NAAC - SSR IV CYCLE

M.Sc. COMPUTER SCIENCE

REGULATION 17

2019-20

PROGRAMME STRUCTURE &

SYLLABUS

Parvathaneni Brahmayya Siddhartha College of Arts & Science: Vijayawada-10

(An Autonomous college in the jurisdiction of Krishna University)

Accredited at A+ grade by NAAC

2019 Batch M.Sc- Computer Science

List of Courses

C CODE	COURSE TITLE	CREDITS	TOTAL	CIA	SEE
	FIRST SEMESTER				
CS1T1	OBJECT ORIENTED PROGRAMMING	4	100	30	70
CS1T2	COMPUTER ORGANIZATION	4	100	30	70
CS1T3	DISCRETE MATHEMATICAL STRUCTURES	4	100	30	70
CS1T4	DATABASE MANAGEMENT SYSTEMS	4	100	30	70
CS1T5	DATA STRUCTURES	4	100	30	70
CS1L1	DATA STRUCTURES LAB	3	100	30	70
CS1L2	DBMS LAB	3	100	30	70
CS1M1	MOOCS-CERTIFICATE	2	50	50	-
	TOTAL	**28**	**750**	**260**	**490**
	SECOND SEMESTER				
CS2T1	COMPUTER NETWORKS	4	100	30	70
CS2T2	OPERATIONS RESEARCH	4	100	30	70
CS2T3A	THEORY OF COMPUTATION	4	100	30	70
CS2T4	SOFTWARE ENGINEERING	4	100	30	70
CS2T5	OPERATING SYSTEMS	4	100	30	70
CS2L2	COMPUTER NETWORKS & OPERATING SYSTEMS LAB	3	100	30	70
CS2L3	PROBLEM SOLVING USING PYTHON PROGRAMMING LAB	3	100	30	70
GE02	COMMUNICATION SKILLS	2	50	50	-
	TOTAL	**28**	**750**	**260**	**490**
	THIRD SEMESTER				
CS3T1	INTERNET OF THINGS (IOT)	4	100	30	70
CS3T2	DESIGN & ANALYSIS OF ALGORITHMS	4	100	30	70
CS3T4	WEB TECHNOLOGIES	4	100	30	70
CS3T5	MOBILE COMPUTING	4	100	30	70
CS3T6	DATA MINING TECHNIQUES	4	100	30	70
CS3L1	WEB TECHNOLOGIES LAB	3	100	30	70
CS3L2	DATA MINING LAB	3	100	30	70
CS3P1	MINI PROJECT	2	50	50	-
	TOTAL	**28**	**750**	**260**	**490**
	FOURTH SEMESTER				
CS4T1	CLOUD COMPUTING	4	100	30	70
CS4T2	ARTIFICIAL INTELLIGENCE & MACHINE LEARNING	4	100	30	70
CS4T4	BIG DATA & ANALYTICS	4	100	30	70
CS4L2	BIG DATA & ANALYTICS LAB	3	100	30	70
CS4P1	PROJECT WORK	10	300	100	200
	TOTAL	**25**	**700**	**220**	**480**

P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE :: VIJAYAWADA-10
(An Autonomous College in the jurisdiction of Krishna University)
M.Sc., (Computer Science) Programme - I Semester

COURSE	COURSE CODE	L	T	P	C	Year
DATA STRUCTURES LAB	**CS1L1**	**-**	**-**	**6**	**3**	**2019-20**

Course Outcomes:
1. To define Stacks Queues, Tree Traversals, Graphs, Matrices, Sorting, & Searching.
2. To understand the concepts of Stacks, Queues, Tree Traversals, Graphs, Matrices, Sorting, & Searching.
3. To apply the operations of Stacks, Queues, Linked Lists, Trees, Graphs, Sorting & Searching's.
4. To evaluate Trees, Graphs and complexities of Sorting & Searching Algorithms.
5. To analyze Linear Lists, Stacks, Queues, Hash Tables, Binary Trees, Heaps, Binary Search Trees, and Graphs.
6. To create Linked Lists, Trees & Graphs by using Data Structures.

CYCLE 1
1. Write a Java Program to create a class called Stack and implement Stack Operations. (BTL6)
2. Write a Java Program to create a class called Queue and implement Stack Operations. (BTL6)
3. Write a Java Program to convert the Infix to Postfix Expression. (BTL3)
4. Write a Java Program to evaluate Postfix Expression. (BTL4)

CYCLE 2
1. Write a Java Class to implement the operations of a Singly Linked List. (BTL3)
2. Write a Java Class to implement the operations of a Doubly Linked List. (BTL3)
3. Write a Java Class to implement the operations of a Circular Linked List. (BTL3)

CYCLE 3
1. Write a Java Program to implement operations on Binary Trees. (BTL3)
2. Write a Java Program to perform Binary Search Tree Traversal. (BTL3)
3. Write a Java Program to implement Sparse Matrix. (BTL3)
4. Write a Java Program to implement DFS Algorithm. (BTL3)
5. Write a Java Program to implement BFS Algorithm. (BTL3)

CYCLE 4
1. Write a Java Program to implement the following sorting techniques: (BTL3)
a. Bubble Sort b. Merge Sort. c. Quick Sort. d. Heap Sort.

2. Write a Java Program to implement the Following search techniques: (BTL3)
a. Linear Search   b. Binary Search

COURSE	COURSE CODE	L	T	P	C	Year
DBMS LAB	**CS1L2**	-	-	6	3	**2019-20**

Course Outcomes:
1. Create database using DDL commands.
2. Retrieve data from database using DML for a given situation.
3. Familiarize with a query language through basic SQL queries.
4. Experiment Nested query, Joins, Integrity Constraints and Views in database.
5. Demonstrate trigger, function and procedure using PL/SQL.

CYCLE-I

Aim: Marketing Company wishes to computerize their operations by using following tables.(BTL3)

Table Name: Client- Master			
Column Name	Data Type	Size	Attribute
CLIENT_ NO	Varchar2	6	Primary key and first letter must start
NAME	Varchar2	20	Not null
ADDRESS 1	Varchar2	30	
ADDRESS S	Varchar2	30	
CITY	Varchar2	15	
PINCODE	Varchar2	8	
STATE	Varchar2	15	
BAL_DUE	Number	10,2	

Table Name: Product_Master			
Column Name	Data Type	Size	Attribute
PRODUCT_NO	Varchar2	6	Primary key and first letter must start
DESCRIPTION	Varchar2	15	Not null
PROFIT_PERCENT	Number	4,2	Not null
UNIT_MEASUE	Varchar2	10	
QTY_ON_HAND	Number	8	
REORDER_LVL	Number	8	
SELL_PRICE	Number	8, 2	Not null, cannot be 0
COST_PRICE	Number	8,2	Not null, cannot be 0
Table Name: Salesman_Master			
Column Name	Data Type	Size	Attribute
SALESMAN_NO	Varchar2	6	Primary key and first letter must start with 'S'
SALESMAN_NAME	Varchar2	20	Not null

ADDRESS1	Varchar2	30	
ADDRESS2	Varchar2	30	
CITY	Varchar2	20	
PINCODE	Number	8	
STATE	Vachar2	20	
SAL_AMT	Number	8,2	Not null, cannot be 0
TGT_TO_GET	Number	6,2	Not null, cannot be 0
YTD_SALES	Number	6,2	Not null
REMARKS	Varchar2	20	

