Uka Tarsadia University

B.C.A.

CC5 Relational DBMS
(030010209)

2nd Semester

EFFECTIVE FROM JANUARY-2016
UKA TARSADIA UNIVERSITY  

Course Code: 030010209  
Course Title: CC5 Relational DBMS  
Course Credits: 4  
[Lectures: 04, Tutorial: 00, Practical: 04]

Prerequisites: Database Management Systems

Prerequisites By Topics:  
- File organization, Basic concepts of DBMS, 
- Normalization process and Basic SQL

Objectives: To provide fundamentals of transaction processing and concurrency control as well as to develop skills of procedural SQL programming for designing database applications.

1 Inbuilt functions and introduction to Procedural SQL [16 %]
   1.1. Inbuilt functions: Numeric Functions, String Functions, Date and Time Functions
   1.2. Overview of non-procedural SQL: select, insert, update and delete statements
   1.3. BEGIN...END compound statement, Statement Label
   1.4. PREPARE, EXECUTE and DEALLOCATE PREPARE
   1.5. DECLARE: variables in stored programs

2 Control Flow Statements [16 %]
   2.1. Conditional Statements: IF, CASE
   2.2. Iterative Statements: ITERATE, LEAVE, LOOP, REPEAT, WHILE
   2.3. RETURN Statement
   2.4. SELECT... INTO statement

3 Application Development using Procedural SQL [18 %]
   3.1. Cursors: OPEN, CLOSE and FETCH
   3.2. User Defined Function
   3.3. Stored Procedure
   3.4. Arguments type: IN, OUT and INOUT

4 Triggers and Transactions [16 %]
   4.1. Triggers and Their Usage
   4.2. Trigger Activation
   4.3. BEFORE And AFTER Trigger
   4.4. COMMIT, ROLLBACK, SAVEPOINT

5 Transaction Processing [18 %]
   5.1. Concepts in Transaction Processing
   5.2. Transaction and System Concepts
   5.3. Desirable Properties of Transactions
   5.4. Serial, Non-Serial and Schedules
   5.5. Testing for Conflict Serializability

6 Concurrency Control [16 %]
   6.1. Types of Locks and System Lock Tables
   6.2. Serializability by Two-Phase Locking
   6.3. Dealing with Deadlock and Starvation
   6.4. Timestamp Ordering

Course Outcomes:

CO1: Differentiate DBMS & RDBMS and use SQL data types.
CO2: Use of IF, CASE, LEAVE, LOOP, WHILE and REPEAT control flow statements.
CO3: Design user defined functions and stored procedures using procedural SQL.
CO4: Demonstrate creating and firing of triggers.
CO5: Describe the concept of transaction processing and test the conflict serializability.
CO6: Apply two-phase locking and time-stamp locking techniques for concurrency control.

Course Objectives and Course Outcomes Mapping:
- Procedural SQL: CO1, CO2, CO3, CO4
- Transaction processing: CO5
- Concurrency control: CO6

### Course Units and Course Outcomes Mapping

<table>
<thead>
<tr>
<th>Unit No.</th>
<th>Unit</th>
<th>Course outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inbuilt functions and introduction to Procedural SQL</td>
<td>✔️</td>
</tr>
<tr>
<td>2</td>
<td>Control flow statements</td>
<td>✔️</td>
</tr>
<tr>
<td>3</td>
<td>Application development using procedural SQL</td>
<td>✔️ ✔️</td>
</tr>
<tr>
<td>4</td>
<td>Triggers and Transactions</td>
<td>✔️</td>
</tr>
<tr>
<td>5</td>
<td>Transaction processing</td>
<td>✔️</td>
</tr>
<tr>
<td>6</td>
<td>Concurrency control</td>
<td>✔️</td>
</tr>
</tbody>
</table>

