Birla Institute of Technology & Science, Pilani
Hyderabad Campus

SECOND SEMESTER 2022-2023

Course Handout Part II

Date: 1-01-2023

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 F212
Course Title : Database Systems
Instructor-in-Charge : R. Gururaj (gururaj@hyderabad.bits-pilani.ac.in)
Instructors : Dr.Abhijit Das, Dr.Prajna Devi Upadhyay, Dr.Manik Gupta.

Scope:

The scope of this course includes- Data modeling, database design theory, data definition and manipulation languages, relational data model, relational algebra and relational calculus, SQL, functional dependencies and normalization, storage and indexing techniques, query processing and optimization, transaction management - concurrency control and crash recovery.

Course Objectives:

- To enrich the skill and competency of students in Modeling and Design of relational Database Systems using ER modeling technique.
- To learn Formal and Commercial query languages like- Relational Algebra and SQL for Relational data.
- To learn the concepts related to indexing, hashing and Query processing for relational databases.
- To understand transaction processing, concurrency control schemes and database recovery models for relational databases.
- To impart practical knowledge in SQL and PL-SQL with hands on experience.

Textbooks:

T1. Elmarsi R, & Navathe S B, ***Fundamental of Database System,*** Sixth Edition, Pearson Education.

Reference books:

R1. Silberschatz, Abraham, Henry F. Korth & S.Sudarshan, Database System Concepts McGRAW-HILLS, 6th ed., 2010.

R2. Ramakrishna R. & Gehrke J, ***Database Management Systems***, 3e, Mc-Graw Hill, 2003.

Course Plan:

Lecture No.	Learning Objectives	Topics to be covered	Chapter in the Text Book
1-2	To get the context for this course and introduction to basic concepts of Database Systems	Introduction to Database System Concepts – data models ; architecture; components of DBMS.	T1-Ch.1&2; Class Notes
3-5	To understand the essence of Relational data model.	Relational Data Model concepts; Constraints.	T1-Ch.3

6-10	To learn and practice SQL query operations	SQL – DDL and DML Commands	T1-Ch.4 &5
11-14	To understand the Formal query language operations for relational model.	Formal QLs for Relational Model; Relational Algebra; Operations; introduction to Tuple Relational Calculus(TRC).	T1-Ch.6
15-17	To learn modeling Databases at Conceptual level	Database Design by ER-and EER; Mapping from ER/EER to-Relational Schema	T1-Ch. 7, 8
18-22	To understand the basics of database design concepts	Relational Database Design: Functional Dependencies and Normalization , Decomposition rules	T1-Ch. 15
23-25	To understand Data storage mediums and File organization for databases	Disk Storage, File/Record organization	T1-Ch.16
26-30	To learn Hashing and Indexing schemes for Database Systems	Indexing- Primary; Secondary; multilevel; B+ Trees . Hashing – Static and Dynamic hashing Schemes	T1-Ch. 16 & 17
31-32	To understand the Transaction Model	Transaction Processing – States; Schedules	T1- Ch.20
33-35	To understand concurrency control mechanisms	Concurrency Control Techniques – Lock-based and Timestamp based schemes	T1-Ch.21
36-37	To learn the fundamentals of Database recovery Techniques	Database Recovery Techniques- Log-based and Shadow paging schemes	T1- Ch.22
38-41	To understand the basics of SQL Query Processing and Optimization and Database tuning	Query Processing & Optimization- Query trees and Optimization Heuristics; Database tuning strategies	T1- Ch.18, 19
42		Conclusion	

Evaluation Scheme:

S No	Evaluation Component	Weightage	Date & Time	Nature of Component
1	Mid-semester Test	35%	17/3 2.00 - 3.30 PM	Close Book
2	End-sem Lab- Exam	10%	29-Apr-2023(Sat) AN	Open Book
3	Mini-project (5% evaluation before mid-semester grading)	10%		Open Book(take-home)
4	Comprehensive Exam	45%	18/05 FN	Close Book

Make-up Policy:
Make-up will be given for genuine cases (on medical grounds only) with prior permission by the IC.

Course Notices
All notices pertaining to this course will be made available on the CMS.

Chamber Consultation: To be announced.

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
Prof. R Gururaj