B.A /B.Sc. (Life Sciences) with Computer Application Syllabus

I Semester, DSC 1A
Computer Fundamentals

Unit – I

Introduction to Computer : Introduction, Digital and Analog Computers, Characteristics of Computer, History of Computer, Generations of Computer, Classification of Computer, The Computer System, Application of Computers.

The Computer System Hardware: Introduction, Central Processing Unit, Memory Unit, Instruction Format, Instruction Set, Instruction Cycle, Microprocessor, Interconnecting the Units of a Computer, Performance of a Computer, Inside a Computer Cabinet

Computer Memory : Introduction, Memory Representation, Memory Hierarchy, CPU Registers, Cache Memory, Primary Memory, Secondary Memory, Access Types of Storage Devices, Magnetic Tape, Magnetic Disk, Optical Disk, Magneto-Optical Disk, Using the Computer Memory.

Unit – II

Input and Output Devices: Introduction, Input-Output Unit, Input Devices, Human Data Entry Devices, Source Data Entry Devices, Output Devices, I/O Port, Working of I/O System.

Data Representation : Introduction, Number System, Conversion from Decimal to Binary, Octal, Hexadecimal, Conversion of Binary, Octal, Hexadecimal to Decimal , Conversion of Binary to Octal, Hexadecimal, Conversion of Octal, Hexadecimal to Binary, Binary Arithmetic, Signed and Unsigned Numbers, Binary Data Representation, Binary Coding Schemes, Logic Gates.

Interaction of User and Computer: Introduction, Types of Software, System Software, Application Software, Software Acquisition.

Unit – III

Operating System : Introduction, Objectives of Operating System, Types of OS, Functions of OS, Process Management, Memory Management, File Management, Device Management, Protection and Security, User Interface, Examples of Operating Systems.

Computer Programming Fundamentals: Introduction, Program Development Life Cycle, Algorithm, Control Structures, Flowchart, Pseudo Code, Programming Paradigms.

The Internet and Internet Services: Introduction, History of Internet, Internetworking Protocol, the Internet Architecture, Managing the Internet, Connecting to Internet, Internet Connections, Internet Address, Internet Services, Uses of Internet.

Unit IV

Information Systems : Introduction, Data, Information and Knowledge, Characteristics of Information, Information System (IS), Computer-Based Information System (CBIS), Need for Efficient Information System, Categories of Information System, Operations Support System, Management Support System, Specialized Information System, Careers in Information Systems.

Computer Security: Introduction, Security Threat and Security Attack, Malicious

KAKATIYA UNIVERSITY
U.G. Computer Science (Under CBCS)
B.Sc. Final Year
SEMESTER - V:

Elective 1

A) Computer Networks

Unit I
Introduction: Data Communication Components, Line Configuration, Topologies, Transmission Mode, Categories of Networks, ISO Reference Model–Layered Architecture, Functions of Layers, TCP/IP Reference Model.
Transmission Media: Guided Media–Twisted Pair Cable, Coaxial Cable, Optical Fiber, Unguided Media– Satellite Communication, and Cellular Telephony. Multiplexing: Frequency–Division Multiplexing, Time–Division Multiplexing.

Unit II
Data Link Layer: Error Detection–VRC, LRC, CRC, Checksum, Error Correction–Hamming Code, Burst Error Correction, Line Discipline–ENQ/ACK, Poll/Select, Flow Control–Stop-and-Wait, Sliding Window, Error Control–Stop-and-Wait ARQ, Sliding Window ARQ Go-Back-n ARQ, Selective-Reject ARQ.

Unit III
Local Area Networks: Introduction to IEEE 802, Ethernet-CSMA/CD, Implementation, Token Ring,-Token Passing, Implementation.
Switching: Circuit Switching, Packet Switching, Message Switching.

Unit IV
Networking and Internetworking Devices: Repeaters, Bridges, Routers, Gateways, Routers, Switches, Distance Vector Routing Algorithm, Link State Routing Algorithm.
Transport Layer: Duties of Transport Layer, Connection. Upper OSI Layers; Session Layer, Presentation Layer, Application Layer.