Table Name: Sales_Order			
Column Name	Data Type	Size	Attribute
ORDER_NO	Varchar2	6	Primary key and first letter must start with
CLIENT_NO	Varchar2	6	Foreign Key
ORDER_DATE	Date		
DELY_ADDRESS	Varchar2	25	
SALESMAN_NO	Varchar2	6	Foreign Key
DELY_TYPE	Char	1	Delivery: part(p)/ full(f) and default 'F'
BILL_YN	Char	1	
DELY_DATE	Date		Can't be less than order date
ORDER_STATUS	Varchar2	10	Values ("In Process", " Fulfilled",

Table Name: Sales_Order_Details			
Column Name	Data Type	Size	Attribute
ORDER_NO	Varchar2	6	Primary key references SALES_ORDER
PRODUCT_NO	Varchar2	6	Foreign Key references
QTY_ORDERED	Number	8	
QTY_DISP	Number	8	
PRODUCT_RATE	Number	10,2	Foreign Key

Solve the following queries by using above tables. (BTL3)
1. Retrieve the list of names, city and the state of all the clients.
2. List all the clients who are located in 'Mumbai' or 'Bangalore'.
3. List the various products available from the product_master table.
4. Find the names of sales man who have a salary equal to Rs.3000.
5. List the names of all clients having 'a' as the second letter in their names.
6. List all clients whose Bal due is greater than value 1000.
7. List the clients who stay in a city whose first letter is 'M'.
8. List all information from sales-order table for orders placed in the month of July.
9. List the products whose selling price is greater than 1000 and less than or equal to 3000.
10. Find the products whose selling price is greater than 1000 and also find the new selling price as original selling price 0.50.
11. Find the products in the sorted order of their description.
12. Find the products with description as '540HDD' and 'Pen drive'.
13. Count the total number of orders.
14. Print the description and total qty sold for each product.

15. Calculate the average qty sold for each client that has a maximum order value of 15,000.
16. Find all the products whose quantity on hand is less than reorder level.
17. List the order number and day on which clients placed their order.
18. Find out the products and their quantities that will have to deliver in the current month.
19. Find the names of clients who have placed orders worth of 10000 or more.
20. Find the client names who have placed orders before the month of June,2018.

CYCLE-II

Aim: A manufacturing company deals with various parts and various suppliers supply these parts. It consists of three tables to record its entire information. Those are as follows.   (BTL3)
Supplier (Supplier_No, Sname, City, status)
Part(Part_no, pname, color, weight, city, cost)
Shipment (supplier_No, Part_no, city)
JX(project_no, project_name, city)
SPJX (Supplier_no, part_no, project_no, city)

Solve the following queries by using above tables. (BTL3)
1. Get supplier numbers and status for suppliers in Chennai with status > 20.
2. Get project names for projects supplied by supplier S.
3. Get colors of parts supplied by supplier S_1.
4. Get part numbers for parts supplied to any project in Mumbai.
5. Find the id's of suppliers who supply a red or pink parts.
6. Find the pnames of parts supplied by London supplier and by no one else.
7. Get the names of the parts supplied by the supplier 'Mart' and 'Miller'.
8. Get supplier names for suppliers who do not supply part P_2.
9. Get all pairs of supplier numbers such that the suppliers concerned are "colocated".
10. Get suppliers names for the suppliers who supply at least one red part.

CYCLE –III

Aim: An enterprise wishes to maintain a database to automate its operations. Enterprise divided into a certain departments and each department consists of employees. The following two tables describes the automation schemas. (BTL3) (BTL4)

Emp(Empno, Ename, Job, Mgr, Hiredate, Sal, Comm, Deptno)
Dept(Deptno, Dname, Loc)

Solve the following queries by using above tables. (BTL3)
1. List the details of employees who have joined before the end of September' 81.

2. List the name of the employee and designation of the employee, who does not report to anybody.
3. List the name, salary and PF amount of all the employees (PF is calculated as 10% of salary)
4. List the names of employees who are more than 2 years old in the organization.
5. Determine the number of employees, who are taking commission.
6. Update the employee salary by 20% , whose experience is greater than 12 years.
7. Determine the department does not contain any employees.
8. Create a view, which contains employee name and their manager names working in sales department.
9. Determine the employees, whose total salary is like the minimum salary of any department.
10. List the department numbers and number of employees in each department.
11. Determine the employees, whose total salary is like the minimum salary of any department.
12. List average salary for all departments employing more than five people.
13. Determine the names of employees, who take highest salary in their departments.
14. Determine the names of employees, who earn more than their managers.
15. Display ename, dname, even if no employee belongs to that department (use outer join).

CYCLE- IV

An Airline system would like to keep track their information by using the following relations. (BTL3)

FLIGHTS(fl_no: integer, from: string, to: string, distance: integer, price: integer)
AIRCRAFT(aid: integer, aname: string, cruising_range: integer)
CERTIFIED(eid: integer, aid: integer)
Employees(eid: integer, ename: string, salary: real)

Note that the employees relation describes pilots and other kinds of employees as well; every pilot is certified for aircraft and only pilots are certified to fly. Resolve the following queries. (BTL3) (BTL4)

a) Find the names of pilots whose salary is less than the price of the cheapest route from Newyork to Chicago.
b) For each pilot who is certified for more than 2 aircraft, find the eid's and the maximum cruising range of the aircraft that he or she certified for.
c) For all aircraft with cruising range over 1,500 miles, find the name of the aircraft and the average salary of all pilots certified for this aircraft.
d) Find the aid's of all aircraft than can be used from chicaga to LosAngels.
e) Find the name of the pilots certified from some Boeing aircraft.
f) Print the enames of pilots who can operate planes with cruising range greater than 3,500 miles, but are not certified by Boeing aircraft.
g) Find the eid's of employees who are certified for exactly 2 aircrafts.
h) Find the total amount paid to employees as salaries.

i) Find the aid's of all than can be used on non-stop flights from Chennai to Dubai.
j) Find the eid's of employee who make second highest salary.

PL/SQL PROGRAMS (BTL3) (BTL4)

1. Write a PL/SQL program to check the given number is strong or not.
2. Write a PL/SQL program to check the given string is palindrome or not.
3. Write a PL/SQL program to swap two numbers without using third variable.
4. Writ a PL/SQL program to generate multiplication tables for 2, 4, 6.
5. Write a PL/SQL program to check the given number is Amstrong or not.
6. Write a PL/SQL code to find the factorial of any number.
7. Write a PL/SQL program to display sum of even numbers and sum of odd numbers in the given range.
8. Write a PL/SQL program to check the given number is palindrome or not.
9. The HRD manager has decide to raise the employee salary by 15% write a PL/SQL block to accept the employee number and update the salary of that employee. Display appropriate message based on the existence of the record in Emp table.
10. Write a PL/SQL program to display to 10 rows in Emp table based on their job and salary.
11. Write a PL/SQL program to raise the employee salary by 10% for department number 30 people and also maintain the raised details in the raise table.
12. Write a procedure to update the salary of Employee, who are not getting commission by 10%.

