

# INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPT./CENTRE: **Electronics and Computer Engineering**

1. Subject Code: **EC - 451** Course Title: **Database Management Systems**

2. Contact Hours: **L: 3 T: 1 P: 0**

3. Examination Duration (Hrs.): **Theory**

0	3
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**Practical**

0	0
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4. Relative Weightage: **CWS**

25
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**PRS**

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**MTE**

25
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**ETE**

50
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**PRE**

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5. Credits: 

0	4
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 6. Semester 

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**Autumn Spring Both**

7. Pre-requisite: **EC - 251**

8. Subject Area: **DCC**

9. Objective: To introduce the concepts of database management systems and the design of relational databases.

10. Details of the Course:

Sl. No.	Contents	Contact Hours
1.	Introduction to database management, data abstraction and system structure.	3
2.	Entity relational model, entity set, relationship sets, mapping cardinalities, keys, E-R diagrams.	3
3.	Relational model, database schema, relational algebra, outer join and manipulation of databases.	6
4.	Tuple relational calculus: Example queries, formal definitions and safety of expressions; SQL: Query processing and optimization, set operations, aggregate functions, data definition language and views, comparison of queries in relational algebra, SQL, tuple relation calculus and domain relation calculus.	7
5.	Relational database design, various normal forms, functional dependencies, canonical cover, lossless join, dependency preservation, multi value dependency and higher normal forms, transaction management, ACID property.	6
6.	Serializability and testing for serializability, concurrency control schemes, lock-based protocols, two-phase locking protocols, graph-based protocols, time stamp-based protocols, deadlocks.	5
7.	Recovery systems, log-based recovery, deferred and immediate database modification, object oriented database design.	6

8.	Data warehousing, heterogeneous component systems, data scrubbing.	3
9.	Data mining and knowledge discovery, basic mathematical, numerical and statistical techniques; Applications in information retrieval.	3
<b>Total</b>		<b>42</b>

11. Suggested Books:

<b>Sl. No.</b>	<b>Name of Books / Authors</b>	<b>Year of Publication</b>
1.	Abraham, H. and Sudershan, S., "Database System Concepts", 4 <sup>th</sup> Ed., McGraw-Hill.	2002
2.	Elmasi, R. and Navathe, S.B., "Fundamentals of Database Systems", 4 <sup>th</sup> Ed., Pearson Education.	2005
3.	Date, C. J., "Introduction to Database Systems", Pearson Education.	2002
4.	Ramakrishnan, R. and Gekhre, J., "Database Management Systems", 3 <sup>rd</sup> Ed., McGraw-Hill.	2003
5.	Pang, N. T., Steinbach, M. and Kumar, V., "Introduction to Data Mining", Pearson Education.	2007