GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT
COURSE CURRICULUM

Course Title: Advanced Database Management System
(Code: 3340701)

Diploma Programme in which this course is offered	Semester in which offered
Computer Engineering	**4th Sem**

1. RATIONALE:

This subject is associated with the designing of database for business, scientific and engineering application. By the end of this course the students will be able to write simple and advanced PL/SQL code blocks, use advanced features such as ref cursors and bulk fetches and database designing with normalization. Hence students will be able to design relational database which will help them in designing phase of projects in forthcoming semester.

2. COMPETENCY:

The course should be taught and implemented with the aim to develop different types of skills so that students are able to acquire following competency:

- Design a relational database system with appropriate functionality to process the data and with constraints to maintain data integrity and avoid data redundancy.

3. Course Outcomes:

1. Execute various advance SQL queries related to Transaction Processing & Locking using concept of Concurrency control.
2. Demonstrate use of Database Object.
3. Perform PL/SQL programming using concept of Cursor Management, Error Handling, Package and Triggers.
4. Understand Functional Dependency and Functional Decomposition.
5. Apply various Normalization techniques.

4. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	**T**	**P**	**C**	**ESE**	**PA**	**ESE**	**PA**	**200**
3	0	4	7	70	30	40	60	

Legends: L - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P –** Practical; **C** - Credit; **ESE** - End Semester Examination; **PA** - Progressive Assessment

5. COURSE DETAILS

Unit	Major Learning Outcomes	Topics and Sub-topics
Unit – I Advanced SQL	1a. Explain & practice Transaction Control and Data Control Language	1.1 Transactional Control: Commit, Save point, Rollback 1.2 DCL Commands : Grant and Revoke
	1b. Explain types of Locks 1c. Test the locks on database	1.3 Types of locks : i. Row level locks ii. Table level locks iii. Shared lock iv. Exclusive lock v. Deadlock
	1d. Practice using various Database Objects	1.4 Synonym : Create synonym 1.5 Sequences: Create and alter sequences 1.6 Index : Unique and composite
	1e. Describe different types views and test it on a database	1.7 Views : Create/Replace, Update and alter views
Unit– II PL / SQL and Triggers	2a. Describe the fundamentals of the PL/SQL programming language	2.1 Basics of PL / SQL 2.2 Data types 2.3 Advantages
	2b.Use different Control Structures 2c. Write and execute PL/SQL programs in SQL*Plus	2.4 Control Structures : Conditional, Iterative, Sequential
	2d. Explain & Implement Concepts of exception handling	2.5 Exceptions: Predefined Exceptions ,User defined exceptions
	2e. Implement procedure, function, cursor in Package	2.6 Cursors : Static (Implicit & Explicit), Dynamic 2.7 Procedures & Functions 2.8 Packages : Package specification, Package body, Advantages of package
	2f. Describe the various types of triggers 2g. Write, code, test and debug various types of triggers	2.9 Fundamentals of Database Triggers 2.10 Creating Triggers 2.11 Types of Triggers : Before, after for each row, for each statement

Unit	Major Learning Outcomes	Topics and Sub-topics
Unit– III Functional Dependency and Decomposition	3a. Describe Functional Dependency 3b. Solve problems of functional dependencies	3.1 Basics of Functional Dependency 3.2 Functional dependency diagram and examples 3.3 Full function dependency (FFD) 3.4 Armstrong's Axioms for functional dependencies 3.5 Redundant functional dependencies 3.6 Closures of a set of functional dependencies
	3b. Describe and solve problems using decomposition	3.7 Lossy Decomposition 3.8 Lossless join decomposition 3.9 Dependency-Preserving Decomposition
Unit– IV Normalization	4a. Describe different Normal Forms 4b. Solve problems of normalization	4.1 Basics of Normalization 4.2 Normal Forms i. First Normal Form (1NF) ii. Second Normal Form (2NF) iii. Third Normal Form (3NF)
Unit– V Transaction Processing	5a. Analyse various concurrency control methods	5.1 Introduction to transaction concepts 5.2 Concurrency 5.3 Methods for Concurrency control i. Locking Methods ii. Timestamp methods iii. Optimistic methods

6. SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS (THEORY)

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks (Duration – 42 Hours)			
			R Level	U Level	A Level	Total
1.	Advanced SQL	10	8	2	8	18
2.	PL / SQL and Triggers	10	8	4	10	22
3.	Functional Dependency and Decomposition	8	4	4	2	10
4.	Normalization	8	4	4	4	12
5.	Transaction Processing	6	4	2	2	8
	Total	**42**	**28**	**16**	**26**	**70**

Legends: R = Remember; U = Understand; A = Apply and above levels (Bloom's revised taxonomy)

Note: This specification table shall be treated as only general guideline for students and teachers. The actual distribution of marks in the question paper may vary from above table.

