17CS001 Advanced Database Management Systems

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Course Description and Objectives:
This course presents in depth, databases and database management systems. Topics covered will include: the fundamental nature for how data is stored on electro-magnetic devices, database management system architecture, building complex database objects, establishing and maintaining database security and tuning databases for optimum performance. Provides the theory and practice of advanced database development and administration.

Course Outcomes
The student will be able to:
- ✓ Understand the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra and SQL.
- ✓ Design Entity Relationship(ER) models to represent simple database application scenarios.
- ✓ Design and implement advanced queries using Structured Query Language
- ✓ Understand the Distributed database concepts
- ✓ Identify, describe, and categorize database objects.
- ✓ Understand the basic concepts of Mongo DB
- ✓ Explore non-relational database systems and structures

Skills

- ✓ Design a conceptual database using ER-Model.
- ✓ Convert ER- Model to RDBMS.
- ✓ Design and implement advanced queries using Structured Query Language
- ✓ Perform the database tuning
- ✓ Identify, describe, and categorize database objects.

UNIT - I
Conceptual database Design: Relational Model, Relational Algebra, Relational Calculus, ER Model, ER-Diagram, Normalization and SQL

UNIT - II
Physical database Design: Overview of Storage and Indexing, Physical Database design and Tuning

Unit III
Distributed Database Systems: Evolution of Distributed Database System, Distributed Database- Concepts, Design and Transaction Management

UNIT - IV
Object-Oriented Database Design: Introduction, Object-oriented Data Model, Object Databases Standards and Definitions.

UNIT - V
Bigdata: Introduction to MongoDB, The data Model, Installing MongoDB, Working with MongoDB.

Activities
- ✓ Design of ER diagram for the development of web applications
- ✓ Transformation of ER diagram into a relational schema.
- ✓ Creation of relations with entity and referential integrity constraints for a given relational schema
- ✓ Performing the database tuning techniques
- ✓ Creating complex database objects
- ✓ Installation of mongo DB
- ✓ Working with No SQL

Laboratory Experiments

List of Programs
1. Web application Database Design using ER Design tool (ex. ERDPlus, SmartDraw,TOAD)
2. Data Definition, Table Creation, Constraints, Insert, Select Commands, Update and Delete Commands.
3. Basic SQL Queries
4. Complex Queries and Join Queries
5. Views
6. Design and development of database using MYSQL
7. High level programming language extensions (Control structures, Procedures and Functions).
8. Triggers
9. Familiarization of MongoDB
10. Installation of MongoDB
11. Working on MongoDB using NoSQL
12. Case Study/ Database application project.

Text Books :
1. *C . J. Date, A. Kannan* and *S.Swamynathan*, Introduction to Database Systems, Pearson Education, 2006 (for Unit I)
2. *Raghu Ramakrishnan* and *Johannes Gehrke*, Database Management Systems, Third Edition, Mc Graw Hill (for unit II)
3. *Chhanda Ray*, Distributed Database Systems, Pearson Education India, 2009 (for Unit III)
4. *Jan L. Harrington*, Object-oriented Database Design Clearly Explained, Morgan Kaufmann, 2000 (for Unit IV)
5. David Hows, Peter Membrey Eelco Plugge and Tim Hawkins, The Definitive Guide to MongoDB, Third Edition, Apress, 2015. (for Unit V)

Reference Text Books:
1. Seyed M.M. Tahaghoghi, Hugh E. Williams, Learning MySQL-concepts and Techniques for working with Relational data, O'Reilly Media, Inc,2006.
2. David Hows, Peter Membrey Eelco Plugge and Tim Hawkins, The Definitive Guide to MongoDB, Third Edition, Apress, 2015.