Year: 2023
Semester: IV

1. **Name of the Faculty: Bhavana Kaushik** **Course Code: CSEG2005**
2. **Course: Advance Database Management Systems**
3. **Program: B.Tech. (CSE) All Branches**

L: 3, T: 0, P:0, C:0

COURSE PLAN

Target	50% (marks)
Level-1	40% (population)
Level-2	50% (population)
Level-3	60% (population)

1. Method of Evaluation

UG	**PG**
Quizzes/Tests, Assignments (30%)	~~Quizzes/Tests, Assignments, seminar (50%)~~
Mid Examination (20%)	~~End semester (50%)~~
End examination (50%)	

*may be keep as per Program (UG/PG)

2. Passing Criteria

Scale	**PG**	**UG**
Out of 10point scale	~~SGPA – "6.00" in each semester~~ ~~CGPA – "6.00"~~ ~~Min. Individual Course Grade – "C"~~ ~~Course Grade Point – "4.0"~~	SGPA – "5.0" in each semester CGPA – "5.0" Min. Individual Course Grade – "C" Course Grade Point – "4.0"

*may be keep as per Program (UG/PG)

3. Pedagogy

- _____

4. Topics introduced for the first time in the program through this course

- Nil

5. References:

Text Books	Web resources	Journals	Reference books
1. Fundamentals of Database Systems by Ramez Elmasri and Shamkant B. Navathe, Pearson India	https://nptel.ac.in/courses/106/106/106106093/	Database Management & Information Retrieval (Springer)	1. Database System Concepts by Abraham Silberschatz, Henry F. Korth and S. Sudarshan, McGraw-Hill 2. Database Systems-The Complete Book by Jeffrey D. Ullmam, Pearson India

Signature of HOD/Dean **Signature of Faculty**

Date: **Date:**

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GUIDELINES TO STUDY THE SUBJECT

Instructions to Students:

1. Go through the 'Syllabus' in the Black Board section of the web-site(https://learn.upes.ac.in) in order to find out the Reading List.
2. Get your schedule and try to pace your studies as close to the timeline as possible.
3. Get your on-line lecture notes (Content, videos) at Lecture Notes section. These are our lecture notes. Make sure you use them during this course.
4. check your blackboard regularly
5. go through study material
6. check mails and announcements on blackboard
7. keep updated with the posts, assignments and examinations which shall be conducted on the blackboard
8. Be regular, so that you do not suffer in any way
9. **Cell Phones and other Electronic Communication Devices:** Cell phones and other electronic communication devices (such as Blackberries/Laptops) are not permitted in classes during Tests or the Mid/Final Examination. Such devices MUST be turned off in the class room.
10. **E-Mail and online learning tool:** Each student in the class should have an e-mail id and a pass word to access the LMS system regularly. Regularly, important information – Date of conducting class tests, guest lectures, via online learning tool. The best way to arrange meetings with us or ask specific questions is by email and prior appointment. All the assignments preferably should be uploaded on online learning tool. Various research papers/reference material will be mailed/uploaded on online learning platform time to time.
11. **Attendance:** Students are required to have minimum attendance of 75% in each subject. Students with less than said percentage shall NOT be allowed to appear in the end semester examination.

This much should be enough to get you organized and on your way to having a great semester! If you need us for anything, send your feedback through e-mail nchugh@ddn.upes.ac.in. Please use an appropriate subject line to indicate your message details.

There will no doubt be many more activities in the coming weeks. So, to keep up to date with all the latest developments, please keep visiting this website regularly.

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RELATED OUTCOMES

1. **The expected outcomes of the Program are:**

PO1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	**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.
PO3	**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.
PO4	**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.
PO5	**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.
PO6	**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.
PO7	**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.
PO8	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	**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.

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PO11	**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.
PO12	**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.

2. The expected outcomes of the Specific Program are:

PSO1	Perform system and application programming using computer system concepts, concepts of Data Structures, algorithm development, problem solving and optimizing techniques.
PSO2	Apply software development and project management methodologies using concepts of front-end and back-end development and emerging technologies and platforms.
PSO3	Understand and apply Cloud Computing architecture for scalable, secure and dynamically provisioned business oriented environment with optimized performance tuning and data reliability.

3. **The expected outcomes of the Course are:**
On completion of this course, the students will be able to

CO 1	Explain the terminologies, features and models of database systems.
CO 2	Apply various disk storage, Indexing and hashing techniques for data storage.
CO 3	Formulate SQL queries using relational algebra and relational calculus.
CO 4	Apply normalization theory to database design.
CO5	Develop database application design and its implementation including integrity constraints, transaction management and concurrent control algorithms.

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CO6	Discuss database models like Object Oriented Databases, Distributed Databases.

