UNIT – 6   7 Hours
A Typical Relational Query Optimizer: Translating SQL queries in to Relational Algebra; Estimating the cost of a plan; Relational algebra equivalences; Enumeration of alternative plans; Nested sub-queries; other approaches to query optimization.

UNIT – 7   7 Hours
Physical Database Design and Tuning: Introduction; Guidelines for index selection, examples; Clustering and indexing; Indexes that enable index-only plans; Tools to assist in index selection; Overview of database tuning; Choices in tuning the conceptual schema; Choices in tuning queries and views; Impact of concurrency; DBMS benchmarking.

UNIT – 8   6 Hours
More Recent Applications: Mobile databases; Multimedia databases; Geographical Information Systems; Genome data management

Text Books:
1. Raghu Ramakrishnan and Johannes Gehrke: Database Management Systems, 3rd Edition, McGraw-Hill, 2003.
   (Chapters 8, 9, 10, 11, 12, 13.1 to 13.3, 14, 15, 20)
2. Elmasri and Navathe: Fundamentals of Database Systems, 5th Edition, Pearson Education, 2007.
   (Chapter 30)

Reference Books:
1. Connolly and Begg: Database Systems, 4th Edition, Pearson Education, 2002.

DIGITAL SIGNAL PROCESSING

Subject Code: 10CS752   I.A. Marks : 25
Hours/Week : 04   Exam Hours: 03
Total Hours : 52   Exam Marks: 100

PART - A
UNIT – 1   7 Hours
The Discrete Fourier Transform: Its Properties and Applications   :
Frequency Domain Sampling: The Discrete Fourier Transform: Frequency Domain Sampling and Reconstruction of Discrete-Time Signals, The Discrete Fourier Transform (DFT), The DFT as a Linear Transformation, Relationship of the DFT to other Transforms. Properties of the DFT: Periodicity, Linearity and Symmetry Properties, Multiplication of Two DFT's and Circular Convolution, Additional DFT Properties; Linear Filtering

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Methods Based on the DFT: Use of the DFT in Linear Filtering, Filtering of Long Data Sequences; Frequency Analysis of Signals using the DFT.

UNIT – 2   **7 Hours**
Efficient Computation of the DFT: Fast Fourier Transform Algorithms:
Efficient Computation of the DFT: FFT Algorithms : Direct Computation of the DFT, Divide-and-Conquer Approach to Computation of the DFT, Radix-2 FFT Algorithms, Radix-4 FFT Algorithms, Split-Radix FFT Algorithms, Implementation of FFT Algorithms.
Applications of FFT Algorithms: Efficient computation of the DFT of Two Real Sequences, Efficient computation of the DFT of a 2N-Point Real Sequence, Use of the FFT Algorithm in Linear filtering and Correlation.
A Linear filtering approach to Computation of the DFT: The Goertzel Algorithm, The Chirp-Z Transform Algorithm.
Quantization Effects in the Computation of the DFT: Quantization Errors in the Direct Computation of the DFT, Quantization Errors in FFT Algorithms.

UNIT – 3   **6 Hours**
Implementation of Discrete-Time Systems – 1:   Structures for the Realization of Discrete-Time Systems
Structures for FIR Systems: Direct-Form Structures, Cascade-Form Structures, Frequency-Sampling Structures, Lattice Structure.
Structures for IIR Systems: Direct-Form Structures, Signal Flow Graphs and Transposed Structures, Cascade-Form Structures, Parallel-Form Structures, Lattice and Lattice-Ladder Structures for IIR Systems.

UNIT – 4   **6 Hours**
Implementation of Discrete-Time Systems – 2: State-Space System Analysis and Structures: State-Space Descriptions of Systems Characterized by Difference Equations, Solution of the State-Space Equations, Relationships between Input-Output and State-Space Descriptions, State-Space Analysis in the Z-Domain, Additional State-Space Structures.
Representation of Numbers: Fixed-Point Representation of Numbers, Binary Floating-Point Representation of Numbers, Errors Resulting from Rounding and Truncation.

PART – B

UNIT – 5   **6 Hours**
Implementation of Discrete-Time Systems – 3: Quantization of Filter Coefficients: Analysis of Sensitivity to Quantizatior of Filter Coefficients, Quantization of Coefficients in FIR Filters

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Dept. Of Computer Science & Engineering
Alva's Institute of Engg. & Technology
Mijar, MOODBIDRI - 574 225

Round-Off Effects in Digital Filters: Limit-Cycle Oscillations in Recursive Systems, Scaling to Prevent Overflow, Statistical Characterization of Quantization effects in Fixed-Point Realizations of Digital Filters.

UNIT – 6   **7 Hours**
Design of Digital Filters – 1: General Considerations: Causality and its Implications, Characteristics of Practical Frequency-Selective Filters.
Design of FIR Filters: Symmetric And Antisymetric FIR Filters, Design of Linear-Phase FIR Filters Using Windows, Design of Linear-Phase FIR Filters by the Frequency-Sampling Method, Design of Optimum Equiripple Linear-Phase FIR Filters, Design of FIR Differentiators, Design of Hilbert Transformers, Comparison of Design Methods for Linear-Phase FIR filters.

UNIT – 7   **6 Hours**
Design of Digital Filters – 2: Design of IIR Filters from Analog Filters: IIR Filter Design by Approximation of Derivatives, IIR Filter Design by Impulse Invariance, IIR Filter Design by the Bilinear Transformation, The Matched-Z Transformation, Characteristics of commonly used Analog Filters, Some examples of Digital Filters Designs based on the Bilinear Transformation.

UNIT – 8   **7 Hours**
Design of Digital Filters – 3: Frequency Transformations: Frequency Transformations in the Analog Domain, Frequency Transformations in the Digital Domain.
Design of Digital Filters based on Least-Squares method: Padé Approximations method, Least-Square design methods, FIR least-Squares Inverse (Wiener) Filters, Design of IIR Filters in the Frequency domain.

Text Books:
1. John G. Proakis and Dimitris G. Manolakis: Digital Signal Processing, 3rd Edition, Pearson Education, 2003. (Chapters 5, 6, 7 and 8)

Reference Books:
1. Paulo S. R. Diniz, Eduardo A. B. da Silva And Sergio L. Netto: Digital Signal Processing: System Analysis and Design, Cambridge University Press, 2002.
2. Sanjit K. Mitra: Digital Signal Processing: A Computer Based Approach, Tata Mcgraw-Hill, 2001.
3. Alan V Oppenheim and Ronald W Schafer: Digital Signal Processing, PHI, Indian Reprint, 2008.