

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
*(Formerly West Bengal University of Technology)*  
**Syllabus for B. Tech in Computer Science & Engineering**  
 (Applicable from the academic session 2018-2019)

**Database Management Systems**

**Code: PCC-CS601**

**Contact: 3L**

Name of the Course:	<b>Database Management Systems</b>		
Course Code: PCC-CS601	Semester: VI		
Duration:6 months	Maximum Marks:100		
<b>Teaching Scheme</b>		<b>Examination Scheme</b>	
Theory:3 hrs./week		Mid Semester exam: 15	
Tutorial: NIL		Assignment and Quiz: 10 marks	
		Attendance: 5 marks	
Practical: hrs./week		End Semester Exam:70 Marks	
Credit Points:	3		
<b>Objective:</b>			
1	To understand the different issues involved in the design and implementation of a database system.		
2	To study the physical and logical database designs, database modeling, relational, hierarchical, and network models		
3	To understand and use data manipulation language to query, update, and manage a database		
4	To develop an understanding of essential DBMS concepts such as: database security, integrity, concurrency, distributed database, and intelligent database, Client/Server (Database Server), Data Warehousing.		
5	To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS.		
6	To understand the different issues involved in the design and implementation of a database system.		

Unit	Content	Hrs/Unit	Marks/Unit
1	<p><b>Database system architecture:</b>            Data Abstraction, Data Independence, Data Definition Language(DDL), Data Manipulation Language(DML).  <b>Data models:</b> Entity-relationship model, network model, relational and object oriented data models, integrity constraints, data manipulation operations.</p>	9	

2	<p><b>Relational query languages:</b> Relational algebra, Tuple and domain relational calculus, SQL3, DDL and DML constructs, Open source and Commercial DBMS - MYSQL, ORACLE, DB2, SQLserver.</p> <p><b>Relational database design:</b> Domain and data dependency, Armstrong's axioms, Normal forms, Dependency preservation, Lossless design.</p> <p><b>Query processing and optimization:</b> Evaluation of relational algebra expressions, Query equivalence, Join strategies, Query optimization algorithms.</p>	13	
3	<b>Storage strategies:</b> Indices, B-trees, hashing.	3	
4.	<b>Transaction processing:</b> Concurrency control, ACID property, Serializability of scheduling, Locking and timestamp based schedulers, Multi-version and optimistic Concurrency Control schemes, Database recovery.	5	
5	<b>Database Security:</b> Authentication, Authorization and access control, DAC, MAC and RBAC models, Intrusion detection, SQL injection.	3	
6	<b>Advanced topics:</b> Object oriented and object relational databases, Logical databases, Web databases, Distributed databases, Data warehousing and data mining.	3	

**Text book and Reference books:**

1. "Database System Concepts", 6th Edition by Abraham Silberschatz, Henry F. Korth, S. Sudarshan, McGraw-Hill.
2. "Principles of Database and Knowledge – Base Systems", Vol 1 by J. D. Ullman, Computer Science Press.
3. Database Management Systems, R.P. Mahapatra, Khanna Publishing House, New Delhi (AICTE Recommended Textbook – 2018)

4. "Fundamentals of Database Systems" , 5th Edition by R. Elmasri and S. Navathe,  
5. Pearson Education "Foundations of Databases", Reprint by Serge Abiteboul,  
Richard Hull, Victor Vianu, Addison-Wesley

### **Course Outcomes:**

On completion of the course students will be able to

1. For a given query write relational algebra expressions for that query and optimize the developed expressions
2. For a given specification of the requirement design the databases using E R method and normalization.
3. For a given specification construct the SQL queries for Open source and Commercial DBMS -MYSQL, ORACLE, and DB2.
4. For a given query optimize its execution using Query optimization algorithms
5. For a given transaction-processing system, determine the transaction atomicity, consistency, isolation, and durability.
6. Implement the isolation property, including locking, time stamping based on concurrency control and Serializability of scheduling.