Text Book:
Behrouz A. Forouzan, Data Communication and Networking (2e Update)

References:
1. S.S. Shinde, Computer Networks
2. William Stallings, Data and Computer Communications
3. Andrew S. Tanenbaum, David J Wetherall, Computer Networks
4. Behrouz A Forouzan, Firouz Mosharraf, Computer Networks A Top-Down Approach
5. James F. Kurose, Keith W. Ross, Computer Networking: A Top-Down Approach Featuring the Internet.

KAKATIYA UNIVERSITY
Under Graduate Courses (Under CBCS 2020 – 2021 onwards)
B.Sc. Computer Science II Year
SEMESTER – IV

DATA BASE MANAGEMENT SYSTEMS

Theory:	4 Hours/Week;	Credits: 4	Marks: 100 (Internal: 20; External: 80)	
Practical:	3 Hours/Week	Credits: 1	Marks: 25	

Unit - I
Introduction: Database-System Applications, Purpose of Database Systems, View of Data, Database Languages, Relational Databases, Database Design, Data Storage and Querying, Transaction Management, Database Architecture, Database Users and Administrators.
Introduction to the Relational Model: Structure of Relational Databases, Database
Schema, Keys, Schema Diagrams, Relational Query Languages, Relational Operations.

Unit - II
Database Design and the E-R Model: Overview of the Design Process, The Entity- Relationship Model, Constraints, Removing Redundant Attributes in Entity Sets, Entity-Relationship Diagrams, Reduction to Relational Schemas, Entity-Relationship Design Issues, Extended E-R Features, Alternative Notations for Modeling Data, Other Aspects of Database Design.
Relational Database Design: Features of Good Relational Designs, Atomic Domains and First Normal Form, Decomposition Using Functional Dependencies, Functional- Dependency Theory, Decomposition Using Multivalued Dependencies, Normal Forms-2 NF, 3 NF, BCNF, The Database Design Methodology for Relational Databases.

Unit - III
Introduction to SQL: Overview of the SQL Query Language, SQL Data Definition, Basic Structure of SQL Queries, Additional Basic Operations, Set Operations, Null Values, Aggregate Functions, Nested Subqueries, Modification of the Database.
Intermediate SQL: Join Expressions, Views, Transactions, Integrity Constraints, SQL Data Types and Schemas, Authorization.
Advanced SQL: Accessing SQL from a Programming Language, Functions and Procedures, Triggers, Recursive Queries.

Unit - IV
Transaction Management: Transaction Support–Properties of Transactions, Database Architecture, Concurrency Control–The Need for Concurrency Control, Serializability and Recoverability, Locking Methods, Deadlock, Time Stamping Methods, Multi-version Timestamp Ordering, Optimistic Techniques, Granularity of Data Items, Database Recovery–The Need for Recovery, Transactions and Recovery, Recovery Facilities, Recovery Techniques, Nested Transaction Model. Security: Database Security–Threats, Computer-Based Controls–Authorization, Access Controls, Views, Backup and Recovery, Integrity, Encryption, RAID.

Text book:
1. Silberschatz, H. Korth and S. Sudarshan, Database System Concepts, 6th Ed., Tata McGraw Hill, 2011
2. Thomas M. Connolly, Carolyn E. Begg, Database Systems–A Practical Approach to Design, Implementation, and Management (6e)

Dr. B.Rama Chairperson Board of Studies, Department of Computer Science, KU

Faculty of Commerce & Business Management, Kakatiya University, Warangal.

Paper DSC 303: RELATIONAL DATABASE MANAGEMENT SYSTEMS
(Only for B.Com. (Computer Applications)

Hours Per Week: 7 (3T+4P) Credits: 5

Exam Hours: 1 ½ Marks: 50U+35P+15I

Objective: to acquire basic conceptual background necessary to design and develop simple database system, Relational database mode, ER model and distributed databases, and to write good queries using a standard query language called SQL.

