

B.C.A. 2nd Semester
Teaching Schedule
Course: 030010209- CC5 Relational DBMS

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

Course Outcomes: Upon completion of the Course, students shall be able to

- CO1: Differentiate DBMS & RDBMS and use SQL data types.
- CO2: Use of IF, CASE, FOR, LOOP, WHILE and REPEAT control flow statements.
- CO3: Design application development with 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.

Unit	Sub Unit	No. of Lecture (s)	Topics	Reference Chapter/ Additional Reading	Teaching Methodology to be used	Evaluation Parameters
Unit 1: Inbuilt functions and introduction to Procedural SQL						
1	1.1	2	Inbuilt functions: Numeric Functions, String Functions, Date and Time Functions	IB#14, PageNo:294-338 http://nptel.ac.in/courses/106104135/20	Demonstration Audio-Visual Tool	
	1.2	2	Overview of non-procedural SQL: select, insert, update and delete statements	https://dev.mysql.com/doc/refman/5.5/en/sql-syntax.html	Demonstration method & chalk and talk	
	1.3	1	BEGIN...END compound statement, Statement Label	http://dev.mysql.com/doc/refman/5.7/en/begin-end.html	Presentation	
	1.4	2	PREPARE, EXECUTE and DEALLOCATE PREPARE	http://dev.mysql.com/doc/refman/5.7/en/sql-syntax-prepared-statements.html	Chalk & Talk	
	1.5	1	DECLARE: variables in stored programs	http://dev.mysql.com/doc/refman/5.7/en/declare.html	Chalk & Talk	
Unit 2: Control Flow statements						
2	2.1	2	Conditional Statements : IF, CASE	http://dev.mysql.com/doc/refman/5.7/en/flow-control-statements.html	Group Discussion	
	2.2	3	Iterative Statements: ITERATE, LEAVE, LOOP, REPEAT, WHILE		Chalk & Talk	Quiz
	2.3	1	RETURN Statement	https://dev.mysql.com/doc/refman/5.7/en/return.html	Chalk & Talk	

	2.4	2	SELECT ... INTO statement	http://stackoverflow.com/questions/3075147/select-into-variable-in-mysql-declare-causes-syntax-error	Chalk & Talk	
Unit 3: Application development using Procedural SQL						
3	3.1	3	Cursors : OPEN, CLOSE and FETCH	IB#14, Page No:448-449	Discussion	
	3.2	2	User Defined Function	IB#14, Page No:414-425	Audio-visual tool, Chalk & Talk	Open Book,
	3.3	3	Stored Procedure			
	3.4	1	Arguments type: IN, OUT and INOUT			
Unit 4 : Triggers and Transactions						
4	4.1	1	Triggers and Their Usage	SK#5 –Page no. – 179 - 180	Chalk and Talk	
	4.2	2	Trigger Activation	http://nptel.ac.in/courses/106106093/9	Audio-Visual tool	
	4.3	2	BEFORE and AFTER Trigger	HK #6 – Page no. 201-203 HK #7 – Page no. 263-266	Discussion, Chalk and Talk	
	4.4	2	COMMIT, ROLLBACK, SAVEPOINT processing	SK#9 – Page no. – 327 - 332	Chalk and Talk	
Unit 5: Transaction Processing						
5	5.1	1	Concepts in Transaction Processing	HK#14, Page No:627-629 EN-#17-Page No 612	Example based teaching	
	5.2	2	Transaction and System concepts	EN-#17-Page No 618-621 http://nptel.ac.in/courses/106106093/20	Discussion	
	5.3	1	Desirable properties of Transactions	HK#14, Page No:629-631	Discussion	
	5.4	2	Serial, non-serial and schedules	EN-#17-Page No 623-626 HK#14, Page No:635-640	Audio visual tool	
	5.5	2	Testing for conflict serializability	EN-#17-Page No 630-633	Audio visual tool	
	5.6	1	Transaction support in SQL	EN-#17-Page No 636-639	Audio visual tool	Unit Test 1
Unit 6 : Concurrency Control						
6	6.1	2	Types of locks and system lock tables	EN-#18-Page No 644-648 HK#15, Page No:661-666 http://nptel.ac.in/courses	Chalk & Talk	

				/106104135/38		
6.2	1	Serializability Locking by Two-Phase	EN-#18-Page No 651-654 HK#15, Page No:674-679		Presentation and Chalk and Talk	
6.3	2	Dealing with Deadlock and Starvation	EN-#18-Page No 654-658 HK#15, Page No:682-685 http://nptel.ac.in/courses/106104135/40		Example based teaching with Group Discussion	
6.4	2	Timestamp ordering	EN-#18-Page No 659-660 HK#15, Page No:686-687 http://nptel.ac.in/courses/106104135/41		Example based teaching	Unit Test 2

Textbooks:

1. H. Korth, "Database System Concepts", Tata McGraw Hills.[HK]
2. Ivan Bayross, MySQL 5 for Professionals, SPD.[IB]

References:

1. S.K. Singh. "Database Systems Concepts, Design and Applications", Pearson Education.[SK]
2. ElmasriNavathe. "Fundamentals of Database Systems", Pearson Education.[EN]
3. MySQL Reference Manual - <https://dev.mysql.com/doc/refman/5.6/en/index.html>

Note: # denotes chapter number.

