SYLLABUS OF VII SEMESTER B.E. COMPUTER SCIENCE (SEMESTER PATTERN)

77CS1: TCP / IP & Internet

Unit I:

Unit II:
Internet Addresses: IP address classes, subnet mask, CIDR, ARP, RARP, Internet Protocol, Routing IP Datagrams, ICMP and IGMP.

Unit III:
UDP, TCP, Sockets and socket Programming, Routing in Internet, Routing protocols- RIP, OSPF and BGP. Introduction to Multicasting and Multicast routing.

Unit IV:
Host Configuration: BOOTP, DHCP; Services: Domain Name System, FTP, TFTP and Electronic Mail: SMTP, MIME, IMAP, POP.

Unit V:
Network Management: SNMP, WWW: HTTP, Mobile IP. Multimedia: RTP, RTCP.

Unit VI:
Middlewares: RPC, RMI. Introduction to IPv6 and ICMPv6, Internet Security: IPSec, PGP, Firewalls, SSL.

Books:

Reference Book:
- Stevens W. R. TCP/IP Illustrated, volume 1,2,3, Pearson education.
- Book For Practical:

77CS2: Language Processors

UNIT-I
Introduction to Compilers: Compilers and translators, Phases of compiler design, cross compiler, Bootstrapping, Design of Lexical analyzer, LEX.

UNIT-II
Syntax Analysis: Specification of syntax of programming languages using CFG, Top-down parser, design of LL (1) parser, bottom up parsing technique, LR parsing algorithm, Design of SLR, LALR, CLR parsers.

UNIT-III
Syntax directed translation: Study of syntax directed definitions & syntax directed translation schemes, implementation of SDTS, intermediate notations: postfix, syntax tree, TAC, translation of expression, controls structures, declarations, procedure calls, Array reference.

UNIT-IV
Storage allocation & Error Handling: Run time storage administration, stack allocation, symbol table management, Error detection and recovery: lexical, syntactic, semantic.

UNIT-V
Code optimization: Important code optimization techniques, loop optimization, control flow analysis, data flow analysis, Loop invariant computation, Induction variable removal, Elimination of Common sub expression.

UNIT-VI

Text Books:

77CS3: Elective I: Digital Signal Processing

UNIT—I
Basic elements of a Digital Signal Processing system, Classification of signals, Concept of frequency in Continuous-time and discrete-time signals, Sampling theorem, Quantization of continuous-amplitude signals, quantization of sinusoidal signals. Discrete-time signals, Discrete-time systems, Analysis of discrete-time LTI systems, Correlation of discrete-time signals.
UNIT—II

UNIT—III
Frequency analysis of Continuous-time signals, Frequency analysis of discrete-time signals, Fourier series for discrete-time periodic signals, Power density spectrum of periodic signals, Fourier transform of Discrete-time aperiodic signals, Energy density spectrum of aperiodic signals, Concept of bandwidth, Symmetry properties of the Fourier transform, Fourier transform theorems and properties.

UNIT—IV
The Discrete Fourier Transform: Its properties and applications, Frequency domain sampling: The DFT, Properties of the DFT, Linear filtering 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—V
Introduction to FFT algorithms: Decimation in time-FFT algorithm, Decimation in frequency-FFT algorithm, Quantization effects in the computation of the DFT, Quantization errors in the direct computation of the DFT, Quantization errors in FFT algorithms, DCT.

UNIT—VI
Design of digital filters: Design of FIR filters based on windows, Design of IIR filters from analog filters, IIR filter design by approximation of derivatives, Impulse invariance, Bilinear transformation, Examples of digital filter designs based on the bilinear transformation.

Text Books:
• Digital Signal Processing: Alan V. Oppenheim, W. Schaffer, Pearson Education
• Digital Signal Processing: John G. Proakis and D. Monalkies & D. Sharma, Pearson Education

Reference Books:
• Digital Signal Processing, 2nd Edition by E. Ifeachor, Pearson Education
• Theory and application of signal processing—Rabiner & Gold (PHI)
• Digital filter design and analysis—Andreas Antonious

77CS3: Elective I: Computer Graphics

Unit 1:

Unit 2:
Polygon filling methods: Scan Conversion Algorithms: Simple Ordered edge list, Edge Fill, Fence fill and Edge Flag Algorithm. Seed fill Algorithms: Simple and Scan Line Seed Fill Algorithm, Antialiasing and Halftoning techniques.

