# Lovely Professional University, Punjab

| Course Code | Course Title | Lectures | Tutorials | Practicals | Credits | |
|---|---|---|---|---|---|---|
| INT306 | DATABASE MANAGEMENT SYSTEMS | 3 | 0 | 2 | 4 | |
| **Course Weightage** | ATT: 5   CA: 25   MTT: 20   ETT: 50 | **Exam Category:   11: Mid Term Exam: All MCQ – End Term Exam: All MCQ** | | | | |
| **Course Focus** | EMPLOYABILITY,SKILL DEVELOPMENT | | | | | |

**Course Outcomes** :Through this course students should be able to

CO1 :: explain the Database components and logical design of databases

CO2 :: practice relational constructs like algebra, constraints and SQL

CO3 :: possess knowledge on the different issues involved in the design and implementation of relational database system

CO4 :: learn  the transaction management systems in single and concurrent environment

CO5 :: practice  programming constructs such as functions, stored procedures and triggers that can be shared by multiple forms

CO6 :: discuss file organization techniques, reports and data management applications

| TextBooks ( T ) | | | |
|---|---|---|---|
| **Sr No** | **Title** | **Author** | **Publisher Name** |
| T-1 | DATABASE SYSTEM CONCEPTS | HENRY F. KORTH, ABRAHAM SILBERSCHATZ, S. SUDARSHAN | MCGRAW HILL EDUCATION |

| Reference Books ( R ) | | | |
|---|---|---|---|
| **Sr No** | **Title** | **Author** | **Publisher Name** |
| R-1 | THE PROGRAMMING LANGUAGE OF ORACLE | IVAN BYROSS | BPB PUBLICATIONS |
| R-2 | DATABASE SYSTEMS: MODELS, LANGUAGES, DESIGN AND APPLICATION PROGRAMMING | RAMEZ ELMASRI, SHAMKANT B. NAVATHE | PEARSON |
| R-3 | AN INTRODUCTION TO DATABASE SYSTEMS | C. J. DATE, S. SWAMYNATHAN, A. KANNAN | PEARSON |

| Other Reading ( OR ) | |
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| **Sr No** | **Journals articles as Compulsary reading (specific articles, complete reference)** |
| OR-1 | https://www.oracle.com/in/database/technologies/appdev/plsql.html , |

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|---|---|
| OR-2 | https://www.w3schools.com/sql/ , |
| OR-3 | https://www.tutorialspoint.com/dbms/dbms_transaction.htm , |
| OR-4 | https://www.geeksforgeeks.org/normal-forms-in-dbms/ , |

| LTP week distribution: (LTP Weeks) | |
|---|---|
| Weeks before MTE | 7 |
| Weeks After MTE | 7 |
| Spill Over (Lecture) | 7 |

**Detailed Plan For Lectures**

| Week Number | Lecture Number | Broad Topic(Sub Topic) | Chapters/Sections of Text/reference books | Other Readings, Relevant Websites, Audio Visual Aids, software and Virtual Labs | Lecture Description | Learning Outcomes | Pedagogical Tool Demonstration/ Case Study / Images / animation / ppt etc. Planned | Live Examples |
|---|---|---|---|---|---|---|---|---|
| Week 1 | Lecture 1 | Introduction to Databases (purpose of database systems, components of dbms, applications of dbms) | T-1 R-3 | | L0: lecture zero L1: Introduction to database L2: What is three tier dbms architecture L3: what is data independence, database schema, instance data modeling, entity relationship model, relational model L4: Introduction to E-R and relational model | student will learn about basics of databases | Discussion with real life example | |
| | | Introduction to Databases (three tier dbms architecture) | T-1 R-3 | | L0: lecture zero L1: Introduction to database L2: What is three tier dbms architecture L3: what is data independence, database schema, instance data modeling, entity relationship model, relational model L4: Introduction to E-R and relational model | student will learn about basics of databases | Discussion with real life example | |

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| Week 1 | Lecture 1 | Introduction to Databases (data independence, database schema, instance) | T-1 R-3 | | L0: lecture zero L1: Introduction to database L2: What is three tier dbms architecture L3: what is data independence, database schema, instance data modeling, entity relationship model, relational model L4: Introduction to E-R and relational model | student will learn about basics of databases | Discussion with real life example | |
|--------|-----------|------------|---------|--|--------|--------|--------|--|
| | | Introduction to Databases (data modeling, entity relationship model, relational model) | T-1 R-3 | | L0: lecture zero L1: Introduction to database L2: What is three tier dbms architecture L3: what is data independence, database schema, instance data modeling, entity relationship model, relational model L4: Introduction to E-R and relational model | student will learn about basics of databases | Discussion with real life example | |
| | Lecture 2 | Introduction to Databases (purpose of database systems, components of dbms, applications of dbms) | T-1 R-3 | | L0: lecture zero L1: Introduction to database L2: What is three tier dbms architecture L3: what is data independence, database schema, instance data modeling, entity relationship model, relational model L4: Introduction to E-R and relational model | student will learn about basics of databases | Discussion with real life example | |

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| Week 1 | Lecture 2 | Introduction to Databases (three tier dbms architecture) | T-1 R-3 | | L0: lecture zero L1: Introduction to database L2: What is three tier dbms architecture L3: what is data independence, database schema, instance data modeling, entity relationship model, relational model L4: Introduction to E-R and relational model | student will learn about basics of databases | Discussion with real life example | |
|---|---|---|---|---|---|---|---|---|
| | | Introduction to Databases (data independence, database schema, instance) | T-1 R-3 | | L0: lecture zero L1: Introduction to database L2: What is three tier dbms architecture L3: what is data independence, database schema, instance data modeling, entity relationship model, relational model L4: Introduction to E-R and relational model | student will learn about basics of databases | Discussion with real life example | |
| | | Introduction to Databases (data modeling, entity relationship model, relational model) | T-1 R-3 | | L0: lecture zero L1: Introduction to database L2: What is three tier dbms architecture L3: what is data independence, database schema, instance data modeling, entity relationship model, relational model L4: Introduction to E-R and relational model | student will learn about basics of databases | Discussion with real life example | |

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| Week 1 | Lecture 3 | Introduction to Databases (purpose of database systems, components of dbms, applications of dbms) | T-1 R-3 | | L0: lecture zero<br>L1: Introduction to database<br>L2: What is three tier dbms architecture<br>L3: what is data independence, database schema, instance<br>data modeling, entity relationship model, relational model<br>L4: Introduction to E-R and relational model | student will learn about basics of databases | Discussion with real life example | |
|---|---|---|---|---|---|---|---|---|
| | | Introduction to Databases (three tier dbms architecture) | T-1 R-3 | | L0: lecture zero<br>L1: Introduction to database<br>L2: What is three tier dbms architecture<br>L3: what is data independence, database schema, instance<br>data modeling, entity relationship model, relational model<br>L4: Introduction to E-R and relational model | student will learn about basics of databases | Discussion with real life example | |
| | | Introduction to Databases (data independence, database schema, instance) | T-1 R-3 | | L0: lecture zero<br>L1: Introduction to database<br>L2: What is three tier dbms architecture<br>L3: what is data independence, database schema, instance<br>data modeling, entity relationship model, relational model<br>L4: Introduction to E-R and relational model | student will learn about basics of databases | Discussion with real life example | |

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| Week 1 | Lecture 3 | Introduction to Databases (data modeling, entity relationship model, relational model) | T-1 R-3 | | L0: lecture zero<br>L1: Introduction to database<br>L2: What is three tier dbms architecture<br>L3: what is data independence, database schema, instance data modeling, entity relationship model, relational model<br>L4: Introduction to E-R and relational model | student will learn about basics of databases | Discussion with real life example | |
|--------|-----------|------------------------------------------------------------------------------------------|---------|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|------------------------------------|--|
| Week 2 | Lecture 4 | Introduction to Databases (purpose of database systems, components of dbms, applications of dbms) | T-1 R-3 | | L0: lecture zero<br>L1: Introduction to database<br>L2: What is three tier dbms architecture<br>L3: what is data independence, database schema, instance data modeling, entity relationship model, relational model<br>L4: Introduction to E-R and relational model | student will learn about basics of databases | Discussion with real life example | |
| | | Introduction to Databases (three tier dbms architecture) | T-1 R-3 | | L0: lecture zero<br>L1: Introduction to database<br>L2: What is three tier dbms architecture<br>L3: what is data independence, database schema, instance data modeling, entity relationship model, relational model<br>L4: Introduction to E-R and relational model | student will learn about basics of databases | Discussion with real life example | |

