

Name of Institute: INDUS INSTITUTE OF TECHNOLOGY & ENGINEERING

Name of Faculty: Sejal Thakkar.

Course code: CE0317/CS0317/IT0317

Course name: Database Management System

Pre-requisites: NIL

Credit points: 0

Offered Semester: III

Course Coordinator (weeks 1 - 11)

Full Name: Sejal Thakkar

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Consultation times: Saturday (12:00 to 4:00)

Course Lecturer (weeks xx - XX)

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Consultation times:Saturday (12:00 to 4:00)

Students will be contacted throughout the Session via Mail with important information relating to this Course.

Course Objectives

By participating in and understanding all facets of this Course a student will:

1. Learn the values of Data.
2. Learn the significant role of DBMS.
3. Learn the need for normalizing a Database.

4. Learn the problems with unnecessary duplication of data.
5. Learn the concepts of transaction
6. Learn the concepts of concurrent transactions

Course Outcomes (CO)

After successful completion of the course, student will able:

1. Understand and evaluate the role of database management systems in information technology applications within organizations.
2. Recognize and use contemporary logical design methods and tools for databases.
3. Derive a physical design for a database from its logical design.
4. Implement a database solution to an information technology problem.
5. Understand the SQL data definition and SQL query languages.
6. Have been introduced to the alternative design techniques utilized for Management Reporting applications.
7. Develop sophisticated queries to extract information from large datasets.

Course Outline

UNIT-I	[12 hours]
Overview of database management	
Introduction: data, database, database management, database management system, application of database, why database? , Data independence	
Architecture: The three levels of architecture -Levels, mapping, Database users and DBA Brief overview of different types of model Entity	
Relationship model: Introduction, An overview of the E/R model, E/R diagrams, Database design with the E/R model, extended E-R features –generalization, specialization, aggregation, reduction to E-R database schema	
UNIT-II	[12 hours]
Relational Model:	
Structure of relational databases, relational model, relations, relational integrity, Domains, Relational Algebra (fundamental and extended) and query Relation database design: Functional Dependency – definition, trivial and non-trivial FD, closure of FD set, closure of attributes, irreducible set of FD, Normalization –1NF,2NF,3NF, composition using FD-dependency reservation, BCNF, Multivalued dependency, 4NF, Join dependency and 5NF.	
UNIT-III	[12 hours]
Transaction Management and Security:	
Transaction concepts, properties of transactions, serializability of transactions, testing for serializability, System recovery, Two-Phase Commit protocol, Recovery and Atomicity, Log-based	

recovery, concurrent executions of transactions and related problems, Locking mechanism, solution to concurrency related problems, deadlock, , two -phase locking protocol, Isolation, Intent locking.
Security:
Introduction, Discretionary access control, Mandatory Access Control, Data Encryption
UNIT-IV
[12 hours]
SQL & PL/SQL Concepts:
SQL:Basics of SQL, DDL,DML,DCL, structure –creation, alteration, defining constraints –Primary key, foreign key, unique, not null, check, IN operator, aggregate functions, Built-in functions – numeric, date, string functions, set operations, sub-queries, correlated sub-queries,join, Exist, Any, All , view and its types., transaction control commands.
PL/SQL: Cursors, Stored Procedures, Stored Function, Database Trigger

Method of delivery

1. Chalk & Talk
2. PPT presentation

Study time

- 3 lectures per week
2 hour labs per week

CO-PO Mapping (PO: Program Outcomes)

Course Outcome	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C01	√	√	√									√	√	√	√
C02			√		√	√				√			√	√	√
C03	√	√		√	√						√			√	√
C04		√	√	√	√						√				√
C05				√	√				√		√				√
C06			√	√	√	√	√	√			√				√
C07	√	√	√	√	√	√						√			√

Blooms Taxonomy and Knowledge retention(For reference)

(Blooms taxonomy has been given for reference)

