**A. Course Handout (Version 1.0) | Last updated on 01st July, 2023**

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| Institute/School Name | Chitkara University Institute of Engineering and Technology | | |
| Department Name | Department of Computer Science & Engineering | | |
| Programme Name | Bachelor of Engineering, Computer Science & Engineering | | |
| Course Name | Database Management System | Session | 2023-2024 |
| Course Code | 22CS007 | Semester/Batch | 3st/2023 |
| L-T-P (Per Week) | 3-0-2 | Course Credits | 04 |
| Course Coordinator | Dr. Gaganpreet Kaur | | |

1. **Scope & Objectives of the Course**

The course provides a wide scope of learning & understanding of the subject and the main objectives of the course are:

* + To provide a comprehensive foundation for designing and implementing database system by using RDBMS and analyse its need for real life applications.
  + To enable the students to participate in the development process by implementing SQL commands and be able to describe relational algebraic expression from queries.
  + To recognize and identify the use of normalization and functional dependency used in database design.
  + To apply and relate the concept of transaction, concurrency control, security and recovery in database.
  + To provide knowledge about the concepts of sequence, triggers, cursor, function, procedure, package.

1. **Course Learning Outcomes**

Student should be able:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Course Outcome** | **POs** | **CL** | **KC** | **Sessions** |
| **CLO01** | To provide a comprehensive foundation for designing and implementing database system by using RDBMS and analyse its need for real life applications. | PO2,PO3,PO11,PO12 | K2 | Factual  Conceptual | **8** |
| **CLO02** | To enable the students to participate in the development process by implementing SQL commands and be able to describe relational algebraic expression from queries. | PO2,PO3,PO4,PO12 | K3 | Procedural Conceptual | **14** |
| **CLO03** | To recognize and identify the use of normalization and functional dependency used in database design. | PO1,PO2,PO3,PO12 | K3 | Conceptual Procedural | **14** |
| **CLO04** | To apply and relate the concept of transaction, concurrency control, security and recovery in database. | PO3,PO5,PO12 | K3 | Conceptual Procedural | **12** |
| **CLO05** | To provide knowledge about the concepts of sequence, triggers, cursor, function, procedure, package. | PO1,PO2,PO3,PO10,PO11, PO12 | K3 | Conceptual Procedural | **12** |
| **Total Contact Hours** | | | | | **60** |

Revised Bloom’s Taxonomy Terminology

\*Cognitive Level =CL

\*Knowledge Categories = KC

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course**  **Learning**  **Outcomes** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** |
| CLO01 |  | M | H |  |  |  |  |  |  |  | H | M |
| CLO02 |  | M | H | M |  |  |  |  |  |  |  | M |
| CLO03 | M | M | M |  |  |  |  |  |  |  |  | M |
| CLO04 |  |  | H |  | H |  |  |  |  |  |  | H |
| CLO05 | M | M | H |  |  |  |  |  |  | H | H | M |

H=High, M=Medium, L=Low

1. **ERISE Grid Mapping**

|  |  |
| --- | --- |
| **Feature Enablemnet** | **Level(1-5, 5 being highest)** |
| Entrepreneurship | 3 |
| Research | 4 |
| Innovation | 3 |
| Skills | 5 |
| Employability | 5 |

1. **Recommended Books:**

**B01:** Database System Concepts’, Abraham Silberschatz, Henry F. Korth, Sudharsan, McGraw- Hill,

Seventh Edition.

