

**B.C.A 1st Semester
Teaching Schedule**

Course: 030010115-Database Management Systems

Objective: To introduce the need of database systems, data modelling and database designing, and to make use of SQL for efficient storage and retrieval of data.

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

CO1: Differentiate between database approach and conventional file processing system.

CO2: Describe the concept of database, its architecture, components and users.

CO3: Design an entity-relationship model based on user requirements.

CO4: Use ERDPlus to design an entity-relationship diagram.

CO5: Convert an E-R model to Relational model.

CO6: Use data definition and manipulation statements over one or more tables using SQL to store, manipulate and retrieve the data.

Unit	Sub Unit	No. of Lecture (s)	Topics	Reference Chapter/ Additional Reading	Teaching Methodology to be used	Active learner	Evaluation Parameters
Unit 1: Database Management System :10 Hours							
1	1.1	1	Introduction	HK#10 – Page no. – 462-464	Discussion		
	1.2	1	View of Data	HK#1 – Page no. – 5-8	Chalk and Talk		
	1.3	1	Database Languages: DDL and DML	EN#2 - Page no. – 36 – 38 HK#1 – Page no. – 9-14	Chalk and Talk		
	1.4	2	Data models: Entity-Relationship(ER), Relational, Object-Oriented and Semi Structured	HK#1 – Page no. – 8	Presentation and Chalk and Talk		
	1.5	2	Data Storage and Querying	HK#1 – Page no. – 20-22	Presentation and Chalk and Talk		
	1.6	1	Database Architecture	EN#2 - Page no. – 44 – 49 HK#1 – Page no. – 24-26	Chalk and Talk		Quiz
	1.7	2	Database Users and Administrator	HK#1 – Page no. – 26-28	Reading	Reading and	

						Discussion	
Unit 2: Data Modeling: 7 Hours							
2	2.1	2	E-R Model and Constraints	HK#6 - Page no. - 204-214	Chalk & Talk, Presentation		
	2.2	2	E-R Diagram and Design Issues	EN#3 - Page no. – 79 – 83 HK#6 - Page no. - 214-224	Chalk & Talk		
	2.3	1	Weak and Strong Entity Set	EN#3 - Page no. – 76 – 77 HK#6 - Page no. – 225-227,	Chalk & Talk	Hands- on	
	2.4	2	Design choices for E-R conceptual diagram	EN#3 - Page no. – 81 – 82 https://www.coursera.org/learn/analytics-mysql/lecture/Xs93i/how-to-make-entity-relationship-diagrams-using-erdplus	Audio-visual tool		Practical Test- 1
Unit 3: Model Conversion : 8 Hours							
3	3.1	1	Extended E-R Features	HK#6 - Page no. – 227-229	Chalk & Talk, Presentation		
	3.2	1	Constraints on Specialization	EN#4 – Page no. – 110-112	Reading	Reading and discussion	
	3.3	2	Relational Model Concepts: Domain, Tuples, Attributes, Relations	EN#5 – Page no. – 146-153	Chalk & Talk		
	3.4	1	Keys: Super, Candidate and Primary	EN#5 – Page no. – 154-155			
	3.5	1	Conversion of E-R to Relational Model	EN#7 – Page no. –			

				226-233 SK #6-Page no.-248-250			
	3.7	2	Usage of tool for Model creation and conversion	https://erdplus.com	Hands- on		
Unit 4 : DDL statements : 7 Hours							
4	4.1	2	Datatypes of attributes	http://dev.mysql.com/doc/refman/5.7/en/data-types.html	Discussion	Case based discussion	
	4.2	2	Schema-based operations: Table Creation, Table Structure modifications and removal	https://dev.mysql.com/doc/refman/5.7/en/sql-syntax-data-definition.html	Chalk & Talk	Hands-on by students	
	4.3	1	Domain Constraints	EN#5 – Page no. – 154	Chalk & Talk		
	4.4	2	Referential Integrity Constraints	EN#5 – Page no. – 157-160	Chalk & Talk	Hands-on	
Unit 5 : DML statements : 9 Hours							
5	5.1	2	Data manipulation	https://dev.mysql.com/doc/refman/5.7/en/sql-syntax-data-manipulation.html	Chalk & Talk	Hands-on by students	
	5.2	1	Viewing the data	https://dev.mysql.com/doc/refman/5.7/en/select.html	Chalk & Talk, Hands-on by students		
	5.3	2	Operators: IN, BETWEEN, LIKE, Relational, Arithmetic and Logical Operators	http://dev.mysql.com/doc/refman/5.7/en/non-typed-operators.html	Chalk & Talk		Unit Test