Course objectives and Course outcomes mapping:

- Procedural SQL: C01,C02,C03,C04
- Transaction processing: C05
- Concurrency control: C06

Course units and Course outcomes mapping:

Unit No.	Unit	Course Outcome					
		C01	C02	C03	C04	C05	C06
1	Inbuilt functions and introduction to Procedural SQL	✓					
2	Control flow statements		✓				
3	Application development using procedural SQL		✓	✓			
4	Triggers and transactions				✓		
5	Transaction processing					✓	
6	Concurrency control						✓

Programme Outcomes:

- PO1: Ability to understand the concepts of key areas in computer science.
- PO2: Ability to design and develop system, component or process as well as test and maintain it so as to provide promising solutions to industry and society.
- PO3: Effective communication and presentation skill.
- PO4: Ability to understand professional and ethical responsibility.
- PO5: Recognition of the need for life-long learning.

Course outcomes and Programme outcomes mapping:

Programme Outcomes	Course Outcome					
	C01	C02	C03	C04	C05	C06
PO1	✓	✓	✓	✓		
PO2	✓	✓	✓	✓		
PO3		✓				✓
PO4					✓	✓
PO5	✓	✓			✓	

Computing Environment:

A student must have the following computing environment in laboratory and/or on his/her laptop.

- MySQL 5.0 or above

Modes of Transaction (Delivery):

Unit No	Topic Detail	Teaching Approach	PO mapped
2	2.2 Iterative Statements	Self-created animated PPTs to explain iteration so that students can visualize the concept.	PO1, PO5, PO6
5	5.4 Serial and Non Serial Schedule 5.5 Testing for serializability	Questions to analyze knowledge of students: For each topic there will be two questions, one is of understanding type while another of analysis type. These questions will be asked in between of the lectures to ponder students about the topic.	PO1, PO2, PO3, PO4, PO5, PO6, PO7

Activities/Practicum:

The following activities shall be carried out by the students.

- Lock conversion and escalation in MySQL/DB2.
- Retrieving data from system tables in MySQL.

The following activities shall be carried out by the teacher.

Learner	Activities to be done	PO mapped
For slow learners	Puzzles	PO1, PO2, PO3, PO4, PO5, PO6, PO7
For advanced learners	Design tables from given application and normalize it upto 3 rd Normal form and identify and implement	PO1, PO2, PO3, PO4,

	different important reports in it.	P05, P06, P07
For all	Data retrieval with application programs.	P01, P02, P03, P04, P05, P06, P07

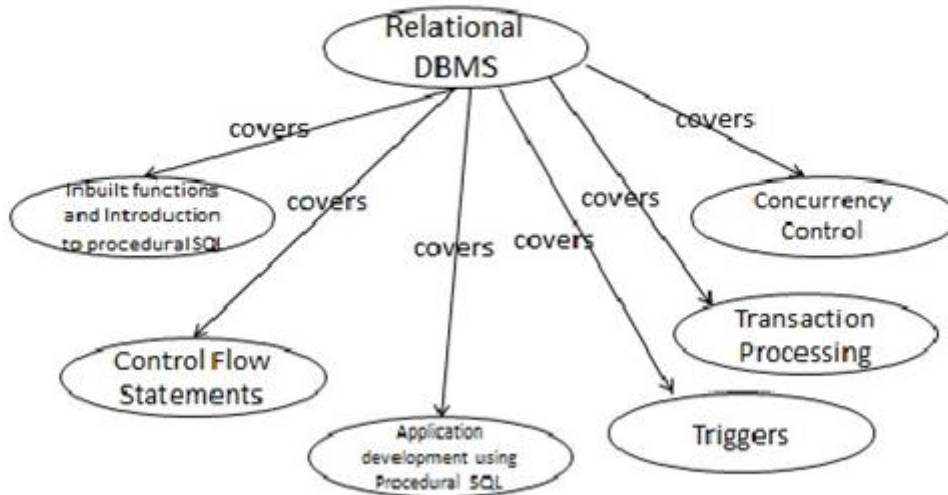
Number of Practical Problems in Journal: 19