13. Write a PL/SQL procedure to prepare an electricity bill by using following table.
    Table used: Elect

Name	Null?	Type
MNNO	NOT NULL	NUMBER(3)
CNAME		VARCHAR2(20)
CUR_READ		NUMBER(5)
PREV_READ		NUMBER(5)
NO_UNITS		NUMBER(5)
AMOUNT		NUMBER(8,2)
SER_TAX		NUMBER(8,2)
NET_AMT		NUMBER(9,2)

14. Write a PL/SQL program to prepare an telephone bill by using following table and print the monthly bills for each customer.

Table used: Phone		
Name	Null?	Type

TEL_NO	NOT NULL	NUMBER(6)
CNAME		VARCHAR2(20)
CITY		VARCHAR2(10)
PR_READ		NUMBER(5)
CUR_READ		NUMBER(5)
NET_AMT		NUMBER(5)
TOT-AMT		NUMBER(8,2)

15. Write a PL/SQL program to raise the employee salary by 10 %, who are completed ther 25 years of service and store the details at appropriate tables (Define the Retair_ Emp_Table) .
16. Write a PL/SQL program to evaluate the grade of a student with following conditions:
   For pass: all marks > 40
   For I class: Total % > 59
   For II Class: Total % between >40 and < 60
   For III class: total % = 40
   And also maintain the details in abstract table.

1. Table Std		
Name	Null?	Type
NO	NOT NULL	NUMBER
NAME		VARCHAR2(10)
INTNO		NUMBER
CLASS	NOT NULL	VARCHAR2(10)
M1		NUMBER
M2		NUMBER
M3		NUMBER
M4		NUMBER
M5		NUMBER

2. Table Abstract		
Name	Null?	Type
STDNO		NUMBER
STDNAME		VARCHAR2(10)
CLASS		VARCHAR2(10)
MONTH		VARCHAR2(10)
INTNO (INTEGER NUMBER)		NUMBER
TOT		NUMBER
GRADE		VARCHAR2(10)
PERCENT		NUMBER
DAT_ENTER		DATE

COURSE	COURSE CODE	L	T	P	C	YEAR
Certification Course offered by MOOCS provides such as NPTEL/Swayam/Edx/Coursera/Udacity/Udemy etc.	**CS1M1**	**-**	**-**	**3**	**2**	**2019-20**

Rules:
1. The candidate is required to complete certification course in the field of computer science which are not in the curriculum from massive open online course (MOOCS) providers such as *NPTEL / Swayam / Edx / Coursera / Udacity / Udemy etc*. with the prior permission of HOD within the duration of entire program.
2. The syllabus and training is to be taken from respective certifying bodies.

P.B. Siddhartha College of Arts & Science, Vijayawada – 520 010
(An Autonomous College in the jurisdiction of Krishna University)
M.Sc., (Computer Science) Programme - I Semester

COURSE	COURSE CODE	L	T	P	C	Year
OBJECT ORIENTED PROGRAMMNG	CS1T1	4	-	-	4	2019-20

Course Outcomes:

1. Apply the salient features of Java Programming.
2. Understand the concepts of object, classes and interfaces and packages of Java.
3. Adopting threads and handling exceptions.
4. Implementing knowledge of streams, applets and database connectivity using JDBC.
5. Creating applications using servlets and implementing RMI.

UNIT 1

Object Oriented Programming: Introduction to OOP, Objects and Classes, Characteristics of OOP, Difference between OOP and Procedure Oriented Programming.

Introduction to Java Programming: Introduction, Features of Java, Comparing Java and other languages, Applications and Applets, Java Development Kit, More Complex Programs, Java Source file structure, Prerequisites for Compiling and Running Java Programs.

UNIT 2

Java Language Fundamentals: The building Blocks of Java, Data Types, Variable Declarations, Wrapper Classes, Operators and Assignment, Control Structures, Arrays, Strings, The String Buffer Class.

Java as an OOP Language: Defining Classes, Modifiers, Packages, Interfaces.

UNIT 3

Exception Handling: Introduction, Basics of Exception Handling in Java, Exception Hierarchy, Constructors and Methods in Throwable Class, Unchecked and Checked Exceptions, Handling Exceptions in Java, Exception and Inheritance, Throwing User Defined Exceptions, Redirecting and Rethrowing Exceptions, Advantages of Exception Handling Mechanism.

Multithreading: An Overview of Threads, Creating Threads, Thread Life Cycle, Thread Priorities and Thread Scheduling, Thread Synchronization, Daemon Threads, Thread groups, Communication of Threads.

UNIT 4

Files and I/O Streams: An Overview of I/O streams, Java I/O, File Streams, File Input Stream and File Output Stream, Filter streams, Random Access File, Serialization.

Applets: Introduction, Java applications versus Java Applets, Applet Life Cycle, Working with Applets, The HTML Applet Tag.

Database Handling Using JDBC: An Overview of DBMS, JDBC Architecture, Working with JDBC.

UNIT 5

Servlets: Introduction, How to run Servlets, The Life Cycle of the Servlet, Servlet API, Multitier Applications using JDBC from a Servlet.

Networking and Remote Method Invocation: Introduction to Networking, Understanding Ports, Networking Classes in JDK, Introduction to RMI, RMI Architecture, Implementing Remote Class and Interface, Security.

Prescribed Text Book			
	Author	Title	Publisher
1	P.Radha Krishna	Object Oriented Programming through Java	Universities Press (2007)

Reference Text Book			
	Author	Title	Publisher
1	Cay S. Horstmann Gray Cornell	Core Java ,Volume 1 Fundamentals	Eighth Edition, Pearson Education
2	E.Balagurusamy	Programming with Java	3e, TMH (2007)
3	H.M.Deitel, P.J.Deitel	Java How to Program	Sixth Edition, Pearson Education (2007)
4	Debasish Jana	Java and Object Oriented Programming Paradigm	PHI (2005)
5	ISRD Group	Introduction to Object Oriented Programming through Java	TMH (2007)

M.Sc.,(COMPUTER SCIENCE) DEGREE EXAMINATIONS-NOVEMBER 2019
FIRST SEMESTER
OBJECT ORIENTED PROGRAMMING

Time 3 Hours   **Max.Marks: 70**

Answer all questions. All question carry equal marks.   **5 × 14 M**

1. a) What is object oriented programming? Discuss the characteristics of   object oriented
      programming.
      (BTL3)
   b) What are the differences between applications and applets in Java? Give examples.
      (BTL3)

                                       Or

   c) Discuss and distinguish between object oriented programming and procedure oriented
      programming.   (BTL3
   d) Describe the features of Java programming language.
      (BTL3)

2. a) Explain various operators available in Java.
      (BTL2)
   b) What is an interface? Write a program to demonstrate how interfaces can be
      extended.
      (BTL2)

                                       Or

   c) Explain the Control structures in Java with examples.
      (BTL2)
   d) What is a Constructor? Explain Constructor Overloading with an example program.
(BTL2)

3. a) Write about Exception handling mechanism in Java.
      (BTL6)
   b) Explain with an example how Java performs thread synchronization.
      (BTL6)

                                       Or

   c) Give the advantages of Exception handling.
      (BTL6)
   d) Explain the life cycle of a thread.
      (BTL6)

4. a) Explain the life cycle of an applet.
      (BTL3)
   b) Explain JDBC architecture and different types of devices available.
      (BTL3)