UNIT-I

Session Plan				Actual Delivery			
Lect.	Date	Topics to be Covered	CO Mapped	Lect.	Date	Topics Covered	CO Achieved
1		Database & Database users and basics of SQL, characteristics and advantages of the database, Database systems, concepts and architecture	CO1				
2		Data models, schemas & instances, Codd's Rule	CO1				
3		Three-Schema architecture & data independence	CO1				
4		Database languages & interfaces, Centralized and Client/Server Architecture of DBMS	CO1				
5		Classification of DBMS	CO1				
6		ER Diagrams	CO1				
7		EER Diagrams	CO1				
8		Mapping of ER and EER Model to Relations	CO1				

Signature of faculty **Date:**

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UNIT-II

Session Plan				Actual Delivery			
Lect.	Date	Topics to be Covered	CO Mapped	Lect.	Date	Topics Covered	CO Achieved
1		Relational model Concepts, Relational model constraint & relational database schemas, transactions, and dealing with constraint Violation,	CO3				
2		DBMS Keys	CO3				
3		Relational Algebra, Unary relational operation, Binary relational operations and, relational algebra operations from set Theory	CO3				
4		Relational Calculus; and implementation in SQL	CO3				
5		Informal Design guideline for relational Schemas, Functional Dependencies, Normal forms based on primary keys, (1NF, 2NF, 3NF & BCNF)	CO3, CO4				
6		lossless join and dependency preserving decomposition, Multivalued dependencies (4NF, 5NF), domain key normal form	CO3, CO4				

Signature of faculty

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UNIT-III

Session Plan				Actual Delivery			
Lect.	Date	Topics to be Covered	CO Mapped	Lect.	Date	Topics Covered	CO Achieved
1		DBMS Instance, DBMS Internal Memory Structure, Background Processes, Data Types, Roles & Privileges	CO3				
2		Introduction to Query Processing	CO3				
3		Translating SQL Queries into Relational Algebra	CO3				
4		Translating Relational Algebra into SQL Queries	CO3				
5		Algorithms for External Sorting	CO3				
6		Algorithms for SELECT and JOIN Operations	CO3				
7		Algorithms for PROJECT and SET Operations	CO3				
8		Implementing Aggregate Operations and Outer Joins	CO3				

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UNIT-IV

Session Plan				Actual Delivery			
Lect.	Date	Topics to be Covered	CO Mapped	Lect.	Date	Topics Covered	CO Achieved
1		Introduction, Secondary Storage Devices, Buffering of Blocks and Placing File Records on Disk, Operations on Files	CO2				
2		Heap Files, Sorted Files	CO2				
3		Hashing Techniques	CO2				
4		Parallelizing Disk Access using RAID Technology	CO2				
5		Secondary Access Paths, Types of Single-Level Ordered Indexes	CO2				
6		Multilevel Indexes	CO2				
7		Dynamic Multilevel Indexes Using B-Trees and B+ Trees	CO2				
8		Indexes on Multiple Keys	CO2				

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UNIT-V

Session Plan				Actual Delivery			
Lect.	Date	Topics to be Covered	CO Mapped	Lect.	Date	Topics Covered	CO Achieved
1		Introduction to Transaction Processing, Transaction and System Concepts	CO5				
2		Desirable Properties of Transactions	CO5				
3		Characterizing Schedules based on Recoverability	CO5				
4		Characterizing Schedules based on Serializability	CO5				
5		Introduction to Concurrency Control	CO5				
6		Two Phase Locking Techniques	CO5				
7		Concurrency Control on Timestamp Ordering	CO5				
8		Validation Concurrency Control Techniques	CO5				
9		Granularity of Data items	CO5				
10		Multiple Granularity Locking	CO5				
11		Recovery Concepts, Recovery Techniques Based on Deferred and Immediate Update	CO5				
12		Shadow Paging	CO5				

Date: **Signature of faculty**

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UNIT-VI

Session Plan				Actual Delivery			
Lect.	Date	Topics to be Covered	CO Mapped	Lect.	Date	Topics Covered	CO Achieved
1		Overview of Object-Oriented Concepts, Object Model of ODMG, Object Definition Language, Object Query Language	CO6				
2		Object Database Conceptual Design, Distributed Database Concepts	CO6				
3		Data Fragmentation, Replication and Allocation Techniques for Distributed Design	CO6				
4		Types of Distributed Database Systems	CO6				
5		Query Processing in Distributed Databases	CO6				
6		Overview of Concurrency Control and recovery techniques in Distributed Databases	CO6				

Signature of faculty

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INDIRECT ASSESSMENT

Sample format for Indirect Assessment of Course outcomes:

NAME:
ENROLLMENT NO:
SAP ID:
COURSE:
PROGRAM:

Please rate the following aspects of course outcomes of ----------.

Use the scale 1-3*

course Outcomes	Statement	1	2	3
CO1				
CO2				
CO3				
CO4				
CO5				
CO6				

* 1 WEAK 2 MODERATE 3 STRONG