Total sets to be developed for each division: 2

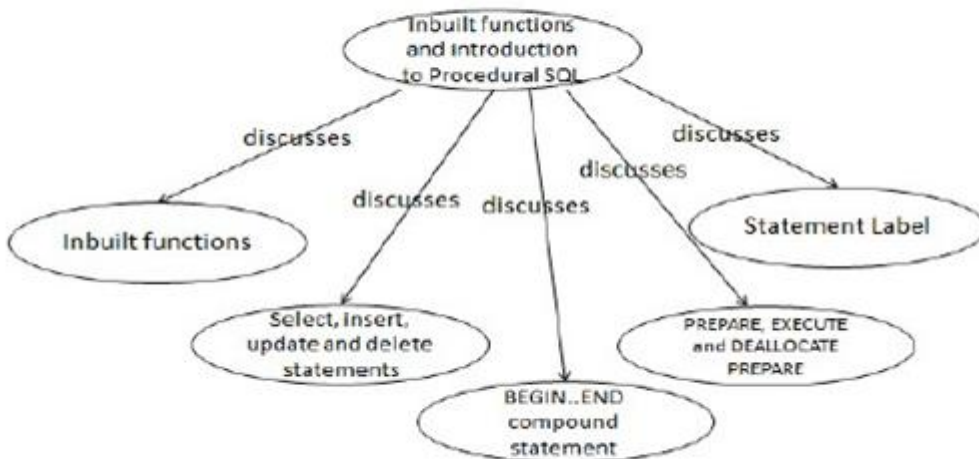
Unit Number	Number of Questions	Time required to implement and debug the question (in hours)	Minimum required of Journal Certification
Unit 1	02	04	02
Unit 2	03	07	02
Unit 3	06	16	05
Unit 4	08	21	07
Total	19	48	17

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.

