Acropolis Technical Campus, Indore, 452020, (M.P.)
Computer Science and Engineering
Course Plan
UG

Database Management System

Course Code	CS-5003	Session: Jul-Dec 2018	Semester :V
Tutor	Prof Ankit Chopra	Revision date :	Branch: CSE
E mail	ankitchopra.atc@acropolis.in	Mob. No: 9039737679	No. of Pages: 9

a. Scheme of the Semester Containing the Course

S. No.	Subject Code	Subject Name & Title	Maximum Marks Allotted						Total Marks	Hours / week.			Total Credits
			Theory			Practical							
			End Sem	Mid Sem MST	Quiz Assignment	End Sem	Lab Work	Assignment /Quiz/Term paper		L	T	P	
3	CS-5003	Data Base Management System	70	20	10	30	10	10	150	3	1	2	6

b. Course Overview

Database is a collection of related data and data is a collection of facts and figures that can be processed to produce information. Mostly data represents recordable facts. Data aids in producing information, which is based on facts. For example, if we have data about marks obtained by all students, we can then conclude about toppers and average marks. A database management system stores data in such a way that it becomes easier to retrieve, manipulate, and produce information.

c. Course Learning Objectives (CLO)

The Learning Objectives of Database Management System are such that the student will
CLO1: Understand structure of data and various types of Data Models
CLO2: Study how to populate the data.
CLO3: Know about manipulation of data within the database
CLO4: Appreciate allowing of multiple users at the same time with authentication.
CLO5: Acquire awareness about Integrity and optimization of data

d. Course Outcomes (CO)

At the end of the course, student would be able to demonstrate the knowledge and ability to
CO1: Implement and manipulate the computational data.
CO2: Identify and apply optimization method on computational data.
CO3: Able to demonstrate the transaction and transaction processing.
CO4: Able to demonstrate architectural view of data.
CO5: Able to develop an application, store, update and manipulate data.
CO6: Able to judge the complexity of develop a database project.

Course Outcome (CO)	CO Statement
CO.503.1	Implement and manipulate the computational data.
CO.503.2	Identify and apply optimization method on computational data.
CO.503.3	Able to demonstrate the transaction and transaction processing.
CO.503.4	Able to demonstrate architectural view of data.
CO.503.5	Able to develop an application, store, update and manipulate data.
CO.503.6	Able to judge the complexity of develop a database project.

e. **Mapping Course Outcomes (COs) leading to the achievement of Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)**
(A) PROGRAM OUTCOMES (POs)
Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

B) PROGRAM SPECIFIC OUTCOMES (PSOs)

1. Develop latest solutions for real world problems; applying mathematical, engineering and project management skills through modern infrastructure and tools to benefit society and human.
2. Understand the need for sustainable development and commit to professional ethics to create an intelligent model that understand real world entities and their relationship to one another.
3. Effectively communicate knowledge, thoughts, techniques and processes to community.

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO.503.1	3	2	----	----	----	2	1	----	----	----	----	1	1	----	1
CO.502.2	----	2	1	----	----	1	----	1	----	----	----	1	----	1	1
CO.503.3	----	----	----	----	----	----	----	1	2	----	----	1	----	----	----
CO.503.4	1	----	----	1	2	3	2	----	----	1	2	----	----	2	3
CO.503.5	----	----	1	----	----	3	----	2	----	----	----	1	3	1	2
CO.503.6	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----

Enter correlation level 1, 2, 3 as defined below-
1: Slight (Low);   2: Moderate (Medium); 3: Substantial (High) and if there is no correlation, put "----".

f. Topic delivery details of "Content beyond the Syllabus" for the attainment of POs and PSOs.

Sr. No.	Content Beyond syllabus to be taught	Satisfying PO	Satisfying PSO
1.			1
2.			
Etc.			

g. Distribution of Course Work as per University Scheme

Slot / Contact Type	Ingredients (per student)	Distribution of periods @ 60min		Distribution of Marks Max. Marks As per University scheme		
		Number of hours per week	Per Sem (12 weeks)	End Sem.	Internal	
					MST / LWS	Q/A
Theory Slot	Lecture (L)	3	36	70	20	10
	Tutorial (T)	1	12			
Practical Slot	Practical Work (P)	2	24	30	10	10

Internal Assessments are based on scheme provided by the university.

