

**Unit I**

Introduction: machine structure, machine language and assembly language, elements of assembly language programming, need for assemblers, design of assemblers: one pass and two pass assembler, symbol table organization, table processing, searching and sorting.

**Unit II**

Macro Processors: Macro instructions, features of macro facility, design of macro processor: design of one and two pass macro processor and their relationship with an assembler.

**Unit III**

Linkers: relocation and linking concepts, design of linker, self-relocating programmes. Loaders: Loading schemes: compile and go loaders, General loading Scheme: absolute loaders, subroutine linkages, relocating loaders, direct linking loaders, other loader schemes: binders, linking overlays, dynamic binders, design of absolute loader, design of direct linking loader.

**Unit IV**

Compiler Design: structure of a compiler, finite automaton and lexical analysis: role of lexical analyzer, regular expressions, finite automation, LEX, Syntax analysis: Role of parser, context free grammar, Basic parsing techniques: bottom up parsing, top down parsing, operator precedence parsing, LR parsers.

**Unit V**

Syntax directed translation schemes, intermediate code generation, intermediate languages, code optimization, loop optimization, code generation, machine model of code generator, error detection and recovery.

**Text Books:**

1. System Programming by John J. Donovan (Tata McGraw Hill).
2. Compilers principle, techniques and tools by Alfred V. Aho, Ram Sethi (Pearson Education)

**Reference Books:**

1. Systems Programming and Operating Systems by D.M. Dhamdhare (Tata McGraw Hill)
2. Compiler Design by A S Ullman.

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MCS-402

## COMPUTER GRAPHICS

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### Unit I

Input / output devices, refresh CRT, raster and random scan displays, DVST, Line DDA Algorithm, Bresenham's line algorithm Midpoint and Bresenham's Circle Generating algorithm, Ellipse, Scan-line polygon fill, inside/ outside test, Boundary - fill, flood fill algorithm, character Generation.

### Unit II

Attribute of output primitives: line attributes, color and Gray Scale levels, CMY, RGB color model Character attributes, 2-D viewing, Cohen-Sutherland, Midpoint subdivision, Cyrus beck and Liang-Barsky line clipping algorithm, Character clipping.

### Unit III

Transformation in 2D and 3D: translation, rotation, scaling, shearing, reflection, Homogeneous Coordinate System.

### Unit IV

Parallel and perspective projections, Ortho graphics cabinet, cavalier and axonometric, projections, methods of general parallel and one point perspective projections, clipping list priority hidden line elimination algorithm, Z-buffer and floating horizon algorithm.

### Unit V

Hermite cubic curves and surfaces, Beizer and B-spline curves and surfaces, rational curves and surfaces of revolutions, cylindrical, ruled and Sweep surfaces.

### Text Book:

1. Computer Graphics by Hearn and Baker.

### Reference Books:

1. Computer graphics by Foley, Vandam, Feiner & Hughes, 2nd Edition, Addison Wesley publishing.
2. Computer graphics by Hill, Mac Millan publishing.
3. Mathematical elements of computer graphics by Rogers & Adams, 2<sup>nd</sup> Edition, McGraw hills, ISF.
4. Geometric modeling by Mortenson, John Wililay publishing.

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MCS 403 (1)

## NEURAL NETWORK

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### Unit I

Characteristics of Neural Networks, biological neuron, action potentials, neuron firing, artificial neural networks, HLU, multilayer neural networks models of neuron, topologies, basic learning laws.

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### Unit II

Activation dynamics models: additive and shunting, bivalent additive BAM, functional units of ANN for pattern recognition Task.

### Unit III

Analysis of Pattern Association, classification and mapping networks, training the threshold as weight in perceptron rule and delta rule, LMS and Back propagation algorithm.

### Unit IV

Analysis of pattern storage networks: Hopfield Model: capacity and energy analysis, state transition diagram, Competitive learning Neural Networks: introduction, components, analysis of feedback layer for different output functions.

### Unit V

Fuzziness as multivalence, subset hood, fuzzy systems: as structured numerical estimators, as parallel associators, fuzzy - entropy theorem, subsethood theorem, fuzzy hebb's BAM, fuzzy truck backer upper control systems.

### Text Books:

1. Artificial Neural Networks by B.Yagnarayana.
2. Neural Networks and Fuzzy systems by Bart Kosko, PHI.

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MCS 403 (2)

## PARALLEL PROCESSING

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### Unit I

Introduction to parallel processing: parallel processing mechanism, parallelism in unprocessed system, parallel computer structure, architecture classification scheme.

