

BASIRHAT COLLEGE

DEPARTMENT OF COMPUTER SCIENCE

LESSON PLAN-2019-2020

B.Sc. Program with Computer Science (GE/DSC)

Semester-II

Paper Title- DBMS

Paper Code- CMSGCOR02T

Credits-4

COURSE OUTCOME: -

After completion of this course the students will be able –

CO1 . Identify the basic concepts and various data model used in database design ER modelling concepts and architecture use and design queries using SQL.

CO2 . Apply relational database theory and be able to describe relational algebra expression, tuple and domain relation expression fro queries.

CO3 . Recognize and identify the use of normalization and functional dependency, indexing and hashing technique used in database design.

CO4 . Recognize/ identify the purpose of query processing and optimization and also demonstrate the basic of query evaluation.

CO5 . Apply and relate the concept of transaction, concurrency control and recovery in database.

CO6 . Discuss recovery system and be familiar with introduction to web database.

| MONTH | COURSE/ TOPIC | TEACHER | CLASS HOUR | TUTORIAL |
|---------|---|-----------|-------------------|---|
| January | Introduction to Database Management Systems: Characteristics of database approach, datamodels, DBMS architecture and data independence. | DP | DP-13 FA-7 | THEORYTICAL-10 PRACTICAL-8 TUTORIAL-2 |

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| | 1. Create tables with relevant foreign key constraints 2. Populate the tables with data 3. Perform the following queries on the database : 1. Display all the details of all employees working in the company. 2. Display ssn, lname, fname, address of employees who work in department no 7. 3. Retrieve the birthdate and address of the employee whose name is 'Franklin T. Wong' 4. Retrieve the name and salary of every employee 5. Retrieve all distinct salary values. | | | |
| | Entity Relationship and Enhanced ER Modeling: Entity types, relationships, 6. Retrieve all employee names whose address is in „Bellaire“ 7. Retrieve all employees who were born during the 1950s | FA | | |
| February | SQL- 99: Schema Definition , constraints, and object modeling. 8. Retrieve all employees in department 5 whose salary is between 50,000 and 60,000(inclusive) 9. Retrieve the names of all employees who do not have supervisors 10. Retrieve SSN and department name for all employees 11. Retrieve the name and address of all employees who work for the 'Research' | DP | DP-15 FA-9 | THEORYTICAL-14 PRACTICAL-8 TUTORIAL-2 |

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| | department | | | |
| | <p>Relational Data Model : Basic concepts, relational constraints,</p> <p>12. For every project located in 'Stafford', list the project number, the controlling department number, and the department manager's last name, address, and birthdate.</p> <p>13. For each employee, retrieve the employee's name, and the name of his or her immediate supervisor.</p> <p>14. Retrieve all combinations of Employee Name and Department Name</p> | FA | | |
| March | <p>relational algebra, SQLqueries.</p> <p>15. Make a list of all project numbers for projects that involve an employee whose last name is 'Narayan' either as a worker or as a manager of the department that controls the project.</p> <p>16. Increase the salary of all employees working on the 'ProductX' project by 15%. Retrieve employee name and increased salary of these employees.</p> <p>17. Retrieve a list of employees and the project name each works in, ordered by the employee's department, and within each department ordered alphabetically by employee first name.</p> <p>18. Select the names of employees whose salary does not</p> | DP | <p>DP-13</p> <p>FA-9</p> | <p>THEORYTICAL-10</p> <p>PRACTICAL-8</p> <p>TUTORIAL-2</p> |

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| | match with salary of any employee in department 10. | | | |
| | <p>Database design: ER and EER</p> <p>19. Retrieve the name of each employee who has a dependent with the same first name and same sex as the employee.</p> <p>20. Retrieve the employee numbers of all employees who work on project located in Bellaire, Houston, or Stafford.</p> <p>21. Find the sum of the salaries of all employees, the maximum salary, the minimum salary, and the average salary. Display with proper headings.</p> <p>22. Find the sum of the salaries and number of employees of all employees of the „Marketing“ department, as well as the maximum salary, the minimum salary, and the average salary in this department.</p> | FA | | |
| April & May | <p>Database design: ER and EER to relational mapping functional dependencies</p> <p>23. Select the names of employees whose salary is greater than the average salary of all employees in department 10.</p> <p>24. For each department, retrieve the department number, the number of employees in the department, and their average salary.</p> | DP | <p>DP-15</p> <p>FA-11</p> | <p>THEORYTICAL-12</p> <p>PRACTICAL-10</p> <p>TUTORIAL-2</p> |