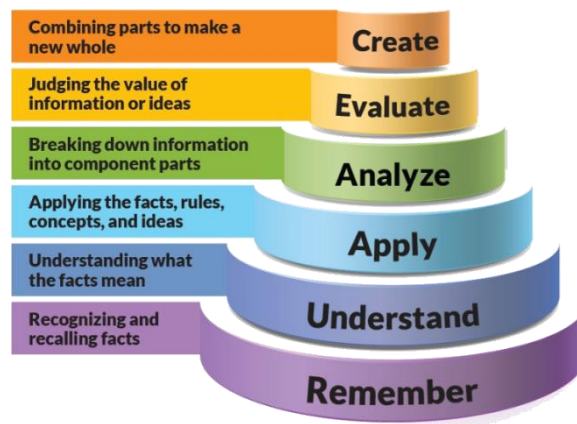


Figure 1: Blooms Taxonomy

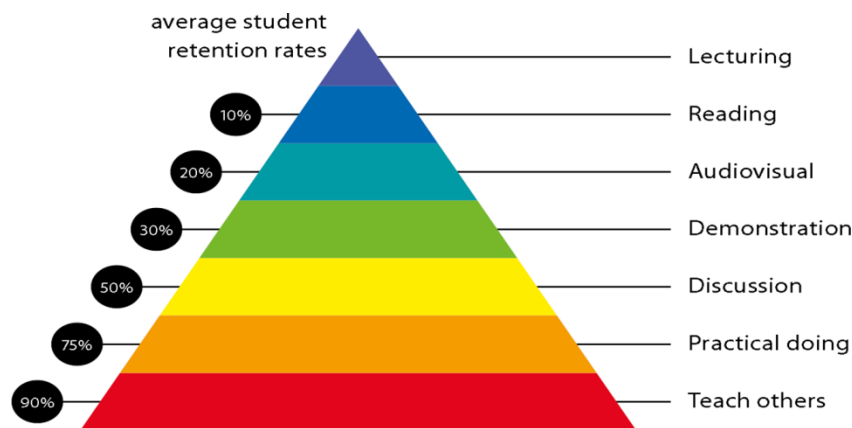


Figure 2: Knowledge retention

Graduate Qualities and Capabilities covered
 (Qualities graduates harness crediting this Course)

General Graduate Qualities	Specific Department of _____ Graduate Capabilities
<p>Informed Have a sound knowledge of an area of study or profession and understand its current issues, locally and internationally. Know how to apply this knowledge. Understand how an area of study has developed and how it relates to other areas.</p>	<p>1 Professional knowledge, grounding & awareness</p>
<p>Independent learners Engage with new ideas and ways of thinking and critically analyze issues. Seek to extend knowledge through ongoing research, enquiry and reflection. Find and evaluate information, using a variety of sources and technologies.</p>	<p>2 Information literacy, gathering & processing</p>

Acknowledge the work and ideas of others.	
Problem solvers Take on challenges and opportunities. Apply creative, logical and critical thinking skills to respond effectively. Make and implement decisions. Be flexible, thorough, innovative and aim for high standards.	4 Problem solving skills
Effective communicators Articulate ideas and convey them effectively using a range of media. Work collaboratively and engage with people in different settings. Recognize how culture can shape communication.	5 Written communication
	6 Oral communication
	7 Teamwork
Responsible Understand how decisions can affect others and make ethically informed choices. Appreciate and respect diversity. Act with integrity as part of local, national, global and professional communities.	10 Sustainability, societal & environmental impact

Practical work:

(Mention what practical work this Course involves)

1	Introduction to SQL.	Basic knowledge of SQL.
2	Create given table and give the sql statement for the given. (Select with from, distinct, where, and, or, between, not, in, not in, like clauses, order by clause and delete).	Basic knowledge of in simple commands.
3	Write the sql statement for the given.(Use of inbuilt functions).	Basic knowledge of inbuilt functions.
4	Create the given tables with given constraints and write SQL statement for the given.(Use of SUB query).	Basic knowledge of Constraints.
5	Write the SQL statements for following. (Use of grant, revoke, join, exist).	Basic knowledge of giving and taking rights through SQL Commands.
6	Write a program using view.	Basic knowledge of View.
7	Write a PL/SQL block to reserve a given number.	Basic knowledge of PL/SQL Programming.
8	Write a PL/SQL block to check given num is odd or even.	Basic knowledge of PL/SQL Programming.

9	Write a PL/SQL block to accept id of employee (emp2 table) from user and fetch a record of that employee. Check the salary and update the salary Column as follows: a. If salary >10000 and salary <=20000, then salary = salary+30% of salary. b. If salary >20000 and salary <=30000, then salary = salary+ 40% of salary.	Basic knowledge of PL/SQL Programming.
10	Write a PL/SQL block to calculate the area of a circle for value of radius varying from 3 to 7. Store the radius and the corresponding values of calculated area in an empty table named Areas, consisting of two columns Radius and Area.	Basic knowledge of PL/SQL Programming.
11	The price of a product changes constantly. It is important to maintain the history of the prices of the products. Create a trigger to update the 'product_price_history' table when the price of the product is updated in the 'product' table.	Basic knowledge of Trigger.
12	Write Program of explicit and Implicit cursor.	Basic knowledge of cursor.

Lecture/tutorial times

(Give lecture times in the format below)

Lecture
Practicals

Attendance Requirements

The University norms states that it is the responsibility of students to attend all lectures, tutorials, seminars and practical work as stipulated in the Course outline. Minimum attendance requirement as per university norms is compulsory for being eligible for mid and end semester examinations.