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| Week 2 | Lecture 4 | Introduction to Databases (data independence, database schema, instance) | T-1 R-3 | | L0: lecture zero L1: Introduction to database L2: What is three tier dbms architecture L3: what is data independence, database schema, instance data modeling, entity relationship model, relational model L4: Introduction to E-R and relational model | student will learn about basics of databases | Discussion with real life example | |
|---|---|---|---|---|---|---|---|---|
| | | Introduction to Databases (data modeling, entity relationship model, relational model) | T-1 R-3 | | L0: lecture zero L1: Introduction to database L2: What is three tier dbms architecture L3: what is data independence, database schema, instance data modeling, entity relationship model, relational model L4: Introduction to E-R and relational model | student will learn about basics of databases | Discussion with real life example | |
| | Lecture 5 | Relational query language (relational algebra) | T-1 | | L5: Introduction to relational algebra L6: introduction to data definition language L7: Introduction to data manipulation,data control and transaction control language | student will learn about Relational algebra, DDL, DML, DCL and TCL | Discussion and live demonstration using oracle | STUDENT, EMPLOYEE, CUSTOMER, UNIVERSITY |
| | | Relational query language (introduction to data definition language) | T-1 | | L5: Introduction to relational algebra L6: introduction to data definition language L7: Introduction to data manipulation,data control and transaction control language | student will learn about Relational algebra, DDL, DML, DCL and TCL | Discussion and live demonstration using oracle | STUDENT, EMPLOYEE, CUSTOMER, UNIVERSITY |

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| Week 2 | Lecture 5 | Relational query language (data manipulation) | T-1 | | L5: Introduction to relational algebra L6: introduction to data definition language L7: Introduction to data manipulation,data control and transaction control language | student will learn about Relational algebra, DDL, DML, DCL and TCL | Discussion and live demonstration using oracle | STUDENT, EMPLOYEE, CUSTOMER, UNIVERSITY |
|---|---|---|---|---|---|---|---|---|
| | | Relational query language (data control and transaction control language) | T-1 | | L5: Introduction to relational algebra L6: introduction to data definition language L7: Introduction to data manipulation,data control and transaction control language | student will learn about Relational algebra, DDL, DML, DCL and TCL | Discussion and live demonstration using oracle | STUDENT, EMPLOYEE, CUSTOMER, UNIVERSITY |
| | Lecture 6 | Relational query language (relational algebra) | T-1 | | L5: Introduction to relational algebra L6: introduction to data definition language L7: Introduction to data manipulation,data control and transaction control language | student will learn about Relational algebra, DDL, DML, DCL and TCL | Discussion and live demonstration using oracle | STUDENT, EMPLOYEE, CUSTOMER, UNIVERSITY |
| | | Relational query language (introduction to data definition language) | T-1 | | L5: Introduction to relational algebra L6: introduction to data definition language L7: Introduction to data manipulation,data control and transaction control language | student will learn about Relational algebra, DDL, DML, DCL and TCL | Discussion and live demonstration using oracle | STUDENT, EMPLOYEE, CUSTOMER, UNIVERSITY |
| | | Relational query language (data manipulation) | T-1 | | L5: Introduction to relational algebra L6: introduction to data definition language L7: Introduction to data manipulation,data control and transaction control language | student will learn about Relational algebra, DDL, DML, DCL and TCL | Discussion and live demonstration using oracle | STUDENT, EMPLOYEE, CUSTOMER, UNIVERSITY |
| | | Relational query language (data control and transaction control language) | T-1 | | L5: Introduction to relational algebra L6: introduction to data definition language L7: Introduction to data manipulation,data control and transaction control language | student will learn about Relational algebra, DDL, DML, DCL and TCL | Discussion and live demonstration using oracle | STUDENT, EMPLOYEE, CUSTOMER, UNIVERSITY |

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| Week 3 | Lecture 7 | Relational query language (relational algebra) | T-1 | | L5: Introduction to relational algebra<br>L6: introduction to data definition language<br>L7: Introduction to data manipulation,data control and transaction control language | student will learn about Relational algebra, DDL, DML, DCL and TCL | Discussion and live demonstration using oracle | STUDENT, EMPLOYEE, CUSTOMER, UNIVERSITY |
|---|---|---|---|---|---|---|---|---|
| | | Relational query language (introduction to data definition language) | T-1 | | L5: Introduction to relational algebra<br>L6: introduction to data definition language<br>L7: Introduction to data manipulation,data control and transaction control language | student will learn about Relational algebra, DDL, DML, DCL and TCL | Discussion and live demonstration using oracle | STUDENT, EMPLOYEE, CUSTOMER, UNIVERSITY |
| | | Relational query language (data manipulation) | T-1 | | L5: Introduction to relational algebra<br>L6: introduction to data definition language<br>L7: Introduction to data manipulation,data control and transaction control language | student will learn about Relational algebra, DDL, DML, DCL and TCL | Discussion and live demonstration using oracle | STUDENT, EMPLOYEE, CUSTOMER, UNIVERSITY |
| | | Relational query language (data control and transaction control language) | T-1 | | L5: Introduction to relational algebra<br>L6: introduction to data definition language<br>L7: Introduction to data manipulation,data control and transaction control language | student will learn about Relational algebra, DDL, DML, DCL and TCL | Discussion and live demonstration using oracle | STUDENT, EMPLOYEE, CUSTOMER, UNIVERSITY |
| | Lecture 8 | Relational query language (integrity constraints) | T-1<br>R-1 | | L8: introduction to constraints<br>L9: Database Keys<br>L10: INtroduction to SQL basic operations<br>L11:Aggregate functions | student will learn about various integrity constraints, database keys, sql operations and aggregate functions | Discussion and live demonstration using oracle | |
| | | Relational query language (database keys) | T-1<br>R-1 | OR-2 | L8: introduction to constraints<br>L9: Database Keys<br>L10: INtroduction to SQL basic operations<br>L11:Aggregate functions | student will learn about various integrity constraints, database keys, sql operations and aggregate functions | Discussion and live demonstration using oracle | |

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| Week | Lecture | Topic | | | Lecture Details | Learning Outcomes | Pedagogical Tool | |
|---|---|---|---|---|---|---|---|---|
| Week 3 | Lecture 8 | Relational query language (SQL basic operations) | T-1 R-1 | OR-2 | L8: introduction to constraints L9: Database Keys L10: INtroduction to SQL basic operations L11:Aggregate functions | student will learn about various integrity constraints, database keys, sql operations and aggregate functions | Discussion and live demonstration using oracle | |
| | | Relational query language (Aggregate functions) | T-1 R-1 | | L8: introduction to constraints L9: Database Keys L10: INtroduction to SQL basic operations L11:Aggregate functions | student will learn about various integrity constraints, database keys, sql operations and aggregate functions | Discussion and live demonstration using oracle | |
| | Lecture 9 | Relational query language (integrity constraints) | T-1 R-1 | | L8: introduction to constraints L9: Database Keys L10: INtroduction to SQL basic operations L11:Aggregate functions | student will learn about various integrity constraints, database keys, sql operations and aggregate functions | Discussion and live demonstration using oracle | |
| | | Relational query language (database keys) | T-1 R-1 | OR-2 | L8: introduction to constraints L9: Database Keys L10: INtroduction to SQL basic operations L11:Aggregate functions | student will learn about various integrity constraints, database keys, sql operations and aggregate functions | Discussion and live demonstration using oracle | |
| | | Relational query language (SQL basic operations) | T-1 R-1 | OR-2 | L8: introduction to constraints L9: Database Keys L10: INtroduction to SQL basic operations L11:Aggregate functions | student will learn about various integrity constraints, database keys, sql operations and aggregate functions | Discussion and live demonstration using oracle | |
| | | Relational query language (Aggregate functions) | T-1 R-1 | | L8: introduction to constraints L9: Database Keys L10: INtroduction to SQL basic operations L11:Aggregate functions | student will learn about various integrity constraints, database keys, sql operations and aggregate functions | Discussion and live demonstration using oracle | |
| Week 4 | Lecture 10 | Relational query language (integrity constraints) | T-1 R-1 | | L8: introduction to constraints L9: Database Keys L10: INtroduction to SQL basic operations L11:Aggregate functions | student will learn about various integrity constraints, database keys, sql operations and aggregate functions | Discussion and live demonstration using oracle | |

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| Week 4 | Lecture 10 | Relational query language (database keys) | T-1 R-1 | OR-2 | L8: introduction to constraints L9: Database Keys L10: INtroduction to SQL basic operations L11:Aggregate functions | student will learn about various integrity constraints, database keys, sql operations and aggregate functions | Discussion and live demonstration using oracle | |
|--------|-----------|---------------------------------------------|---------|------|--------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|------------------------------------------------|---|
| | | Relational query language (SQL basic operations) | T-1 R-1 | OR-2 | L8: introduction to constraints L9: Database Keys L10: INtroduction to SQL basic operations L11:Aggregate functions | student will learn about various integrity constraints, database keys, sql operations and aggregate functions | Discussion and live demonstration using oracle | |
| | | Relational query language (Aggregate functions) | T-1 R-1 | | L8: introduction to constraints L9: Database Keys L10: INtroduction to SQL basic operations L11:Aggregate functions | student will learn about various integrity constraints, database keys, sql operations and aggregate functions | Discussion and live demonstration using oracle | |
| | Lecture 11 | Relational query language (integrity constraints) | T-1 R-1 | | L8: introduction to constraints L9: Database Keys L10: INtroduction to SQL basic operations L11:Aggregate functions | student will learn about various integrity constraints, database keys, sql operations and aggregate functions | Discussion and live demonstration using oracle | |
| | | Relational query language (database keys) | T-1 R-1 | OR-2 | L8: introduction to constraints L9: Database Keys L10: INtroduction to SQL basic operations L11:Aggregate functions | student will learn about various integrity constraints, database keys, sql operations and aggregate functions | Discussion and live demonstration using oracle | |
| | | Relational query language (SQL basic operations) | T-1 R-1 | OR-2 | L8: introduction to constraints L9: Database Keys L10: INtroduction to SQL basic operations L11:Aggregate functions | student will learn about various integrity constraints, database keys, sql operations and aggregate functions | Discussion and live demonstration using oracle | |
| | | Relational query language (Aggregate functions) | T-1 R-1 | | L8: introduction to constraints L9: Database Keys L10: INtroduction to SQL basic operations L11:Aggregate functions | student will learn about various integrity constraints, database keys, sql operations and aggregate functions | Discussion and live demonstration using oracle | |

