**BCA (1st Semester)**

**Teaching Schedule**

**030010116: CC2 Database Management System**

**Course Objective:** To introduce the need of database systems, modelling of data and to make use of SQL for efficient storage and retrieval of data.

**Course Outcomes:** Upon completion of the course, students shall be able to

CO1: Differentiate between database approach and conventional file processing system.

CO2: Describe the concept of database, its architecture, components and users.

CO3: Design an entity-relationship model based on user requirements.

CO4: Use ERD-Plus to design an entity-relationship diagram.

CO5: Convert an E-R model to Relational model.

CO6: Use data definition and manipulation statements over one or more tables using SQL to store, manipulate and retrieve the data.

Unit 1: Database Management System Hours: 10

| CO Mapped | % |
|---|---|
| CO1 | 50 |
| CO2 | 50 |

| Sub Unit No. | Sub Unit Title | Number of Lectures | Teaching Methodology | References |
|---|---|---|---|---|
| 1.1 | Introduction | 1 | Discussion | HK#10 – Page no. – 462-464 |
| 1.2 | View of Data | 1 | Chalk and Talk | HK#1 – Page no. – 5-8 |
| 1.3 | Database Language: DDL and DML | 1 | Chalk and Talk | EN#2 - Page no. – 36 – 38<br>HK#1 – Page no. – 9-14 |
| 1.4 | Data models: Entity-Relationship(ER), Relational, Object-Oriented and Semi Structured | 2 | Topic Slides and Chalk and Talk | HK#1 – Page no. – 8 |
| 1.5 | Data Storage and Querying | 2 | Topic Slides and Chalk and Talk | HK#1 – Page no. – 20-22 |

Approved 20/09/19

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|---|---|---|---|---|
| 1.6 | Database Architecture | 1 | Chalk and Talk | EN#2 - Page no. – 44 – 49<br>HK#1 – Page no. – 24-26 |
| 1.7 | Database Users and Administrator | 2 | Reading | HK#1 – Page no. – 26-28 |

Unit 2: Data Modelling Hours: 07

| CO Mapped | % |
|---|---|
| CO3 | 50 |
| CO4 | 50 |

| Sub Unit No. | Sub Unit Title | Number of Lectures | Teaching Methodology | References |
|---|---|---|---|---|
| 2.1 | E-R Model and Constraints | 2 | Chalk & Talk, Audio-visual | HK#6 - Page no. - 204-214<br>https://onlinecourses-archive.nptel.ac.in/noc19_cs12/unit?unit=21&lesson=24 |
| 2.2 | E-R Diagram and Design Issues | 2 | Chalk & Talk | EN#3 - Page no. – 79 – 83<br>HK#6 - Page no. - 214-224 |
| 2.3 | Weak and Strong Entity Set | 1 | Chalk & Talk | EN#3 - Page no. – 76 – 77<br>HK#6 - Page no. – 225-227, |
| 2.4 | Design Choices for E-R conceptual diagram | 2 | Audio-visual tool | EN#3 - Page no. – 81 – 82<br>https://www.coursera.org/learn/analytics-mysql/lecture/Xs93i/how-to-make-entity-relationship-diagrams-using-erdplus |



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Unit 3: Model Conversion Hours: 07

| CO Mapped | % |
|---|---|
| CO4 | 50 |
| CO5 | 50 |

| Sub Unit No. | Sub Unit Title | Number of Lectures | Teaching Methodology | References |
|---|---|---|---|---|
| 3.1 | Extended E-R Features | 1 | Chalk & Talk, Topic Slides | HK#6 - Page no. – 227-229 |
| 3.2 | Constraints on Specialization | 1 | Reading | EN#4 – Page no. – 110-112 |
| 3.3 | Relational Model Concepts: Domain, Tuples, Attributes, Relations | 1 | Chalk & Talk Audio-Visual | EN#5 – Page no. – 146-153 https://onlinecourses-archive.nptel.ac.in/noc19_cs12/unit?unit=5&lesson=9 |
| 3.4 | Keys: Super, Candidate and Primary | 1 | Chalk & Talk | EN#5 – Page no. – 154-155 |
| 3.5 | Conversion of E-R to Relational Model | 1 | Chalk & Talk | EN#7 – Page no. – 226-233 SK #6-Page no.-248-250 |
| 3.6 | Usage of tool for Model creation and conversion | 2 | Hands- on | https://erdplus.com |

Unit 4: DDL Statements Hours: 07

| CO Mapped | % |
|---|---|
| CO6 | 100 |

| Sub Unit No. | Sub Unit Title | Number of Lectures | Teaching Methodology | References |
|---|---|---|---|---|
| 4.1 | Datatypes of attributes | 1 | Discussion | http://dev.mysql.co |

| | | | | |
|---|---|---|---|---|
| | | | | m/doc/refman/5.7/en/data-types.html |
| 4.2 | Schema-based Operations: Table Creation, Table Structure modification and removal | 3 | Chalk & Talk | https://dev.mysql.com/doc/refman/5.7/en/sql-syntax-data-definition.html |
| 4.3 | Domain Constraint | 1 | Chalk & Talk | EN#5 – Page no. – 154 |
| 4.4 | Referential Integrity Constraints | 2 | Chalk & Talk | EN#5 – Page no. – 157-160 |

