CAP779:COMBINATORIAL STUDIES-II

Course Outcomes: Through this course students should be able to

CO1 :: understand various addressing modes, concept of memory hierarchy and I/O interface in computer architecture

CO2 :: formulate problem solutions and understand deep concepts related to RDBMS and Structured Query Language (SQL)

CO3 :: practice critical problems related to computer networks and security

CO4 :: practice critical technical problems related to combinational and sequential circuits in digital logic

CO5 :: practice all the mathematical theories and concepts important for a computer science engineer

Unit I

Digital logic : Boolean algebra, Combinational and sequential circuits, Minimization, Number representations and computer arithmetic (fixed and floating point)

Unit II

Computer organization and architecture : Machine instructions and addressing modes, ALU, data-path and control unit, Instruction pipelining, Memory hierarchy: cache, main memory and secondary storage, I/O interface (interrupt and DMA mode)

Unit III

Computer networks : Concept of layering, LAN technologies (Ethernet), Flow and error control techniques, switching, IPv4/IPv6, routers and routing algorithms (distance vector, link state), TCP/UDP and sockets, congestion control, Application layer protocols (DNS, SMTP, POP, FTP, HTTP), Basics of Wi-Fi, Network security: authentication, basics of public key and private key cryptography, digital signatures and certificates, firewalls

Unit IV

Databases : ER-model, Relational model: relational algebra, tuple calculus, Integrity constraints, normal forms, structured query language (SQL), file organization, indexing (e.g., B and B+ trees), transactions and concurrency control

Unit V

Discrete mathematics : propositional logic, first order logic, sets, relations, functions, partial orders, lattices, groups

Unit VI

Probability : random variables, uniform, normal, exponential, poisson and binomial distributions, mean, median, mode, standard deviation, conditional probability, bayes theorem

Text Books:

1. DATABASE SYSTEM CONCEPTS by ABRAHAM SILBERSCHATZ, HENRY F. KORTH, S. SUDARSHAN, MCGRAW HILL EDUCATION

2. DATA COMMUNICATIONS AND NETWORKING (SIE) by BEHROUZ A. FOROUZAN, MCGRAW HILL EDUCATION

3. COMPUTER ARCHITECTURE AND ORGANIZATION: DESIGN PRINCIPLES AND APPLICATIONS by B. GOVINDARAJALU, MCGRAW HILL EDUCATION

4. DIGITAL LOGIC DESIGN AND COMPUTER ORGANIZATION WITH COMPUTER ARCHITECTURE FOR SECURITY by NIKROUZ FAROUGHI, MCGRAW HILL EDUCATION

References:

1. UGC NET COMPUTER SCIENCE AND APPLICATIONS by SURBHI SHARMA, KAILASH CHANDRA GURUNANI, ARIHANT PUBLICATIONS INDIA LTD.