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**SECOND SEMESTER 2020-2021**

# Course Handout Part II

Date: 16-01-2021

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](mailto:gururaj@hyderabad.bits-pilani.ac.in))

Instructors : Lov Kumar , Subhrakanta panda, Jabez Christopher, Sandeep

PhD TAs : Gourish G, Lalitha, Simran

**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 Impart practical knowledge in SQL and PL-SQL with hands on experience.
* To make students Industry ready in the field of Database Systems.

**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:**

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| **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:**

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| --- | --- | --- | --- | --- |
| **S No** | **Evaluation Component** | **Weightage** | **Date & Time** | **Nature of Component** |
| 1 | Mid-semester Test | 35% | 03/03 1.30 - 3.00PM | Open Book |
| 2 | Lab Test (post-midsem) | 10% | TBA | Open Book |
| 3 | Mini project  (will have two spells of evaluation) | 5%  before midsem grading | TBA | Open Book(take-home) |
| 10%  after-midsem grading | TBA | Open Book(take-home) |
| 4 | Comprehensive Exam | 40 % | 08/05 AN | Open Book |

**Make-up-Policy:**

As per the specific guidelines from AUGSD, the General Requirement for Students is as follows.

*“It is expected that each student shall acquire a computer with the desired hardware, software along with an internet connection. High-speed broadband access is highly recommended for the optimal learning experience”.*

Hence it is the responsibility of the student to take care of necessary things to take the evaluation components online. Do not ask for makeup on reasons like- HW/Internet/BW related issues. No make-up is possible without prior permission of the IC. Make-up request may be considered only for cases - where hospitalization of the student is done and, on submission of discharge note issued by the hospital authorities, after thorough scrutiny.

**Course Notices:** All notices pertaining to this course will be put on the **CMS** and/or **Google Classroom** - Course web-page.

# **Chamber Consultation**: Since it is online mode of instruction, the doubt clarification slot will be announced once the course starts, depending on the need, after discussing with students.

# **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