(g.1) No. of Theory Lectures Necessary for the course: 45
(g.2) No. of Theory Lectures Unit wise:

UNIT	I	II	III	IV	V	VI	TOTAL
Assigned No. of Lectures per Unit →	8	12	8	8	9	--	45
Actual Taken	0	3	5	5	6	--	19

h. Time Schedules: Total expected periods from **02/07/2018** as per Academic Calendar, excluding sports week, holidays etc.

CSA

Ingredients	Mon	Tue	Wed	Thu	Fri	Sat	Max. Available	Needed	Excess / Short
Available	12	13	12	12	13	--	62	--	--
Theory (L)	0	12	12	12	--	--	36	35	1
Tutorials (T)	--	--	--	--	13	--	13	10	3
Practical's (P)	12	13	--	12	--	--	24	20	4
Batch (for T & P)	L2	L3	--	L1	--	--	--	--	--

i. Prerequisite(s)

The students should have a basic idea about data base concept, data models and SQL Statements.

j. Post Requisites

The Students able to design and moderate database, design and implement business application.

k. University Syllabus

Theory

Unit I	**
DBMS Concepts and architecture Introduction, Database approach v/s Traditional file accessing approach, Advantages, of database systems, Data models, Schemas and instances, Data independence, Data Base Language and interfaces, Overall Database Structure, Functions of DBA and designer, ER data model: Entitles and attributes, Entity types, Defining the E-R diagram, Concept of Generalization, Aggregation and Specialization. Transforming ER diagram into the tables. Various other data models object oriented data Model, Network data model, and Relational data model, Comparison between the three types of models.	8

Unit II	**
Relational Data models: Domains, Tuples, Attributes, Relations, Characteristics of relations, Keys, Key attributes of relation, Relational database, Schemas, Integrity constraints. Referential integrity, Intension and Extension, Relational Query languages: SQL-DDL, DML, integrity constraints, Complex queries, various joins, indexing, triggers, assertions, Relational algebra and relational calculus, Relational algebra operations like select, Project, Join, Division, outer union. Types of relational calculus i.e. Tuple oriented and domain oriented relational calculus and its operations	7

Unit III	**
Data Base Design: Introduction to normalization, Normal forms, Functional dependency, Decomposition, Dependency preservation and lossless join, problems with null valued and dangling tuples, multi valued dependencies. Query Optimization:	7

Introduction, steps of optimization, various algorithms to implement select, project and join operations of relational algebra, optimization methods: heuristic based, cost estimation based.

Unit IV	**
Transaction Processing Concepts: - Transaction System, Testing of Serilizability, Serializability of schedules, conflict & view serializable schedule, recoverability, Recovery from transaction failures. Log based recovery. Checkpoints deadlock handling. Concurrency Control Techniques: - Concurrency Control, locking Techniques for concurrency control, time stamping protocols for concurrency control, validation based protocol, multiple granularity. Multi version schemes, Recovery with concurrent transaction. Introduction to Distributed databases, data mining, data warehousing, Object Technology and DBMS, Comparative study of OODBMS Vs DBMS. Temporal, Deductive, Multimedia, Web & Mobile database.	10

Unit V	**
Study of Relational Database Management Systems through Oracle/Postgres SQL/MySQL: Architecture, physical files, memory structures, background process. Concept of table spaces, segments, extents and block. Dedicated server, multi threaded server. Distributed database, database links, and snapshot. Data dictionary, dynamic performance view. Security, role management, privilege management, profiles, invoker defined security model. SQL queries, Data extraction from single, multiple tables equi-join, non equi-join, self-join, outer join. Usage of like, any, all, exists, in Special operators. Hierarchical queries, inline queries, flashback queries. Introduction of ANSI SQL, anonymous block, nested anonymous block, branching and looping constructs in ANSI SQL. Cursor management: nested and parameterized cursors, Oracle exception handling mechanism. Stored procedures, in, out, in out type parameters, usage of parameters in procedures. User defined functions their limitations. Triggers, mutating errors, instead of triggers.	13

**No of lecture required

Tutorials
- 2 Tier & 3 Tier Architecture
- Schema Architecture
- Data models
- SQL Queries
- ACID Properties