<div align="center">Or</div>

c) What is stream class? Explain the streams used in Java.
   (BTL3)

d) Explain two-tier and three- tier architecture with client- server communication.
   (BTL3)

5. a) What is a servlet? Discuss about the servlet API.
   (BTL6)

b) Explain about RMI architecture.
   (BTL6)

<div align="center">Or</div>

c) Explain the life-cycle of a servlet.
   (BTL6)

d) What is a socket? Write a Java program to establish a socket connection.
   (BTL6)

P.B. Siddhartha College of Arts & Science, Vijayawada – 520 010
(An Autonomous College in the jurisdiction of Krishna University)
M.Sc., (Computer Science) Programme - I Semester

COURSE	COURSE CODE	L	T	P	C	Year
COMPUTER ORGANIZATION	CS1T2	3	1	-	4	2019-20

Course Outcomes:

1. State principles underlying, building digital logic circuits, digital components, data representation, register transfer & micro operations, basic computer organization & design, micro programmed unit, central processing unit, computer arithmetic, input-output organization, and memory organization. (BTL1)
2. Apply generic principles to build a digital computer including digital logic circuits, digital components and data representation. (BTL3)
3. Describe a simple computer with hardware design including micro operations, register transfer buses, instruction codes and timing and control. (BTL2)
4. Discuss design of processing unit using control memory, address sequencing, register and stacks, instruction formats and addressing modes. (BTL2)
5. Analyze addition, subtraction, multiplication and floating point operation in computers. (BTL4)
6. Explain input-output & memory organizations. (BTL2)

UNIT 1

Digital Logic Circuits: Digital Computers, Logic Gates, Boolean Algebra, Map Simplification, Combinational Circuits, Flip-Flops, Sequential Circuits.

Digital Components: Integrated Circuits, Decoders, Multiplexers, Registers, Shift Registers, Binary Counters, Memory Unit.

Data Representation: Data Types, Complements, Fixed-Point Representation, Floating-Point Representation, Other Binary Codes, Error Detection Codes.

UNIT 2

Register Transfer and Micro Operations: Register Transfer Language, Register Transfer, Bus & Memory Transfers, Arithmetic Micro Operations, Logic Micro Operations, Shift Micro Operations, Arithmetic Logic Shift Unit.

Basic Computer Organization and Design: Instruction Codes, Computer Registers, Computer Instructions, Timing & Control, Instruction Cycle, Memory-Reference Instructions, Input-Output Interrupt.

UNIT 3

Micro Programmed Control: Control Memory, Address Sequencing, Micro Program Example,

Design of Control Unit.

Central Processing Unit: General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control.

UNIT 4

Computer Arithmetic: Introduction, Addition and Subtraction, Multiplication Algorithm, Floating Point Arithmetic Operations, Decimal Arithmetic Unit, Decimal Arithmetic Operations.

UNIT 5

Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt.

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory.

Prescribed Text Book			
	Author	Title	Publisher
1	M. Morris Mano	Computer System Architecture	3rd Edition, Pearson Education (2008). **Chapters :** 1, 2, 3, 4, 5.1 to 5.7, 7, 8.1 to 8.7, 10.2 to 10.5, 11.1 to 11.5, 12.1 to

Reference Text Books			
	Author	Title	Publisher
1	V. Rajaraman, T. Radha Krishnan	Computer Organization and Architecture	PHI
2	Behrooz Parhami	Computer Architecture	Oxford (2007)
3	ISRD group	Computer Organization	Ace series, TMH (2007)
4	William Stallings	Computer Organization and Architecture – Designing for Performance	Pearson Education (2005)
5	P.Chakraborty	Computer Architecture and Organization	Jaico Books (2008)

M.Sc.,(COMPUTER SCIENCE) DEGREE EXAMINATIONS-NOVEMBER 2019
FIRST SEMESTER
COMPUTER ORGANIZATION

Time 3 Hours   Max.Marks: 70

Answer all questions. All question carry equal marks.   **5 × 14 M**

1. a) Explain the operation of 4×1 multiplexer with logic diagram and truth table. 7M (BTL2)
   b) Simplify F together with it's don't care condition d in sum of products form and also draw

   the logic diagram using NAND gates. 7M (BTL4)
   $$F(A,B,C,D)=\sum (0,1,2,8,9,12,13)$$
   $$d(A,B,C,D)=\sum (10,11,14,15)$$
                                        Or
   c) State the operation of SR flip flop with logic diagram. 7M (BTL1)
   d) Explain about fixed point and floating point data representation. 7M (BTL2)

2. a) What is a register? Explain register transfer using block diagram and timing diagram. 7M
    (BTL2)
   b) Explain the memory- reference instruction. 7M (BTL2)
                                        Or
3. c) Draw the block diagram of an ALU and explain the operations performed by it. 7M (BTL2)
   d) Define an interrupt? Explain the interrupt cycle with diagram. 7M (BTL1)

4. a) Describe the organization of Micro programmed control with block diagram.7M (BTL2)
   b) Explain about instruction format. 7M (BTL2)
                                        Or
5. c) Discuss different types of addressing modes. 7M (BTL2)
   d) Explain about control memory in detail. 7M (BTL2)

6. a) What is BCD adder? Analyze with block diagram. 7M (BTL4)
   b) Examine Booth's multiplication algorithm with example. 7M (BTL4)
                                        Or
   c) With a flow chart analyze hardware algorithm. 7M (BTL4)
   d) Examine floating point arithmetic operations. 7M (BTL4)

7. a) What is an input - output interface? State the difference between isolated I/O and memory
       mapped I/O. (BTL1)
   b) Write a note on memory hierarchy. (BTL1)
                                        Or
   c) Discuss asynchronous data transfer? (BTL2)
   d) What is locality of reference? Discuss various organizations of cache memory. (BTL2)

P.B. Siddhartha College of Arts & Science, Vijayawada – 520 010

(An Autonomous College in the jurisdiction of Krishna University)

M.Sc., (Computer Science) Programme - I Semester

COURSE	COURSE CODE	L	T	P	C	Year
DISCRETE MATHEMATICAL STRUCTURES	CS1T3	3	1	-	4	2019-20

Course Outcomes:

1. Understand mathematical reasoning in order to construct mathematical arguments.
2. Perform combinatorial analysis to solve computing problems and analyze algorithms.
3. Demonstrate the abstract mathematical structures used to represent discrete objects and relationships between objects.
4. Model problems in Computer Science using graphs and trees.
5. Apply the principles to solve problems in various domains.

UNIT 1
The Foundations: Logic and Proofs: Propositional Logic, Propositional Equivalences, Predicates and Quantifiers, Nested Quantifiers, Rules of Inference, Introduction to Proofs, Normal Forms, Proof Methods and Strategy, Program Correctness.
Basic Structures: Sets, Functions, Sequences and Sums: Sets, Set Operations, Functions, Recursive Functions, Sequences and Summations.
The Fundamentals: Algorithms, The Integers and Matrices: Algorithms, The Growth of Functions, Complexity of Algorithms, The Integers and Divisions, Primes and Greatest Common Divisors, Integers and Algorithms, Applications of Number Theory, Matrices.

