Birla Institute of Technology & Science, Pilani
Hyderabad Campus

SECOND SEMESTER 2023 - 2024

Course Handout Part II

Date: 28.12.2023

In addition to part-I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course.

Course No. : CS G516
Course Title : Adv. Databases Systems
Instructor-in-Charge : Prof. Subhrakanta Panda

Scope and Objective of the Course:
The scope of the course includes advance DBMS techniques like object-oriented database, parallel databases, distributed databases, deductive databases, spatial database, multimedia databases, query optimization, information retrieval and XML, data warehousing and data mining etc. The course will also focus on the data related issues in building, analysing, and maintaining complex software systems. It will highlight the common concepts behind the different applications. The laboratory component will focus to design an interface of database with front end tools and to understand advanced DBMS techniques to construct tables and write effective queries, forms, and reports.
The objectives of this course are as follows:

- To develop a good understanding of the different architectural as well as the design perspectives of Adv. Database systems.
- To gain hands-on exposure designing interfaces of Adv. Databases.
- Develop understanding of different query optimization techniques and indexing mechanisms.
- To be able to construct tables and write effective queries, forms and reports.

Textbooks:

1. Raghu Ramakrishnan and Johannes Gehrke, **Database Management System**, 3rd Ed, McGraw-Hill, 2002
2. Elmasri, Navathe, **Fundamentals of Database Systems**, Pearson Education, 2002

Reference books

1. NoSQL Distilled: A brief guide to the emerging polyglot persistence (Paperback) by Sadalage, Pramod, Fowler, Martin, Pearsons Education, 2013.
2. Özsu, M. Tamer, **Valduriez**, Patrick, **Principles of Distributed Database Systems,** Springer third edition, ISBN 978-1-4419-8834-8
3. V. Benjamin Nevarez, **Microsoft Sql Server 2014: Query Tuning And Optimization**, McGraw Hill
4. Silberschatz A, Korth H F, and Sudarshan S, **Database System Concepts**, TMH, 7th Edition, 2020.

Course Plan:

L No.	Learning objectives	Topics to be covered	Chapter No.
1-6	Understanding different databases	Introduction to different databases like structured, unstructured, semi-structured, temporal, spatial, multimedia, deductive, parallel, distributed databases etc.	Lecture Notes
7-8	Understanding Database design and performance tuning	Schema refinement in database design, functional dependencies, normal forms, database workloads	T1 Ch 16. T2 Ch 14
9-13	Understanding Index Structures	Overview of Indexes, Properties of indexes, B-Trees, Hash Tables, Hash Structures for Multi-dimensional indexes, Tree Structures for Multidimensional Data.	T1 Ch 9, Ch 10 T2 Ch 17.

14-18	Applying Query processing and evaluation techniques for large databases	Overview of query evaluation, query evaluation techniques for large databases, converting query tree to query evaluation plans, multi-query optimization, and application.	T1 Ch 12. T2 Ch 15, 16.
19-24	Understanding Distributed Database design	Distributed databases: Distributed DBMS architectures, storing data in distributed DBMS, distributed catalogue management, distributed query processing, updating distributed data, distributed transaction, distributed concurrency control, distributed recovery, directory systems, data Replication, data Fragmentation, distributed database transparency features, distribution transparency.	T1 Ch 21 T2 Ch 20, 21
25-30	Learning XML Query processing	Indexing for text search, managing text in DBMS, A data model for XML, querying XML data, efficient evaluation of XML queries.	T1 Ch 22. Lecture Notes
31-42	Understanding NoSQL Data Model	NoSQL data model and schema design, schemaless data representation, types of NoSQL databases: document databases, key-value databases, wide-column stores, and graph databases, data models used in NoSQL, scale-out architecture.	R1, Lecture Notes

Evaluation Scheme:

Sl. No.	Component	Duration	Weightage (%)	Date & Time	Nature of Component
1	Mid-Semester	90 mins	25	TBA	Closed Book
2	Class Assessment Tests (CAT)	5 mins	5	TBA	Open Book
2	Lab Assignments (LA) (Assignments of 10% to be completed for Mid-Semester grading)		30	TBA	Open Book
3	Term Paper Presentation (TPP)		10	TBA	Open Book
4	Comprehensive	3 Hrs	30	10.05.2023	Closed Book

Note:

1. At least 40% of the evaluation components to be completed for Mid-semester grading.

Chamber Consultation Hour: To be announced in the class.
Notices: Notices regarding the course will be put up on the CSIS notice board and/or CMS/Google Classroom.
Make-up Policy: No makeup for CAT, TPP, and LA components. ***Make-up*** will be granted as per the guidelines by AGSRD for Mid-Semester and Comprehensive Exams**.**
Academic Honesty and Integrity Policy: Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

Instructor In-Charge
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