Unit 3:
2D Clipping algorithms for regular and irregular windows: Sutherland Cohen Outcode, Sutherland Cohen Subdivision, Mid-Point subdivision, Cyrus Beck and Sutherland Hodgman Polygon clipping Algorithm. Clipping about Concave regions. 2D Transformations, Normalized Device Coordinates and Viewing Transformations.

Unit 4:

Unit 5:

Unit 6:

Text Books:
• Computer Graphics, Hearn and Baker, Pearson Education

Reference Books:
• Computer Graphics : Principles and Practice in “C” by J. D. Foley Pearson Education

77CS3: Elective - I: Real Time Operating Systems

UNIT – I:

UNIT-II:
Effective release times and deadlines, Optimality and non optimality of EDF & LST, Challenges in validating timing constraints in priority-driven systems, off-line versus on-line scheduling. Clock-driven scheduling, Priority driven
scheduling of periodic tasks.

UNIT-III:
Scheduling aperiodic & sporadic jobs in priority-driven systems: Deferrable servers, Sporadic servers, Constant utilization, total bandwidth and weighted fair-queueing servers, scheduling of sporadic jobs. Resources and resource access control: assumption on resources and their usage, effects of resource contention & resource access control, non preemptive critical sections, basic priority-inheritance protocol, basic priority-ceiling protocol, stack-based priority-ceiling protocol, use of priority-ceiling protocol in dynamic-priority systems, preemption-ceiling protocol, controlling accesses to multiple-unit resources.

UNIT-IV
Model of multiprocessor & distributed systems, Task assignment, Multiprocessor priority-ceiling protocol, Elements of scheduling algorithms for end-to-end periodic tasks, Scheduability of fixed priority end-to-end periodic tasks, end-to-end tasks in heterogeneous systems.

Programming Languages and Tools: Desired language characteristics, Data typing, Control structures, Facilitating hierarchical decomposition, packages, Run time error handling, Overloading and generics, Multitasking, Lowlevel programming, Task scheduling, Timing specifications, Programming environments, Run time support.

UNIT-V:
Real Time Databases: Introduction, Basic definitions, real time vs. general purpose databases, main memory databases, Transaction priorities, Transaction aborts, concurrency control issues, disk scheduling algorithms, maintaining serialization consistency, databases for hard real time systems.

Real Time Communication: Introduction, Network Topologies, Contention-based protocol, token based protocol, Stop and go protocol, Polled bus protocol, Hierarchical round robin protocol, Deadline based protocols, Fault tolerant routing.

UNIT – VI:

TEXT-BOOK:
- Real-Time Systems: Jane W.S. Liu, Pearson Education.
- Real Time Systems: C.M.Krishna & Kang G. Shin [TMH]
77CS 3: Elective-I: Fundamentals of Multimedia

UNIT 1
Multimedia Authoring and Data Representations:
Introduction to Multimedia, Multimedia Authoring and Tools, Graphies and Image Data Representations.

UNIT 2

UNIT 3
Multimedia Data Compression: Lossless Compression Algorithms, Run-Length Coding, Variable-Length Coding (VLC), Huffman Coding, Adaptive Huffman Coding, Lossy Compression Algorithms, Quantization, Uniform Scalar Quantization, Nonuniform Scalar Quantization, Vector Quantization, Transform Coding, Discrete Cosine Transform (DCT), Image Compression Standards.

UNIT 4
Basic Video Compression Techniques, MPEG Video Coding I - MPEG-1 and 2, MPEG Video Coding II — MPEG-4, 7 and Beyond, MPEG Audio Compression.

UNIT 5
Multimedia Communication: Computer and Multimedia Networks, Multimedia Network Communications and Applications, Interactive TV (ITV) and Set-Top Box (STB), Broadcast Schemes for Video-on-Demand, Buffer Management, Further Exploration, Wireless Networks, Multimedia over Wireless Networks, Trends in Wireless Interactive Multimedia.

UNIT 6
Multimedia Retrieval: Content-Based Retrieval in Digital Libraries, Minimum three Case studies.

