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B.Tech. CSE LNCT University
III Semester Syllabus

Data base Management System CS301

COURSE OUTCOMES:

After Completing the course student should be able to

CO1	Explain various data models with their merits and demerits.
CO2	Construct sql queries using various data manipulation statements.
CO3	Apply normalization upto 3nf on given relations.
CO4	Summarize concurrency control mechanism for database transactions.
CO5	Utilize triggers and cursors in pl/sql programming.

Course content

Unit – IDBMS Concepts and architecture Introduction, Database approach v/s Traditional file accessing approach, Advantages, of database systems, Data models, Schemas and instances, Data independence, Data Base Language and interfaces, Functions of DBA, ER data model: Entitles and attributes, Entity types, Defining the E-R diagram, Concept of Generalization, Aggregation and Specialization. transforming ER diagram into the tables.

Unit - II Relational Data models: Domains, Tuples, Attributes, Relations, Characteristics of relations, Keys, Key attributes of relation, Relational database, Schemas, Integrity constraints. Referential integrity, Intension and Extension, Relational Query languages: SQL-DDL, DML, integrity con straints, various joins, Relational algebra and relational calculus, Relational algebra operations like select, Project, Join, Division, outer union.

Unit - III Data Base Design: Introduction to normalization, Normal forms, Functional dependency, Decomposition, Dependency preservation and lossless join, problems with null valued and , multivalued dependencies. Query Optimization: Introduction, steps of optimization.

Unit - IV Transaction Processing Concepts: -Transaction System, Testing of Serializability, Serializability of schedules, conflict & view serializable schedule, recoverability, Recovery from transaction failures. Log based recovery. Checkpoints deadlock handling. Concurrency Control Techniques: Concurrency Control, locking Techniques for concurrency control, time stamping protocols for concurrency control.

Unit - V Study of Relational Database Management Systems through Oracle/PL SQL Distributed database, database links, and snapshot. Data dictionary, SQL queries, Data extraction from single, multiple tables equi- join, non equi-join, self -join, outer join. Usage of like, any, all, exists, in Special operators. Hierarchical quires, inline queries, flashback queries.

Books Suggested:

1. Date C J, “An Introduction to Database System”, Pearson Educations
2. Korth, Silbertz, Sudarshan, “Fundamental of Database System”, McGraw Hill
3. Rob, “ Data Base System: Design Implementation & Management”, Cengage Learninig
4. Elmasri, Navathe, “Fundamentals Of Database Systems”, Pearson Educations
5. AtulKahate , “ Introduction to Database Management System”, Pearson Educations
6. Oracle 9i Database Administration Fundamental-I, Volume I, Oracle Press,TMH.
7. Paneerselvam,”DataBase Management System”, PHI Learning

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Suggested List of Experiments

Suggested list of experiments:- Lab Assignments:

1. Delete duplicate row from the table.
2. Display the alternate row from table.
3. Delete alternate row from table.
4. Update multiple rows in using single update statement.
5. Find the third highest paid and third lowest paid salary.
6. Display the 3rd, 4th, 9th rows from table.
7. Display the ename, which is start with j, k, l or m.
8. Show all employees who were hired the first half of the month.
9. Display the three record in the first row and two records in the second row and one record in the third row in a single sql statements.
10. Write a sql statements for rollback commit and save points.
11. Write a pl/sql for select, insert, update and delete statements.
12. Write a pl/sql block to delete a record. If delete operation is successful return 1 else return 0.
13. Display name, hire date of all employees using cursors.
14. Display details of first 5 highly paid employees using cursors.
15. Write a database trigger which fires if you try to insert, update, or delete after 7'o' clock.
16. Write a data base trigger, which acts just like primary key and does not allow duplicate values.
17. Create a data base trigger, which performs the action of the on delete cascade.
18. Write a data base trigger, which should not delete from emp table if the day is Sunday.
19. In this subject the students are supposed to prepare a small database application in complete semester like financial accounting system, Railway reservation system,institute timetable management system. Student record system, library management system, hospital management system etc. in RDBMS as follows:

Section A:

Solving the case studies using ER datamodel (design of the database)

Section B:

Implement a miniproject for the problem taken in section A.

