SYLLABUS FOR THE POST OF LECTURER (TECHNICAL)

Sl No	SYLLABUS FOR COMPUTER SCIENCE AND ENGINEERING Unit Name and Content
1	**Problem Solving using C:** Design of algorithms for solving problems and use of C language features like expressions, branching and looping, arrays and structures, functions, recursion, pointers and dynamic memory allocation, preprocessor directives, files etc. for implementation of these algorithms
2	**Object Oriented Programming using C++:**Features of object oriented programming languages. Classes and objects, inheritance, compiler time and run time polymorphism, abstract classes, interfaces, exception handling, class templates
3	**Internet Programming:** Java language features, use of AWT and SWING package, event driven programming, threads in Java, networking using Java, JDBC,HTML, Javascript, DHTML,DOM, SOAP,XML,XSL, JSP and PHP
4	**Digital Systems:** Transistor Logic family, simplification of Boolean Functions, combinational Logic design, synchronous sequential logic design, counters, registers
5	**Computer Organization**: Architecture of 8086/8088 microprocessor, instruction set architecture and addressing modes, assembly language programming, RISC,CISC, memory technology, IO subsystem, pipelining
6	**Data structures**: Representation and implementation of linear data structures like linear lists, stacks, queues, dynamic memory storage management techniques, representation and implementation of graphs, trees, binary search tress, height balanced trees, searching and sorting, graph algorithms (traversal, shortest path, spanning tree, max flow) and tree algorithms (traversals, searching, successors)
7	**Operating System**: Architecture, process management, process synchronization and inter process communication, UNIX system calls for process management and memory management, System V IPC, Files and Directories.
8	**Microprocessors and microcontrollers**: 8085 Microprocessor , parallel data transfer using 8155 - DMA transfer using 8257 DMA controller, system design using interrupt 8259 controller - Floppy Disk Controller - CRT controller, microprocessor interfacing techniques
9	**Embedded Computing:** Processors and hardware units in an embedded system, architecture. instruction set and programming with 8051 micro controller, Application- Specific Circuits, FPGA. ARM-based System on a Chip, Network on Chip, hardware modeling using Verilog/VHDL. Real-time operating systems, embedded application development
10	**Computer Network:** Data transmission concepts, OSI and TCP/IP architectures, data encoding, data link control, Medium Access Control, routing algorithms, transport layer(TCP and UDP). Application Layer (FTP,SMTP,SNMP,DNS,HTTP)
11	**Formal Language and Automata Theory**: Deterministic and non-deterministic finite automata. Context-Free Grammars (simplification, normal forms, push down automaton, pumping lemma, properties of CFL), Turing Machines, Undecidability, properties of recursive and recursively enumerable languages, universal Turing machines, post correspondence problem, recursive function theory, oracle computation, Chomsky Hierarchy
12	**Database Management System:** Relational data model, relational languages, file organization, query processing , query optimization, database design, concurrency control and recovery, parallel and distributed database, storage, querying and transformation of XML document schema, object databases, advanced transaction processing
13	**Compiler Design:** Phases of a compiler, lexical analysis, top down and bottom up parsing (recursive descent, predictive, SLR, canonical LR, LALR) , syntax directed translation, intermediate code generation and optimization, target code generation
14	**Design and Analysis of Algorithms**: Asymptotic analysis of complexity bounds, algorithm design by brute-force, greedy, branch-and-bound, backtracking and dynamic programming methodologies, red black trees, Fibonacci heap, binomial heap, sorting in linear time, amortized complexity, median and order statistics, tractable and intractable problems, complexity classes, approximation algorithms, randomized algorithms, evolutionary algorithms
15	**Software Engineering**: Software life cycle models, software requirements analysis and specification, software design, software testing and quality management, software project management

16	**Distributed Computing:** Architectural models, logical clocks, mutual exclusion, distributed deadlock detection, distributed objects and remote invocation, distributed transactions
17	**Data Mining:** Data Preprocessing, Association and Correlation Analysis, Clustering Algorithms and Cluster Analysis, Classification, Applications
18	**Artificial Intelligence:** Scope of AI, State space search, Knowledge Representation and Reasoning, Handling uncertainty and learning
19	**Graph Theory:** Basic concepts, Cut vertices, bridges and blocks, auto Orphism groups, Trees and connectivity, Eulerian and Hamiltonian graphs, Coloring and planar graphs, Matching, factors, decomposition and domination, Extremal Graph theory