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| Week | Lecture | | | | Test 1 | | | |
|---|---|---|---|---|---|---|---|---|
| Week 4 | Lecture 12 | | | | Test 1 | | | |
| Week 5 | Lecture 13 | Relational query language (Sql joins) | T-1 R-3 | | L13: Introduction to sql joins, sql operators L14: Introduction to views L15: subqueries | student will learn about sql joins, operators , views and subqueries | Discussion and live demonstration using oracle | |
| | | Relational query language (set operators) | T-1 R-3 | | L13: Introduction to sql joins, sql operators L14: Introduction to views L15: subqueries | student will learn about sql joins, operators , views and subqueries | Discussion and live demonstration using oracle | |
| | | Relational query language (views) | T-1 R-3 | | L13: Introduction to sql joins, sql operators L14: Introduction to views L15: subqueries | student will learn about sql joins, operators , views and subqueries | Discussion and live demonstration using oracle | |
| | | Relational query language (subqueries) | T-1 R-3 | | L13: Introduction to sql joins, sql operators L14: Introduction to views L15: subqueries | student will learn about sql joins, operators , views and subqueries | Discussion and live demonstration using oracle | |
| | Lecture 14 | Relational query language (Sql joins) | T-1 R-3 | | L13: Introduction to sql joins, sql operators L14: Introduction to views L15: subqueries | student will learn about sql joins, operators , views and subqueries | Discussion and live demonstration using oracle | |
| | | Relational query language (set operators) | T-1 R-3 | | L13: Introduction to sql joins, sql operators L14: Introduction to views L15: subqueries | student will learn about sql joins, operators , views and subqueries | Discussion and live demonstration using oracle | |
| | | Relational query language (views) | T-1 R-3 | | L13: Introduction to sql joins, sql operators L14: Introduction to views L15: subqueries | student will learn about sql joins, operators , views and subqueries | Discussion and live demonstration using oracle | |
| | | Relational query language (subqueries) | T-1 R-3 | | L13: Introduction to sql joins, sql operators L14: Introduction to views L15: subqueries | student will learn about sql joins, operators , views and subqueries | Discussion and live demonstration using oracle | |
| | Lecture 15 | Relational query language (Sql joins) | T-1 R-3 | | L13: Introduction to sql joins, sql operators L14: Introduction to views L15: subqueries | student will learn about sql joins, operators , views and subqueries | Discussion and live demonstration using oracle | |

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| Week 5 | Lecture 15 | Relational query language (set operators) | T-1 R-3 | | L13: Introduction to sql joins, sql operators L14: Introduction to views L15: subqueries | student will learn about sql joins, operators , views and subqueries | Discussion and live demonstration using oracle | |
|---|---|---|---|---|---|---|---|---|
| | | Relational query language (views) | T-1 R-3 | | L13: Introduction to sql joins, sql operators L14: Introduction to views L15: subqueries | student will learn about sql joins, operators , views and subqueries | Discussion and live demonstration using oracle | |
| | | Relational query language (subqueries) | T-1 R-3 | | L13: Introduction to sql joins, sql operators L14: Introduction to views L15: subqueries | student will learn about sql joins, operators , views and subqueries | Discussion and live demonstration using oracle | |
| Week 6 | Lecture 16 | Relational Database Design (data integrity rules, functional dependency) | T-1 R-3 | | L16: Introduction to relational database design L17:need of normalization, first normal form, second normal form L18: third normal form, boyce codd normal form L19: multivalued dependencies, fourth normal form,join dependencies, fifth normal form and pitfalls in relational database design | Student will learn about functional dependency and normalization concept | Discussion on normalization using live datasets | |
| | | Relational Database Design (need of normalization, first normal form, second normal form) | T-1 R-3 | OR-4 | L16: Introduction to relational database design L17:need of normalization, first normal form, second normal form L18: third normal form, boyce codd normal form L19: multivalued dependencies, fourth normal form,join dependencies, fifth normal form and pitfalls in relational database design | Student will learn about functional dependency and normalization concept | Discussion on normalization using live datasets | |

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| Week 6 | Lecture 16 | Relational Database Design (third normal form, boyce codd normal form) | T-1 R-3 | | L16: Introduction to relational database design L17:need of normalization, first normal form, second normal form L18: third normal form, boyce codd normal form L19: multivalued dependencies, fourth normal form,join dependencies, fifth normal form and pitfalls in relational database design | Student will learn about functional dependency and normalization concept | Discussion on normalization using live datasets | |
|---|---|---|---|---|---|---|---|---|
| | | Relational Database Design (multivalued dependencies, fourth normal form) | T-1 R-3 | | L16: Introduction to relational database design L17:need of normalization, first normal form, second normal form L18: third normal form, boyce codd normal form L19: multivalued dependencies, fourth normal form,join dependencies, fifth normal form and pitfalls in relational database design | Student will learn about functional dependency and normalization concept | Discussion on normalization using live datasets | |
| | | Relational Database Design (join dependencies, fifth normal form and pitfalls in relational database design) | T-1 R-3 | | L16: Introduction to relational database design L17:need of normalization, first normal form, second normal form L18: third normal form, boyce codd normal form L19: multivalued dependencies, fourth normal form,join dependencies, fifth normal form and pitfalls in relational database design | Student will learn about functional dependency and normalization concept | Discussion on normalization using live datasets | |

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| Week 6 | Lecture 17 | Relational Database Design (data integrity rules, functional dependency) | T-1 R-3 | | L16: Introduction to relational database design L17:need of normalization, first normal form, second normal form L18: third normal form, boyce codd normal form L19: multivalued dependencies, fourth normal form,join dependencies, fifth normal form and pitfalls in relational database design | Student will learn about functional dependency and normalization concept | Discussion on normalization using live datasets | |
|---|---|---|---|---|---|---|---|---|
| | | Relational Database Design (need of normalization, first normal form, second normal form) | T-1 R-3 | OR-4 | L16: Introduction to relational database design L17:need of normalization, first normal form, second normal form L18: third normal form, boyce codd normal form L19: multivalued dependencies, fourth normal form,join dependencies, fifth normal form and pitfalls in relational database design | Student will learn about functional dependency and normalization concept | Discussion on normalization using live datasets | |
| | | Relational Database Design (third normal form, boyce codd normal form) | T-1 R-3 | | L16: Introduction to relational database design L17:need of normalization, first normal form, second normal form L18: third normal form, boyce codd normal form L19: multivalued dependencies, fourth normal form,join dependencies, fifth normal form and pitfalls in relational database design | Student will learn about functional dependency and normalization concept | Discussion on normalization using live datasets | |

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| Week 6 | Lecture 17 | Relational Database Design (multivalued dependencies, fourth normal form) | T-1 R-3 | | L16: Introduction to relational database design L17:need of normalization, first normal form, second normal form L18: third normal form, boyce codd normal form L19: multivalued dependencies, fourth normal form,join dependencies, fifth normal form and pitfalls in relational database design | Student will learn about functional dependency and normalization concept | Discussion on normalization using live datasets | |
| | | Relational Database Design (join dependencies, fifth normal form and pitfalls in relational database design) | T-1 R-3 | | L16: Introduction to relational database design L17:need of normalization, first normal form, second normal form L18: third normal form, boyce codd normal form L19: multivalued dependencies, fourth normal form,join dependencies, fifth normal form and pitfalls in relational database design | Student will learn about functional dependency and normalization concept | Discussion on normalization using live datasets | |
| | Lecture 18 | Relational Database Design (data integrity rules, functional dependency) | T-1 R-3 | | L16: Introduction to relational database design L17:need of normalization, first normal form, second normal form L18: third normal form, boyce codd normal form L19: multivalued dependencies, fourth normal form,join dependencies, fifth normal form and pitfalls in relational database design | Student will learn about functional dependency and normalization concept | Discussion on normalization using live datasets | |