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Operating Systems (CS/AL-302)

COURSE OUTCOMES:
After Completing the course student should be able to

CO1	Compare various types of operating systems
CO2	Analyse fcfs, sstf, scan and look disk scheduling algorithm techniques
CO3	Implement fcfs, sjf, priority, and CPU scheduling algorithm.
CO4	Summarize various memory management techniques.
CO5	Differentiate between remote procedure call and remote method invocation.

Course content

Unit-1 Basics of Operating Systems: Definition – Generations of Operating systems – Types of Operating Systems, OS Service, System Calls, OS structure: Layered, Monolithic, Microkernel Operating Systems – Concept of Virtual Machine. Process Management. Processes: Definition , Process Relationship , Process states , Process State transitions , Process Control Block ,Context switching – Threads – Concept of multithreads , Types of threads. Process Scheduling: Definition , Scheduling objectives ,Types of Schedulers ,Scheduling criteria : CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time (Definition only) , Scheduling algorithms : Pre emptive and Non , pre emptive , FCFS – SJF – RR , Multiprocessor scheduling , IPC.

UNIT- II Definition, Deadlock characteristics, Deadlock Prevention, Deadlock Avoidance: banker's algorithm, Deadlock detection and Recovery. Race Conditions, Critical Section, Mutual Exclusion, Hardware Solution, Strict Alternation, Peterson's Solution, The Producer Consumer Problem, Semaphores, Event Counters, Monitors, Message Passing, and Classical IPC Problems: Reader's & Writer Problem, Dinning Philosopher Problem etc., Scheduling, Scheduling Algorithms

Unit – III Basic Memory Management: Definition, Logical and Physical address map, Memory allocation : Contiguous Memory allocation – Fixed and variable partition – Internal and External fragmentation and Compaction , Paging : Principle of operation – Page allocation – Hardware support for paging – ,Protection and sharing – Disadvantages of paging.
Virtual Memory: Basics of Virtual Memory – Hardware and control structures – Locality of reference, Page fault , Working Set , Dirty page/Dirty bit – Demand paging (Concepts only) – Page Replacement policies : Optimal (OPT) , First in First Out (FIFO), Second Chance (SC), Not recently used (NRU) and Least Recently used (LRU)

Unit – IV Principles of I/O Hardware: I/O devices, Disk structure, Disk scheduling algorithm File concept, Aaccess methods, File types, File operation, Directory structure, File System structure, Allocation methods (contiguous,linked, indexed), Free-space management (bit vector, linked list, grouping).

Unit -V Security Environment, Design Principles Of Security, User Authentication, Protection Mechanism: Protection Domain, Access Control List Introduction to Network, Distributed and Multiprocessor Operating Systems. Case Studies: Unix/Linux, WINDOWS and other Contemporary Operating Systems.

Books Suggested:

1. Modern Operating system by Andrew S. Tanenbaum , PHI

2. Operating system concepts, by Abraham Silberschatz, Willey.

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List of Experiment

1. Write a program to implement FCFS CPU scheduling algorithm.
2. Write a program to implement SJF CPU scheduling algorithm.
3. Write a program to implement Priority CPU Scheduling algorithm.
4. Write a program to implement Round Robin CPU scheduling algorithm.
5. Write a program to compare various CPU Scheduling Algorithms over differentScheduling Criteria.
6. Write a program to implement classical inter process communication problem(producerconsumer).
7. Write a program to implement classical inter process communication problem(ReaderWriters).
8. Write a program to implement classical inter process communication problem(Dining_Philosophers).
9. Write a program to implement & Compare various page replacement algorithm.
10. Write a program to implement & Compare various Disk & Drum scheduling Algorithms
11. Write a program to implement Banker’s algorithms.
12. Write a program to implement Remote Proccedure Call(RPC).
13. Write a Devices Drivers for any Device or pheriperal.