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Practicals

1. Company want to maintain the Order with following information such as order no, amount and date of all orders, customer to maintain following information such as cutomer id, customer name, order no, salesman no and salesman to maintain the following information such as salesman no, selesman name, commission, oredr no.
2. Company want to add & remove some attribute and also want to modify the properties of existing attribute such as data type, size and constraints
3. Company want to analyze the employee record for performance evaluation. For this manager will consider some parameter and sort the employee list in descending order.
4. A Salesman who scores more then 30% orders must get commision from existing 10% to 15%.
5. As per government norms a Company who have employee count more than or equal to 25, they must implement Provident Fund (PF). The PF should be 12% of employee's basic salary and the same amount will be credit by the Company. Thus the PF record should be maintain in employee table.
6. This Company want to list of Employee those getting highest, lowest and average salary own department.
7. The Company has decided to grading level of each employee basis of salary structure those employees getting salary more than or equal to 5000 will be "A", those employees getting salary more than 3000 and less than 5000 will be "B" and those employees getting salary more than 1000 and less than 3000 grade will be "C"
8. Company want number of employee details who are working in Production, Quality, HR and Account department Indore branch and holds 'A' Grade.
9. Demonstrate & implement unnamed PL/SQL block.
10. Demonstrate & implement unnamed PL/SQL block.

l. Books prescribed by the University

1. Date C J, "An Introduction To Database System", Pearson Educations
2. Korth, Silbertz, Sudarshan, "Fundamental of Database System", McGraw Hill
3. Rob, " Data Base System: Design Implementation & Management", Cengage Learninig
4. Elmasri, Navathe, "Fundamentals Of Database Systems", Pearson Educations
5. Atul Kahate , " Introduction to Database Management System", Pearson Educations
6. Oracle 9i Database Administration Fundamental-I, Volume I, Oracle Press, TMH.
7. Paneerselvam,"DataBase Management System", PHI Learning
8. Sanjeev Sharma, Jitendra Agarwal, Shikha Agarwal, "Advanced DBMS", Dreamtech Publication

Additional books prescribed by the Tutor

a. Hoffer, Jeffrey A,"Modern database management System", Pearson Educations.
b. Evan Barros PBP Publications
c. Kevin Loney, "Oracle 9i Complete Reference", McGraw-Hill Publications.
d. Benjamin Rosenzweig Addison Wesley.

m. List of Lab experiments with COs

S. No.	Problem Statement	Mapping with CO				
		CO1	CO2	CO3	CO4	CO5
1	Company want to maintain the Order with following information such as order no, amount and date of all orders, customer to maintain following information such as customer id, customer name, order no, salesman no and salesman to maintain the following information such as salesman no, salesmen name, commission, oredr no.	√				
2	Company want to add & remove some attribute and also want to modify the properties of existing attribute such as data type, size and constraints.	√				
3	Company want to analyze the employee record for performance evaluation. For this manager will consider some parameter and sort the employee list in descending order.	√	√			
4	A Salesman who scores more than 30% orders must get commission from existing 10% to 15%.	√				
5	As per government norms a Company who have employee count more than or equal to 25, they must implement Provident Fund (PF). The PF should be 12% of employee's basic salary and the same amount will be credit by the Company. Thus the PF record should be maintain in employee table.		√			
6	This Company want to list of Employee those getting highest, lowest and average salary own department.		√			
7	The Company has decided to grading level of each employee basis of salary structure those employees getting salary more than or equal to 5000 will be "A", those employees getting salary more than 3000 and less than 5000 will be "B" and those employees getting salary more than 1000 and less than 3000 grade will be "C"		√			√
8	Company want number of employee details who are working in Production, Quality, HR and Account department Indore branch and hold 'A' Grade.			√		
9	Demonstrate & implement unnamed PL/SQL block.				√	
10	Demonstrate & implement unnamed PL/SQL block.				√	

n. Lecture Plan

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Computer Science and Engineering
Lecture Plan
UG
Database Management System

Course Code	CS-5003	Session: Jul-Dec 2018		Semester: V
Tutor	Prof. Ankit Chopra	Revision date :-		Branch: CSE
E mail	ankitchopra.atc@acropolis.in	Mob. No: 9039737679		No. of Pages: 3