Details of referencing system to be used in written work

Text books

Text Book :

- 1.Database System Concepts, Abraham Silberschatz, Henry F. Korth& S. Sudarshan, McGraw Hill.
- 2.SQL- PL/SQL by Ivan bayross

Additional Materials

Reference Book:

1. An introduction to Database Systems, C J Date, Addison-Wesley.
2. Understanding SQL by Martin Gruber, BPB

Additional Materials

Web Resource

<https://www.w3resource.com/sql/tutorials.php><https://nptel.ac.in/downloads/106105080/>

<https://nptel.ac.in/courses/106105175/#>

ASSESSMENT GUIDELINES

Your final course mark will be calculated from the following:

CIE-Theory (60 Marks) Attendance – 10 Marks Class Test- 30 Marks Assignments: 10 Marks Certificate/presentation/Continuous Evaluation : 10 Marks	CIE-Practical (60 Marks) Attendance – 10 Marks Practical Test- 10 Marks Practical File: 20 Marks Viva: 10 Marks
ESE-Theory- 40 Marks	ESE-Practical-40 Marks
Total: 200 Marks	

SUPPLEMENTARY ASSESSMENT

Students who receive an overall mark less than 40% in mid semester or end semester will be considered for supplementary assessment in the respective components (i.e mid semester or end semester) of semester concerned. Students must make themselves available during the supplementary examination period to take up the respective components (mid semester or end semester) and need to obtain the required minimum 40% marks to clear the concerned components.

Practical Work Report/Laboratory Report:

A report on the practical work is due the subsequent week after completion of the class by each group.

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Late Work

Late assignments will not be accepted without supporting documentation. Late submission of the reports will result in a deduction of -% of the maximum mark per calendar day

Format

All assignments must be presented in a neat, legible format with all information sources correctly referenced. **Assignment material handed in throughout the session that is not neat and legible will not be marked and will be returned to the student.**

Retention of Written Work

Written assessment work will be retained by the Course coordinator/lecturer for two weeks after marking to be collected by the students.

University and Faculty Policies

Students should make themselves aware of the University and/or Faculty Policies regarding plagiarism, special consideration, supplementary examinations and other educational issues and student matters.

Plagiarism - Plagiarism is not acceptable and may result in the imposition of severe penalties. Plagiarism is the use of another person's work, or idea, as if it is his or her own - if you have any doubts at all on what constitutes plagiarism, please consult your Course coordinator or lecturer. Plagiarism will be penalized severely.

Do not copy the work of other students.

Do not share your work with other students (except where required for a group activity or assessment)

Course schedule (subject to change)

(Mention quiz, assignment submission, breaksetcas well in the table under the Teaching Learning Activity Column)

Week #	Topic & contents	CO Addressed	Teaching Learning Activity (TLA)
Weeks 1	Introduction: data, database, database management, database management system, application of database, why database, Data independence.	CO1	Chalk & Board, Discussion
Weeks 2	Architecture: The three levels of Architecture-Levels, Mapping, Database users and DBA Brief overview of different types of model.	CO2	
Week 3	Entity-Relationship Model: Introduction, An overview of the E/R model, E/R diagrams, Database design with the E/R model, extended E-R features – generalization, specialization, aggregation, reduction to E-R database schema	CO4	
Week 4	Relational Model: Structure of relational databases, relational model, relations, relational integrity, Domains, Relational Algebra(fundamental and extended) and query.	CO3	
Week 5	Relation database design: Functional Dependency – definition, trivial and non-trivial FD, closure of FDset, closure of attributes, irreducible set of FD, Normalization – 1Nf,2NF.	CO4	
Week 6	3NF, composition using FD-dependency preservation, BCNF, Multivalued dependency, 4NF, Join dependency and 5NF.	CO4	
Week 7	Transaction Management and Security: Transaction concepts, properties of transactions. Serializability of	CO4	

		transactions, testing for serializability , System recovery.		
Week 8		Two- Phase Commit protocol, Recovery and Atomicity, Log-based recovery, concurrent executions of transactions and related problems.	CO4	
Week 9		Locking mechanism, solution to concurrency related problems, deadlock, , two-phase locking protocol, Isolation, Intent locking.	CO4	
Week 10		Security: Introduction, Discretionary access control, Mandatory Access Control, Data Encryption.	CO4	
Week 11		SQL: Basics of SQL, DDL,DML,DCL, structure – creation, alteration, defining constraints – Primary key, foreign key, unique, not null, check, IN operator, aggregate functions, Built-in functions –numeric, date, string functions, set operations, sub-queries, correlated sub-queries.	CO5	
Week 12		Join, Exist, Any, All , view and its types., transaction control commands. PL/SQL: Cursors, Stored Procedures, Stored Function, Database Triggers.	CO7	

**PROGRAM MAP for Bachelor of Engineering
 (CE / CSE / IT)**

