Course: CS 601- Database Management System

PROGRAMME: **COMPUTER SCIENCE & ENGINEERING**	DEGREE: **B. TECH**
COURSE: **Database Management System**	SEMESTER: **6** CREDITS: **3**
COURSECODE: **CS 601**	COURSE TYPE: **Theory**
COURSE AREA/DOMAIN: **Practical knowledge about storage, industry**	CONTACT HOURS: **3 (weekly)**
CORRESPONDING LAB COURSE CODE (IF ANY): **CS 691**	LAB COURSE NAME: **Database Management System Lab**

Course Objectives

1. To develop conceptual understanding of database management system
2. To understand how a real world problem can be mapped to schemas
3. To solve different industry level problems & to learn its applications

Course Outcomes

1. Ability to define a problem at the view level & ability to understand the physical structure of the database to handle data
2. Students would be able to implement the logic by using tools like ERD
3. Ability to normalize the database & understand the internal data structure
4. Students would clearly understand the transaction system & could extract data efficiently

Programme Outcomes addressed in this course

a. An ability to apply knowledge of physical storage of data, apply it in solving any industry related problems
b. An ability to take the most important responsibility as a Database Administrator

Syllabus

UNIT	DETAILS	HOURS
I	**Introduction to DBMS** Concept & Overview of DBMS, Data Models, Database Languages, Database Administrator, Database Users, Three Schema architecture of DBMS.	2
II	**Entity-Relationship Model** Basic concepts, Design Issues, Mapping Constraints, Keys, Entity-Relationship Diagram, Weak Entity Sets, Extended E-R features.	4
III	Relational Model Structure of relational Databases, Relational Algebra, Relational Calculus, Extended Relational Algebra Operations, Views, Modifications Of the Database.	**6**
IV	**SQL and Integrity Constraints** Concept of DDL, DML, DCL. Basic Structure, Set operations, Aggregate Functions, Null Values, Domain Constraints, Referential Integrity Constraints, assertions, views, Nested Sub-queries, Database security application development using SQL, Stored procedures and triggers.	**4**
V	**Relational Database Design** Functional Dependency, Different anomalies in designing a Database., Normalization using functional dependencies, Decomposition, Boyce-Codd Normal Form, 3NF, Normalization using multi-valued dependencies, 4NF, 5NF	8
VI	**Internals of RDBMS** Physical data structures, Query optimization: join algorithm, statistics and cost bas optimization. Transaction processing, Concurrency control and Recovery Management: transaction model properties, state serializability, lock base protocols, two phase locking.	7
VII	**File Organization & Index Structures** File & Record Concept, Placing file records on Disk, Fixed and Variable sized Records, Types of Single-Level Index (primary, secondary, clustering), Multilevel Indexes, Dynamic Multilevel Indexes using B tree and B+ tree .	6

Gaps in the syllabus - to meet industry/profession requirements

S.NO.	DESCRIPTION	PROPOSED ACTIONS	PO MAPPING
1	Distributed database concept, Data mining, ware housing	Extra Class	a.

Topics beyond syllabus/advanced topics

S.NO.	DESCRIPTION	HOURS
1	Distributed Database concept	3

References

S.NO.	Books
1	Ramakrishnan: Database Management System , McGraw-Hill
2	Stafano Ceri: Distribute database concept, McGraw-Hill

S.NO.	URL
1	http://en.wikipedia.org/wiki/Distributed_database

Delivery/Instructional Methodologies

S.NO.	DESCRIPTION
1	Chalk and Talk
2	Study Material, slide show

Assessment Methodologies

S.NO.	DESCRIPTION	TYPE
1	Student Assignment	Direct
2	Tests	Direct
3	University Examination	Direct
4	Student Feedback	Indirect

Course Plan

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S. NO.	Day	Module	Topic
1	Day 1	I	Introduction to DBMS , Advantages, Users, DBA, Application
2	Day 2		Data Models, Languages, architecture
3	Day 3-Day 6	II	ENTITY-RELATIOSHIP MODEL: Basic concepts, Design Issues, Mapping Constraints, Keys, Entity-Relationship Diagram, Weak Entity Sets, Extended E-R features.
4	Day 7-Day 12		Relational Model Structure of relational Databases, Relational Algebra, Relational Calculus, Extended Relational Algebra Operations, Views, Modifications Of the Database.
5	Day 13-Day 16		**SQL and Integrity Constraints** Concept of DDL, DML, DCL. Basic Structure, Set operations, Aggregate Functions, Null Values, Domain Constraints, Referential Integrity Constraints, assertions, views, Nested Sub-queries, Database security application development using SQL, Stored procedures and triggers.
6	Day 17-Day 24		**Relational Database Design** Functional Dependency, Different anomalies in designing a Database., Normalization using functional dependencies, Decomposition, Boyce-Codd Normal Form, 3NF, Normalization using multi-valued dependencies, 4NF, 5NF
7	Day 25-Day 31	III	**Internals of RDBMS** Physical data structures, Query optimization: join algorithm, statistics and cost bas optimization. Transaction processing, Concurrency control and Recovery Management: transaction model properties, state serializability, lock base protocols, two phase locking.
8	Day 32-Day35		**File Organization & Index Structures** File & Record Concept, Placing file records on Disk, Fixed and Variable sized Records, Types of Single-Level Index (primary, secondary, clustering), Multilevel Indexes, Dynamic Multilevel Indexes using B tree and B+ tree . 1.