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| Course Code | | **21CSC205P** | | | Course Name | | | **Database Management Systems** | | | | Course Category | | | C | | | | **Engineering Sciences** | | | | | | | | | | | | | **L** | | **T** | | **P** | | **C** | |
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| Pre-requisite Courses | | | | *Nil* | | | | | Co-requisite Courses | *Nil* | | | Progressive Courses | | | | | | | *Nil* | | | | | | | | | | | | | | | | | | | |
| Course Offering Department | | | | | | Computer Science and Engineering | | | | | Data Book / Codes/Standards | | *Nil* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Course Learning Rationale (CLR):** | | | | | | | *The purpose of learning this course is to:* | | | | | | |  | |  | | **Program Learning Outcomes (PLO)** | | | | | | | | | | | | | | | | | | | | |
| CLR-1 : | Understand the fundamentals and need of Database systems, Architecture,Languages | | | | | | | | | | | | |  | |  | 1 | | | | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | | 13 | | 14 | | 15 | |
| CLR-2 : | Conceive database design through Relational model, Relational Algebra | | | | | | | | | | | | |  | |  | **Engineering Knowledge** | | | | **Problem Analysis** | **Design & Development** | **Analysis, Design, Research** | **Modern Tool Usage** | **Society & Culture** | **Environment & Sustainability** | **Ethics** | **Individual &Team Work** | **Communication** | **Project Mgt. & Finance** | **Life Long Learning** | | **PSO - 1** | | **PSO - 2** | | **PSO – 3** | |
| CLR-3 : | Design Logical schema with constraints, Familiarize SQL Queries | | | | | | | | | | | | |  | |  |
| CLR-4 : | Standardization of Database through Normalization | | | | | | | | | | | | |  | |  |
| CLR-5 : | Understand Storage Management, the practical problems of Concurrency control, Failures and recovery,NoSQL database | | | | | | | | | | | | |  | |  |
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| **Course Learning Outcomes (CLO):** | | | | | | | *At the end of this course, learners will be able to:* | | | | | | | | |  |
| CLO-1 : | Acquire knowledge on DBMS architecture and languages | | | | | | | | | | | | | | |  |  | | | | 2 | - | - | - | - | - | - | - | - | - | - | | - | | - | | - | |
| CLO-2 : | Acquire knowledge on Relational languages and design a database | | | | | | | | | | | | | | |  | 1 | | | | 2 | - | - | - | - | - | - | - | - | - | - | | - | | - | | - | |
| CLO-3 : | Implement the Database structure with SQL | | | | | | | | | | | | | | |  | 1 | | | | - | - | - | - | - | - | - | - | - | - | - | | - | | - | | - | |
| CLO-4 : | Removal of anomalies using Normalization concepts | | | | | | | | | | | | | | |  | 1 | | | | - | - | - | - | - | - | - | - | - | - | - | | - | | - | | - | |
| CLO-5 : | Visualizing storage structure, handling concurrency , Failure and recovery principles,NoSQL concept | | | | | | | | | | | | | | |  | 1 | | | | 2 | - | - | - | - | - | - | - | - | - | - | | - | | - | | - | |

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| **Unit-1**  Issues in File Processing System, Need for DBMS, Basic terminologies of Database, Database system Architecture, Various Data models, ER diagram basics and extensions, **Case study :** Construction of Database design using Entity Relationship diagram for an application such as University Database, Banking System, Information System |
| **Unit-2**  Conversion of ER model to Relational Table, **Case study :** Apply conversion concept. Discussion of various design issues. Pitfalls in Relational Database systems, Understanding various Relational languages such as Tuple Relational calculus, Domain relational calculus, Calculus Vs Algebra, Computational capabilities . **Case Study :** Applying Relational Algebra for all the queries of application Designed. |
| **Unit-3**  SQL commands, Constraints, Joins, Set operations, Sub queries, Views, PL – SQL, Triggers, Cursors. **Case Study :** Implement all the queries using SQL, PL-SQL, Cursor and Triggers |
| **Unit-4**  Normalization, Need for Normalization, NF1,NF2,NF3, NF4, NF5. **Case study :** Apply Conversion rules and normalize the Database |
| **Unit-5**  Storage Structure, Transaction control , Concurrency control algorithms, Issues in Concurrent execution, Failures and Recovery algorithms **Case study :** Demonstration of Entire project by applying all the concepts learnt with minimum Front end requirements, NoSQL Databses-Document Oriented, Key value pairs, Column Oriented and Graph |

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| Learning  Resources | 1. *Abraham Silberschatz, Henry F. Korth, S. Sudharshan, Database System Concepts‖, Seventh Edition, Tata McGraw Hill,2019.* 2. *Ramez Elmasri, Shamkant B. Navathe, Fundamentals of Database Systems‖, Sixth Edition, Pearson Education,2011.* 3. *CJ Date,A Kannan,S Swamynathan, An Introduction to Database Systems, Eight Edition, Pearson Education,2006.* | 1. *RaghuramaKrishnan,Johannes Gehrke,Database Management Systems,3rdEdition,McGrawHill Education,2003.* 2. *Principles of Database Systems, J.D.Ullman, Galgoti,1982* 3. *NoSQL Distilled, A brief guide to the emerging world of Polygot persistence,First Edition,Promod J,Sadalage Martin Fowler,2012* |

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|  | Bloom’s Level of Thinking | **Continuous Learning Assessment (CLA) - By the Course Faculty** | | | | | | **By The CoE** | |
| CLA-1 Average of unit test (20%) | | CLA-2 Project Based Learning (60%) | | Report and Viva Voce  (20% Weightage) | | Final Examination  (0% weightage) | |
| Theory | Practice | Theory | Practice | Theory | Practice | Theory | Practice |
| Level 1 | Remember | 20% | - | - | % | - | % | - | - |
| Level 2 | Understand | 40% | - | - | % | - | % | - | - |
| Level 3 | Apply | 40% | - | - | 30% | - | % | - | - |
| Level 4 | Analyze | % | - | - | 30% | - | % | - | - |
| Level 5 | Evaluate | % | - | - | % | - | 50% | - | - |
| Level 6 | Create | % | - | - | 40% | - | 50% | - | - |
|  | Total | 100 % | | 100 % | | 100% | |  | |

Assessment Procedure

**CLA-1 ( 20)**

Written Test For UNIT 1 for a weightage of **15 marks**

Project Selection **( 5 marks)**

**CLA – 2 (60)**

Internal Reviews

First Review - Database design using Entity Relationship diagram **(15 marks)**

Second Review – Applying Relational Algebra **(10 marks)**

Third Review - Implementation of SQL Queries **(20 Marks)**

Fourth Review - Standardization of Database using Normalization , Application on NoSQL concept to some portion of the application **(15 marks)**

Report and Viva - Report Documentation and Viva (**20 marks)**

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| Course Designers |  | |  |  |  |  | |  |
| Experts from Industry | | Experts from Higher Technical Institutions | | | | | Internal Experts | |
| 1. Ms.Sangeetha Jayaprakash, Database Architect, BOSCH India | | 1. Dr.J.Sheeba Rani, Indian Institute of Space Science and Technology, Trivandrum | | | | | 1. Dr.M.Thenmozhi,NWC | |
| 2. Dr.Manipoonchelvi, Senior Technical Manager, HCL Technologies | | 2. Dr.K.Nandhini, Central University of Thiruvarur | | | | | 2. Ms.K.Srividya, DSBS | |