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| **Course Title/ Code** | **Database Management System (CSH202B) T & P** |
| **Course Type** | **Core (Departmental)** |
| **Course Nature** | Hard |
| **L-T-P-O Structure** | (3-1-2-0) |
| **Objectives** | To do logical and physical design of data bases and manipulate them. |

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| **Syllabus** | **Sections** | **Weightage** |
| A | 25% |
| B | 25% |
| C | 25% |
| D | 25% |
| **TOTAL** | **100%** |

# Section-A

**File system & Introduction to DBMS**: ~~File, operations on files, file header, Different file organizations - serial, sequential,~~ indexed sequential, direct/hash, Indexing – primary, secondary, single level, multi-level, clustered, Introduction to DBMS – comparison with conventional file processing, ANSI SPARC three level DBMS architecture, data independence, data abstraction, different users of DBMS, Applications of DBMS, SQL(Introduction, Data Types, Constraints, Creation of Tables)

**Section-B**

**Relational model and Algebra:** Introduction to SQL(Insertion of Data, Updating in the data, Alternation in the Schema, Data Fetching, Functions), Relational model – Mathematical formulation, Relation and its properties, domain compatibility, Relational algebra – set operations (union, intersect, difference, cross product), relational operations (select, project, division, joins-cross, inner/outer, theta, natural, equivalence), group operations Tuple calculus, Relational Calculus.

# Section-C

**Relational Database design:** SQL (Set Operations, group by, order by, Joins), Relational Database Design and ER Model( Entity, Relationship, Strong Entity, Weak Entity, Type of Attributes and their representation), EER( Generalized and Specialization) , Functional dependency, Armstrong inference axioms, Closure and its algorithm, Minimal set of Functional Dependencies and its algorithm, Keys – super key, minimal super key, candidate keys, primary key, foreign key, Algorithm to find primary key.

**Good decomposition properties** – dependency preservation and loss less join, Algorithm for checking los less join decomposition, Synthesis Approach, Anomalies – insertion, deletion and updating, I NF, 2 NF, 3 NF, BCNF, Multi - valued dependency, 4 NF, Join dependency, 5 NF.

# Section-D

**Transaction processing, Concurrency control & recovery**: SQL( Sub queries, View, Sequence, DCL(Roll back, commit)), Introduction to transaction, properties of transaction and life cycle of transaction, Schedule – serial, non-serial, serializable (result, conflict and view), strict schedule, Concurrency and problems related, Concurrency control techniques – Locking, two phase locking, strict, rigorous 2PL, Deadlock – detection, prevention, breaking deadlock, Recovery System, Basic Concepts of Recovery, Database Update(update in place, Deferred Update), Undo-Redo Algorithm, No Undo-Redo Algorithm, Undo-NoRedo Algorithm, Shadow Paging Technique.

**List of Experiments**

1. File Vs DBMS
2. DDL statement
3. DML Statement
4. DCL Statement
5. Project
6. Tool related to RDBMS

**Text Books:**

1. Fundamentals of Database Systems by R. Elmasri and S.B. Navathe,6th edition, 2013, Addision-Wesley, Low Priced Edition
2. Database system concepts, 6th edition, McGraw-Hill, [AviSilberschatz](http://www.cs.yale.edu/homes/avi), [Henry F. Korth](http://www.lehigh.edu/%7Ehfk2/hfk2.html), [S. Sudarshan](http://www.cse.iitb.ac.in/%7Esudarsha)

**Reference Book:**

1. An Introduction to database systems by Bipin C. Desai, Galgolia Publications.

Modern Database Management by Feffray A. lioffcr, Mary B. Prcscotl, Fred R Mefaddcn, 6th edition. Pearson Education