DEPARTMENT OF COMPUTER APPLICATIONS

NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

Name of the Program and Specialisation	**M.C.A. – Computer Applications**		
Course Title	**Database Systems**		
Course Code	**CA712**	**No. of Credits**	**3**
Department	**Computer Applications**	**Faculty**	**Dr. S. Nickolas**
Session	**Jan 2021**	**Section**	**A**
Pre-requisites Course Code	**CA711, CA713**	**Course Coordinator**	**Dr. S. Sangeetha**
Course Teacher E-mail	**nickolas@nitt.edu**	**Telephone No.**	**0431-2503739**
Course Type	**Core course**		

Syllabus :

File System versus DBMS – Advantages – Database Languages – ER-Model: Entities Relationships – Additional Features of ER Model – Conceptual Design with ER Model. Relational Model – Keys - Constraints – Querying – Views - Relational Algebra – Relational Calculus – SQL – QBE. File Organization – Organization of records in files – Indexing – Ordered Indices - B + Tree Index files – Hashing – Static – Dynamic – Query Optimization – Transformation of Relational Expressions – Choice of evaluation plans. Database Design – Pitfalls in Relational Database Design – Functional Dependencies – Decomposition – Normalization – I to V Normal Forms. DB Tuning – Security – Transaction Management – Transactions – Transaction state – Concurrent executions – Serializability – Concurrency Control – Protocols – Crash Recovery.

COURSE OVERVIEW

The database management systems course provides a general overview of the need and purpose of database systems. It presents the entity-relationship model with its design issues and constraints and also presents the relational model covering the relational algebra, relational calculus and SQL. It focuses on the relational database design which covers the theory of functional dependencies and normalization with emphasis on the understanding of each normal form. It deals with file-system structure and mapping of relational data to a file system. It explains a variety of access techniques such as hashing and indexing. It addresses query-evaluation algorithms, and query optimization based on equivalence-preserving query transformations. The course also focuses on the database tuning, security, transaction-processing system, concurrency control, techniques for ensuring serializability and recovery.

COURSE OBJECTIVES

To learn different database models and design of databases
To study query languages and transaction management

COURSE OUTCOMES	Aligned Programme Outcomes (PO)
1. Illustrate the features of DBMS & Models for designing databases	**1,2,3,5,7,8**
2. Describe the nuances of Data retrieval methods	**1,3,5,7**
3. Apply normalization techniques in DB design	**1,2,3,7**
4. Perform concurrency and Transaction Management operations	**2,3,7,8**

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week	Topic	Mode of Delivery
1	1	File System versus DBMS – Advantages – Database Languages - ER-Model: Entities – Relationships	Theory Online PPT Presentation
2	2	Additional Features of ER Model - Conceptual Design with ER Model	-do-
3	3	Relational Model – Keys - Constraints – Querying – Views	-do-
4	4	Relational Algebra – Relational Calculus – SQL – QBE	-do-
5	5	File Organization – Organization of records in files – Indexing – Ordered Indices - B + Tree Index files	-do-
6	6	Hashing – Static – Dynamic – Query Optimization – Transformation of Relational Expressions – Choice of evaluation plans	-do-
7	7	Database Design – Pitfalls in Relational Database Design – Functional Dependencies	-do-
8	8	Decomposition – Normalization – I to V Normal Forms	-do-
9	9	DB Tuning – Security	-do-

10	10	Transaction Management – Transactions – Transaction state – Concurrent executions	-do-
11	11	Serializability – Concurrency Control – Protocols – Crash Recovery	-do-

COURSE ASSESSMENT METHODS

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Test 1	Week 4	1 Hr	20
2	Test 2	Week 8	1 Hr	20
3	Assignment	Week 6	1 week	10
4	Surprise Quiz	After Week 5	15min.	10
5	MCQ	After Week 8	15 min.	10
6	Compensation Assessment	At the end of the semester	1 Hr.	20
7	End Semester		1 1/2 Hour	30

ESSENTIAL READINGS :

1. Raghu Ramakrishnan and Johannes Gehrke, "Data Base Management Systems", 3rd Edition, McGraw-Hill, 2003.
2. Silberschatz, Korth and Sudarshan, "Data Base System Concepts", McGraw-Hill, 6th Edition, 2010.
3. C. J. Date, "An Introduction to Database Systems", 8th Edition, Addison-Wesley, 2003.
4. R. Elmasri, S.B. Navathe, "Fundamentals of Database Systems", 5th Edition, Pearson Education/Addison Wesley, 2007.

COURSE EXIT SURVEY (mention the ways in which the feedback about the course is assessed and indicate the attainment also)

- The students through the class representative may give their feedback at any time to the course faculty which will be duly addressed.
- The students may also give their feedback during Class Committee meeting.
- The COs will be computed after arriving at the final marks.

COURSE POLICY (including plagiarism, academic honesty, attendance, etc.)

- Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.

- Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.

- The departmental disciplinary committee including the course faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.

- The above policy against academic dishonesty shall be applicable for all the programs.

- **Attendance:**
  At least 75% attendance in each course is mandatory. A maximum of 10% shall be allowed under On Duty (OD) category. Students with **less than 65% of attendance** shall be prevented from writing the final assessment and **shall be awarded 'V' grade.**

ADDITIONAL COURSE INFORMATION

The students can get their doubts clarified at any time with their faculty member with prior appointment.

FOR SENATE'S CONSIDERATION

Course Faculty   **CC-Chairperson**   **HOD**