**B02**: 'An Introduction to Database Systems', C.J.Date , O'Reilly Media, Eighth Edition.

**B03:** ‘Database Systems’, Ramez.Z.Elmasri, Shamkant B.Navathe, Pearson Education, Seventh Edition.

**B04:** Introduction to SQL by Oracle Press.

**B05:** Introduction to PL/SQL by Ivan Bayross, BPB Publications, Fourth Edition

**B06:** Database Management System, Raghu Ramkrishnan, Johannes Gehrke, McGraw-hill, Third Edition.

1. **Other readings and relevant websites:**

|  |  |
| --- | --- |
| **Serial No** | **Link of Journals, Magazines, websites and Research Papers** |
| **1.** | <https://dl.acm.org/doi/pdf/10.5555/77708> |
| **2.** | <https://link.springer.com/chapter/10.1007/978-1-349-11552-5_1> |
| **3.** | <https://www.sciencedirect.com/science/article/pii/B9780934613538500091> |
| **4.** | <https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.444.3426&rep=rep1&type=pdf> |
| **5.** | <https://www.db-book.com/db7/> |
| **6.** | [http://index-](http://index-of.es/Rdbms/McGraw.Hill.Osborne.Media.Oracle.Database.11g.The.Complete.Reference.Dec.2008.eBook-DDU.pdf)  [of.es/Rdbms/McGraw.Hill.Osborne.Media.Oracle.Database.11g.The.Complete.Reference.Dec.2008.e](http://index-of.es/Rdbms/McGraw.Hill.Osborne.Media.Oracle.Database.11g.The.Complete.Reference.Dec.2008.eBook-DDU.pdf)  [Book-DDU.pdf](http://index-of.es/Rdbms/McGraw.Hill.Osborne.Media.Oracle.Database.11g.The.Complete.Reference.Dec.2008.eBook-DDU.pdf) |
| **7.** | [https://community.oracle.com/mosc/discussion/2956726/pl-sql-programming-language-of-oracleby-ivan-bayross](https://community.oracle.com/mosc/discussion/2956726/pl-sql-programming-language-of-oracle-by-ivan-bayross) |
| **8.** | <https://nptel.ac.in/courses/106/106/106106093/> |
| **9.** | <https://dl.acm.org/doi/abs/10.1145/7239.7266> |

1. **Recommended Tools and Platforms** Oracle 11g Express Edition

1. **Course Plan:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Session No.** | **Topic(s)** | **Recommended Book**  **/ Other reading material** | | **Total Sessions** |
| 1-4 | **Introduction to Databases:**  Overview of Database, Database Management System  (DBMS), DBMS Architecture, Data Independence, Integrity Constraints | BO1  BO2  Link 6 Link 7 | | 4 |
| 5-8 | **Data Models:**  Data Models, Relational Model, ER Model, ER Diagram, Relational Model | BO1  BO2  BO5 | | 4 |
| 9-16 | **Functional Dependencies and Normalization:**  Functional Dependencies, Normalization: Functional  Dependencies, Decomposition  Full Functional Dependency (FFD), Transitive Dependency, Normal Forms: 1NF, 2NF  Normal Forms: 3NF, BCNF, De-Normalization | BO1 BO2  BO5  Link 5  Link 6 Link 9 | | 8 |
| 17-24 | **SQL Queries:**  DDL statements Create, Alter, Drop , DML statements Insert,  Update, Delete, Simple queries WHERE Clause, Compound  WHERE Clause with multiple AND & OR Conditions  Joins, Sub-queries - Simple & Correlated Using IN, EXISTS,  NOT EXISTS, DCL statement Grant, Revoke | BO1  BO2  BO5 | | 8 |
| 25-26 | **Database Security:**  Database Security: Introduction, Threats, Counter Measures | BO1  B06 | | 2 |
| 27-36 | **Control Structures:**  Control Structures: Introduction To Conditional statement,  Iterative Control  Sequential Control Statements, Cursors, Views | BO3  BO4  Link 8 | | 10 |
|  | **ST-I (Syllabus covered from 1-36 lectures)** | |  |  |
| 37-48 | **Package, Procedures and Triggers:**  Procedures, Parts Of Procedures, Parameter Modes,  Advantages Of Procedures  Triggers: Syntax For Creating Triggers  Types Of Triggers  Package, Package Specification And Package Body  Developing A Package, Bodiless Package, Advantages |  | BO1  BO2  Link 8 | 12 |
| 49-54 | **Transaction Management and Concurrency Control:**  Transaction Management, Concurrency Control: Introduction  To Transaction, Properties Of Transactions  Serializability And Recoverability, Need For Concurrency Control, Locking Techniques |  | BO1  BO2  Link 7  Link 9 | 6 |
|  | **ST-II (Syllabus covered from 37-54 lectures)** | |  |  |
| 55-60 | **Database Recovery:**  Database Recovery Of Database: Introduction, Need For  Recovery, Types Of Errors Recovery Techniques |  | BO1 BO2  BO6  Link 6  Link 7 | 6 |
|  | **ETE (Syllabus covered from 1-60 lectures)** | |  |  |