### Laboratory:
- A course teacher shall prepare a fresh practical list for each academic year with no repeated problems from previous two consecutive years.
- The practical problem list shall consist of “Required number of problems” for journal certification as well as “Practice problems” of varying nature from each unit as per its weightage and criticality.
- Laboratory supervisor or course teacher shall sign in the journal only if he/she is satisfied by the work of student.
- Journal shall be verified by the laboratory teacher as well as by the course teacher at least thrice in a semester at an interval of 10 laboratory sessions or an appropriate interval upon the discretion of the course teacher.
- Journal must not be certified if required number of problems are not included and not written clearly or copied.
- After approved by Course Co-ordinator, the List of problem definition shall be kept by concern teacher on web site before the commencement of the semester.

### Computing Environment:
- A student must have the following computing environment in laboratory and or on his/her laptop and.
  - MySQL 5.0 or above

### Modes of Transaction (Delivery):
- Lecture method is generally used but along with it, as and when required, discussion method would be fruitful. It shall be supplemented with various appropriate audio-visual aids.
- Practical exercises would be solved by the students.

### Activities/Practicum:
- The following activities shall be carried out by the students.
- Lock conversion and escalation in MySQL.
- Design and identify serial and non-serial schedule and also test for conflict serializability.
- Log-based and checkpoint schemes for data recovery.

The following activities shall be carried out by the teacher.
- Query processing and methods of it.
- Query optimization technique with example.
- Demonstration of concurrency management in MySQL.

Text Books:
2. Ivan Bayross, MySQL 5 for Professional, SPD.

References:

Concept Map:
It is a hierarchical / tree based representation of all topics covered under the course. This gives direct / indirect relationship /association among topics as well as subtopics.

Unit-1: Inbuilt functions and introduction to Procedural SQL

Unit-2: Control Flow Statements
Unit-3: Application Development using Procedural SQL

Unit-4: Triggers and Transactions
Unit-5: Transaction Processing

Transaction Processing

- Transaction and System concepts
- Desirable properties of transactions
- Testing for conflict serializability
- Serial, Non-serial and schedules

Unit-6: Concurrency control

Concurrency Control

- Type of locks and system lock tables
- Two-Phase Locking
- Timestamp ordering
- Dealing with Deadlock and starvation
- has technique
Assessment:

- The weightage of CIE and University examination shall be as per the University regulations.
- At the institute level the structure of CIE for a course may comprise of Quizzes, Unit Test, Assignments, and Internal applicable to both theory and practical courses.
- The frequency and weightage of each assessment parameter may vary from time to time to satisfy courses objectives and outcomes so as to achieve programme educational objectives and its outcomes.
- The courses teacher is free to decide the number of assessment parameters for a course subject to prior approval of the authority.
- The assessment policy document should be uploaded on the web before the commencement of the semester.
- Syllabus for each CIE parameter shall be covered by the date of the corresponding test.
- No make-up work shall be accepted for missed or failed tests.

Question Bank:

Question Bank must be prepared which consists of several types of questions namely Multiple Choice Questions, Fill in the blanks, Short type questions, long type questions and comprehensive exercises.

Academic Honesty:

Coursework is assumed to be accomplished individually (otherwise stated). Any portion of submission taken directly from anywhere (like statements in assignment/report etc.) without modification must be accompanied with the properly formatted reference giving credit to the author and to the source.

UFM:

- If two or more submitted papers are too similar for coincidence, a penalty shall be imposed that shall usually be the same for the student who did the original as for the one copying from it.
- Any ascertained fact of breaking institute policy shall be associated with one or all of the following: (i) zero marks for the work; (ii) report to the programme coordinator; (iii) report to the Director.

Discussion Group:

Students are welcome to post on the Course Discussion Board available on SRIMCA View Course Webpage. It is responsibility of the concern Course teacher to maintain Discussion Board.

Attendance:

- Attendance means being present for the entire class session. Those arriving significant late or leaving significantly early without prior permission shall be counted as ABSENT for the entire class session.
- Concern teacher must clearly state his/her attendance policies at the first class meeting.