UNIT 2
Introduction and Recursion: Mathematical Induction, Strong Induction and Well-Ordering, Recursive Definitions and Structural Induction, Recursive Algorithms.
Counting: The Basics of Counting, The Pigeon Hole Principle, Permutations and Combinations, Binomial Coefficients, Generalized Permutations and Combinations, Generating Permutations and Combinations.

UNIT 3
Advanced Counting Techniques: Recurrence Relations, Solving Linear Recurrence Relations, Divide and Conquer Algorithms and Recurrence Relations, Generating Functions, Inclusion, Exclusion, Applications of Inclusion & Exclusion.
Relations: Relations and their Properties, N-ary Relations and their Applications, Representing Relations, Closures of Relations, Equivalence Relations, Partial Orderings.

UNIT 4
Graphs: Graphs and Graph Models, Graph Terminology and Special Types of Graphs, Representing Graphs and Graph Isomorphism's, Connectivity, Euler and Hamilton Paths, Shortest Path Problems, Planar Graphs, Graph Coloring.

UNIT 5

Trees: Introduction to Trees, Applications of Trees, Tree Traversal, Spanning Trees, Minimum Spanning Trees.

Boolean Algebra: Boolean Functions, Representing Boolean Functions, Logic Gates, Minimization of Circuits.

Prescribed Text Book			
	Author	Title	Publisher
1	Kenneth H Rosen, KamalaKrithivasan	Discrete Mathematics and its Applications with Combinatorics & Graph	7thEdition, Tata McGraw-Hill (2011), Special Indian Edition.

Reference Books			
	Author	Title	Publisher
1	Ralph P. Grimaldi, B.V. Ramana	Discrete and Combinational Mathematics	5th Edition, Pearson Education (2008).
2	Swapan Kumar Sarkar	A Text Book of Discrete Mathematics	S.Chand (2008)
3	D.S.Malik and M.K.Sen	Discrete Mathematical Structures	Thomson (2006)

CS1T3

M.Sc.,(COMPUTER SCIENCE) DEGREE EXAMINATIONS-NOVEMBER 2019
FIRST SEMESTER
DISCRETE MATHEMATICAL STRUCTURES
Time 3 Hours   Max.Marks: 70

Answer all questions. All question carry equal marks.   5 × 14 M

1. a) Prove the relation (pvq) Λ (¬p v r) -> (p v r) is a tautology. (BTL3)
   b) Explain Greatest Common Divisor (GCD) and Find the GCD (123, 277), GCD (414, 662)
       using the Euclidean algorithm. (BTL2)
                                        Or
   c) State Demorgan laws. Use set builder notation prove the Demorgan laws. (BTL3)

d) Explain (i) Biconditional statement $(\leftrightarrow)$ (ii) Exclusive or (iii) Conditional statement $(\rightarrow)$ with the truth tables. (BTL2)

2. a) Use Mathematical Induction to show that $1+2+2^2+......+2^n = 2^{n+2} -1$ for all positive integers n. (BTL3)

b) Expand $(2x+3y)^4$ using Binomial theorem and find the coefficient of $x^{12}y^{13}$ in the expansion of $(x+y)^{25}$ (BTL3).

Or

c) How many different license plates are available if each plate contains a sequence of three
letters followed by three digits without repetition. (BTL3)

d) Find the values of following
(i) C (12, 6)   (ii) C (30, 6)   (iii) P (10, 9)   (iv) P (15, 5) (BTL2)

3. a) Solve the recurrence relation $a_n=a_{n-1}+f(n)$ $n>=1$ by substitution where $a_0=1$(BTL3)

b) Discuss properties of relations with examples. (BTL2)

Or

c) Find the solution of the Homogenous recurrence relation
$a_n=6a_{n-1} - 11a_{n-2} + 6a_{n-3}$ with initial condition $a_0 = 2$, $a_1 =5$, $a_2 =15$.(BTL3)

d) Discuss reflexive closures, Transitive closures of relations with examples. (BTL2)

4. a) Discuss Graphs and Graphs Models. (BTL2)

b) Explain the Bipartite Graphs. (BTL2)

Or

c) Explain Isomorphism of two graphs with an examples. (BTL2)

d) Explain the Dijkstra's algorithm to find a shortest path with an example. (BTL2)

5. a) Explain how to produce minimum spanning tree using Prim's algorithm with an example. (BTL6)

b) State the applications of trees. (BTL2)

Or

c) Find the minimal expansion equivalent to $x\,y\,\bar{z}+x\,\bar{y}\,z+x\,y\overline{z}+\overline{x\,y}\,\overline{z}+x\,y\,z$
using Quine Mc Clusky method. (BTL3)

d) Use Karnaugh maps to minimize these sum-of products expansions. (BTL3)

(i) $x\,\bar{y}\,\overline{z+\bar{y}\,z}+x\,y\,\overline{z+x}\,y\,z$ (ii) $x\,y\,\overline{z}+x\,\bar{y}\,z+x\,\overline{y}\,z+\overline{x\,y}\,\overline{z}+x\,y\,z$

M.Sc., (Computer Science) Programme - I Semester

COURSE	COURSE CODE	L	T	P	C	Year
DATABASE MANAGEMENT SYSTEMS	CS1T4	4	-	-	4	2019-20

Course Outcomes:
1. Impart an introduction to the theory and practice of database systems.
2. Provide exposure to database programming.
3. Understand basics on data modeling and design of efficient relations.
4. Analyze basic database storage structures and access techniques.
5. Evaluate transactional, concurrent and distributed database processing.

UNIT I
Databases and Database Users: Introduction, An Example, Characteristics of the Database Approach, Actors on the Scene, Workers behind the Scene, Advantage of Using the DBMS Approach.
Database System Concepts and Architecture: Data Models, Schemas, and Instances, Three-Schema Architecture and Data Independence, Database Languages and Interfaces, The Database System Environment, Centralized and Client/Server Architectures for DBMSs.
The Relational Data Model and Relational Database Constraints: Relational Model Concepts, Relational Model Constraints and Relational Database Schemas, Update Operations, Transactions, and Dealing with Constraint Violations.

UNIT II
Basic SQL: SQL Data Definition and Data Types, Specifying Constraints in SQL, Basic Retrieval Queries in SQL, INSERT, DELETE, and UPDATE Statements in SQL.
More SQL: More Complex SQL Retrieval Queries, Views (Virtual Tables) in SQL, Schema Change Statements in SQL.
The Relational Algebra and Relational Calculus: Unary Relational Operations: SELECT and PROJECT, Relational Algebra Operations from Set Theory, Binary Relational Operations: JOIN and DIVISION, Additional Relational Operations, Examples of Queries in Relational Algebra, The Tuple Relational Calculus, The Domain Relational Calculus.

UNIT III
Data Modeling Using the Entity-Relationship (ER) Model: Using High-Level Conceptual Data Models for Database Design, Entity Types, Entity Sets, Attributes, Keys, Relationship Types, Relationship Sets, Roles, Structural Constraints, Weak Entity Types, ER Diagrams, Naming Conventions, Design Issues.
The Enhanced Entity-Relationship (EER) Model: Subclasses, Super classes, Inheritance, Specialization and Generalization, Constraints and Characteristics of Specialization and Generalization Hierarchies, Modeling of UNION Types Using Categories, A Sample UNIVERSITY EER Schema, Design Choices, Formal Definitions.
Functional Dependencies: Introduction, Basic Definitions, Trivial and Non-Trivial Dependencies, Closure of set of Dependencies, Closure of set of Attributes, Irreducible sets of dependencies.