### Unit II

Pipelining and vector processing: Instruction and arithmetic pipelines, vector processing requirements, pipeline computers and vectorization methods. Various vector processors: STAR -100, CRA Y-I, CYBER-205, FUJITSU-200, and their special features.

### Unit III

SIMD Array processor: parallel algorithm for array processors, SIMD computers and performance enhancement.

### Unit IV

Multiprocessor architecture and programming: functional structures, interconnection networks, parallel memory organizations, multiprocessor control algorithms.

### Unit V

Interprocess communication mechanisms, system deadlocks and protection, multiprocessor scheduling strategies. Parallel algorithms for multiprocessor-synchronous & asynchronous. Data flow computers: data-driver computing and languages, advantage and potential difficulties etc.

### Text Book:

1. Computer architecture and Parallel Processing by Hwang K., Briggs F.A., McGraw Hill, 1985.

### Reference Books:

1. Parallelism in Hardware and Software by Lorin H., Prentice hall, 1982.
2. Parallel Processing System by Evans D.J., Cambridge Univ. 1982
3. The Architecture of Pipelined computer by Koggh H.
4. Computer system Architecture by Bafr J.E. Computer Sct. Press, 1980.
5. Parallel Computers Architecture Programming & Algorithm by Hockney R. W. & Jesshope C.R.

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MCS 403(3)

## IMAGE PROCESSING

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### Unit I

Digital Image Fundamentals: an image model, sampling and quantization, some basic relationships between pixels, imaging geometry, image transforms: introduction to the Fourier transform, Discrete Fourier transform, some properties of the two-dimensional Fourier transform, convolution and correlation, sampling, Fast Fourier transform, FFT algorithm, inverse FFT, other separable image transforms, Walsh transform, Hadamard transform, discrete cosine transform, Hotelling transform, application to image rotation, Hough transform.

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### Unit II

Image Enhancement, background, spatial-domain methods, frequency domain methods, image enhancement by histogram-modification techniques, foundation, histogram equalization, local enhancement, image smoothing, neighborhood averaging of multiple images, image sharpening, sharpening by differentiation, highpass filtering, ideal filter, Butterworth filter, enhancement based on an image model, generation of spatial masks from frequency domain specifications.

### Unit III

Image Restoration: degradation model, some definitions, degradation model for continuous functions, discrete formulation, diagonalization of circulant and block-circulant matrices, algebraic approach to restoration, unconstrained restoration, constrained restoration, inverse filtering, removal of blur caused by uniform linear motion, least-mean-square filter, constrained least-squares restoration, interactive restoration, geometric transformations, spatial transformations, gray-level interpolation.

### Unit IV

Image Encoding: fidelity criteria, objective and subjective fidelity criteria, encoding process, the mapping, the quantizer, the coder, entropy, Huffman code, b-codes, image encoding relative to a fidelity criterion.

### Unit V

Image Segmentation: detection of discontinuities, point and line detection, edge detection, gradient operator, Laplacian operator, combined detection, edge linking and boundary detection, local analysis, global analysis via the Hough transform, global analysis via graph-theoretic techniques, thresholding: foundation, role of illumination, a global thresholding technique, optimal thresholding, region-oriented segmentation, basic formulation.

### Text Book:

1. Image Processing by Gonzalez and Wintz.

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MCS-403 (4)

INTERNET & WEB TECHNOLOGY

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**Unit I**

The Internet's brief history, getting connected to the internet, installing the essential internet clients, internet addresses, domain name system, internet governance, internet hosts, LAN internet access, PPP/SLIP internet access, TCP/IP and other protocols on the internet.

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**Unit II**

Features of the Internet, services provided by the internet, e-mail system, usenet newsgroups, ftp, chatting and conferencing, world wide web: e-commerce, internet and extranet, internet security (firewalls, cryptography, protection from viruses), security of web browsers, impact of the internet on social life.

**Unit III**

General Web Terminology: web sites, web servers, http, web pages, web portal, web browsers, URL, gophers, search engines, HTML, WML, hypertext and hypermedia.

**Unit IV**

Virtual networks, value-added networks, private networks, creating a web site, creating web pages with HTML, creating web pages with front page express.

**Unit V**

Electronic publishing: advantages, disadvantages, copyright issues: credit issues, project gutenber and online books, electronic journals, magazines and newspapers, web programming material: the java script programming language, applets, guest books web page, counters programming languages, applets, guest book, web page counters.

**Text Books:**

1. Using the Internet by Honeycutt (Prentice Hall of India).
2. Fundamentals of the Internet by Raynold Greenlaw & Ellen Hepp (Tata McGraw Hill).