1. **Delivery/Instructional Resources**

|  |  |  |  |
| --- | --- | --- | --- |
| **Lecture No.** | **Topics** | **Web References** | **Audio-Video** |
| 1-2 | Introduction to Databases**:**  Database Concepts,  Characteristics of Data Base approach, Advantages and Disadvantages of DBMS. | https://drive.google.com/dri ve/folders/15AHZkkEkPkMp  cOTuX3WRAFv2twAa-  A\_b?usp=drive\_link | [https://nptel.ac.in/course](https://nptel.ac.in/courses/106104135)  [s/106104135](https://nptel.ac.in/courses/106104135) |
| 3 | Overview of Database Languages  and Architectures:Data Independence, DBA and  Responsibilities of DBA, Schemas,  Instances, Schema architecture | https://drive.google.com/dri ve/folders/15AHZkkEkPkMp cOTuX3WRAFv2twAa-  A\_b?usp=drive\_link | [https://nptel.ac.in/course](https://nptel.ac.in/courses/106106220)  [s/106106220](https://nptel.ac.in/courses/106106220) |
| 4 | Data Base System Architecture  (Two-tier, Three Level ANSISPARC Architecture) | https://drive.google.com/dri ve/folders/15AHZkkEkPkMp  cOTuX3WRAFv2twAa-  A\_b?usp=drive\_link | [https://nptel.ac.in/course](https://nptel.ac.in/courses/106105175)  [s/106105175](https://nptel.ac.in/courses/106105175) |
| 5-6 | Data Models:  Relational Model, ER Model: Design, issues, Mapping constraints, ER diagram,  Comparison of Models. | https://drive.google.com/dri ve/folders/15AHZkkEkPkMp cOTuX3WRAFv2twAa-  A\_b?usp=drive\_link | [https://nptel.ac.in/course](https://nptel.ac.in/courses/106106220)  [s/106106220](https://nptel.ac.in/courses/106106220) |