Text Book:

Reference Books:
- Multimedia Making Work (TMH Pub.) by Tay Vaughan.
- Advanced Multimedia Programming (McGraw Hill Pub.) - Steve Rimmer
- Digital Image Processing – Gonzalez and Woods, Pearson Education

77CS4: Elective I:-Advanced Computer Architecture

Unit 1
Models of parallel computer, multiprocessors and multicomputers, multivector and SIMD computers, PRAM and VLSI models conditions of parallelism, data and resource dependencies, grain size and latency, grain packing and scheduling, program flow mechanisms, system interconnect architectures.

Unit 2
Principles of scalable performance, performance metrics and measures, speedup performance laws, advanced processor technology, superscaler and vector processors, verified memory, cache memory organizations, shared memory organizations.

Unit 3
Pipeline and superscalar techniques, linear pipeline processors, reservation and latency analysis, collision free scheduling, pipeline schedule optimization, instruction pipeline design, arithmetic pipeline design, superscaler and superpipeline design.

Unit 4
Multiprocessors and multicomputers, multiprocessor system interconnects, cache coherence and synchronization mechanisms, message passing schemes.

Unit 5
Multivector and SIMD computers vector processing principles, compound vector processing, SIMD computer organizations scalable multithread and dataflow architectures.

Unit 6:
Introduction to Parallel Programming Models, Parallel Language Constructs, Elementary theory about dependence analysis, Code optimizations and Scheduling.

BOOKS:

77CS4: Elective II:- Artificial Intelligence

UNIT I

UNIT II
Search Techniques: Problem size, complexity, approximation and search; depth, breadth and best search; Heuristic Based
Search: Heuristic search, Hill climbing, best-first search, branch and bound

UNIT III
Knowledge representation: First order logic, Unification, Resolution in Predicate Logic.
Learning: Block architecture of learning system, Types of learning, performance Measures

UNIT IV
Uncertainty Treatment: formal and empirical approaches including Bayesian theory, belief functions, certainty factors and fuzzy sets.
UNIT V

UNIT VI
Language Machine: Introduction to Natural Language understanding. Level of knowledge in NLU, Approaches to NLU, Problems in NLU, Basic parsing techniques.

TEXT BOOKS:
- Introduction to Artificial Intelligence by E.Charniack and D. Medermott, Pearson Education.
- Introduction to Artificial Intelligence & Expert system (PHI Pub.) - D.W.Patterson.

REFERENCE BOOKS:

77CS4: Elective-II:- Enterprise Resource Planning

COURSE MODULES:

<table>
<thead>
<tr>
<th>MODULE</th>
<th>LEARNING OBJECTIVE</th>
<th>INDICATIVE HOURS</th>
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<tbody>
<tr>
<td>ERP &amp; Related Technologies</td>
<td>An overview, Business Process Reengineering(BPR), Management Information System(MIS), Decision Support Systems(DSS), Executive Information Systems(EIS), Data Warehousing, Data Mining, OLAP.</td>
<td>6</td>
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<tr>
<td>ERP Implementation and the Competitive Advantage</td>
<td>An overview, Role of consultants, vendors &amp; users, customization, precautions, ERP.Post-implementation options, ERP implementation Lifecycle, Guidelines for ERP implementation, problems. ERP &amp; competitive strategy, problems.</td>
<td>8</td>
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<tr>
<td>ERP Case Studies</td>
<td>Various ERP Case studies.</td>
<td>6</td>
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<td><strong>TOTAL</strong></td>
<td><strong>40</strong></td>
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Textbook:
- Enterprise Resource Planning- Alexis Leon (TMH)
- Reference book:
- ERP Demystified – By Alexis Leon (TMH)

77CS4: Elective-II:- Operating System Design

UNIT-I.
General overview of the Unix System, Kernel: Architecture of Unix OS, Kernel data structures, system administration. The buffer cache; advantages & disadvantages.

UNIT-II.
Internal representation of files, inodes, structures, directories, super block, allocation of disk blocks, System Calls for the file system in Unix.

UNIT-III.

UNIT-IV.
Memory management policies in Unix. Swapping, demand paging hybrid system. I/O subsystem : drivers & streams.

UNIT-V.

UNIT-VI.

Text Books :
- M. J. Bach : The Design of Unix Operating System, Pearson Education
- D. Comer : Operating System Design (Prentice Hall)