	5.4	2	Numeric, String and Date functions	https://dev.mysql.com/doc/refman/8.0/en/string-functions.html https://dev.mysql.com/doc/refman/8.0/en/numeric-functions.html https://dev.mysql.com/doc/refman/8.0/en/numeric-functions.html	Hands -on	Question-answer session	
	5.5	1	Aggregate Functions	https://dev.mysql.com/doc/refman/8.0/en/group-by-functions.html	Hands -on	Question-answer session	
	5.6	1	Summarizing and Grouping the data	https://dev.mysql.com/doc/refman/8.0/en/group-by-modifiers.html	Chalk & Talk		
Unit 6 : Retrieving Data from multiple Relations : 7 Hours							
6	6.1	2	Join: Inner, Outer and Self	https://dev.mysql.com/doc/refman/8.0/en/join.html	Example based teaching		Practical Test -2
	6.2	2	Effect of NULL on Aggregate functions and Join	https://dev.mysql.com/doc/refman/8.0/en/group-by-functions.html	Example based teaching		
	6.3	3	Sub-queries	http://ftp.nchu.edu.tw/MySQL/doc/refman/5.4/en/subqueries.html	Chalk & Talk, discussion	Show the output based on questions	

Textbooks:

1. Elmasri Navathe. "Fundamentals of Database Systems", Pearson Education.[EN]
2. Ivan Bayross, MySQL 5 for Professionals, SPD.[IB]

References :

1. H. Korth, "Database System Concepts", Tata McGraw Hills.[HK]
2. S.K. Singh. "Database Systems Concepts, Design and Applications", Pearson Education.[SK]
3. MySQL Reference Manual - <https://dev.mysql.com/doc/refman/5.6/en/index.html>
4. <https://www.postgresql.org/docs/9.5/static/index.html>

Note: # denotes chapter number.

Course objectives and Course outcomes mapping:

- To introduce the need of database systems: CO1, CO2
- To model the data: CO3, CO4, CO5
- To make use of SQL for efficient data storage and retrieval: CO6

Course units and Course outcomes mapping:

Unit No.	Unit	Course Outcome					
		CO1	CO2	CO3	CO4	CO5	CO6
1	Database Management System	✓	✓				
2	Data Modeling			✓	✓		
3	Model Conversion				✓	✓	
4	DDL statement						✓
5	DML statements						✓
6	Retrieving Data from multiple relations						✓

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 Outcomes					
	CO1	CO2	CO3	CO4	CO5	CO6
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
- PostgreSQL 9.5 or above
- Both the DBMS must be used to demonstrate the topics of unit 4, 5 and 6.
- ERDPlus

Activities/Practicum:

The following activities shall be carried out by the students.

- Comparison between PostgreSQL and MySQL with respect to constraints on table.
- Compare Creately with ERDPlus on the basis of E-R diagram creation functionality.

The following activities shall be carried out by the teacher.

Learner	Activities to be done	PO mapped
For slow learners	<ul style="list-style-type: none"> • Arrange one remedial session to solve difficulties. • A bowl containing chits with question(s) for all the topics that were taught during remedial session. • Each slow learner shall pick a chit of his choice from bowl and discuss answer for the question(s) available in chit in classroom. 	PO1,PO3,P O5
For advanced learners	The teacher shall demonstrate complex query. Then the teacher shall provide list of complex queries to students and shall verify the same in a week.	PO2,PO3

Number of Practical Problems in Journal: 18

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 2	03	9	3

Unit 3	04	12	4
Unit 4	03	6	3
Unit 5	04	9	4
Unit 6	04	12	4
Total	18	48	18

Concept linkage:

Unit/Sub-Unit Prior concept	Prior concept linkage	Post concept linkage
2.4,3.2,3.3	-	030010209(Relational DBMS): Unit 1
5.4,6.1,6.4	-	030010209(Relational DBMS): Unit 2: 2.4,Unit 3:3.1