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| --- | --- | --- | --- |
| 7-8 | Conceptual Data Modelling using Entities and Relationships:  Database design process, Entity Types, Entity sets, Attributes, keys And their types, Weak entity types, ER diagrams, naming convention and design issues. | https://drive.google.com/dri ve/folders/15AHZkkEkPkMp cOTuX3WRAFv2twAa-  A\_b?usp=drive\_link | [https://nptel.ac.in/course](https://nptel.ac.in/courses/106106220)  [s/106106220](https://nptel.ac.in/courses/106106220)    [https://nptel.ac.in/course s/106106220](https://nptel.ac.in/courses/106106220) |
| 9-10 | Functional dependencies,  Decomposition, Full Functional  Dependency (FFD), Transitive  Dependency (TD) | https://drive.google.com/dri ve/folders/15AHZkkEkPkMp cOTuX3WRAFv2twAa-  A\_b?usp=drive\_link | [https://nptel.ac.in/course](https://nptel.ac.in/courses/106106220)  [s/106106220](https://nptel.ac.in/courses/106106220) |
| 11-16 | Normalization:  Normal Forms (1NF, 2NF)  Normal Forms (3NF, BCNF) | https://drive.google.com/dri ve/folders/15AHZkkEkPkMp  cOTuX3WRAFv2twAa-  A\_b?usp=drive\_link | [https://nptel.ac.in/course](https://nptel.ac.in/courses/106104135)  [s/106104135](https://nptel.ac.in/courses/106104135)    [https://nptel.ac.in/course s/106104135](https://nptel.ac.in/courses/106104135)  [https://nptel.ac.in/course s/106104135](https://nptel.ac.in/courses/106104135) |
| 17-24 | Introduction to PL/SQL:  Introduction to PL/SQL basic, environment, Data Types,  Variables, operators. | https://drive.google.com/dri ve/folders/15AHZkkEkPkMp cOTuX3WRAFv2twAa-  A\_b?usp=drive\_link | [https://www.csharpcorner.com/article/](https://www.c-sharpcorner.com/article/plsql-for-beginners/)  [plsql-for-beginners/](https://www.c-sharpcorner.com/article/plsql-for-beginners/) |
| 25-26 | Database Security, Threats, Counter Measures. | https://drive.google.com/dri ve/folders/15AHZkkEkPkMp  cOTuX3WRAFv2twAa-  A\_b?usp=drive\_link | [https://www.digimat.in/n ptel/courses/video/1061](https://www.digimat.in/nptel/courses/video/106105175/L01.html)  [05175/L01.html](https://www.digimat.in/nptel/courses/video/106105175/L01.html) |
| 27-36 | Control Structures:  Introduction to conditional control, Iterative control and sequential control statements. | https://drive.google.com/dri ve/folders/15AHZkkEkPkMp  cOTuX3WRAFv2twAa-  A\_b?usp=drive\_link | [https://www.csharpcorner.com/article/](https://www.c-sharpcorner.com/article/plsql-for-beginners/)  [plsql-for-beginners/](https://www.c-sharpcorner.com/article/plsql-for-beginners/) |
| 37-40 | Introduction to Functions and Cursors | https://drive.google.com/dri ve/folders/15AHZkkEkPkMp cOTuX3WRAFv2twAa-  A\_b?usp=drive\_link | [https://www.csharpcorner.com/article/](https://www.c-sharpcorner.com/article/plsql-for-beginners/)  [plsql-for-beginners/](https://www.c-sharpcorner.com/article/plsql-for-beginners/) |
| 41-48 | Procedure, Packages and Triggers: Parts of procedures, Parameter modes, Advantages of procedures, package specification and package body, developing a package, Advantages of packages. | https://drive.google.com/dri ve/folders/15AHZkkEkPkMp cOTuX3WRAFv2twAa-  A\_b?usp=drive\_link | [https://www.csharpcorner.com/article/](https://www.c-sharpcorner.com/article/plsql-for-beginners/)  [plsql-for-beginners/](https://www.c-sharpcorner.com/article/plsql-for-beginners/) |
| 49-51 | Introduction to Triggers, advantages of triggers, Syntax for creating triggers, Types of triggers. | https://drive.google.com/dri ve/folders/15AHZkkEkPkMp  cOTuX3WRAFv2twAa-  A\_b?usp=drive\_link | [https://freevideolectures. com/course/3684/oracle11g-12c/40](https://freevideolectures.com/course/3684/oracle-11g-12c/40) |
| 52 | Transaction Management:  Introduction to Transaction Processing, Properties of Transactions, Sates of transactions, Schedule. | https://drive.google.com/dri ve/folders/15AHZkkEkPkMp  cOTuX3WRAFv2twAa-  A\_b?usp=drive\_link | [https://onlinecourses.npt el.ac.in/noc21\_cs04/previ ew](https://onlinecourses.nptel.ac.in/noc21_cs04/preview) |
| 53-54 | Serializability, Conflict schedule,  View Serializability and  Recoverability | https://drive.google.com/dri ve/folders/15AHZkkEkPkMp cOTuX3WRAFv2twAa-  A\_b?usp=drive\_link | [https://nptel.ac.in/course s/106104135](https://nptel.ac.in/courses/106104135) |
| 55-56 | Concurrency Control:  Need for Concurrency Control, Locking Techniques, Time Stamping Methods. | https://drive.google.com/dri ve/folders/15AHZkkEkPkMp  cOTuX3WRAFv2twAa-  A\_b?usp=drive\_link | [https://nptel.ac.in/course s/106106220](https://nptel.ac.in/courses/106106220)  [https://nptel.ac.in/course s/106104135](https://nptel.ac.in/courses/106104135) |
| 57-60 | Database Recovery of database:  Introduction, Need for Recovery, Types of errors, Recovery  Techniques | https://drive.google.com/dri ve/folders/15AHZkkEkPkMp  cOTuX3WRAFv2twAa-  A\_b?usp=drive\_link | [https://nptel.ac.in/course s/106104135](https://nptel.ac.in/courses/106104135) |