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| Week 6 | Lecture 18 | Relational Database Design (need of normalization, first normal form, second normal form) | T-1 R-3 | OR-4 | L16: Introduction to relational database design L17:need of normalization, first normal form, second normal form L18: third normal form, boyce codd normal form L19: multivalued dependencies, fourth normal form,join dependencies, fifth normal form and pitfalls in relational database design | Student will learn about functional dependency and normalization concept | Discussion on normalization using live datasets | |
|--------|-----------|---------|---------|---------|---------|---------|---------|--|
| | | Relational Database Design (third normal form, boyce codd normal form) | T-1 R-3 | | L16: Introduction to relational database design L17:need of normalization, first normal form, second normal form L18: third normal form, boyce codd normal form L19: multivalued dependencies, fourth normal form,join dependencies, fifth normal form and pitfalls in relational database design | Student will learn about functional dependency and normalization concept | Discussion on normalization using live datasets | |
| | | Relational Database Design (multivalued dependencies, fourth normal form) | T-1 R-3 | | L16: Introduction to relational database design L17:need of normalization, first normal form, second normal form L18: third normal form, boyce codd normal form L19: multivalued dependencies, fourth normal form,join dependencies, fifth normal form and pitfalls in relational database design | Student will learn about functional dependency and normalization concept | Discussion on normalization using live datasets | |

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| Week 6 | Lecture 18 | Relational Database Design (join dependencies, fifth normal form and pitfalls in relational database design) | T-1 R-3 | | L16: Introduction to relational database design L17:need of normalization, first normal form, second normal form L18: third normal form, boyce codd normal form L19: multivalued dependencies, fourth normal form,join dependencies, fifth normal form and pitfalls in relational database design | Student will learn about functional dependency and normalization concept | Discussion on normalization using live datasets | |
|---|---|---|---|---|---|---|---|---|
| Week 7 | Lecture 19 | Relational Database Design (data integrity rules, functional dependency) | T-1 R-3 | | L16: Introduction to relational database design L17:need of normalization, first normal form, second normal form L18: third normal form, boyce codd normal form L19: multivalued dependencies, fourth normal form,join dependencies, fifth normal form and pitfalls in relational database design | Student will learn about functional dependency and normalization concept | Discussion on normalization using live datasets | |
| | | Relational Database Design (need of normalization, first normal form, second normal form) | T-1 R-3 | OR-4 | L16: Introduction to relational database design L17:need of normalization, first normal form, second normal form L18: third normal form, boyce codd normal form L19: multivalued dependencies, fourth normal form,join dependencies, fifth normal form and pitfalls in relational database design | Student will learn about functional dependency and normalization concept | Discussion on normalization using live datasets | |

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| Week 7 | Lecture 19 | Relational Database Design (third normal form, boyce codd normal form) | T-1 R-3 | | L16: Introduction to relational database design L17:need of normalization, first normal form, second normal form L18: third normal form, boyce codd normal form L19: multivalued dependencies, fourth normal form,join dependencies, fifth normal form and pitfalls in relational database design | Student will learn about functional dependency and normalization concept | Discussion on normalization using live datasets | |
|---|---|---|---|---|---|---|---|---|
| | | Relational Database Design (multivalued dependencies, fourth normal form) | T-1 R-3 | | L16: Introduction to relational database design L17:need of normalization, first normal form, second normal form L18: third normal form, boyce codd normal form L19: multivalued dependencies, fourth normal form,join dependencies, fifth normal form and pitfalls in relational database design | Student will learn about functional dependency and normalization concept | Discussion on normalization using live datasets | |
| | | Relational Database Design (join dependencies, fifth normal form and pitfalls in relational database design) | T-1 R-3 | | L16: Introduction to relational database design L17:need of normalization, first normal form, second normal form L18: third normal form, boyce codd normal form L19: multivalued dependencies, fourth normal form,join dependencies, fifth normal form and pitfalls in relational database design | Student will learn about functional dependency and normalization concept | Discussion on normalization using live datasets | |

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<table>
<tr><td colspan="8" align="center"><strong>SPILL OVER</strong></td></tr>
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| Week 7 | Lecture 20 | | | | Spill Over | | | |
|---|---|---|---|---|---|---|---|---|
| | Lecture 21 | | | | Spill Over | | | |

<table>
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| Week 8 | Lecture 22 | Database Transaction Processing(transaction system concepts, desirable properties of transactions) | R-2 R-3 | OR-3 | L22:Introduction to Database Transaction Processing L23: schedules, serializability of schedules L24;concurrency control L25:recoverability | student will learn about transaction system concepts, schedules, concurrency control and recoverability | discussion using real life problems | |
|---|---|---|---|---|---|---|---|---|
| | | Database Transaction Processing(schedules, serializability of schedules) | R-2 R-3 | | L22:Introduction to Database Transaction Processing L23: schedules, serializability of schedules L24;concurrency control L25:recoverability | student will learn about transaction system concepts, schedules, concurrency control and recoverability | discussion using real life problems | banking, ATM |
| | | Database Transaction Processing(concurrency control) | R-2 R-3 | | L22:Introduction to Database Transaction Processing L23: schedules, serializability of schedules L24;concurrency control L25:recoverability | student will learn about transaction system concepts, schedules, concurrency control and recoverability | discussion using real life problems | banking, ATM |
| | | Database Transaction Processing(recoverability) | R-2 R-3 | | L22:Introduction to Database Transaction Processing L23: schedules, serializability of schedules L24;concurrency control L25:recoverability | student will learn about transaction system concepts, schedules, concurrency control and recoverability | discussion using real life problems | banking, ATM |
| | Lecture 23 | Database Transaction Processing(transaction system concepts, desirable properties of transactions) | R-2 R-3 | OR-3 | L22:Introduction to Database Transaction Processing L23: schedules, serializability of schedules L24;concurrency control L25:recoverability | student will learn about transaction system concepts, schedules, concurrency control and recoverability | discussion using real life problems | |

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| Week 8 | Lecture 23 | Database Transaction Processing(schedules, serializability of schedules) | R-2 R-3 | | L22:Introduction to Database Transaction Processing L23: schedules, serializability of schedules L24;concurrency control L25:recoverability | student will learn about transaction system concepts, schedules, concurrency control and recoverability | discussion using real life problems | banking, ATM |
|---|---|---|---|---|---|---|---|---|
| | | Database Transaction Processing(concurrency control) | R-2 R-3 | | L22:Introduction to Database Transaction Processing L23: schedules, serializability of schedules L24;concurrency control L25:recoverability | student will learn about transaction system concepts, schedules, concurrency control and recoverability | discussion using real life problems | banking, ATM |
| | | Database Transaction Processing(recoverability) | R-2 R-3 | | L22:Introduction to Database Transaction Processing L23: schedules, serializability of schedules L24;concurrency control L25:recoverability | student will learn about transaction system concepts, schedules, concurrency control and recoverability | discussion using real life problems | banking, ATM |
| | Lecture 24 | Database Transaction Processing(transaction system concepts, desirable properties of transactions) | R-2 R-3 | OR-3 | L22:Introduction to Database Transaction Processing L23: schedules, serializability of schedules L24;concurrency control L25:recoverability | student will learn about transaction system concepts, schedules, concurrency control and recoverability | discussion using real life problems | |
| | | Database Transaction Processing(schedules, serializability of schedules) | R-2 R-3 | | L22:Introduction to Database Transaction Processing L23: schedules, serializability of schedules L24;concurrency control L25:recoverability | student will learn about transaction system concepts, schedules, concurrency control and recoverability | discussion using real life problems | banking, ATM |
| | | Database Transaction Processing(concurrency control) | R-2 R-3 | | L22:Introduction to Database Transaction Processing L23: schedules, serializability of schedules L24;concurrency control L25:recoverability | student will learn about transaction system concepts, schedules, concurrency control and recoverability | discussion using real life problems | banking, ATM |

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| Week | Lecture | | | | | | |
|------|---------|---|---|---|---|---|---|
| Week 8 | Lecture 24 | Database Transaction Processing(recoverability) | R-2<br>R-3 | | L22:Introduction to Database Transaction Processing<br>L23: schedules, serializability of schedules<br>L24;concurrency control<br>L25:recoverability | student will learn about transaction system concepts, schedules, concurrency control and recoverability | discussion using real life problems | banking, ATM |
| Week 9 | Lecture 25 | Database Transaction Processing(transaction system concepts, desirable properties of transactions) | R-2<br>R-3 | OR-3 | L22:Introduction to Database Transaction Processing<br>L23: schedules, serializability of schedules<br>L24;concurrency control<br>L25:recoverability | student will learn about transaction system concepts, schedules, concurrency control and recoverability | discussion using real life problems | |
| | | Database Transaction Processing(schedules, serializability of schedules) | R-2<br>R-3 | | L22:Introduction to Database Transaction Processing<br>L23: schedules, serializability of schedules<br>L24;concurrency control<br>L25:recoverability | student will learn about transaction system concepts, schedules, concurrency control and recoverability | discussion using real life problems | banking, ATM |
| | | Database Transaction Processing(concurrency control) | R-2<br>R-3 | | L22:Introduction to Database Transaction Processing<br>L23: schedules, serializability of schedules<br>L24;concurrency control<br>L25:recoverability | student will learn about transaction system concepts, schedules, concurrency control and recoverability | discussion using real life problems | banking, ATM |
| | | Database Transaction Processing(recoverability) | R-2<br>R-3 | | L22:Introduction to Database Transaction Processing<br>L23: schedules, serializability of schedules<br>L24;concurrency control<br>L25:recoverability | student will learn about transaction system concepts, schedules, concurrency control and recoverability | discussion using real life problems | banking, ATM |
| | Lecture 26 | | | | Test 2 | | | |

| Week 9 | Lecture 27 | Programming constructs in Database(flow control statements) | T-1 R-2 | | OR-1 | L27: INtroduction to Programming constructs in Database using flow control statements L28: what are functions L29:what are stored procedures L30: what is cursor and its uses L31: introduction to triggers and its uses L32:What is exception handling | student will learn about various programming construct in database using PL/SQL | Discussion and live demonstration using oracle | |
|---|---|---|---|---|---|---|---|---|---|
| | | Programming constructs in Database(functions) | T-1 R-2 | | | L27: INtroduction to Programming constructs in Database using flow control statements L28: what are functions L29:what are stored procedures L30: what is cursor and its uses L31: introduction to triggers and its uses L32:What is exception handling | student will learn about various programming construct in database using PL/SQL | Discussion and live demonstration using oracle | customer, employee, student |
| | | Programming constructs in Database(stored procedures) | T-1 R-2 | | | L27: INtroduction to Programming constructs in Database using flow control statements L28: what are functions L29:what are stored procedures L30: what is cursor and its uses L31: introduction to triggers and its uses L32:What is exception handling | student will learn about various programming construct in database using PL/SQL | Discussion and live demonstration using oracle | customer, employee, student |