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TOC (CS-303)

COURSE OUTCOMES:
After Completing the course student should be able to

CO1	Compare deterministic and nondeterministic finite state machines.
CO2	Sketch finite state machine and push down automata on various types of languages
CO3	Classify various types of languages based on recognizer and generator
CO4	Explain recursive and recursively enumerable languages
CO5	Illustrate Turing machine as a capacitor with its capabilities

Course content

Unit-I
Introduction of Automata Theory: Examples of automata machines, Finite Automata as a language acceptor and translator, Moore machines and mealy machines, composite machine, Conversion from Mealy to Moore and vice versa.
Unit-II
Types of Finite Automata: Non Deterministic Finite Automata (NDFA), Deterministic finite automata machines, conversion of NDFA to DFA, minimization of automata machines, regular expression, Arden's theorem. Meaning of union, intersection, concatenation and closure, 2 way DFA.
Unit-III
Grammars: Types of grammar, context sensitive grammar, and context free grammar, regular grammar. Derivation trees, ambiguity in grammar, simplification of context free grammar,conversion of grammar to automata machine and vice versa, Chomsky hierarchy of grammar, killing null and unit productions. Chomsky normal form and Greibach normal form.
Unit-IV
Push down Automata: example of PDA, deterministic and non-deterministic PDA, conversion of PDA into context free grammar and vice versa, CFG equivalent to PDA, Petrinet model
Unit-V
Turing Machine: Techniques for construction. Universal Turing machine Multitape, multihead and multidimensional Turing machine,Halting problem of Turing machine & the post correspondence problem., decidability
RECOMMENDED BOOKS

Books Suggested:

1. Introduction to Automata Theory Language & Computation, Hopcroft& Ullman, Narosa Publication.
2. Element of the Theory Computation, Lewis &Christors, Pearson.
3. Theory of Computation, Chandrasekhar & Mishra, PHI.
4. Theory of Computation, Wood, Harper & Row.
5. Aho, R. Sethi, and J. D. Ullman. Compilers: Principles, Techniques and Tools , Pearson Education

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BTech. CSE III SEM Programming Elective - I Java Programming (CS304 -PE)

COURSE OUTCOMES:

After Completing the course student should be able to

C01	Implement encapsulation, abstraction of object oriented technology
CO2	Explain classes, their relationships and associativity of objects with classes.
CO3	Discuss various object oriented features like polymorphism, inheritance and abstract methods with example.
CO4	Perform operations with container classes and templates.
CO5	Perform the file and JDBC operations with the help of various class library

Course contents

UNIT-I: Introduction to Java:

Overview of Java, History and evolution of Java, Java features and benefits, Java versions and environments (JDK, JRE, JVM), Setting Up Java Development Environment, Installing JDK and setting up IDE (Eclipse, IntelliJ IDEA), Writing, compiling, and running a basic Java program, Java Basics, Data types and variables, Operators and expressions, Control flow statements (if-else, switch-case, loops), Array, String.

UNIT-II:Object Oriented Programming

Introduction to OOP Concepts, Classes and objects, Constructors and methods, Access modifiers (private, protected, public), Inheritance and Polymorphism, Types of inheritance, Method overriding and overloading, this and super keyword, Abstract Classes and Interfaces, Abstract classes and methods, Implementing interfaces, Interface vs. Abstract class, Lambda Expression.

UNIT-III: Exception Handling and Multithreading

Exception Handling: Exception, Types of exceptions (checked and unchecked), Differences between checked and unchecked exceptions, Try-catch block syntax, Multiple catch blocks, Nested try-catch blocks, The finally clause and its purpose, throwing exceptions using the throw keyword, Creating custom exceptions. Multithreading: Introduction, Priorities and scheduling, Inter-thread communication, Thread Synchronization and its lifecycle.

UNIT-IV: Java IO and Collection Framework

Study Basic concept of streams I/O stream & reader-writer classes.

