# COURSE FILE INDEX



COURSE COORDINATOR HOD

# Anurag Group of Institutions

An Autonomous Institution
(Formerly CVSR College of Engineering)
Venkatapur (V), Ghatkesar (M), Ranga Reddy (Dist.)
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## Department of Computer Science and Engineering


Course Name : Data Base Management Systems

Course Number : A54026

Course Designation: Core

Prerequisites : Data Structures

II B Tech – II Semester
5th Dec 2016 to 5thApril 2016

(2016-2017)


Mr P.Raja Sekhar Reddy
Assistant Professor
Course Coordinator

Faculty:

1. Ms.G.Sudeepthi

2.Mr.A.Malllikarjuna Reddy

3.Mr .J.Shiva Prashanth

## SYLLABUS

| | |
|---|---|
| **Unit – I** | **Introduction to Database System Concepts:** Database-System Applications, Purpose of Database Systems, View of Data, Database Language, Database Design, Database Architecture, Database Users and Administrators.<br>**Introduction to the Relation Models and Database Design using ER Model:** Structure of Relational Databases, Database Schema, Keys, Schema Diagrams, Relational Query Languages, Relational Operations Overview of the Design Process, The Entity-Relationship Model, Constraints, Removing Redundant Attributes in Entity Sets, Entity-Relationship Diagrams, Reduction to Relational Schemas, Entity-Relationship Design Issues, Extended E-R Features, |
| **Unit – II** | **Introduction to SQL:** Overview of the SQL Query Language, SQL Data Definition, Basic Structure of SQL Queries, Additional Basic Operations, Set Operations, Null Values, Aggregate Functions Nested Sub queries, Modification of the Database.<br>**Intermediate and Advanced SQL:** Join Expressions, Views , Integrity Constraints, SQL Data Types, Authorization. Functions and Procedures, Triggers, Advanced Aggregation Features |
| **Unit – III** | **Formal Relational Query Languages:** The Relational Algebra, The Tuple Relational Calculus, The Domain Relational Calculus.<br>.**Relational Database Design:** Features of Good Relational Designs, Atomic Domains and First Normal Form, Decomposition Using Functional Dependencies, Decomposition Using Multi valued Dependencies, More Normal Forms |
| **Unit – IV** | **Indexing and Hashing:** Basic Concepts, Ordered Indices, B+-Tree Index Files, B+-Tree Extensions, Multiple-Key Access, Static Hashing, Dynamic Hashing, Comparison of Ordered Indexing and Hashing, Bitmap Indices.<br>**Transactions :** Transaction Concept, A Simple Transaction Model, Storage Structure, Transaction Atomicity and Durability, Transaction Isolation, Serializability, Transaction Isolation and Atomicity, Transaction Isolation Levels. |
| **Unit – V** | **Concurrency Control :** Lock-Based Protocols, Deadlock Handling, Multiple Granularity, Timestamp-Based Protocols, Validation-Based Protocols, Multi version schemes.<br>**Recovery System:** Failure Classification, Storage, Recovery and Atomicity, Recovery Algorithm, Buffer Management, Failure with Loss of Nonvolatile Storage, ARIES, Remote Backup Systems. |

## TEXT BOOKS & OTHER REFERENCES

| **Text Books** | |
|---|---|
| 1. | Abraham Silberschatz, Henry F. Korth, S. Sudarshan, Database System Concepts, Sixth Edition, Tata Mc Graw-Hill 2006. |
| 2. | Raghu Rama Kirshna, Johannes Gchrke, Database Management System, Third Edition, TATA MC Graw Hill, 2003. |
| **Reference Books** | |
| 1. | Peter Rob & Carlos Coronel, Data base Systems design, Implementation and Management ,7th Edition, 2007 |
| 2. | RamezElmasri, Shamkanth B. Navrate, Fundamentals of Database Systems, Pearson Education, 2008. |
| 3. | C.J. Date ,Introduction to Database Systems, Pearson Education |

| **Websites References** | |
|---|---|
| **1.** | http://en.wikipedia.org/wiki/Database_normalization |
| **2.** | http://www.w3schools.com/sql/default.asp |
| **3.** | http://www.sql-tutorial.net/ |
| **4.** | www.cs.iit.edu/~cs561/cs425/algebra/home.html |