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| Week 9 | Lecture 27 | Programming constructs in Database(cursors) | T-1<br>R-2 | | L27: INtroduction to Programming constructs in Database using flow control statements<br>L28: what are functions<br>L29:what are stored procedures<br>L30: what is cursor and its uses<br>L31: introduction to triggers and its uses<br>L32:What is exception handling | student will learn about various programming construct in database using PL/SQL | Discussion and live demonstration using oracle | customer, employee, student |
|---|---|---|---|---|---|---|---|---|
| | | Programming constructs in Database(triggers) | T-1<br>R-2 | | L27: INtroduction to Programming constructs in Database using flow control statements<br>L28: what are functions<br>L29:what are stored procedures<br>L30: what is cursor and its uses<br>L31: introduction to triggers and its uses<br>L32:What is exception handling | student will learn about various programming construct in database using PL/SQL | Discussion and live demonstration using oracle | customer, employee, student |
| | | Programming constructs in Database(exception handling) | T-1<br>R-2 | | L27: INtroduction to Programming constructs in Database using flow control statements<br>L28: what are functions<br>L29:what are stored procedures<br>L30: what is cursor and its uses<br>L31: introduction to triggers and its uses<br>L32:What is exception handling | student will learn about various programming construct in database using PL/SQL | Discussion and live demonstration using oracle | customer, employee, student |

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| Week 10 | Lecture 28 | Programming constructs in Database(flow control statements) | T-1<br>R-2 | OR-1 | L27: INtroduction to Programming constructs in Database using flow control statements<br>L28: what are functions<br>L29:what are stored procedures<br>L30: what is cursor and its uses<br>L31: introduction to triggers and its uses<br>L32:What is exception handling | student will learn about various programming construct in database using PL/SQL | Discussion and live demonstration using oracle | |
|---|---|---|---|---|---|---|---|---|
| | | Programming constructs in Database(functions) | T-1<br>R-2 | | L27: INtroduction to Programming constructs in Database using flow control statements<br>L28: what are functions<br>L29:what are stored procedures<br>L30: what is cursor and its uses<br>L31: introduction to triggers and its uses<br>L32:What is exception handling | student will learn about various programming construct in database using PL/SQL | Discussion and live demonstration using oracle | customer, employee, student |
| | | Programming constructs in Database(stored procedures) | T-1<br>R-2 | | L27: INtroduction to Programming constructs in Database using flow control statements<br>L28: what are functions<br>L29:what are stored procedures<br>L30: what is cursor and its uses<br>L31: introduction to triggers and its uses<br>L32:What is exception handling | student will learn about various programming construct in database using PL/SQL | Discussion and live demonstration using oracle | customer, employee, student |

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| Week 10 | Lecture 28 | Programming constructs in Database(cursors) | T-1 R-2 | | L27: INtroduction to Programming constructs in Database using flow control statements L28: what are functions L29:what are stored procedures L30: what is cursor and its uses L31: introduction to triggers and its uses L32:What is exception handling | student will learn about various programming construct in database using PL/SQL | Discussion and live demonstration using oracle | customer, employee, student |
|---|---|---|---|---|---|---|---|---|
| | | Programming constructs in Database(triggers) | T-1 R-2 | | L27: INtroduction to Programming constructs in Database using flow control statements L28: what are functions L29:what are stored procedures L30: what is cursor and its uses L31: introduction to triggers and its uses L32:What is exception handling | student will learn about various programming construct in database using PL/SQL | Discussion and live demonstration using oracle | customer, employee, student |
| | | Programming constructs in Database(exception handling) | T-1 R-2 | | L27: INtroduction to Programming constructs in Database using flow control statements L28: what are functions L29:what are stored procedures L30: what is cursor and its uses L31: introduction to triggers and its uses L32:What is exception handling | student will learn about various programming construct in database using PL/SQL | Discussion and live demonstration using oracle | customer, employee, student |

| Week 10 | Lecture 29 | Programming constructs in Database(flow control statements) | T-1 R-2 | OR-1 | L27: INtroduction to Programming constructs in Database using flow control statements L28: what are functions L29:what are stored procedures L30: what is cursor and its uses L31: introduction to triggers and its uses L32:What is exception handling | student will learn about various programming construct in database using PL/SQL | Discussion and live demonstration using oracle | |
|---|---|---|---|---|---|---|---|---|
| | | Programming constructs in Database(functions) | T-1 R-2 | | L27: INtroduction to Programming constructs in Database using flow control statements L28: what are functions L29:what are stored procedures L30: what is cursor and its uses L31: introduction to triggers and its uses L32:What is exception handling | student will learn about various programming construct in database using PL/SQL | Discussion and live demonstration using oracle | customer, employee, student |
| | | Programming constructs in Database(stored procedures) | T-1 R-2 | | L27: INtroduction to Programming constructs in Database using flow control statements L28: what are functions L29:what are stored procedures L30: what is cursor and its uses L31: introduction to triggers and its uses L32:What is exception handling | student will learn about various programming construct in database using PL/SQL | Discussion and live demonstration using oracle | customer, employee, student |

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| Week 10 | Lecture 29 | Programming constructs in Database(cursors) | T-1 R-2 | | L27: INtroduction to Programming constructs in Database using flow control statements<br>L28: what are functions<br>L29:what are stored procedures<br>L30: what is cursor and its uses<br>L31: introduction to triggers and its uses<br>L32:What is exception handling | student will learn about various programming construct in database using PL/SQL | Discussion and live demonstration using oracle | customer, employee, student |
|---|---|---|---|---|---|---|---|---|
| | | Programming constructs in Database(triggers) | T-1 R-2 | | L27: INtroduction to Programming constructs in Database using flow control statements<br>L28: what are functions<br>L29:what are stored procedures<br>L30: what is cursor and its uses<br>L31: introduction to triggers and its uses<br>L32:What is exception handling | student will learn about various programming construct in database using PL/SQL | Discussion and live demonstration using oracle | customer, employee, student |
| | | Programming constructs in Database(exception handling) | T-1 R-2 | | L27: INtroduction to Programming constructs in Database using flow control statements<br>L28: what are functions<br>L29:what are stored procedures<br>L30: what is cursor and its uses<br>L31: introduction to triggers and its uses<br>L32:What is exception handling | student will learn about various programming construct in database using PL/SQL | Discussion and live demonstration using oracle | customer, employee, student |

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| Week 10 | Lecture 30 | Programming constructs in Database(flow control statements) | T-1<br>R-2 | OR-1 | L27: INtroduction to Programming constructs in Database using flow control statements<br>L28: what are functions<br>L29:what are stored procedures<br>L30: what is cursor and its uses<br>L31: introduction to triggers and its uses<br>L32:What is exception handling | student will learn about various programming construct in database using PL/SQL | Discussion and live demonstration using oracle | |
|---|---|---|---|---|---|---|---|---|
| | | Programming constructs in Database(functions) | T-1<br>R-2 | | L27: INtroduction to Programming constructs in Database using flow control statements<br>L28: what are functions<br>L29:what are stored procedures<br>L30: what is cursor and its uses<br>L31: introduction to triggers and its uses<br>L32:What is exception handling | student will learn about various programming construct in database using PL/SQL | Discussion and live demonstration using oracle | customer, employee, student |
| | | Programming constructs in Database(stored procedures) | T-1<br>R-2 | | L27: INtroduction to Programming constructs in Database using flow control statements<br>L28: what are functions<br>L29:what are stored procedures<br>L30: what is cursor and its uses<br>L31: introduction to triggers and its uses<br>L32:What is exception handling | student will learn about various programming construct in database using PL/SQL | Discussion and live demonstration using oracle | customer, employee, student |

| Week 10 | Lecture 30 | Programming constructs in Database(cursors) | T-1<br>R-2 | | L27: INtroduction to Programming constructs in Database using flow control statements<br>L28: what are functions<br>L29:what are stored procedures<br>L30: what is cursor and its uses<br>L31: introduction to triggers and its uses<br>L32:What is exception handling | student will learn about various programming construct in database using PL/SQL | Discussion and live demonstration using oracle | customer, employee, student |
|---------|-----------|----------------------------------------------|------|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|--------------------------------------------------|--------------------------------|
| | | Programming constructs in Database(triggers) | T-1<br>R-2 | | L27: INtroduction to Programming constructs in Database using flow control statements<br>L28: what are functions<br>L29:what are stored procedures<br>L30: what is cursor and its uses<br>L31: introduction to triggers and its uses<br>L32:What is exception handling | student will learn about various programming construct in database using PL/SQL | Discussion and live demonstration using oracle | customer, employee, student |
| | | Programming constructs in Database(exception handling) | T-1<br>R-2 | | L27: INtroduction to Programming constructs in Database using flow control statements<br>L28: what are functions<br>L29:what are stored procedures<br>L30: what is cursor and its uses<br>L31: introduction to triggers and its uses<br>L32:What is exception handling | student will learn about various programming construct in database using PL/SQL | Discussion and live demonstration using oracle | customer, employee, student |