Collections Framework: Collection interfaces (List, Set, Map, Queue), Implementations of List (ArrayList, LinkedList, Vector), HashSet, LinkedHashSet, TreeSet, HashMap, LinkedHashMap, TreeMap, Hashtable, Implementations of Queue, Iterators, ListIterators, Enumeration, Comparable vs Comparator.

UNIT-V: JDBC API and Miscellaneous

Introduction to JDBC, JDBC architecture, JDBC drivers (types and usage), Setting up a JDBC environment, connecting to a database, DriverManager class, Connection interface, Statement interface, PreparedStatement interface, CallableStatement interface, Executing SQL queries (SELECT, INSERT, UPDATE, DELETE), ResultSet interface, Handling SQL exceptions, Batch processing, Transaction management, Connection pooling, DataSource interface, Working with metadata, Stream API.

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List of Experiment

1. Write a Java program to print 'Hello' on screen and your name on a separate line.
2. Write a Java Program to Swap Two Numbers Using Function.
3. Write a jav Program to find the average of numbers using array.
4. Write a java program to display the employee details using Scanner class .
5. Write a java program that checks whether a given string is palindrome or not.
6. Write a Java Program toDisplaying first and last character of a String.
7. Write java program that declares a class named Person. It should have instance variables to record name age and salary.
8. Write a java program that can count the number of instances created for the class.
9. Write a java program that shows passing object as parameter.
10. Write a java program that implememtsa inheritance.
11. Write a java program that implements method overloading & method overriding.
12. Write a java program that implements uses of super keywords.
13. Write a java program to represent Abstract class with example.
14. Write a java program to implement Interface using extends keyword .
15. Write a java program to create user defined package.
16. Write a java program to implement Exception Handling using try and catch block.
17. Write a java program to acheive a multithreading.
18. Write a java program to represent ArrayList class.
19. Write a java program to represent Tree Set & Tree Map.
20. Write a java program that connects to a database using JDBC .

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Programming Elective I – Python Programming(304)

COURSE OUTCOMES:

After Completing the course student should be able to

CO1	Introduction and basics
CO2	Demonstrate the concept of conditional operators and loops
CO3	Structural and functional programming concept with python.
CO4	Demonstrate the concept of file handling and exception handing
CO5	Database connectivity with python

Course content

Unit-1 Python programming Basic,Programming cycle of Python, Python Basic,Type conversion, Expressions, Keywords, variables, identifiers, Operators, Data types(Numbers, string, list, tuple, dictionary, set)

Unit - II Conditional statements, if-else statements, iterators, purpose and working of loops, for loop, while loop, comprehension (list, dictionary, set), Nested loop, Control statement (break, continue, pass).

Unit – III Function and its uses, different types of functions, def Statements with Parameters, Local and Global Scope, lambda function, map, filter, Introduction to recurssion, function arguments, return statement.

Unit – IV Modules and packages (datetime, math, random, os), regular expression, file handling, access modes in file handling, reading and writing in the file, with statement working with file, handling file exception, exception handling,

Unit -V Introduction to DBMS, concept of RDBMS, MySQL, SQL Languages, DDL, DML, DCL, TCL, Database connectivity with Python, Client server relationships.

Books Suggested:

1. Timothy A. Budd: Exploring python, McGraw-Hill Education.
2. R.Nageshwar Rao ,"Python Programming" ,Wiley India
3. Allen B. Downey; Think Python, O'Reilly Media, Inc.

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List of Experiment

1. Write a Python program to convert temperatures to and from Celsius and Fahrenheit.
   [Formula : c/5 = f-32/9 [where c = temperature in celsius and f = temperature in fahrenheit]
   Expected Output :
   60°C is 140 in Fahrenheit
   45°F is 7 in Celsius
2. Write a program which accepts a sequence of comma-separated numbers from console and generate a list and a tuple which contains every number.
3. Write a Python program to construct the following pattern, using a nested for loop.