## Time Table

Room No: W.E.F: 5-12-2016

| Class Hour | 1 | 2 | 3 | 4 | | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| Time | 9:00 -09:50 | 09.50 –10:40 | 10:40 –11:30 | 11:30 – 12: 20 | | 1:10 – 2:00 | 2:00 – 2:50 | 2:50 – 3:40 |
| MON | Lecture II-II C | | | | | | | |
| TUE | | | Lecture II-II C | | | | | |
| WED | | Lab II-II C | | | | | Lecture II-II C | |
| THU | | | | | | Lab II-II C | | |
| FRI | | | | | | Lecture II-II C | | |
| SAT | | | | | | | | |

**12:20 – 1:10 LUNCH BREAK**

## PROGRAM EDUCATIONAL OBJECTIVES (PEO's)

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|---|---|
| **PEO1** | The Graduates are employable as software professionals in reputed industries. |
| **PEO2** | The Graduates analyze problems by applying the principles of computer science, mathematics and scientific investigation to design and implement industry accepted solutions using latest technologies. |
| **PEO3** | The Graduates work productively in supportive and leadership roles on multidisciplinary teams with effective communication and team work skills with high regard to legal and ethical responsibilities. |
| **PEO4** | The Graduates embrace lifelong learning to meet ever changing developments in computer science and Engineering. |

## (A) PROGRAM OUTCOMES(POs)

**Engineering Graduates will be able to:**

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **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.
3. **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.
4. **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.
5. **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.
6. **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.
7. **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.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **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.
11. **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.
12. **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.

## Course Outcomes:

**CO1:** Design Entity-Relationship Model for enterprise level databases.

**CO2:** Develop the database and provide restricted access to different users of database and formulate the Complex SQL queries.

**CO3:** Analyze various Relational Formal Query Languages and various Normal forms to carry out Schema refinement

**CO4:** Use of suitable Indices and Hashing mechanisms for real time implementation

**CO5:** Ability to analyze various concurrency control protocols and working principles of recovery algorithms.

### MAPPING OF COURSE OUT COMES WITH PO's & PEO's

| Course Outcomes | PO's | PEO's |
|---|---|---|
| CO1 | 1,2,3,4,5,9 | 1,2,3,4 |
| CO2 | 1,2,3,4,5 | 1,2,3,4 |
| CO3 | 1,2,3,4,5 | 1,2,3,4 |
| CO4 | 1,2,3,4,5,12 | 1,2,3,4 |
| CO5 | 1,2,3,4,5,12 | 1,2,3,4 |

### Corelation of Cos with POs

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 3 | 3 | 2 | 2 | - | - | - | 1 | - | - | - |
| CO2 | 2 | 2 | 3 | 2 | 1 | - | - | - | - | - | - | - |
| CO3 | 2 | 3 | 3 | 2 | 1 | - | - | - | - | - | - | - |
| CO4 | 3 | 2 | 3 | 2 | 3 | - | - | - | - | - | - | 2 |
| CO5 | 2 | 3 | 2 | 2 | 3 | - | - | - | - | - | - | 2 |

| | PSO1 | PSO2 | PSO3 |
|---|---|---|---|
| **CO1** | **3** | **3** | **3** |
| **CO2** | **3** | **3** | **3** |
| **CO3** | **2** | **3** | **2** |
| **CO4** | **2** | **3** | **2** |
| **CO5** | **3** | **3** | **3** |

