:** CSE 802

**Credit:** 2 Credit Theory and 1 Credit Lab

**Course Outline:** Overview: Network Security Concepts, Security Attacks, Services and Mechanisms;

Classical Encryption techniques: Symmetric Cipher Model, Substitution and Permutation Ciphers, Steganography; Block Ciphers and Data Encryption Standard: Design principles and modes of operation; Public-key cryptography: Introduction to number theory, RSA and Diffie-Hellman; Message Digest: Requirements for cryptographic hash functions, MD5, SHA, Message authentication codes, digital signatures; Key Management and Distribution: Symmetric Key Distribution using Symmetric Encryption, Symmetric Key Distribution using asymmetric Encryption, public key distribution, public key certificates, x.509 certificates; Network and Internet Security: Transport Layer Security, Wireless LAN security, e-mail security.

**References:**

1. Data and Computer Communications By Stallings, 8th Edition, Pearson Education, 2007

**Course Title:** Data Mining and Warehousing

**Code:** CSE 825

**Credit:** 3 Credits (2 Credit Theory and 1 Credit Lab)

**Course Outline:** Introduction to Data Mining, Knowing Data (Data objects, similarities and dissimilarities, statistical descriptions and visualizations), Data Pre-processing, Data Warehousing and Online Analytical Processing, Data Cube technology, Mining frequent patterns, Classification and Cluster Analysis, Research trends in Data mining and warehousing.

**References:**

1. Data Mining: Concepts and Techniques. Jiawei Han, Micheline Kambar, Jian Pei [Text Book]

**Course Title:** Pattern Recognition and Image Processing

**Course Code:** CSE 829

**Course Credit:** 3 Credits (2 Credit Theory and 1 Credit Lab)

**Course Outline:** Introduction to Image Processing; Digital Image Fundamentals - Elements of Visual Perception. Light and the Electromagnetic Spectrum. Image Sensing and Acquisition. Image Sampling and Quantization. Some Basic Relationships between Pixels. Linear and Nonlinear Operations; Image Enhancement in the Spatial Domain - Background. Some Basic Gray Level Transformations. Histogram Processing. Enhancement Using Arithmetic/Logic Operations. Basics of Spatial Filtering. Smoothing Spatial Filters. Sharpening Spatial Filters. Combining Spatial Enhancement Methods; Image Enhancement in the Frequency Domain - Background. Introduction to the Fourier Transform and the Frequency Domain. Smoothing Frequency-Domain Filters. Sharpening Frequency Domain Filters. Homomorphic Filtering. Implementation; Image Restoration - A Model of the Image Degradation/Restoration Process. Noise Models. Restoration in the Presence of Noise Only-Spatial Filtering. Periodic Noise Reduction by Frequency Domain