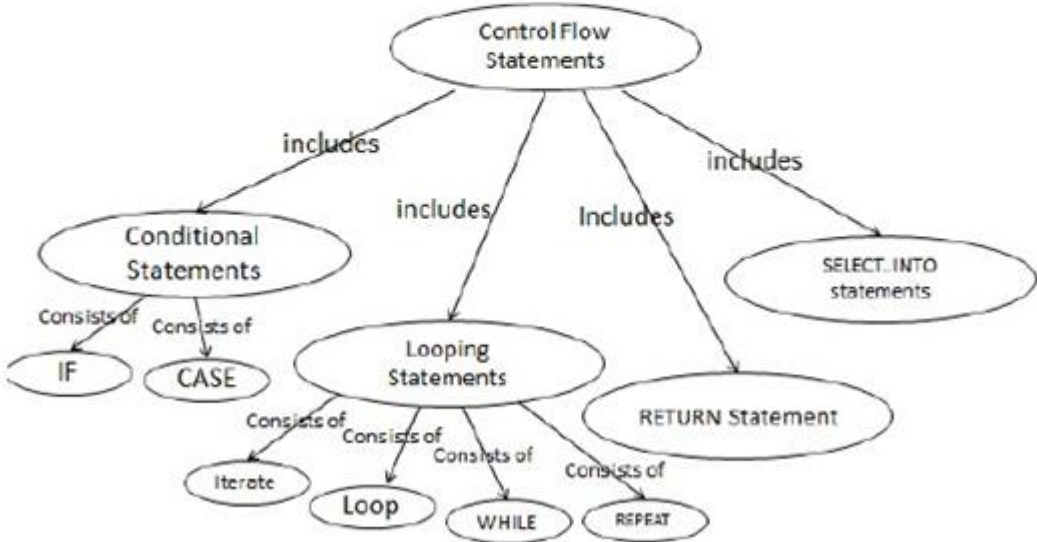
Relational DBMS



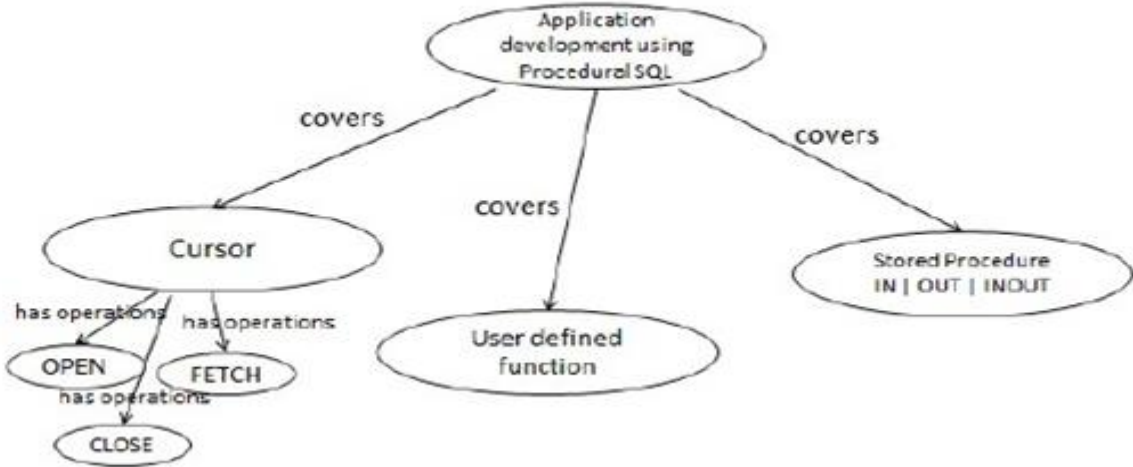
Unit-1: Inbuilt functions and introduction to Procedural SQL



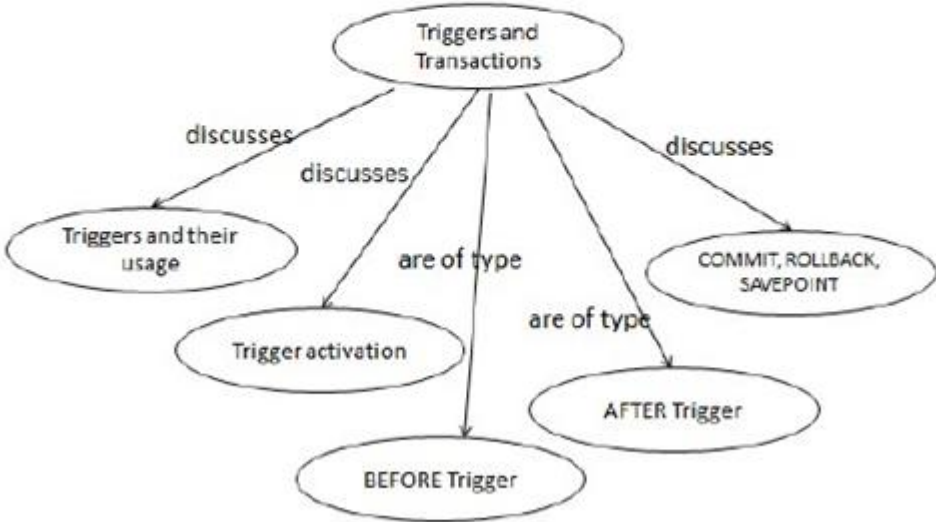
Unit-2: Control Flow Statements



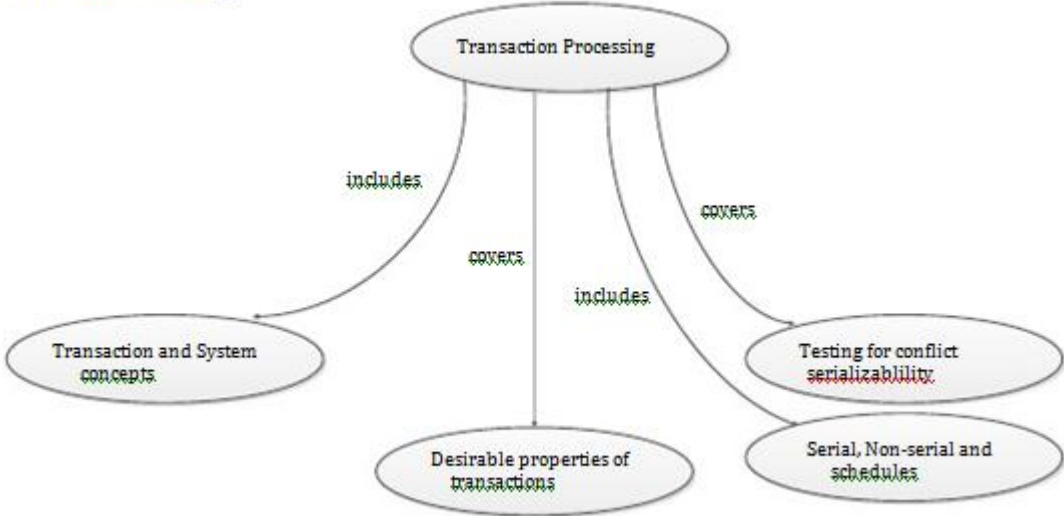
Unit-3: Application Development using Procedural SQL



Unit-4: Triggers and Transactions



Unit-5: Transaction Processing



Unit-6: Concurrency control