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| Week 11 | Lecture 31 | Programming constructs in Database(flow control statements) | T-1 R-2 | OR-1 | L27: INtroduction to Programming constructs in Database using flow control statements L28: what are functions L29:what are stored procedures L30: what is cursor and its uses L31: introduction to triggers and its uses L32:What is exception handling | student will learn about various programming construct in database using PL/SQL | Discussion and live demonstration using oracle | |
|---|---|---|---|---|---|---|---|---|
| | | Programming constructs in Database(functions) | T-1 R-2 | | L27: INtroduction to Programming constructs in Database using flow control statements L28: what are functions L29:what are stored procedures L30: what is cursor and its uses L31: introduction to triggers and its uses L32:What is exception handling | student will learn about various programming construct in database using PL/SQL | Discussion and live demonstration using oracle | customer, employee, student |
| | | Programming constructs in Database(stored procedures) | T-1 R-2 | | L27: INtroduction to Programming constructs in Database using flow control statements L28: what are functions L29:what are stored procedures L30: what is cursor and its uses L31: introduction to triggers and its uses L32:What is exception handling | student will learn about various programming construct in database using PL/SQL | Discussion and live demonstration using oracle | customer, employee, student |

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| Week 11 | Lecture 31 | Programming constructs in Database(cursors) | T-1 R-2 | | L27: INtroduction to Programming constructs in Database using flow control statements L28: what are functions L29:what are stored procedures L30: what is cursor and its uses L31: introduction to triggers and its uses L32:What is exception handling | student will learn about various programming construct in database using PL/SQL | Discussion and live demonstration using oracle | customer, employee, student |
|---|---|---|---|---|---|---|---|---|
| | | Programming constructs in Database(triggers) | T-1 R-2 | | L27: INtroduction to Programming constructs in Database using flow control statements L28: what are functions L29:what are stored procedures L30: what is cursor and its uses L31: introduction to triggers and its uses L32:What is exception handling | student will learn about various programming construct in database using PL/SQL | Discussion and live demonstration using oracle | customer, employee, student |
| | | Programming constructs in Database(exception handling) | T-1 R-2 | | L27: INtroduction to Programming constructs in Database using flow control statements L28: what are functions L29:what are stored procedures L30: what is cursor and its uses L31: introduction to triggers and its uses L32:What is exception handling | student will learn about various programming construct in database using PL/SQL | Discussion and live demonstration using oracle | customer, employee, student |

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| Week 11 | Lecture 32 | Programming constructs in Database(flow control statements) | T-1 R-2 | OR-1 | L27: INtroduction to Programming constructs in Database using flow control statements L28: what are functions L29:what are stored procedures L30: what is cursor and its uses L31: introduction to triggers and its uses L32:What is exception handling | student will learn about various programming construct in database using PL/SQL | Discussion and live demonstration using oracle | |
|---|---|---|---|---|---|---|---|---|
| | | Programming constructs in Database(functions) | T-1 R-2 | | L27: INtroduction to Programming constructs in Database using flow control statements L28: what are functions L29:what are stored procedures L30: what is cursor and its uses L31: introduction to triggers and its uses L32:What is exception handling | student will learn about various programming construct in database using PL/SQL | Discussion and live demonstration using oracle | customer, employee, student |
| | | Programming constructs in Database(stored procedures) | T-1 R-2 | | L27: INtroduction to Programming constructs in Database using flow control statements L28: what are functions L29:what are stored procedures L30: what is cursor and its uses L31: introduction to triggers and its uses L32:What is exception handling | student will learn about various programming construct in database using PL/SQL | Discussion and live demonstration using oracle | customer, employee, student |

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| Week 11 | Lecture 32 | Programming constructs in Database(cursors) | T-1<br>R-2 | | L27: INtroduction to Programming constructs in Database using flow control statements<br>L28: what are functions<br>L29:what are stored procedures<br>L30: what is cursor and its uses<br>L31: introduction to triggers and its uses<br>L32:What is exception handling | student will learn about various programming construct in database using PL/SQL | Discussion and live demonstration using oracle | customer, employee, student |
|---|---|---|---|---|---|---|---|---|
| | | Programming constructs in Database(triggers) | T-1<br>R-2 | | L27: INtroduction to Programming constructs in Database using flow control statements<br>L28: what are functions<br>L29:what are stored procedures<br>L30: what is cursor and its uses<br>L31: introduction to triggers and its uses<br>L32:What is exception handling | student will learn about various programming construct in database using PL/SQL | Discussion and live demonstration using oracle | customer, employee, student |
| | | Programming constructs in Database(exception handling) | T-1<br>R-2 | | L27: INtroduction to Programming constructs in Database using flow control statements<br>L28: what are functions<br>L29:what are stored procedures<br>L30: what is cursor and its uses<br>L31: introduction to triggers and its uses<br>L32:What is exception handling | student will learn about various programming construct in database using PL/SQL | Discussion and live demonstration using oracle | customer, employee, student |
| | Lecture 33 | File Organization and Trends in Databases(file organizations and its types) | T-1<br>R-3 | | L33: file organizations and its types<br>L34: Indexing<br>L35: Types of indexing | student will learn about file organization, indexing and its types | discussion using real time datasets | |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Week 11 | Lecture 33 | File Organization and Trends in Databases (indexing, types of indexing) | T-1 R-3 | | L33: file organizations and its types L34: Indexing L35: Types of indexing | student will learn about file organization, indexing and its types | discussion using real time datasets | |
| Week 12 | Lecture 34 | File Organization and Trends in Databases(file organizations and its types) | T-1 R-3 | | L33: file organizations and its types L34: Indexing L35: Types of indexing | student will learn about file organization, indexing and its types | discussion using real time datasets | |
| | | File Organization and Trends in Databases (indexing, types of indexing) | T-1 R-3 | | L33: file organizations and its types L34: Indexing L35: Types of indexing | student will learn about file organization, indexing and its types | discussion using real time datasets | |
| | Lecture 35 | File Organization and Trends in Databases(file organizations and its types) | T-1 R-3 | | L33: file organizations and its types L34: Indexing L35: Types of indexing | student will learn about file organization, indexing and its types | discussion using real time datasets | |
| | | File Organization and Trends in Databases (indexing, types of indexing) | T-1 R-3 | | L33: file organizations and its types L34: Indexing L35: Types of indexing | student will learn about file organization, indexing and its types | discussion using real time datasets | |
| | Lecture 36 | | | | BYOD-Practical | | | |
| Week 13 | Lecture 37 | File Organization and Trends in Databases (hashing, hashing techniques) | T-1 R-2 | | L37: Introduction hashing L38: Various hashing techniques | student will learn about hashing, and its various techniques | discussion on real time datasets | |
| | Lecture 38 | File Organization and Trends in Databases (hashing, hashing techniques) | T-1 R-2 | | L37: Introduction hashing L38: Various hashing techniques | student will learn about hashing, and its various techniques | discussion on real time datasets | |
| | Lecture 39 | File Organization and Trends in Databases (introduction to big data, nosql systems) | T-1 R-2 R-3 | | L39:ntroduction to big data L40: introduction to nosql systems | student will learn basics of big data and nosql | discussion on real time datasets | Facebook, Twitter, Youtube |
| Week 14 | Lecture 40 | File Organization and Trends in Databases (introduction to big data, nosql systems) | T-1 R-2 R-3 | | L39:ntroduction to big data L40: introduction to nosql systems | student will learn basics of big data and nosql | discussion on real time datasets | Facebook, Twitter, Youtube |

# SPILL OVER

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Week 14 | Lecture 41 | | | | Spill Over | | | |
| | Lecture 42 | | | | Spill Over | | | |
| Week 15 | Lecture 43 | | | | Spill Over | | | |
| | Lecture 44 | | | | Spill Over | | | |
| | Lecture 45 | | | | Spill Over | | | |

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## Scheme for CA:

CA Category of this Course Code is:A0203 (2 best out of 3)

| Component | Weightage (%) | Mapped CO(s) |
|---|---|---|
| BYOD-Practical | 50 | CO5, CO6 |
| Test 1 | 50 | CO1, CO2 |
| Test 2 | 50 | CO3, CO4 |

## Details of Academic Task(s)

| Academic Task | Objective | Detail of Academic Task | Nature of Academic Task (group/individuals) | Academic Task Mode | Marks | Allottment / submission Week |
|---|---|---|---|---|---|---|
| BYOD-Practical | To test the querying approach and skill set of the student | Lab evaluation based on scenario based questions 1) SQL Queries and Subqueries 2) PL/SQL Programs | Individual | Online | 30 | 11 / 12 |
| Test 1 | To check the understanding as well as performance of the students based upon the concepts taught | CA1: 30 marks- Quiz based on smartly designed problems A)10 marks based on the architecture and data modelling B)20 marks MCQ based on the SQL | Individual | Online | 30 | 3 / 4 |
| Test 2 | To check the understanding as well as performance of the students based upon the concepts taught | CA2: 30 marks- Quiz based on smartly designed problems A) 20 marks based on topic database design and normalization B) 10 Marks based on topic transactions in the database | Individual | Online | 30 | 7 / 8 |

## MOOCs/ Certification etc. mapped with the Academic Task(s)

| Academic Task | Name Of Certification/Online Course/Test/Competition mapped | Type | Offered By Organisation |
|---|---|---|---|
| BYOD-Practical | ORACLE DATABASE SQL| 1Z0-071 | Industry Certification | ORACLE |
| BYOD-Practical | DATABASE MANAGEMENT SYSTEMS DBMS | MOOCs | GREAT LEARNING |
| Test 1 | DATABASE MANAGEMENT SYSTEMS DBMS | MOOCs | GREAT LEARNING |
| Test 1 | ORACLE DATABASE SQL| 1Z0-071 | Industry Certification | ORACLE |
| Test 1 | DATABASE MANAGEMENT SYSTEMS DBMS | MOOCs | UDEMY |

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| Test 2 | ORACLE DATABASE SQL| 1Z0-071 | Industry Certification | ORACLE |
| Test 2 | DATABASE MANAGEMENT SYSTEMS DBMS | MOOCs | GREAT LEARNING |

Where MOOCs/ Certification etc. are mapped with Academic Tasks:
1. Students have choice to appear for Academic Task or MOOCs etc.
2. The student may appear for both, In this case best obtained marks will be considered.

## MOOCs/ Certification etc. not-mapped with the Academic Task(s) (Available for students for better learning/ will get students ready for )

| Name Of Certification/Online Course/Test/Competition mapped | Type | Offered By Organisation |
|---|---|---|
| DATABASE MANAGEMENT SYSTEM | Test/Examination | NPTEL |

## Detailed Plan For Practicals

| Practical No | Broad topic | Subtopic | Other Readings | Learning Outcomes |
|---|---|---|---|---|
| Practical 1 | SQL,PL/SQL | Set Operations, Basic Structure, Aggregate functions, DDL, DML, DCL | | student will learn basics of sql operations, aggregate functions, DDL,DML,DCL |
| Practical 2 | SQL,PL/SQL | Set Operations, Basic Structure, Aggregate functions, DDL, DML, DCL | | student will learn basics of sql operations, aggregate functions, DDL,DML,DCL |
| Practical 3 | SQL,PL/SQL | Set Operations, Basic Structure, Aggregate functions, DDL, DML, DCL | | student will learn basics of sql operations, aggregate functions, DDL,DML,DCL |
| Practical 4 | SQL,PL/SQL | Set Operations, Basic Structure, Aggregate functions, DDL, DML, DCL | | student will learn basics of sql operations, aggregate functions, DDL,DML,DCL |
| Practical 5 | SQL,PL/SQL | Views,Nested Queries, Joins, Complex Queries | | student will learn about views, subqueries, packages, cursors and triggers |
| | SQL,PL/SQL | Packages, Cursors, Triggers | | student will learn about views, subqueries, packages, cursors and triggers |
| | SQL,PL/SQL | Language elements, Subprograms | | student will learn about views, subqueries, packages, cursors and triggers |
| Practical 6 | SQL,PL/SQL | Language elements, Subprograms | | student will learn about views, subqueries, packages, cursors and triggers |
| | SQL,PL/SQL | Packages, Cursors, Triggers | | student will learn about views, subqueries, packages, cursors and triggers |
| | SQL,PL/SQL | Views,Nested Queries, Joins, Complex Queries | | student will learn about views, subqueries, packages, cursors and triggers |
| Practical 7 | SQL,PL/SQL | Views,Nested Queries, Joins, Complex Queries | | student will learn about views, subqueries, packages, cursors and triggers |

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| Practical 7 | SQL,PL/SQL | Packages, Cursors, Triggers | | student will learn about views, subqueries, packages, cursors and triggers |
|---|---|---|---|---|
| | SQL,PL/SQL | Language elements, Subprograms | | student will learn about views, subqueries, packages, cursors and triggers |
| Practical 8 | SQL,PL/SQL | Language elements, Subprograms | | student will learn about views, subqueries, packages, cursors and triggers |
| | SQL,PL/SQL | Packages, Cursors, Triggers | | student will learn about views, subqueries, packages, cursors and triggers |
| | SQL,PL/SQL | Views,Nested Queries, Joins, Complex Queries | | student will learn about views, subqueries, packages, cursors and triggers |
| Practical 9 | SQL,PL/SQL | Views,Nested Queries, Joins, Complex Queries | | student will learn about views, subqueries, packages, cursors and triggers |
| | SQL,PL/SQL | Packages, Cursors, Triggers | | student will learn about views, subqueries, packages, cursors and triggers |
| | SQL,PL/SQL | Language elements, Subprograms | | student will learn about views, subqueries, packages, cursors and triggers |
| Practical 10 | Data Manipulation | Change the Data in a Table | | student will learn about DML |
| | Data Manipulation | Use the DELETE and TRUNCATE Statements | | student will learn about DML |
| | Data Manipulation | How to save and discard changes with the COMMIT and ROLLBACK statements | | student will learn about DML |
| | Data Manipulation | Implement Read Consistency | | student will learn about DML |
| | Data Manipulation | Describe the FOR UPDATE Clause | | student will learn about DML |
| | Data Manipulation | Add New Rows to a Table | | student will learn about DML |
| Practical 11 | Data Manipulation | Add New Rows to a Table | | student will learn about DML |
| | Data Manipulation | Describe the FOR UPDATE Clause | | student will learn about DML |
| | Data Manipulation | Implement Read Consistency | | student will learn about DML |
| | Data Manipulation | How to save and discard changes with the COMMIT and ROLLBACK statements | | student will learn about DML |
| | Data Manipulation | Use the DELETE and TRUNCATE Statements | | student will learn about DML |
| | Data Manipulation | Change the Data in a Table | | student will learn about DML |
| Practical 12 | Data Manipulation | Change the Data in a Table | | student will learn about DML |
| | Data Manipulation | Use the DELETE and TRUNCATE Statements | | student will learn about DML |
| | Data Manipulation | How to save and discard changes with the COMMIT and ROLLBACK statements | | student will learn about DML |

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| Practical 12 | Data Manipulation | Implement Read Consistency | | student will learn about DML |
|---|---|---|---|---|
| | Data Manipulation | Describe the FOR UPDATE Clause | | student will learn about DML |
| | Data Manipulation | Add New Rows to a Table | | student will learn about DML |
| Practical 13 | Retrieve Data using the SQL SELECT Statement | List the capabilities of SQL SELECT statements | | student will learn about SQL statements |
| | Retrieve Data using the SQL SELECT Statement | Generate a report of data from the output of a basic SELECT statement | | student will learn about SQL statements |
| | Retrieve Data using the SQL SELECT Statement | Use arithmetic expressions and NULL values in the SELECT statement | | student will learn about SQL statements |
| | Retrieve Data using the SQL SELECT Statement | Invoke Column aliases | | student will learn about SQL statements |
| | Retrieve Data using the SQL SELECT Statement | Concatenation operator, literal character strings, alternative quote operator, and the DISTINCT keyword | | student will learn about SQL statements |
| | Retrieve Data using the SQL SELECT Statement | Display the table structure using the DESCRIBE command | | student will learn about SQL statements |
| Practical 14 | Retrieve Data using the SQL SELECT Statement | Display the table structure using the DESCRIBE command | | student will learn about SQL statements |
| | Retrieve Data using the SQL SELECT Statement | Concatenation operator, literal character strings, alternative quote operator, and the DISTINCT keyword | | student will learn about SQL statements |
| | Retrieve Data using the SQL SELECT Statement | Invoke Column aliases | | student will learn about SQL statements |
| | Retrieve Data using the SQL SELECT Statement | Use arithmetic expressions and NULL values in the SELECT statement | | student will learn about SQL statements |
| | Retrieve Data using the SQL SELECT Statement | Generate a report of data from the output of a basic SELECT statement | | student will learn about SQL statements |
| | Retrieve Data using the SQL SELECT Statement | List the capabilities of SQL SELECT statements | | student will learn about SQL statements |
| Practical 15 | Aggregated Data Using the Group Functions | Usage of the aggregation functions in SELECT statements to produce meaningful reports | | student will learn about aggregate functions , GROUP BY and HAVING clause |
| | Aggregated Data Using the Group Functions | Describe the AVG, SUM, MIN, and MAX function | | student will learn about aggregate functions , GROUP BY and HAVING clause |
| | Aggregated Data Using the Group Functions | How to handle Null Values in a group function? | | student will learn about aggregate functions , GROUP BY and HAVING clause |
| | Aggregated Data Using the Group Functions | Exclude groups of date by using the HAVING clause | | student will learn about aggregate functions , GROUP BY and HAVING clause |
| | Aggregated Data Using the Group Functions | Divide the data in groups by using the GROUP BY clause | | student will learn about aggregate functions , GROUP BY and HAVING clause |