   ```
   *
    * *
    * * *
    * * * *
    * * * * *
    * * * *
    * * *
    * *
    *
   ```
4. Write a Python program that iterates the integers from 1 to 50. For multiples of three print "Fizz" instead of the number and for multiples of five print "Buzz". For numbers that are multiples of three and five, print "FizzBuzz".
5. Define a function which can generate a dictionary where the keys are numbers between 1 and 20 (both included) and the values are square of keys. The function should just print the values only.
6. Write a Python program to calculate the sum of the positive integers of n+(n-2)+(n-4)... (until n-x =< 0) using recursion.
7. Write a Python script to display the various Date Time formats -
   a) Current date and time
   b) Current year
   c) Month of year
   d) Week number of the year
   e) Weekday of the week
   f) Day of year
   g) Day of the month
   h) Day of week
8. Write a function to compute 5/0 and use try/except to catch the exceptions.
9. Manually create a table and update its value with the help of MySQL Connectivity in Python

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Discrete Structure (CSE/AIML) (CS/AL 305)

COURSE OUTCOMES: After Completing the course student should be able to

CO1	Apply the key concepts of set theory and also gain knowledge to computer logics.
CO2	Construct various algebraic structures.
CO3	Analyse method of representing mathematical propositional logic and its application.
CO4	Discuss graph theory concepts to solve complex problems.
CO5	Describe possets, hasse diagram and lattices with suitable example.

Course Contents

UNIT-1 Set Theory, Relation, Function, Theorem Proving Techniques : Set Theory: Definition of sets, countable and uncountable sets, Venn Diagrams, proofs of some general identities on sets Relation: Definition, types of relation, composition of relations,Pictorial representation of relation, Equivalence relation, Partial ordering relation, Job-Scheduling problem Function: Definition, type of functions, one to one, into and onto function, inverse function, composition of functions, recursively defined functions,

pigeonhole principle. Theorem proving Techniques: Mathematical induction, Proof by contradiction.

UNIT-II Algebraic Structures: Definition, Properties, types: Semi Groups, Monoid,Groups, Abelian group, properties of groups, Subgroup, cyclic groups, Cosets, factor group,Permutation groups,Normal subgroup, Homomorphism and isomorphism of Groups,example and standard results, Rings and Fields: definition and standard results.

UNIT-III Propositional Logic: Proposition, First order logic, Basic logical operation,truth tables, tautologies, Contradictions, Algebra of Proposition, logical implications,logical equivalence, predicates, Normal Forms, Universal and existential quantifiers.Introduction to finite state machine Finite state machines as models of physical system equivalence machines, Finite state machines as language recognizers

UNIT-IV Graph Theory: Introduction and basic terminology of graphs, Planer graphs, Multigraphs and weighted graphs, Isomorphic graphs, Paths, Cycles and connectivity,Shortest path in weighted graph, Introduction to Eulerian paths and circuits, Hamiltonian paths and circuits, Graph coloring, chromatic number, Isomorphism and Homomorphism of graphs. Posets, Hasse Diagram and Lattices: Introduction, ordered set, Hasse diagram of partially, ordered set,isomorphic ordered set, well ordered set, properties of

Lattices, bounded and complemented lattices.

UNIT-V Combinatorics: Introduction, Permutation and combination, Binomial Theorem, Multimonial Coefficients Recurrence Relation and Generating Function: Introduction to Recurrence Relation and Recursive algorithms , Linear recurrence relations with constant coefficients, Homogeneous solutions, Particular solutions, Total solutions , Generating functions , Solution by method of generating functions.

References:

1. C.L.Liu, “Elements of Discrete Mathematics” Tata Mc Graw-Hill Edition.
2. Trembley, J.P & Manohar; “Discrete Mathematical Structure with Application CS”,
McGraw Hill.
3. Kenneth H. Rosen, “Discrete Mathematics and its applications”, McGraw Hill.
4. Bisht, “Discrete Mathematics”,Oxford University Press
5. Biswal,”Discrete Mathematics & Graph Theory”, PHI