1. **Action plan for different types of learners**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Slow Learners** |  | **Average Learners** |  | **Advanced Learners** |
| •  •  • | Remedial Class for slow learners.  Encouragement for improvement using peer tutoring.  Individual feedback to each slow learner. | •  •  • | Doubt Class for average learners Special Doubt session will be arranged for ST topics.  Doubts of individual student will be resolved. | • | Academic Courses would be provided to fast learner.    . |

1. **Evaluation Scheme & Components:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Evaluation**  **Component** | **Type of Component** | **No. of Assessments** | **Weightage of Component** | **Mode of Assessment** |
| Component 1 | Sessional Tests (STs) | 02\* | 40% | Online |
| Component 2 | End Term Examination | 01\*\* | 60% | Online |
|  | **Total** |  | **100%** |  |

\* Out of 02 STs, the ERP system automatically picks the best 01 ST.

\*\*As per Academic Guidelines minimum 85% attendance is required to become eligible for appearing in the End Semester Examination.

**11. Syllabus of the Course:**

|  |  |  |  |
| --- | --- | --- | --- |
| **SNo.** | **Topic** | **No. of Lectures** | **Weightage %** |
| **1** | Overview of Database, Database Management System (DBMS) DBMS Architecture, Data Independence,  Integrity Constraints | 4 | 13.4% |
| Data Models, Relational Model, ER Model  ER Diagram, Relational Model | 4 |
| **2** | Functional Dependencies, Normalization: Functional Dependencies, Decomposition  Full Functional Dependency (FFD), Transitive  Dependency, Normal Forms: 1NF, 2NF  Normal Forms: 3NF, BCNF, De-Normalization | 8 | 26.6% |
| DDL statements Create, Alter, Drop , DML statements  Insert, Update, Delete, Simple queries WHERE Clause, | 8 |
|  | Compound WHERE Clause with multiple AND & OR Conditions, Joins, Sub-queries - Simple & Correlated Using IN, EXISTS, NOT EXISTS, DCL statement Grant, Revoke |  |  |
| **3** | Database Security: Introduction, Threats, Counter  Measures | 2 | 20% |
| Control Structures: Control Structures: Introduction To |  |
|  | Conditional statement, Iterative Control  Sequential Control Statements, Cursors, Views | 10 |  |
| **4** | Package, Procedures and Triggers  Procedures, Parts Of Procedures, Parameter Modes, Advantages Of Procedures  Triggers: Syntax For Creating Triggers, Types Of Triggers, Package, Package Specification And Package Body, Developing A Package, Bodiless Package, Advantages | 12 | 20% |
| **5** | Transaction Management and Concurrency Control:  Transaction Management, Concurrency Control: Introduction To Transaction, Properties Of  Transactions  Serializability And Recoverability, Need For  Concurrency Control, Locking Techniques | 6 | 10% |
| **6** | Database Recovery:  Database Recovery Of Database: Introduction, Need  For Recovery, Types Of Errors  Recovery Techniques | 6 | 10% |

**This Document is approved by:**

|  |  |  |
| --- | --- | --- |
| **Designation** | **Name** | **Signature** |
| **Course Coordinator** | Dr. Gaganpreet Kaur |  |
| **Dean** | Dr. Raj Gaurang Tiwari |  |
| **Date (DD/MM/YYYY)** | 01/07/2023 |  |