

ITE6007		Advanced Database Systems		L T P J C	
Pre-Req: NIL				3 0 2 0 4	
Version 1.1					
Objectives:					
1. To familiarize the relational database concepts.					
2. Know the need for parallel and distributed.					
3. Understand the usage of object, XML and spatial databases.					
Expected Outcome :					
On completion of this course, student should be able to					
1. Analyze the collected data and Design Schemas.					
2. Work with parallel and distributed databases.					
3. Develop applications with complex data types.					
Module	Topics			L Hrs	SLO
1	Relational Database Design: Basics, Entity Types, Relationship Types, ER Model, ER-to-Relational Mapping algorithm. Normalization: Functional Dependency, 1NF, 2NF, 3NF, BCNF, 4NF and 5NF			9	5
2	Parallel Databases: Architecture, I/O Parallelism, Interquery Parallelism, Intraquery Parallelism, Intraoperation Parallelism, Interoperation Parallelism			6	2
3	Distributed Databases: Architecture, Distributed data storage, Distributed transactions, Commit protocols, Concurrency control, Query Processing			6	2
4	Object – Based Databases: Complex Data Types, Structured Types and Inheritance, Table Inheritance, array and Multiset, Object Identity and Reference Types, Object Oriented versus Object Relational.			5	5
5	Spatial Database: Types of Spatial Data, Representation of Geometric Information, Design Databases, Geographic data, Spatial queries, Indexing of spatial data.			5	2
6	XML Databases: XML Hierarchical data model, XML Documents, DTD, XML Schema, XML Querying.			5	2
7	Multimedia Databases: Multimedia data format, Continuous media data, Similarity based retrieval. Mobility and personal databases: A model of mobile computing, Routing and query processing, Broadcast data, Disconnectivity and consistency			6	2
8	Contemporary Issues			3	
# Mode: Flipped Class Room, [Lecture to be videotaped], Use of physical and computer models to lecture, Visit to Industry, Min of 2 lectures by industry experts				45	
Text Books					
1. Abraham Silberschatz, Henry F Korth, S Sudarshan, “Database System Concepts”, 6 th edition, McGraw-Hill International Edition, 2011.					
Reference Books					
2. Ramez Elmasri, Shamkant B Navathe, “Fundamental of Database Systems”, Pearson,					

7th edition, 2016.

3. Thomas Connolly, Carolyn Begg, “ Database Systems A practical Approach to Design, Implementation, and Management”, 4th Edition, Pearson Education, 2009

Challenging Experiments:

Experiment: 1

- a. Creating an Airline database to set various constraints and writing SQL queries to retrieve information from the database.
- b. Performing Insertion, Deletion, Modifying, Altering, Updating and Viewing records based on conditions.
- c. Creation of Views, Synonyms, Sequence, Indexes, Save point .

Experiment: 2

Consider the application for VIT University Counselling. The campus, department and vacancy details are maintained in 4 sites. Students are allocated campus in these 4 sites simultaneously. Implement this application using parallel database [State any assumptions you have made].

Experiment: 3

There are 5 processors working in a parallel environment and producing output. The output record contains campus details and students mark information. Implement parallel join and parallel sort algorithms to get the marks from different campus of the university and publish 10 ranks for each discipline.

Experiment: 4

A University wants to track persons associated with them. A person can be an Employee or Student. Employees are Faculty, Technicians and Project associates. Students are Full time students, Part time students and Teaching Assistants. Design object based model for university database. Write OQL for the following

- a. Insert details in each object.
- b. Display the Employee details.
- c. Display Student Details.
- d. Modify person details.
- e. Delete person details.

Experiment: 5

Extend the design of university database by incorporating the following information.

Students are registering for courses which are handled by instructor researchers (graduate students). Faculty are advisors to graduate students. Instructor researchers' class is a category with super class of faculty and graduate students. Faculty are having sponsored research projects with a grant supporting instruction researchers. Grants are sanctioned by different agencies. Faculty belongs to different departments. Department is chaired by a faculty. Implement for the Insertion and Display of details in each class.

Experiment: 6

Design XML Schema for the given company database

Department (deptName, deptNo, deptManagerSSN, deptManagerStartDate, deptLocation) Employee (empName, empSSN, empSex, empSalary, empBirthDate, empDeptNo, empSupervisorSSN, empAddress, empWorksOn)

Project (projName, projNo, projLocation, projDeptNo, projWorker)

Implement the following queries using XQuery and XPath

- a. Retrieve the department name, manager name, and manager salary for every department
- b. Retrieve the employee name, supervisor name and employee salary for each employee who works in the Research Department.
- c. Retrieve the project name, controlling department name, number of employees and total hours worked per week on the project for each project.
- d. Retrieve the project name, controlling department name, number of employees and total hours worked per week on the project for each project with more than one employee working on it

Experiment: 7

Implement a storage structure for storing XML database and test with the above schema.

Experiment: 8

Design a multimedia database.

Approved by Academic Council No.:47	Date:	05.10.2017
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