Lr. No.	Unit No.	Topic to Cover / Content	Aim (CO)	Ref. No. [page to page]	No. of Student present	Actual date of Completion
1	U1	• Introduction of DBMS	CO1	2[1- 3]		
2	U1	• DBMS Concepts and Architecture	CO1	2[23- 25]		
3	U1	• Database approach v/s Traditional file accessing approach	CO1	2[3- 4]		
4	U1	• Advantages of database systems	CO1	2[4-5]		
5	U1	• Data models	CO1	2[8-9]		
6	U1	• Schemas and Instances	CO1	2[8]		
7	U1	• Data Independence	CO1	2[6-7]		
8	U1	• Database language and interfaces	CO1	2[9-11]		
9	U1	• Overall Database Structure	CO1	2[24-25]		
10	U1	• Function of DBA ad Designer	CO1	2[28-29]		
11	U1	• ER Data model: Entities & Attributes	CO1	2[262-263]		
12	U1	• Entity type, Defining ER diagram	CO1	2[17-18]		
13	U1	• Transforming ER diagram into the Table	CO1	2[267-268]		
14	U2	• Relational data model: Domain, Tuple, Attributes, Relation	CO2	2[42-44]		
15	U2	• Characteristics of relation, Keys, Key attributes of relation	CO2	2[45-46]		
16	U2	• Integrity constraints, Referential Integrity, Intension and Extension	CO2	2[58] ,2[17-18], 2[263]		
17	U2	• Relation query language DDL, DML	CO2	2[57-58], c		
18	U2	• Complex Queries, Various Joins, Indexing, Triggers, Assertion	CO2	c, Internet Notes, 2[549-562], 2[475-476], 2[180-185]		
19	U2	• Relational Algebra and Relational Calculus	CO2	2[51-52]		
20	U2	• Relational algebra operation like select, project, join, division, union	CO2	2[51-52]		
21	U2	• Tuple and Domain oriented calculus	CO2	2[239-242]		

Lr. No.	Unit No.	Topic to Cover / Content	Aim (CO)	Ref. No. [page to page]	No. of Student present	Actual date of Completion
22	U3	• Introduction to Normalization, Normal Forms	CO3	2[327-360]		
23	U3	• Functional Dependency, Decomposition	CO3	2[329-332]		
24	U3	• Dependency preservation and losless join	CO3	2[334-335]		
25	U3	• Recovery	CO3	2[758-759]		
26	U3	• Problem with null valued and dangling tuples, Multivalues dependency	CO3	2[83-84], 2[51-52]		
27	U3	• Query optimization, Steps of optimization	CO3	2[608-613]		
28	U3	• Various algorithms to implement select, project and join operation of relational algebra.	CO3	2[51-53]		
29	U3	• Optimization methods: heuristic based, cost estimation based.	CO3	2[602-605]		
30	U4	• Transaction system, Testing of serilizability, serilizability of Schedule.	CO4	2[627-628], 2[641-642]		
31	U4	• Conflict & View Serializable Schedule, Recoverability,	CO4	2[643-645], 2[647-648]		
32	U4	• Recover from transaction failure. Log Based recovery	CO4	2[633-635], 2[726-728]		
33	U5	• Checkpoints deadlock handling, Cocurrency Control	CO4	2[750-752], 2[631-632]		
34	U5	• Cocurrency Control techniques, Timestamp protocol	CO4	2[633-635], 2[682-686]		
35	U5	• Validation based protocol, multiple ganularity, Multi version schemes.	CO4	Internet Notes		
36	U5	• Introduction to distributed System, data mining, data ware housing, object technolgy	CO4	2[889-893]		
37	U5	• Study of Relational database management system	CO5	2[323-327]		
38	U5	• Sql queries	CO5	2[63-70], c		
39	U5	• Usage of like. Any, all, exists, in special operators	CO5	2[76-77], c		
40	U5	• Hierarchical queries, inline queries, Flashback queries	CO5	c, Internet Notes		
41	U5	• Cursor management	CO5	2[702-703], c		
42	U5	• Stored procedures	CO6	c, Internet Notes		
43	U5	• Triggers	CO6	2[180-183], c		
44	U5	• Instead of triggers.	CO6	2[183-185]		
45	U5	• Oracle exception handling mechanism	CO6	Internet Notes		
		Revision and Test 1				
		Revision and Test 2				
		Total				

Course Outcomes (CO)

CO1: Implement and manipulate the computational data.

CO2: Identify and apply optimization method on computational data.

CO3: Able to demonstrate the transaction and transaction processing.

CO4: Able to demonstrate architectural view of data.

CO5: Able to develop an application, store, update and manipulate data.

CO6: Able to judge the complexity of develop a database project.

References

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7. Paneerselvam,"DataBase Management System", PHI Learning
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d. Benjamin Rosenzweig Addison Wesley.

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