Unit 5: DML Statements Hours: 10

| CO Mapped | % |
|---|---|
| CO6 | 100 |

| Sub Unit No. | Sub Unit Title | Number of Lectures | Teaching Methodology | References |
|---|---|---|---|---|
| 5.1 | Data Manipulation | 1 | Chalk & Talk | https://dev.mysql.com/doc/refman/5.7/en/sql-syntax-data-manipulation.html |
| 5.2 | Viewing of Data | 1 | Chalk & Talk, Hands-on by students | https://dev.mysql.com/doc/refman/5.7/en/select.html |
| 5.3 | Operators: IN, BETWEEN, LIKE, Relational, Arithmetic and Logical operators | 3 | Chalk & Talk | http://dev.mysql.com/doc/refman/5.7/en/non-typed-operators.html |
| 5.4 | Numeric, String and Date Functions | 2 | Hands -on | https://dev.mysql.com/doc/refman/8.0/en/string-functions.html https://dev.mysql.com/doc/refman/8.0/ |

| | | | | |
|---|---|---|---|---|
| | | | | en/numeric-functions.html https://dev.mysql.com/doc/refman/8.0/en/numeric-functions.html |
| 5.5 | Aggregate Functions | 1 | Hands -on | https://dev.mysql.com/doc/refman/8.0/en/group-by-functions.html |
| 5.6 | Summarizing and Grouping the Data | 2 | Chalk & Talk | https://dev.mysql.com/doc/refman/8.0/en/group-by-modifiers.html |

Unit 6: Retrieving Data from multiple Relations Hours: 07

| CO Mapped | % |
|---|---|
| CO6 | 100 |

| Sub Unit No. | Sub Unit Title | Number of Lectures | Teaching Methodology | References |
|---|---|---|---|---|
| 6.1 | Join: Inner, Outer and Self | 2 | Example based teaching | https://dev.mysql.com/doc/refman/8.0/en/join.html |
| 6.2 | Effect of NULL on Aggregate functions and Join | 2 | Example based teaching | https://dev.mysql.com/doc/refman/8.0/en/group-by-functions.html |
| 6.3 | Sub-queries | 3 | Chalk & Talk, discussion | http://ftp.nchu.edu.tw/MySQL/doc/refman/5.4/en/subqueries.html |

References :

1. Elmasri and Navathe, Fundamentals of Database Systems, Pearson Education.[EN]
2. Ivan Bayross, MySQL 5 for Professionals, SPD[IB]



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3. H. Korth, "Database System Concepts", Tata McGraw Hills.[HK]
4. S.K. Singh. "Database Systems Concepts,Design and Applications", Pearson Education.[SK]
5. MySQL Reference Manual - https://dev.mysql.com/doc/refman/5.6/en/index.html
6. https://www.postgresql.org/docs/9.5/static/index.html

Note: # denotes chapter number.

**Programme Outcomes:**

PO1: Ability to understand the concepts of key areas in computer science.

PO2: Ability to design and develop system, component or process as well as test and maintain it so as to provide promising solutions to industry and society.

PO3: Effective communication and presentation skill.

PO4: Ability to understand professional and ethical responsibility.

PO5: Recognition of the need for life-long learning.

**Programme Outcomes and Course Outcomes mapping:**

| Programme Outcomes | Course Outcomes | | | | | |
|---|---|---|---|---|---|---|
| | CO1 | CO2 | CO3 | CO4 | CO5 | CO6 |
| PO1 | ✓ | ✓ | ✓ | | ✓ | |
| PO2 | | | | ✓ | ✓ | ✓ |
| PO3 | | ✓ | ✓ | | | |
| PO4 | | ✓ | | | | |
| PO5 | ✓ | ✓ | ✓ | | ✓ | ✓ |

**Computing Environment:**

A student must have the following computing environment available in laboratory.

- ✓ MySQL 5.0 or above
- ✓ PostgreSQL 9.5 or above. Both the DBMS must be used to demonstrate the topics of unit 4, 5 and 6.
- ✓ ERDPlus

**Number of Practical Problems in Journal: 19**

**Total sets to be developed for each division: 2**

| Unit Number | Number of Questions | Time required to implement and debug the question (in | Minimum required of Journal Certification | Date of Certification |
|---|---|---|---|---|
| | | | | |



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| | | hours) | | |
|---|---|---|---|---|
| 2 | 4 | 9 | 4 | At the end of 3rd week of the semester |
| 3 | 4 | 9 | 4 | At the end of 5th week of the semester |
| 4 | 2 | 9 | 2 | At the end of 7th week of the semester |
| 5 | 5 | 12 | 5 | During 10th week of the semester |
| 6 | 4 | 9 | 3 | During 12th week of the semester |
| Total | 19 | 48 | 18 | |

**Concept Linkage:**

| Unit/Sub-Unit and Title | Prior concept linkage | Post concept linkage |
|---|---|---|
| 2.4,3.2,3.3 | - | 030010209(Relational DBMS): Unit 1 |
| 5.4,6.1,6.4 | - | 030010209(Relational DBMS): Unit 2: 2.4,Unit 3:3.1 |

*The concepts mentioned in **prior concept linkage** shall be taken as base and revised in context of the respective unit/sub-unit by the course teacher.*

*The concepts mentioned in **post concept linkage** shall be correlated by the course teacher during the discussion of the respective unit/sub-units.*



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