GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT
COURSE CURRICULUM

DATABASE ADMINISTRATION

(Code: 3361605)

Diploma Program in which this course is offered	Semester in which offered
Information Technology	SIXTH

1. RATIONALE

Information Management is a growing area, where lots of jobs are available. Competency in database administration is the key requirement for any information manager. This course attempts to develop skills in the area of database administration. After learning this course students would be able to design, edit, manage and maintain databases, and administer them professionally. They will also be able to write simple and advanced PL/SQL code blocks for transaction processing, using life cycle in developing applications. This course is therefore an important course for students who want to be Information Managers.

2. COMPETENCIES

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

- Manage a database system using transaction processing and locking granularity concepts.
- Developing application using simple and advanced PL/SQL code blocks for transaction processing and implement life cycle.

3. COURSE OUTCOMES

The theory should be taught and practical should be carried out in such a manner that students are able to acquire different learning out comes in cognitive, psychomotor and affective domain to demonstrate following course outcomes.

i). Execute SQL queries related to Transaction Processing & Locking using concept of Concurrency control.
ii). Demonstrate use of Database Object.
iii). Understand database implementation life cycle and information system organization.
iv). Apply user creation and other administrative techniques.
v). Develop simple and advanced PL/SQL code.

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 (in cognitive domain)	Topics and Sub-topics
Unit – I **Advanced SQL**	1a. Implement 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 1. Conditional 2. Iterative 3. Sequential
	2d. 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

Unit	Major Learning Outcomes (in cognitive domain)	Topics and Sub-topics
	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– III Database Design And Implementation	3a. Information System and organization 3b. Database design and implementation	3.1 Database Application Life Cycle 3.2 Conceptual Database application i. Design ii. Retrieve transaction iii. Update Transaction iv. Mixed Transaction 3.3 Logical and Physical Database Design i. Response Time ii. Space Utilization iii. Transaction Throughput
Unit– IV Transaction Processing	4a. Analyse various concurrency control methods	4.1 Transaction concepts 4.2 Concurrency 4.3 Methods for Concurrency control i. Locking Methods ii. Timestamp methods iii. Optimistic methods
Unit– V Database Administrator	5a. Implement user creation and execute authentication mechanism	5.1 Types of Oracle Database Users 5.2 User Creation and management 5.3 Tasks of a Database Administrator 5.4 Submitting Commands and SQL to the Database 5.5 About Database Administrator Security and Privileges 5.6 Database Administrator Authentication 5.7 Creating and Maintaining a Password File 5.8 Data Utilities

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	8	20
3.	Database Design and Implementation	6	4	4	2	10
4.	Transaction Processing	8	4	4	4	12
5.	Database Administration	8	4	2	4	10
	Total	**42**	**28**	**16**	**26**	**70**

Legends: R = Remembrance; U = Understanding; A = Application and above levels (Revised Bloom's taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly 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 **(outcomes in psychomotor and affective domain)** so that students are able to acquire the competencies/programme outcomes. Following is the list of practical exercises for guidance.

Note*: Here only outcomes in psychomotor domain are listed as practical/exercises. However, if these practical/exercises are completed appropriately, they would also lead to development of certain outcomes in affective domain which would in turn lead to development of* ***Course Outcomes*** *related to affective domain. Thus over all development of* ***Programme Outcomes (****as given in a common list at the beginning of curriculum document for this programme) would be assured.*
Faculty should refer to that common list and should ensure that students also acquire outcomes in affective domain which are required for overall achievement of Programme Outcomes/Course Outcomes.

Example Practical list is followed with this suggested list of exercises

Unit No.	Practical/Exercises (Outcomes in Psychomotor Domain)	Hrs.
I	Perform queries for DCL Commands and Locks	4
I	Implement authorization, authentication, privileges on Database.	4
I	Perform queries to Create synonyms, sequence and index	4
I	Perform queries to Create, alter and update views	4
II	Implement PL/SQL programmes using control structures	4
II	Implement PL/SQL programmes using Cursors	4
II	Implement PL/SQL programmes using exception handling.	4

II	Implement user defined procedures and functions using PL/SQL blocks	4
II	Perform various operations on packages.	4
II	Implement various triggers	4
IV	Develop code for transaction processing	4
V	Create User database Creation	6
V	Apply various mechanism of Database Administration	6
	TOTAL	**56**

*** Practical examination can be conducted based upon the experiments suggested and/or implemented by students at the institute. Oral exam can be based upon the concepts of the topics covered in the syllabus.**

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. Design database which can be used in the course on .net programming
iii. 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)

i. Concepts should be introduced in classroom input sessions and by giving demonstration through projector.
ii. Arrange expert lectures by IT experts working professionally in the area of database administration.
iii. More focus should be given on practical work which will be carried out in laboratory sessions. If possible some theory sessions may be conducted in labs so that theory and practice can go hand in hand.
iv. Faculty should allow students to use their creativity and let them struggle to learn on their own during practical sessions. However, faculty should remain around the students and should help them when they are stuck.
v. Arrange a Database Administration System competition by making groups of four students each and giving them a real life problem for database administration and award the best design. Give publicity to this competition at institute/city level.

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. http://service.felk.cvut.cz/courses/X36SQL//cviceni/plsql/pdf/
vi. SQL Basic Concepts: http://www.w3schools.com/sql/
vii http://docs.oracle.com/cd/E11882_01/server.112/e10897/em_manage.htm

11. COURSE CURRICULUM DEVELOPMENT COMMITTEE

Faculty Members from Polytechnics

- Nandu Fatak, Lecturer Information Technology, Sir BPTI Bhavnagar.
- Rahul Pancholi, Lecturer IT, and Computer, L J Polytechnic, Ahmedabad.
- Bhaskar Patel, Head, Information Technology, BSPP Kherva.

Coordinator and Faculty Members from NITTTR Bhopal

- **Dr.K.James Mathai**, Associate Professor, Computer Engineering & Applications, NITTTR Bhopal
- **Dr. Shailendra Singh**, Professor & Head Dept. of Computer Engineering and Applications, NITTTR Bhopal