7. SUGGESTED LIST OF EXERCISES/PRACTICAL

The practical/exercises should be properly designed and implemented with an attempt to develop different types of skills so that students are able to acquire the competency. Following is the list of experiments for guidance.

S. No.	Unit No.	Experiment	Hrs.
1	1	Perform queries for DCL Commands and Locks	4
2	1	Implement authorization, authentication, privileges on database.	4
3	1	Perform queries to Create synonyms, sequence and index	4
4	1	Perform queries to Create, alter and update views	4
5	2	Implement PL/SQL programmes using control structures	6
6	2	Implement PL/SQL programmes using Cursors	4
7	2	Implement PL/SQL programmes using exception handling.	4
8	2	Implement user defined procedures and functions using PL/SQL blocks	6
9	2	Perform various operations on packages.	4
10	2	Implement various triggers	4
11	3	Practice on functional dependencies	4
12	4	Practice on Normalization – using any database performs various normal forms.	4
13	5	Practice on transaction processing	4

8. SUGGESTED LIST OF STUDENT ACTIVITIES

Following is the list of proposed student activities like:

i. Prepare power point presentation for different database objects.
ii. Prepare seminar on Functional dependency with examples of redundant functional dependency.
iii. Prepare case study explaining the need for converting a large table to many smaller tables using 1NF, 2NF, 3NF.
iv. Ask student to design database which can be used in the subject .net programming
v. The created procedures and functions in PL/SQL packages should be used in ADO.net concepts of .net programming

9. SPECIAL INSTRUCTIONAL STRATEGIES (if any)

Concepts will be introduced in lectures and problem solving will be done through tutorials. Practical work will be through laboratory sessions. The course activities include: Formal Lecture: 30% Supervised Classroom Work: 30% Supervised Laboratory Experiences: 30% Unsupervised Directed Learning: 10%

i. Group discussion of real life database design and normalization

10. SUGGESTED LEARNING RESOURCES

(A) List of Books:

Sr. No.	Title of Books	Author	Publication
1	Database Systems Concepts, design and Applications	Singh, S. K.	Pearson Education, New Delhi, 2012
2	SQL/ Pl/SQL	Bayross, Ivan	BPB
3	An Introduction to Database Systems	Date, C. J.	Pearson Education, New Delhi, 2012
4	Database System Concepts,	Korth, Henry	MGH

(B) List of Major Equipment/Materials

i. Computer System with latest configuration and memory
ii. Multimedia Projector

(C) List of Software/Learning Websites

i. Software: Oracle 10e/11g express edition
ii. DBMS:http://nptel.iitm.ac.in/video.php?subjectId=106106093
iii. SQL Plus Tutorial: http://holowczak.com/oracle-sqlplus-tutorial/
iv. DatabaseTutorials:http://www.roseindia.net/programming-tutorial/Database- Tutorials
v. Notes : http://service.felk.cvut.cz/courses/X36SQL//cviceni/plsql/pdf/
vi. SQL Basic Concepts: http://www.w3schools.com/sql/
vii. SQL Tutorial : http://beginner-sql-tutorial.com/sql.htm

11. COURSE CURRICULUM DEVELOPMENT COMMITTEE

Faculty Members from Polytechnics

1. Prof. R. M. Shaikh, H.O.D Computer Department, K. D. Polytechnic, Patan
2. Prof. K. N. Raval, H.O.D Computer Department, R. C. Technical Institute, Ahmedabad
3. Prof. J. J. Karagthala ,Lecturer Computer Engineering Department, GGP , Ahmedabad
4. Prof. R. B. Pancholi ,Lecturer Computer Engineering Department, L. J. Ahmedabad

Coordinator and Faculty Members from NITTTR Bhopal

1. Prof. (Mrs.) Susan S. Mathew
2. Dr. Joshua Earnest,