## COURSE SCHEDULE

**Distribution of Hours Unit – Wise**

| Unit | Topic | Chapters | | Total No. of Hours |
|---|---|---|---|---|
| | | Book1 | Book2 | |
| I | a) Introduction to Database System Concepts:<br>b) Introduction to the Relation Models and Database Design using ER Model: | Ch1,2,9,10 | Ch 1,2 | 12 |
| II | **a)** Introduction to SQL<br>**b)** Intermediate and Advanced SQL: | Ch 4,5 ,6,7 | Ch 3,4 | 8 |
| III | **a)** Formal Relational Query Languages<br>**b)** Relational Database Design | Ch 8,11,12 | Ch 5,15 | 10 |
| IV | **a)** Indexing and Hashing<br>**b)** Transactions | Ch 13,14,15, 16,17 | Ch 8.9,10,18 | 10 |
| V | **a)** Concurrency Control<br>**b)** Recovery System | Ch 18,19 | Ch 19 | 8 |
| Contact classes for Syllabus coverage | | | | 48 |
| Tutorial Classes : 08 ; Online Quiz : 1<br>Case studies-2<br>Revision classes :1 per unit | | | | |

**Number of Hours / lectures available in this Semester / Year : 64**

| S. No. | Topic | Expected Date of Completion | Actual Date of Completion | Remarks |
|---|---|---|---|---|
| | **Unit-I** | | | |
| 1 | Introduction to Database System Concepts: Database-System Applications | 5-12-16 | | |
| 2 | Purpose of Database Systems, View of Data | 6-12-16 | | |
| 3 | Database Language, Database Design | 7-12-16 | | |
| 4 | Database Architecture, Database Users and Administrators | 9-12-16 | | |
| 5 | Introduction to the Relation Models and Database Design using ER Model: Structure of Relational Databases, Database Schema | 12-12-16 | | |
| 6 | Keys, Schema Diagrams, Relational Query Languages, Relational Operations | 13-12-16 | | |
| 7 | Overview of the Design Process, The Entity-Relationship Model | 14-12-16 | | |
| 8 | Removing Redundant Attributes in Entity Sets, Entity-Relationship Diagrams | 16-12-16 | | |
| 9 | Reduction to Relational Schemas | 19-12-16 | | |
| 10 | Entity-Relationship Design Issues | 20-12-16 | | |
| 11 | Extended E-R Features | 21-12-16 | | |
| 12 | Extended E-R Features | 23-12-16 | | |
| 13 | Tutorial class-1 | 26-12-16 | | |
| 14 | Tutorial class-2 | 27-12-16 | | |
| 15 | Revision of Unit-I | 28-12-16 | | |

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| **Unit-II** | | | | |
| 1 | **Introduction to SQL:** Overview of the SQL Query Language | 30-12-16 | | |
| 2 | SQL Data Definition, Basic Structure of SQL Queries | 02-01-16 | | |
| 3 | Additional Basic Operations, Set Operations | 03-01-17 | | |
| 4 | Null Values, Aggregate Functions, Nested Sub queries, Modification of the Database | 04-01-17 | | |
| 5 | **Intermediate and Advanced SQL:** Join Expressions, Views | 06-01-17 | | |
| 6 | Integrity Constraints, SQL Data Types, Authorization. | 16-01-17 | | |
| 7 | Functions and Procedures | 17-01-17 | | |
| 8 | Tutorial class-1 | 18-01-17 | | |
| 9 | Tutorial class-2 | 20-01-17 | | |
| 10 | Triggers, Advanced Aggregation Features | 23-01-17 | | |
| 8 | Revision of Unit-II | 24-01-17 | | |
| 9 | Case Study-1 | 25-01-17 | | |
| **Unit-III** | | | | |
| 1 | **Formal Relational Query Languages:** The Relational Algebra | 27-01-17 | | |
| 2 | The Tuple Relational Calculus, The Domain Relational Calculus. | 30-01-17 | | |
| 3 | **Relational Database Design:** Features of Good Relational Designs | 31-01-17 | | |
| 4 | Atomic Domains and First Normal Form | 01-02-17 | | |
| 5 | First Normal Form example | 10-02-17 | | |
| 6 | Decomposition Using Functional Dependencies | 13-02-17 | | |