Further Normalization 1NF, 2NF, 3NF, BCNF: Introduction, Nonloss decomposition and functional dependencies, 1st, 2nd and 3rd normal forms, Boyce-Codd Normal Form. Multivalued Dependency and Fourth Normal Form, Join Dependencies and Fifth Normal.

UNIT IV

Disk Storage, Basic File Structures and Hashing: Secondary Storage Devices, Buffering of Blocks, Placing File Records on Disk, Operations on Files, Files of Unordered Records (Heap Files), Files of Ordered Records (Sorted Files), Hashing Techniques, Parallelizing Disk Access Using RAID Technology.

Indexing Structures for Files: Types of Single-Level Ordered Indexes, Multilevel Indexes, Dynamic Multilevel Indexes Using B-Trees and B^{+}-Trees.

UNIT V

Introduction to Transaction Processing Concepts and Theory: Introduction to Transaction Processing, Transaction and System Concepts, Desirable Properties of Transactions, Characterizing Schedules Based on Recoverability, Characterizing Schedules Based on Serializability, Transaction Support in SQL.

Concurrency Control Techniques: Two-Phase Locking Techniques for Concurrency Control, Concurrency Control Based on Timestamp Ordering, Multiversion Concurrency Control Techniques, Validation (Optimistic) Concurrency Control Techniques, Granularity of Data Items and Multiple Granularity Locking, Using Locks for Concurrency Control in Indexes.

Distributed Databases: Distributed Database Concepts, Types of Distributed Database Systems, Distributed Database Architectures, Data Fragmentation, Replication, and Allocation Techniques for Distributed Database Design.

Prescribed Text Book			
	Author	Title	Publisher
1	Ramez Elmasri, Shamkant B. Navathe	Fundamentals of Database Systems.	Pearson Education, Seventh Edition, 2017
2	C.J. Date, A.Kannan, S.Swamynathan	An Introduction to Database Systems	VII Edition Pearson Education (2006). Functional Dependencies(Chapters 10.1 to 10.6) Further Normalization (Chapters 11.1 to 11.5, 12.2,12.3)

Reference Text Books			
	Author	Title	Publisher
1	Peter Rob, Carlos Coronel	Database Systems– Design, Implementation and Management	Eigth Edition, Thomson (2008)
2	Raman A Mata – Toledo, Panline K.	Database Management Systems	Schaum's Outlines, TMH (2007)
3	Steven Feuerstein	Oracle PL/SQL – Programming	10th Anniversary Edition, OREILLY (2008)

M.Sc.,(COMPUTER SCIENCE) DEGREE EXAMINATIONS-NOVEMBER 2019
FIRST SEMESTER
DATABASE MANAGEMENT SYSTEMS

Time 3 Hours   Max.Marks: 70

Answer all questions. All question carry equal marks.   **5 × 14 M**

1. a) Explain DBMS systems architecture with neat diagram.   6M
       (BTL1)
    b) Write the advantages of using the DBMS approach.   8M
       (BTL1)

                                    Or

    c) What are Relational Model Constraints and Relational Database Schemas. 6M
       (BTL1)
    d) Does the Three Schema Architecture has any inference between the levels? If so explain in
       detail?   8M
       (BTL2)

2. a) Implement basic retrieval queries in SQL with examples.   8M
       (BTL3)
    b) Detail about Unary Relational operations.   6M
       (BTL2)

                                    Or

    c) Brief Attribute Data Types and Domains in SQL.   6M
       (BTL1)
    d) Differentiate between Join and Cartesian Operation?   8M
       (BTL3)

3. a) Define Entity types, Entity sets and Attribute types with examples. 6M
       (BTL1)
    b) How BCNF in different from 3NF? Explain with a suitable example. 8M
       (BTL2)

                                    Or

    c) Is MVD overcome by Fourth Normal Form? Explain in detail.   5M
       (BTL2)
    d) Compare and contrast Specialization and Generalization with examples. 9M
       (BTL2)

4. a) Assess different types of Hashing Techniques in files organization. 10M
       (BTL4)
    b) Note the Operations on Files.   4M
       (BTL2)

                                    Or

c) Discuss the types of Single Level Ordered Indexes. 7M
   (BTL4)
d) Describe the structure of B^+ Tree. 7M
   (BTL4)

5. a) What are the Desirable Properties of Transactions? 6M
   (BTL5)
   b) How is 3 Tire Client/Server Architecture adapted. 8M
   (BTL5)

                           Or

   c) Brief Concurrency Control techniques. 14M
   (BTL2)

P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE :: VIJAYAWADA-10
(An Autonomous College in the jurisdiction of Krishna University)
M.Sc., (Computer Science) Programme - I Semester

COURSE	COURSE CODE	L	T	P	C	Year
DATA STRUCTURES	**CS1T5**	**4**	**-**	**-**	**4**	**2019-20**

Course Outcomes:
1. To define data structures, operation of data structure, time and space complexities.
2. To understand concepts of string processing, arrays, records and pointers, linked lists, stacks, queues, recursion, trees, graphs & searching techniques. about searching and sorting techniques.
3. To implement applications of linked lists, stacks, queues, trees, graphs, sorting & searching techniques.
4. To analyze applications of linked lists, stacks, queues, trees, graphs, sorting & searching techniques.
5. To evaluate applications of linked lists, stacks, queues, trees, graphs, sorting & searching techniques in terms of time & space complexity.

UNIT 1

Introduction and Overview: Elementary Data Organization, Data Structures, Data Structure operations, Algorithms: Complexity, Time-Space Tradeoff.
Preliminaries: Mathematical Notation and Functions, Algorithmic Notation, Control Structures, Complexity of Algorithms, Other Asymptotic Notations, Sub Algorithms, Variables, Data Types.

UNIT 2

String Processing: Storing Strings, Character Data Type, String Operations, Word Processing, Pattern Matching Algorithms.
Arrays, Records and Pointers: Linear Arrays, Representation and Traversing Linear Arrays, Inserting and Deleting, Bubble Sort, Linear Search, Binary Search, Multidimensional Arrays, Pointer Arrays, Record Structures, Representation of records in memory, Parallel Arrays, Matrices, Sparse Matrices.

UNIT 3

Linked Lists: Representation, Traversing, Searching, Memory Allocation: Garbage Collection, Insertion, Deletion, Header Linked Lists, Two-Way Lists.
Stacks, Queues, Recursion: Stacks, Array representation, Linked List representation, Arithmetic Expressions; Polish notation, Quick Sort, Recursion, Towers of Hanoi, Implementation of recursive procedures by stacks, Queues, Linked representation of Queues, DEqueues, Priority Queues.

UNIT 4

Trees: Binary Trees, Representing and Traversing Binary Trees, Traversal Algorithms Using Stacks, Header Nodes, Binary Search Trees, Searching, Insertion and Deletion in Binary Search Trees, AVL Search Trees, Insertion and Deletion in AVL Trees, M-Way Search Trees, Searching, Insertion and Deletion in M-Way Search Tree, B Trees, Searching, Insertion and Deletion in B-Tree, Heap: Heap Sort, Huffman's Algorithms, General Trees.

