**Annexure ‘CD – 01’**

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U T T A R P R A D E S H

**FORMAT FOR COURSE CURRICULUM**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **L** | **T** | **P/S** | **SW/FW** | **No. of PSDA** | **TOTAL CREDIT UNITS** |
| 3 | - | 2 | 2 | 2 | 5 |

**Course Title: Database Management System Credit Units:**

**Course Level: UG Course Code: CSE201**

**Course Objectives:** The objective of this course is to get students familiar with Databases and their use. They can identify different types of available database model, concurrency techniques and new applications of the DBMS.

**Pre-requisites:** Knowledge about the raw data, knowledge about the operating system and organization

**Course Contents/Syllabus:**

|  |  |
| --- | --- |
|  | **Weightage (%)** |
| **Module I : Introduction** | **15%** |
| **Descriptors/Topics**  Concept and goals of DBMS, Database Languages, Database Users, Database Abstraction. Database architecture,  The Relational Data Model and Relational Database Constraints, Basic Concepts of ER Mode l, Relationship sets, Keys, Mapping, Design of ER Model |
| **Module II: Relational Model** | **20%** |
| **Descriptors/Topics**  The relational model , The catalog, Types, Keys, Relational algebra, Domain relational calculus, Tuple relational  calculus , Fundamental operations, Additional operations, SQL fundamentals, Integrity , Triggers , Views  ,Relational database, Relational Algebra, Relational & Tuple Calculus |
| **Module III: Relational Database Design** | **20%** |
| **Descriptors/Topics**  Normalization using Functional Dependency, Multivalued dependency and Join depende ncy. |
| **Module IV: Query Processing and Optimization, and Database Tuning** | **25%** |
| **Descriptors/Topics**  Translating SQL Q ueries into Relational Algebra, Algorithms for External Sorting, Algorithms for SELEC T and  JOIN Operations, Algorithms for PROJECT and Set Operations, Combining Operations Using P ipelining, Using  Heuristics in Q uery Optimization |
| **Module V: Transaction Processing,Concurrency Control, Recovery and new application** | **20%** |
| **Descriptors/Topics**  Introduction to Transaction Processing Concepts and Theory, Lock Based P rotocols, Time Stamped Based  Protocols, Deadlock Handling, Crash Recovery. Distributed Database, Objective Oriented Database, Multimedia  Database, Data Mining. |

**Course Learning Outcomes: On the successful completion of the course, the student will be able to**

1. Understand the database fundamentals along with conceptual modeling to deal real life applications.
2. Develop the ability to retrieve and miniplate information for business decision making from databases
3. Apply normalization techniques for consistent database development.
4. Understand the query processing techniques to automate the real time problems of databases.
5. Analyse the problems of data management in a concurrent environment.

**Pedagogy for Course Delivery:**

* Classroom Teaching through lectures and presentation
* Case studies
* Lab work

**List of Professional Skill Development Activities (PSDA):**

1. **Case Study**
2. **Quiz**
3. **Group Presentation**
4. **Group Discussion**

**Lab/ Practicals details, if applicable:**

**List of Experiments:**

Based on the Employee & Department tables perform the following SQL queries

1. Write a query in SQL to display the last name and job title of all employees who do not have a manager

2. Write a query in SQL to display the last name, salary, and commission of all employees who earn commissions. Sort data in descending order of salary and commissions.

3. Write a query in SQL that prompts the user for a manager ID and generates the employee ID, last name, salary, and department for that manager’s employees. The HR department wants the ability to sort the report on a selected column.

4. Write a query in SQL to Display all employee last names in which the third letter of the name is *a.*

5. Write a query in SQL to Display the last name of all employees who have both an *a* and an *e* in their last name

6. Write a query in SQL to Display the last name, job, and salary for all employees whose job is sales representative or stock clerk and whose salary is not equal to $2,500, $3,500, or $7,000.

7. Write a query in SQL to display the employee number, last name, salary, and salary increased by 15.5% (expressed as a whole number) for each employee. Label the column New Salary.

8. Create a report that produces the following for each employee: <employee last name> earns <salary> monthly but wants <3 times salary>. Label the column Dream Salaries.

9. Create a query to display the last name and salary for all employees. Format the salary to be 15 characters long, left-padded with the $ symbol. Label the column SALARY.

10. Display each employee’s last name, hire date, and salary review date, which is the first Monday after six months of service. Label the column REVIEW. Format the dates to appear in the format similar to “Monday, the Thirty-First of July, 2000.”

11. Display the last name, hire date, and day of the week on which the employee started. Label the column DAY. Order the results by the day of the week, starting with Monday.

**Open ended problem**

Take an example of real world situation to and do the following

1. Conceptual Design of Database (ER diagram)
2. Convert conceptual design to Relational database
3. Create a complete data base (using DDL & DML )

**Assessment/ Examination Scheme:**

|  |  |
| --- | --- |
| **Theory L/T (%)** | **Lab/Practical/Studio (%)** |
| **80** | **20** |

**Theory Assessment (L&T):**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Continuous Assessment/Internal Assessment**  **(40 %)** | | | | |  |  |  | **End Term Examination**  **(60%)** |
| **Components (Drop down)** | **Attendance** | **Class Test** | **Home Assignment** | **Case Discussion** | **Quiz** | **Group Discussion** | **Group Presentation** |  |
| **Linkage of PSDA with Internal Assessment Component, if any** |  |  |  |  | **3** | **3** | **4** |  |
| **Weightage (%)** | 5 | 10 | 7 | 8 |  |  |  | 60 |

**Lab/ Practical/ Studio Assessment:**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Continuous Assessment/Internal Assessment**  **(40 %)** | | | | **End Term Examination**  **(60 %)** | | |
| **Components (Drop down** | **Attendance** | **Lab Record** | **Performance** | **Viva** | **Experiment** | **Viva** | **Total** |
| **Weightage (%)** | 5 | 15 | 10 | 10 | 30 | 30 | 60 |

**Text Reading:**

1. Korth, S ilberschatz, “Database S ystem Concepts”, 6th Ed., TMH, 2011.

2. Steve Bobrowski, “Oracle & Architecture”, TMH, 2000

**Reference Books:**

1. Date C. J., “An Introduction to Database S ystems”, 7th Ed., Narosa Publishing, 2004

2. Elmsari and Navathe, “F undamentals of Database S ystems”, 6th Ed., A. Wesley, 2010

3. Ullman J. D., “Principles of Database S ystems”, 2nd Ed., Galgotia P ublications, 1999.