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| 7 | Decomposition Using Multi valued Dependencies | 14-02-17 | | |
| 8 | Decomposition Using Functional Dependencies examples | 15-02-17 | | |
| 9 | Tutorial-1 | 17-02-17 | | |
| 10 | Decomposition Using Multi valued Dependencies examples | 20-02-17 | | |
| 11 | More Normal Forms. | 21-02-17 | | |
| 12 | Revision of Unit-III | 22-02-17 | | |
| **Unit-IV** | | | | |
| 1 | **Indexing and Hashing:** Basic Concepts, Ordered Indices | 24-02-17 | | |
| 2 | B+-Tree Index Files | 27-02-17 | | |
| 3 | B+-Tree Extensions | 28-02-17 | | |
| 4 | Multiple-Key Access, Static Hashing | 01-03-17 | | |
| 5 | Hashing, Bitmap Indices | 03-03-17 | | |
| 6 | **Transactions :** Transaction Concept, A Simple Transaction Model | 06-03-17 | | |
| 7 | Storage Structure, Transaction Atomicity and Durability | 07-03-17 | | |
| 8 | Transaction Isolation | 08-03-17 | | |
| 9 | Serializability, | 10-03-17 | | |
| 10 | Transaction Isolation and Atomicity, | 13-03-17 | | |
| 11 | Tutorial-1 | 14-03-17 | | |
| 12 | Tutorial-2 | 15-03-17 | | |
| 13 | Transaction Isolation Levels. | 17-03-17 | | |
| 14 | Revision of Unit-IV | 20-03-17 | | |
| **Unit-V** | | | | |
| 1 | **Concurrency Control :** Lock-Based Protocols | 21-03-17 | | |
| 2 | Deadlock Handling, Multiple Granularity | 22-04-17 | | |

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| 3 | Timestamp-Based Protocols, Validation-Based Protocols | 24-03-17 | | |
| 4 | Multi version schemes | 27-03-17 | | |
| 5 | **Recovery System:** Failure Classification | 28-03-17 | | |
| 6 | Storage, Recovery and Atomicity | 29-03-17 | | |
| 7 | Recovery Algorithm, Buffer Management | 30-03-17 | | |
| 8 | , Failure with Loss of Nonvolatile Storage | 31-03-17 | | |
| 9 | Tutorial-1 | 29-03-17 | | |
| 10 | Online Quiz | 30-03-17 | | |
| 11 | ARIES, | 01-04-17 | | |
| 12 | Case study-2 | 02-04-17 | | |
| 13 | Remote Backup Systems. | 03-04-17 | | |
| 14 | Revision of Unit-V | 05-04-17 | | |

## Teaching Plan

## Date of Unit Completion & Remarks

| | | |
|---|---|---|
| **Unit – 1** | | |
| Date | : | __ / __ / __ |
| Remarks: _____ | | |
| **Unit – 2** | | |
| Date | : | __ / __ / __ |
| Remarks: _____ | | |
| **Unit – 3** | | |
| Date | : | __ / __ / __ |
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| **Unit – 4** | | |
| Date | : | __ / __ / __ |
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| **Unit – 5** | | |
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## Unit Wise Assignments (With different Levels of thinking (Blooms Taxonomy))