UNIT 5

Graphs: Terminology, Sequential representation of Graphs, Warshall's Algorithm, Linked representation of Graphs, Operations on Graphs, Traversing a Graph, Topological Sorting.
Sorting and Searching: Insertion Sort, Selection Sort, Merging, Merge Sort, Radix Sort, Searching and Data Modification, Hashing.

Prescribed Text Book

S.No.	Author	Title	Publisher
1.	Seymour Lipschutz	Data Structures	The McGrawHill (Schaum's Outlines), 2011

Reference Text Book

S.No.	Author	Title	Publisher
1.	Seymour Lipschutz	Theory and Problems of Data Structures	The McGrawHill (Schaum's Outlines)
2.	Aho, Hopcroft & Ullman	Data Structures & Algorithms	Addison-Wesley
3.	M.A.Weiss	Data Structures & Algorithms in C	Addison Wesley

CS1T5

M.Sc.,(COMPUTER SCIENCE) DEGREE EXAMINATIONS-NOVEMBER 2019
FIRST SEMESTER
DATA STRUCTURES

Time 3 Hours   Max.Marks: 70
Answer all questions. All question carry equal marks.   5 × 14 M

1. a) Explain Space and Time Analysis of algorithm with an example.   7M (BTL2)
    b) What are various Operations performed on Data Structures?   7M (BTL1)
                                        Or
    c) What is Complexity of an Algorithm? Explain the Asymptotic Notations for Complexity of
       Algorithms.   7M (BTL1)
    d) Define Local and Global Variables.   (BTL1)

2. a) Explain in detail about the operations performed on strings.   7M (BTL2)
    b) Explain about Binary Search process with an example and give the Complexity of the
    Algorithm
                                        7M (BTL2)
                                        Or
    c) Explain about First Pattern Matching Algorithm.   7M (BTL2)
    d) Write short notes on Records.   7M (BTL2)

3. a) What is a Linked List? Write algorithms to perform operations in Single Linked List. 7M
                                        (BTL1,BTL2)
                                        Or
    b) Define Queue. Implement the Queue Operations using arrays.   7M
    (BTL1,BTL3)
    c) Explain the process of converting an arithmetic expression from infix notation to postfix
    notation
       with an example.   7M (BTL4)

4. a) Define Binary Tree and write non-recursive algorithm for in order traversal of binary
       tree.   7M
    (BTL1,BTL4)
    b) What is a Heap? Construct a heap with the following elements   7M
    (BTL1,BTL3)
       33, 5, 12, 43, 71, 6, 45, 21, 30
                                        Or
    c) Define Binary Search Tree and write an algorithm to search an element in a Binary Search
    tree.
                                        (BTL1,BTL3)
    d) What are AVL search trees? Give example.   (BTL1,BTL3)

5. a) Explain the Graph Traversal techniques.   7M (BTL2)
    b) Illustrate the process of Quick Sort Algorithm over the following   elements
       52, 45, 12, 64, 7, 56, 68, 10, 61   7M (BTL3)
                                        Or
    c) Write an algorithm for Merge Sort and give an example   7M (BTL3)
    d) Explain Warshall's algorithm to find shortest paths in a weighted graph   7M
    (BTL2,BTL4)

COURSE	COURSE CODE	L	T	P	C	Year
COMPUTER NETWORKS & OPERATING SYSTEMS LAB	CS2L1	-	-	6	3	2019-20

Course Outcomes:
1. Practice Unix Shell Scripting and AWK Programming
2. Demonstrate Operating System Scheduling Algorithms
3. Prepare Patch Cards and Implement Network Monitoring Tools.
4. Implement Network Programming to obtain IP address, Machine Name and Communication etc.
5. Design various networks with CISCO Packet Tracer and implement Network Algorithms.

LAB LIST
PART A
Shell Scripting (BTL3)

Introduction to basic UNIX commands.
1. Write a shell script to accept the name of the file from standard input and perform the following tests on whether the file exists, if exists test file permissions whether file is executable, readable, writable,both read & writable.
2. Write a script that will ask user, fullname (first, middle, last name) greet user by first name. Ask users DOB and calculate user's age.
3. Write a shell script which will display fibonacci series up to a given number of arguments.
4. Write a shell script to accept student number, name, marks in 5 subjects. Find total, average and grade. Display the result of student and store in a file called stu.dat
Rules: if avg >=90 grade A+,80-89 grade B+,70-79 grade B, 69-69 grade C+, 51-50 grade C, 41-49 grade D else grade F
5. Write a shell script to accept empno, empname, and basic. Find DA, HRA, TA, PF using following rules. Display empno, empname, basic, DA, HRA, PF, TA, GROSS SAL and NETSAL. Also store details in a file called emp.dat. Rules: DA is 18% of basic if basic > 5000 otherwise 550 DA is 35% of basic, PF is 12% of basic + DA, TA is 10% of basic.
6. Write a shell script to display reverse numbers from given arguments

AWK scripting (BTL3)

7. Write awk script for the following
a. To print the numbers of even lines in a file.
b. To print the numbers of Odd lines in a file.
c. To delete empty lines in a file.
d. To Display lines having more than 60 characters.
e. To display the lines which match the multiple patterns.
f. To display the lines which do not match the patterns.
g. To display the lines or records 5-9 both inclusive.

8. Write awk script for the following
a. To display the lines between two patterns (both inclusive).
b. To display the specified line 5 or record in a file.
c. List out the files which are created in March.

d. Print the total size occupied by the files in your directory.
e. Print the all lines by changing in to upper case.
f. Print line where fields have multiple field separators.

9. Write an awk program to display employee's pay bill (data file may be comma separated file containing (eno,name,basic) calculate DA,HRA,TA,PF(basic+da)

PART B
10. Scheduling algorithms (BTL3)
a) Write program to implement FCFS scheduling algorithm.
b) Write program to implement Round Robin scheduling algorithm.
c) Write program to implement SJF scheduling algorithm.

PART C (BTL3)
11. a.Study different type of Guided media. Coaxial, UTP & OFC.
    b.Prepare straight and cross wire cable and test it.
12. Study network devices in detail (repeater, hub, switch, router, gateway).
13. Study of IP address (IPV4 - classification, Sub netting, super netting, IPV6).
14. Connect the computers in a local area Network.
15. Study basic network commands (ping, finger, ftp, traceroute, nslookup, pathping, telnet, arp).

PART D (Implementing Python /Java) (BTL3)
16. Program to fetch the IP address of a system.
17. Program to obtain the information about the (a) Host (b) Port (c) protocol.
18. Write a program to accept the Website name and return its IP address.
19. Write a program to implement echoclient and echoserver.
20. Write a program to implement TCP client-server program.
21. Write a program to use Simple Mail Transfer Protocol.
22. Write a program to use the Domain Name System using UDP.
23. Implementation of sliding window protocol.
24. Find the subnet mask and Network address for the given IP address.