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| Practical 16 | Aggregated Data Using the Group Functions | Divide the data in groups by using the GROUP BY clause | | student will learn about aggregate functions , GROUP BY and HAVING clause |
|---|---|---|---|---|
| | Aggregated Data Using the Group Functions | Exclude groups of date by using the HAVING clause | | student will learn about aggregate functions , GROUP BY and HAVING clause |
| | Aggregated Data Using the Group Functions | How to handle Null Values in a group function? | | student will learn about aggregate functions , GROUP BY and HAVING clause |
| | Aggregated Data Using the Group Functions | Describe the AVG, SUM, MIN, and MAX function | | student will learn about aggregate functions , GROUP BY and HAVING clause |
| | Aggregated Data Using the Group Functions | Usage of the aggregation functions in SELECT statements to produce meaningful reports | | student will learn about aggregate functions , GROUP BY and HAVING clause |
| Practical 17 | Usage of Subqueries to Solve Queries | Use the EXISTS Operator | | student will learn about subqueries |
| | Usage of Subqueries to Solve Queries | Use a Subquery to Solve a Problem | | student will learn about subqueries |
| | Usage of Subqueries to Solve Queries | Single-Row Subqueries | | student will learn about subqueries |
| | Usage of Subqueries to Solve Queries | Group Functions in a Subquery | | student will learn about subqueries |
| | Usage of Subqueries to Solve Queries | Multiple-Row Subqueries | | student will learn about subqueries |
| | Usage of Subqueries to Solve Queries | Use the ANY and ALL Operator in Multiple-Row Subqueries | | student will learn about subqueries |
| Practical 18 | Usage of Subqueries to Solve Queries | Use the ANY and ALL Operator in Multiple-Row Subqueries | | student will learn about subqueries |
| | Usage of Subqueries to Solve Queries | Multiple-Row Subqueries | | student will learn about subqueries |
| | Usage of Subqueries to Solve Queries | Group Functions in a Subquery | | student will learn about subqueries |
| | Usage of Subqueries to Solve Queries | Single-Row Subqueries | | student will learn about subqueries |
| | Usage of Subqueries to Solve Queries | Use a Subquery to Solve a Problem | | student will learn about subqueries |
| | Usage of Subqueries to Solve Queries | Use the EXISTS Operator | | student will learn about subqueries |
| Practical 19 | SET Operators | Describe the SET operators | | student will learn about SET operator |
| | SET Operators | Use a SET operator to combine multiple queries into a single query | | student will learn about SET operator |
| | SET Operators | Describe the UNION, UNION ALL, INTERSECT, and MINUS Operators | | student will learn about SET operator |
| | SET Operators | Matching the SELECT statements | | student will learn about SET operator |
| | SET Operators | Use the ORDER BY Clause in Set Operations | | student will learn about SET operator |
| Practical 20 | Creating Views | Create, modify, and retrieve data from a view | | student will learn about views |
| | Creating Views | Perform Data manipulation language (DML) operations on a view | | student will learn about views |
| | Creating Views | How to drop a view? | | student will learn about views |

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| Practical 21 | Manipulating Data by Using Subqueries | Using Subqueries to Manipulate Data | | Student will learn about manipulating Data by Using Subqueries |
|---|---|---|---|---|
| | Manipulating Data by Using Subqueries | Inserting by Using a Subquery as a Target | | Student will learn about manipulating Data by Using Subqueries |
| | Manipulating Data by Using Subqueries | Using the WITH CHECK OPTION Keyword on DML Statements | | Student will learn about manipulating Data by Using Subqueries |
| | Manipulating Data by Using Subqueries | Using Correlated Subqueries to Update and Delete rows | | Student will learn about manipulating Data by Using Subqueries |
| Practical 22 | Introduction to PL/SQL | PL/SQL Overview | | student will learn about PL/SQL |
| | Introduction to PL/SQL | List the benefits of PL/SQL Subprograms | | student will learn about PL/SQL |
| | Introduction to PL/SQL | Overview of the Types of PL/SQL blocks | | student will learn about PL/SQL |
| | Introduction to PL/SQL | Create a Simple Anonymous Block | | student will learn about PL/SQL |
| | Introduction to PL/SQL | Generate the Output from a PL/SQL Block | | student will learn about PL/SQL |
| Practical 23 | Introduction to PL/SQL | Generate the Output from a PL/SQL Block | | student will learn about PL/SQL |
| | Introduction to PL/SQL | Create a Simple Anonymous Block | | student will learn about PL/SQL |
| | Introduction to PL/SQL | Overview of the Types of PL/SQL blocks | | student will learn about PL/SQL |
| | Introduction to PL/SQL | List the benefits of PL/SQL Subprograms | | student will learn about PL/SQL |
| | Introduction to PL/SQL | PL/SQL Overview | | student will learn about PL/SQL |
| Practical 24 | PL/SQL Identifiers | List the different Types of Identifiers in a PL/SQL subprogram | | student will learn about PL/SQL |
| | PL/SQL Identifiers | Usage of the Declarative Section to Define Identifiers | | student will learn about PL/SQL |
| | PL/SQL Identifiers | Use of variables to store data | | student will learn about PL/SQL |
| | PL/SQL Identifiers | Scalar Data Types | | student will learn about PL/SQL |
| | PL/SQL Identifiers | %TYPE Attribute | | student will learn about PL/SQL |
| | PL/SQL Identifiers | Bind Variables | | student will learn about PL/SQL |
| | PL/SQL Identifiers | Sequences in PL/SQL Expressions | | student will learn about PL/SQL |
| Practical 25 | Write Executable Statements | Basic PL/SQL Block Syntax Guidelines | | student will learn about Executable statements |
| | Write Executable Statements | How to comment code? | | student will learn about Executable statements |
| | Write Executable Statements | SQL Functions in PL/SQL | | student will learn about Executable statements |
| | Write Executable Statements | Data Type Conversion | | student will learn about Executable statements |

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| | | | | |
|---|---|---|---|---|
| Practical 25 | Write Executable Statements | Nested Blocks | | student will learn about Executable statements |
| | Write Executable Statements | Operators in PL/SQL | | student will learn about Executable statements |
| Practical 26 | Explicit Cursors | Understand Explicit Cursors | | student will learn about cursors |
| | Explicit Cursors | Declare the Cursor | | student will learn about cursors |
| | Explicit Cursors | How to open the Cursor? | | student will learn about cursors |
| | Explicit Cursors | Fetching data from the Cursor | | student will learn about cursors |
| | Explicit Cursors | How to close the Cursor? | | student will learn about cursors |
| | Explicit Cursors | Cursor FOR loop | | student will learn about cursors |
| | Explicit Cursors | Explicit Cursor Attributes | | student will learn about cursors |
| | Explicit Cursors | FOR UPDATE Clause and WHERE CURRENT Clause | | student will learn about cursors |
| Practical 27 | Exception Handling | What are Exceptions? | | student will learn about Exception Handling |
| | Exception Handling | Handle Exceptions with PL/SQL | | student will learn about Exception Handling |
| | Exception Handling | Trap Predefined Oracle Server Errors | | student will learn about Exception Handling |
| | Exception Handling | Trap Non-Predefined Oracle Server Errors | | student will learn about Exception Handling |
| | Exception Handling | Trap User-Defined Exceptions | | student will learn about Exception Handling |
| | Exception Handling | Propagate Exceptions | | student will learn about Exception Handling |
| | Exception Handling | RAISE_APPLICATION_ERROR Procedure | | student will learn about Exception Handling |
| Practical 28 | Stored Procedures and Functions | What are Stored Procedures and Functions? | | student will learn about stored procedures |
| | Stored Procedures and Functions | Differentiate between anonymous blocks and subprograms | | student will learn about stored procedures |
| | Stored Procedures and Functions | Create a Simple Procedure | | student will learn about stored procedures |
| | Stored Procedures and Functions | Create a Simple Procedure with IN parameter | | student will learn about stored procedures |
| | Stored Procedures and Functions | Create a Simple Function | | student will learn about stored procedures |
| | Stored Procedures and Functions | Execute a Simple Procedure | | student will learn about stored procedures |
| | Stored Procedures and Functions | Execute a Simple Function | | student will learn about stored procedures |
| | **SPILL OVER** | | | |
| Practical 29 | Spill Over | | | |