**Note: For every question please mention the level of Blooms taxonomy**

| | |
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| **Unit – 1** | |
| 1. | Explain the architecture of DBMS and levels of abstraction -L2 |
| 2. | Compare and contrast conventional file processing with database system -L3 |
| 3. | Explain complete ER Notations and its extended features with the neat sketch-L3 |
| **Unit – 2** | |
| 1. | Write short notes on joins ,views , Authorization and Integrity Constraints-L2 |
| 2. | Explain various languages (DDL,DML,DCL) and SQL operations(set and aggregate)-L3 |
| 3. | Write a program on trigger to effect the database state based on the change of other database. |
| **Unit – 3** | |
| 1. | Implement Various relational algebraic operations-L2 |
| 2. | Differentiate the TRC and DRC.-L4 |
| 3 | Explain various normal forms with examples-L3 |
| **Unit – 4** | |
| 1. | Explain about B+ tree indexing- and its extension -L2 |
| 2. | Contrast Static and Dynamic Hashing with examples-L3 |
| 3 | Define Transaction states and its Isolation levels in detail-L2 |
| **Unit – 5** | |
| 1. | Analyze the various Concurrency control protocols –L4 |
| 2. | Explain the ARIES and its related datastrctures-L2 |
| 3. | Explain recovery algorithm and buffer management –L2 |

## Case Studies (With Higher Levels of thinking (Blooms Taxonomy))

**Note: For every Case Study please mention the level of Blooms taxonomy**

| **1(Covering Syllabus Up to Mid-1)** |
| --- |
| Develop a Database Design for Railway Reservation System and create relational tables from the generated schemas by applying normal forms - L3<br>**( Content Knowledge-4)** |
| 2(Covering Entire Syllabus) |
| Construct the B+ trees for the given set of elements -L3<br>2,3,7,9,11,13,17,19,21,23,27,29 of order 4.<br><br>**( Content Knowledge-4)** |

**Unit Wise Short Answer Questions**

Unit – I:

1) What are the applications of database system
2) Give an overview of database design process
3) What is binary relationship
4) What is participation constraint.
5) How ternary relationship different from Aggregation

Unit – II:

1) Give short notes on SQL Command languages
2) What are relational set operations
3) Why nested queries are required
4) Describe about view and integrity constraints
5) Explain about the trigger

Unit – III:

1) Explain the operations of Relational Algebra
2) How TRC is different from DRC
3) What are the codd rules
4) Why normal forms are required.
5) Briefly describe about all normal forms.

Unit – IV:

1) What is an ordered indices
2) What are the rules involved in the construction of B+ Tress.
3) How static hashing is different from dynamic hashing
4) What is serializable transaction.
5) What are transaction isolation levels.

Unit – V:

1) Briefly describe about lock based protocols
2) How times tamp protocols are different from validation based protocols
3) What is buffer management
4) Explain about Aries algorithm and its data structures
5) What is Remote backup system

## Previous Question Papers

**Tutorial Sheet**

| **Unit-I Topics Revised** | |
|---|---|
| **Topic Name** | **Date** |
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| **Unit-II Topics Revised** | |
| **Topic Name** | **Date** |
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| **Unit-III Topics Revised** | |
| **Topic Name** | **Date** |
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| **Unit-IV Topics Revised** | |
| **Topic Name** | **Date** |
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| **Unit-V Topics Revised** | |
| **Topic Name** | **Date** |
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## TOPICS BEYOND SYLLABUS

| S.No. | Topic |
|---|---|
| 1 | Different Data models supported in IBM DB2 |

**ASSESMENT OF COURSE OUTCOMES: DIRECT**

**Blooms Taxonomy:**

| | | |
|---|---|---|
| **LEVEL 1** | **REMEMBERING** | Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers |
| **LEVEL 2** | **UNDERSTANDING** | Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas. |
| **LEVEL 3** | **APPLYING** | Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way |
| **LEVEL 4** | **ANALYZING** | Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations. |
| **LEVEL 5** | **EVALUATING** | Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria. |
| **LEVEL 6** | **CREATING** | Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions. |

## Course assessment sheet (MID1 & ASS1)

| S.No | REG.NO | S1 | S2 | S3 | S4 | S5 | L1 | L2 | L3 | L4 | L5 | ASS | TOT |
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## Course assessment sheet (MID 2 & ASS 2)