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| | <p>25. For each project, retrieve the project number, the project name, and the number of employees who work on that project.</p> <p>26. Change the location and controlling department number for all projects having more than 5 employees to „Bellaire“ and 6 respectively.</p> <p>27. For each department having more than 10 employees, retrieve the department no, no of employees drawing more than 40,000 as salary.</p> | | | |
| | <p>normal forms up to third normal form.</p> <p>28. Insert a record in Project table which violates referential integrity constraint with respect to Department number. Now remove the violation by making necessary insertion in the Department table.</p> <p>29. Delete all dependents of employee whose ssn is „123456789“.</p> <p>30. Delete an employee from Employee table with ssn = „12345“(make sure that this employee has some dependents, is working on some project, is a manager of some department and is supervising some employees). Check and display the cascading effect on Dependent and Works on table. In Department table MGRSSN should be set to default value and in Employee table SUPERSSN should be set to NULL</p> <p>31. Perform a query using alter command to drop/add field and a constraint in Employee table.</p> | FA | | |

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| | | TOTAL | 92 | |

Resources :

Books:

1. R. Elmasri, S.B. Navathe, Fundamentals of Database Systems 6th Edition, Pearson Education, 2010.
2. R. Ramakrishnan, J. Gehrke, Database Management Systems 3rd Edition, McGraw-Hill, 2002.
3. A. Silberschatz, H.F. Korth, S. Sudarshan, Database System Concepts 6th Edition, McGraw Hill, 2010.
4. R. Elmasri, S.B. Navathe Database Systems Models, Languages, Design and application Programming, 6th Edition, Pearson Education, 2013.

B.Sc. Program with Computer Science (GE/DSC)

Semester-IV

Paper Title- Computer System Architecture

Paper Code- CMSGCOR04T

Credits-4

COURSE OUTCOME: -

After completion of this course the students will be able –

CO1 . Identify the basic concepts of gates.

CO2 . Identify the concepts of different types of combinational circuit.

CO3 .Introduction to computers and CPUs, as well as concepts of stored programmes.

CO4. Instruction, Instruction Cycle, Interrupt, and Interrupt Cycle are all covered in this course.

CO5 . familiarity with Addressing Modes, I/O Bus Concept, and DMA Controller.

CO6 . familiarity with Memory Hierarchy, Cache Memory, Replacement Algorithms, Mobile Devices Architecture & Synchronous and Asynchronous Data Transfer.

| MONTH | COURSE/ TOPIC | TEACHER | CLASS HOUR | TUTORIAL |
|---------|---|-----------|-----------------------|---|
| January | Introduction: Logic gates, boolean algebra, combinational circuits, circuit simplification, 1. Create a machine based on the following architecture: Register Set | DP | DP-7 FA-17 | THEORYTICAL-12 PRACTICAL-10 TUTORIAL-2 |
| | flip-flops and sequential circuits, decoders, multiplexors, registers, counters and memory | FA | | |

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| | <p>units.</p> <p>ii) Create the micro operations and associate with instructions as given in the chapter (except interrupts). Design the register set, memory and the instruction set. Use this machine for the assignments of this section.</p> | | | | | | | | | | | | |
| February | <p>Data Representation and basic Computer Arithmetic: Number systems, complements, fixed and floating point representation, character representation, addition, subtraction, magnitude comparison.</p> <p>iii) Create a Fetch routine of the instruction cycle.</p> | DP | DP-9 FA-13 | THEORYTICAL-11 PRACTICAL-9 TUTORIAL-2 | | | | | | | | | |
| | <p>Basic Computer Organization and Design: Computer registers, bus system, instructionset, timing and control,</p> <p>iv) Simulate the machine to determine the contents of AC, E, PC, AR and IR registers in hexadecimal after the execution of each of following register reference instructions:</p> <table><tr><td>a. CLA</td><td>e. CIR</td><td>i. SNA</td></tr><tr><td>b. CLE</td><td>f. CIL</td><td>j. SZA</td></tr><tr><td>c. CMA</td><td>g. INC</td><td>k. SZE</td></tr><tr><td>d. CME</td><td>h. SPA</td><td>l. HLT</td></tr></table> | a. CLA | | | e. CIR | i. SNA | b. CLE | f. CIL | j. SZA | c. CMA | g. INC | k. SZE | d. CME |
| a. CLA | e. CIR | i. SNA | | | | | | | | | | | |
| b. CLE | f. CIL | j. SZA | | | | | | | | | | | |
| c. CMA | g. INC | k. SZE | | | | | | | | | | | |
| d. CME | h. SPA | l. HLT | | | | | | | | | | | |