UNIT-I: BASIC CONCEPTS: Database Management System - File based system - Advantages ofDBMS over file based system - Database Approach - Logical DBMS Architecture - Three level architecture of DBMS or logical DBMS architecture - Need for three level architecture - Physical DBMS Architecture - Database Administrator (DBA) Functions & Role - Data files indices and Data Dictionary -Types of Database. Relational and ER Models: Data Models - Relational Model – Domains - Tuple and Relation - Super keys - Candidate keys - Primary keys and foreign key for the Relations - Relational Constraints - Domain Constraint - Key Constraint - Integrity Constraint - Update Operations and Dealing with Constraint Violations - Relational Operations - Entity Relationship (ER) Model – Entities – Attributes – Relationships - More about Entities and Relationships - Defining Relationship for College Database - E-R Diagram - Conversion of E-R Diagram to Relational Database.

UNIT-II: DATABASE INTEGRITY AND NORMALISATION: Relational Database Integrity - TheKeys - Referential Integrity - Entity Integrity - Redundancy and Associated Problems – Single Valued Dependencies – Normalisation - Rules of Data Normalisation - The First Normal Form -The Second Normal Form - The Third Normal Form - Boyce Codd Normal Form - Attribute Preservation - Lossless-join Decomposition - Dependency Preservation. File Organisation : Physical Database Design Issues - Storage of Database on Hard Disks - File Organisation and Its Types - Heap files (Unordered files) - Sequential File Organisation - Indexed (Indexed Sequential) File Organisation - Hashed File Organisation
- Types of Indexes - Index and Tree Structure - Multi-key File Organisation - Need for Multiple Access Paths - Multi-list File Organisation - Inverted File Organisation.
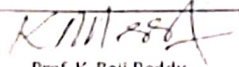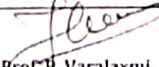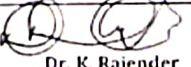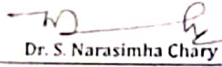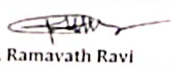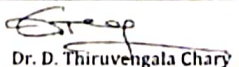
UNIT-III: STRUCTURES QUERY LANGUAGE (SQL): Meaning–SQL commands – Data Definition Language - Data Manipulation Language - Data Control Language - Transaction Control Language - Queries using Order by – Where - Group by - Nested Queries. Joins – Views – Sequences - Indexes and Synonyms - Table Handling.

UNIT-IV: TRANSACTIONS AND CONCURRENCY MANAGEMENT: Transactions – Concurrent Transactions - Locking Protocol - Serialisable Schedules - Locks Two Phase Locking (2PL) - Deadlock and its Prevention - Optimistic Concurrency Control. Database Recovery and Security: Database Recovery meaning - Kinds of failures - Failure controlling methods - Database errors - Backup & Recovery Techniques - Security & Integrity - Database Security - Authorization.

UNIT-V: DISTRIBUTED AND CLIENT SERVER DATABASES: Need for Distributed Database Systems - Structure of Distributed Database - Advantages and Disadvantages of DDBMS - Advantages of Data Distribution - Disadvantages of Data Distribution - Data Replication - Data Fragmentation. Client Server Databases: Emergence of Client Server Architecture - Need for Client Server Computing - Structure of Client Server Systems & its advantages.

ADVANCED TOPICS: Overview: Parallel Database - Multimedia Database - Mobile Database - Web Database - Multidimensional Database. Data Warehouse - OLTP Vs OLAP - NoSQL Database. **LAB:** SQL QUERIES BASED ON VARIOUS COMMANDS.

SUGGESTED READINGS: 1)Database Systems: R.Elmasri& S.B. Navathe, Pearson.; 2)Introduction to DatabaseManagement System: ISRD Group, McGraw Hill.; 3) Database Management System: R.Ramakrishnan&J.Gehrke, McGrawHill.; 4) Modern Database Management: J.A.Hoffer,V.Rames&H.Topi, Pearson.;5) Database System Concepts: Silberschatz,Korth&Sudarshan,McGrawHill.6) Simplified Approach to DBMS: Parteek Bhaia, Kalyani Publishers.

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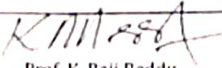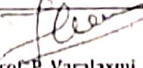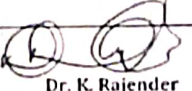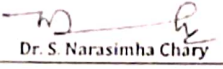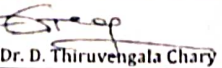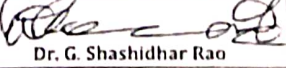
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