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**ASSESMENT OF COURSE OUTCOMES: INDIRECT**

| CSP Rubric | | | |
|---|---|---|---|
| S.N0 | Criteria | **LEVEL** | ( Level : 3-Excellent Level :2-Good Level : 1-Poor) |
| 1 | **Oral Communication** | 3 | Student speaks in phase with the given topic confidently using Audio-Visual aids. Vocabulary is good |
| | | 2 | Student speaking without proper planning, fair usage of Audio-Visual aids. Vocabulary is not good |
| | | 1 | Student speaks vaguely not in phase with the given topic. No synchronization among the talk and Visual Aids |
| 2 | **Writing Skills** | 3 | Proper structuring of the document with relevant subtitles, readability of document is high with correct use of grammar. Work is genuine and not published anywhere else |
| | | 2 | Information is gathered without continuity of topic, sentences were not framed properly. Few topics are copied from other documents |
| | | 1 | Information gathered was not relevant to the given task, vague collection of sentences. Content is copied from other documents |
| 3 | **Social and Ethical Awareness** | 3 | Student identifies most potential ethical or societal issues and tries to provide solutions for them discussing with peers |
| | | 2 | Student identifies the societal and ethical issues but fails to provide any solutions discussing with peers |
| | | 1 | Student makes no attempt in identifying the societal and ethical issues |
| 4 | **Content Knowledge** | 3 | Student uses appropriate methods, techniques to model and solve the problem accurately |
| | | 2 | Student tries to model the problem but fails to solve the problem |
| | | 1 | Student fails to model the problem and also fails to solve the problem |
| 5 | **Student Participation** | 3 | Listens carefully to the class and tries to answer questions confidently |
| | | 2 | Listens carefully to the lecture but doesn't attempt to answer the questions |
| | | 1 | Student neither listens to the class nor attempts to answer the questions |
| 6 | **Technical and analytical Skills** | 3 | The program structure is well organized with appropriate use of technologies and methodology. Code is easy to read and well documented. Student is able to implement the algorithm producing accurate results |
| | | 2 | Program structure is well organized with appropriate use of technologies and methodology. Code is quite difficult to read and not properly documented. Student is able to implement the algorithm providing accurate results. |
| | | 1 | Program structure is not well organized with mistakes in usage of appropriate technologies and methodology. Code is difficult to read and student is not able to execute the program |

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| 7 | **Practical Knowledge** | 3 | Independently able to write programs to strengthen the concepts covered in theory |
| | | 2 | Independently able to write programs but not able to strengthen the concepts learned in theory |
| | | 1 | Not able to write programs and not able to strengthen the concepts learned in theory |
| 8 | **Understanding of Engineering core** | 3 | Student uses appropriate methods, techniques to model and solve the problem accurately in the context of multidisciplinary projects |
| | | 2 | Student tries to model the problem but fails to solve the problem in the context of multidisciplinary projects |
| | | 1 | Student fails to model the problem and also fails to solve the problem in the context of multidisciplinary projects |

**Course assessment sheet Indirect:**
**CSP Rubric Name & Number:**

| S.No. | Hall Ticket Number | Rubric Assessment | Blooms Taxonomy Assessment | Remarks |
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| S.No. | Hall Ticket Number | Rubric Assessment | Blooms Taxonomy Assessment | Remarks |
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| **S.No.** | **Hall Ticket Number** | **Rubric Assessment** | **Blooms Taxonomy Assessment** | **Remarks** |
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**Remedial Classes:**

| Unit Number | Date Conducted | Topics Revised |
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| Unit-I | | |
| Unit-II | | |
| Unit-III | | |
| Unit-IV | | |
| Unit-V | | |

**Add-on Programmes (Guest Lecture/Video Lecture/Poster Presentation):**

**1 Mysql Workshop thru FOSS**

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