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| March | <p>instruction cycle, memory reference, input-output and interrupt</p> <p>5. Simulate the machine for the following memory-reference instructions with I= 0 and address part = 082. The instruction to be stored at address 022 in RAM. Initialize the memory word at address 082 with the operand B8F2 and AC with A937. Determine the contents of AC, DR, PC, AR and IR in hexadecimal after the execution.</p> <p>a. ADD f. BSA b. AND g. ISZ c. LDA d. STA e. BUN</p> | DP | | <p>THEORYTICAL-12 PRACTICAL-10 TUTORIAL-2</p> |
| | <p>Central Processing Unit: Register organization, arithmetic and logical micro-operations, stack organization, micro programmed control.</p> <p>6. Simulate the machine for the memory-reference instructions referred in above question with I= 1 and address part = 082. The instruction to be stored at address 026 in RAM. Initialize the memory word at address 082 with the value 298. Initialize the memory word at address 298 with operand B8F2 and AC with A937. Determine the contents of AC, DR, PC, AR and IR in hexadecimal after the execution.</p> | FA | <p>DP-9 FA-15</p> | |

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| April | <p>Input-output Organization: Peripheral devices, I/O interface, Modes of data transfer, direct memory access.</p> <p>7. Modify the machine created in Practical 1 according to the following instruction format:</p> <p>Instruction format 0 2 3 4 15</p> <p>a. The instruction format contains a 3-bit opcode, a 1-bit addressing mode and a 12-bit address. There are only two addressing modes, I = 0 (direct addressing) and I = 1 (indirect addressing).</p> | DP | | THEORYTICAL-10 PRACTICAL-8 TUTORIAL-2 |
| | <p>Programming the Basic Computer: Instruction formats, addressing modes, instruction codes, machine language, assembly language, input output programming.</p> <p>b. Create a new register I of 1 bit.</p> <p>c. Create two new microinstructions as follows :</p> <p>i. Check the opcode of instruction to determine type of instruction (Memory Reference/Register Reference/Input-Output) and then jump accordingly.</p> <p>ii. Check the I bit to determine the addressing mode and then jump accordingly.</p> | FA | DP-9 FA-11 | |
| May | | DP | DP-0 | THEORYTICAL- |

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| | | FA | FA-0 | 0 PRACTICAL-0 TUTORIAL-0 |
| June | | DP FA | DP-0 FA-0 | |
| | | TOTAL | 90 | |

Resources :

Books:

1. M. Mano, Computer System Architecture, Pearson Education 1992.
2. A. J. Dos Reis, Assembly Language and Computer Architecture using C++ and JAVA, Course Technology, 2004
3. W. Stallings, Computer Organization and Architecture Designing for Performance, 8th Edition, Prentice Hall of India ,2009
4. Digital Design, M.M. Mano, Pearson Education Asia, 1979

B.Sc. Program with Computer Science (**Skill Enhancement Courses**)

Semester-IV

Paper Title- **R-Programming**

Paper Code- **CMSSECO2M**

Credits-2

COURSE OUTCOME: -

After completion of this course the students will be able –

CO1 . Explain critical R programming concepts

CO2 . Demonstrate how to install and configure RStudio

CO3 . Apply OOP concepts in R programming

CO4 . Explain the use of data structure and loop functions

CO5 . Analyse data and generate reports based on the data

CO6 . Apply various concepts to write programs in R

| MONTH | COURSE/ TOPIC | TEACHER | CLASS HOUR | TUTORIAL |
|---------|--|-----------|-------------|---|
| January | <p>Introduction: Overview and History of R, Getting Help, Data Types, Subsetting, Vectorized</p> <p>1. Write a program that prints „Hello World“ to the screen. 2. Write a program that asks the user for a number n and prints the sum of the numbers 1 to n</p> <p>3. Write a program that prints a multiplication table for numbers up to 12. 4. Write a function that returns the largest element in a list.</p> | FA | FA-8 | THEORYTICAL-12 PRACTICAL-10 TUTORIAL-2 |

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| February | <p>Operations, Reading and Writing Data.</p> <p>5. Write a function that computes the running total of a list.</p> | FA | FA-6 | <p>THEORYTICAL-11</p> <p>PRACTICAL-9</p> <p>TUTORIAL-2</p> |
| March | <p>Control Structures, Functions, lapply, tapply, split, mapply, apply, Coding Standards.</p> <p>6. Write a function that tests whether a string is a palindrome.</p> <p>7. Implement the following sorting algorithms: Selection sort, Insertion sort, Bubble Sort</p> <p>8. Implement linear search.</p> | | FA-7 | <p>THEORYTICAL-12</p> <p>PRACTICAL-10</p> <p>TUTORIAL-2</p> |

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| | | FA | | |
| April & May | <p>Scoping Rules, Debugging Tools, Simulation, R Profiler.</p> <p>9. Implement binary search. 10. Implement matrices addition , subtraction and Multiplication</p> | FA | FA-5 | <p>THEORYTICAL-10 PRACTICAL-8 TUTORIAL-2</p> |
| | | FA | | |
| | | TOTAL | 27 | |

Resources :

Books:

1. W. N. Venables, D. M. Smith, An Introduction to R, R-core team, 2015