PART E - Using Cisco packet tracer 6.5 (freely available) (BTL4)
25. Configure a network using a server with five nodes using packet tracer.
26. Configure a network using a DHCP server with five nodes using packet tracer.
27. Configure a network using two DHCP servers with nodes using packet tracer.
28. Configure a network using three DHCP servers with nodes using packet tracer.
29. Configure a network with DHCP servers with wired and wireless nodes using cisco packet tracer.
30. Exhibit spanning tree algorithms

Parvathaneni Brahmayya Siddhartha College of Arts & Science, Vijayawada - 520 010.
(An Autonomous College in the jurisdiction of Krishna University)
M.Sc., (Computer Science) Programme - II Semester

COURSE	COURSE CODE	L	T	P	C	Year
PROBLEM SOLVING USING PYTHON PROGRAMMING LAB	CS2L 3	-	-	6	3	2019-20

1. a) Running instructions in interactive interpreter and a python script.
   b) Write a program to purposefully raise indentation error and correct it.
   c) Write a program to perform arithmetic operations that take two numbers as command line arguments in a single line. (BTL2)

2. a) Write a program to compute distance between two points taking input from the user (Pythagorean Theorem).
    b) Write a Python program to convert temperatures to and from Celsius, Fahrenheit. [Formula: $c/5 = f-32/9$ [where c = temperature in Celsius and f = temperature in Fheit] (BTL3)

3) a) Write a program for checking whether the given number is an even number or not.
    b) Using a for loop, write a program that prints out the decimal equivalents of 1/2, 1/3, 1/4, . . . ,1/10. (BTL3)
    c) Write a program using a while loop that asks the user for a number, and prints a countdown from that number to zero. (BTL3)

4) a) Find the sum of all the primes below 100. (BTL3)
    b) Each new term in the Fibonacci sequence is generated by adding the previous two terms. By starting with 1 and 2, the first 10 terms will be: 1, 2, 3, 5, 8, 13, 21, 34, 55, 89...By considering the terms in the fibonacci sequence whose values do not exceed 100, find the sum of the even-valued terms. (BTL3)

5) a) Write a program to count the numbers of characters in the string and store them in a List data structure. (BTL3)
    b) Write a program to calculate number of days between two sample dates. (BTL3)

6) a) Write a Python script to print a dictionary where the keys are numbers between 1 and 15 (both included) and the values are square of keys. (BTL3)
    b) Write a program to generate the Matrix having R rows and C columns such that all numbers are in increasing order starting from 1 in Row-wise manner. (BTL3)

7) Write a program to perform Liner Search. (BTL3)

8)   Write a program to perform Binary Search. (BTL3)

9) Write a program to perform Bubble sort. (BTL3)

10) Write a program to perform Insertion sort. (BTL3)

11) a) Find mean, median, mode for the given set of numbers in a list.

b) Write a program to print this list L after removing the duplicate values with original order preserved. (BTL3)

12) a) Write a function unique to find all the unique elements of a list.
   b) Write a function reverse to reverse a list.
   c) Write function to compute GCD, LCM of two numbers. (BTL3)

13) Write a program to print each line of a file in reverse order and type of a file. (BTL3)

14) Write a program to compute the number of characters, words and lines in a file. (BTL3)

15) a) Write a program that defines a matrix and prints.
   b) Write a program to perform addition of two square matrices. (BTL3)

16) Write a program to perform multiplication of two square matrices. (BTL3)

17) a) Write a script that imports requests and fetch content from the page. Eg. (Wiki)
   b) Write a simple script that serves a simple HTTP Response and a simple HTML Page. (BTL6)

18) a) Write a program to find sequence of one uppercase letter followed by lower case letters.
   b) Write a program that matches a string that has an 'a' followed by anything and ending in 'b'. (BTL3)

19) a) Write a program that matches a word at the end of the string with optional punctuation.
   b) Write a program to remove leading zeros from IP address. (BTL3)

20) a) Write a Python class to convert Roman numeral to an Integer.
   b) Write a Python class to reverse a string word by word. (BTL3)

21) Write a Python class with class variables and instance variable and illustration of the self variable. (BTL3)

22) Write a Python class with default constructor or non-parameterized constructor. (BTL3)

23) Write a Python program to perform Inheritance. (BTL3)

24) Write a Python program to perform Exception handling. (BTL3)

25) Write a program on modules. (BTL3)

26) Write a program to perform Image operations. (BTL3)

27) Write a GUI for an expression calculator using tk. (BTL6)

28) Write a program to print text from the audio file(Speech to Text). (BTL3)

29) Write a program to connect database and create a table using SQLite. (BTL3)

30) Write a program to perform insertion and selection operation using SQLite. (BTL3)

31) Write a program to perform updation and deletion operation using SQLite. (BTL3)

32) Write a program to create a sample form using GUI and perform crud operations using SQLite. (BTL3)

SYLLABI

P.B. Siddhartha College of Arts & Science, Vijayawada - 520 010.
(An Autonomous College in the jurisdiction of Krishna University)
M.Sc., (Computer Science) Programme - II Semester

COURSE	COURSE CODE	L	T	P	C	Year
COMPUTER NETWORKS	CS2T1	4	-	-	4	2019-20

Course Outcomes:
1. Understand the fundamental concepts of computer networks and identify various networks based on scale and technology.
2. Illustrate and summarize Ethernet, Mobile and Wireless Networks.
3. Interpret network routing concepts, apply in designing Local area networks.
4. Functionality of internet transport protocols.
5. Understand the e-mail, DNS and role of content delivery networks with network security.

UNIT I
Introduction: Uses of Computer Networks: Business Application, Home Applications, Mobile Users, Social Issues, **Network Hardware:** Local Area Networks, Metropolitan Area Networks, Wide Area Networks, Wireless Networks, Home Networks, Internet Works, **Network Software:** Protocol Hierarchies, Design Issues for the Layers, Connection Oriented and Connectionless Services, Service Primitives, The Relationship of Services to Protocols. **Reference Models:** The OSI Reference Model, The TCP/IP Reference Model, A Comparison of OSI and TCP/IP Reference Model, A Critique of the OSI Model and Protocols, A Critique of the TCP/IP reference model, **Example Networks:** The Internet, The Third Generation Mobile Phone Networks, Wireless LANs, RFID and Sensor Networks.
Physical Layer: Guided Transmission Media: Magnetic Media, Twisted Pair, Coaxial Cable, power lines, Fiber Optics.
UNIT II
Data Link Layer: Data Link Layer Design Issues: Services Provided to the Network Layer, Framing, Error Control, Flow Control, **Error Correcting Codes**, **Error Detecting Codes**, **Elementary Data Link Protocols**: An Utopian Simplex Protocol, A Simplex Stop and Wait Protocol, A Simplex Protocol for a Noisy Channel, **Sliding Window Protocols:** A One Bit Sliding Window Protocol, A Protocol Using Go Back N, A Protocol using Selective Repeat
The Medium Access Control Sub Layer: Ethernet: Ethernet Cabling, Manchester Encoding, The Ethernet MAC sub layer Protocol, The Binary Exponential Backoff Algorithm, Ethernet. Performance , Switched Ethernet , Fast Ethernet , Gigabit Ethernet, 10-bit Gigabit Ethernet **Wireless Lans:** The 802.11 Protocol Stack, The 802.11 Physical Layer, The 802.11 MAC Sub Layer Protocol, The 802.11 Frame Structure, **Bluetooth:** Bluetooth Architecture, Bluetooth Applications, The Bluetooth Protocol Stack, The Bluetooth Radio Layer, The Bluetooth Link Layers, The Bluetooth Frame Structure, **Data Link Layer Switching:** Uses of Bridges, Learning Bridges, Spanning Tree Bridges, Remote Bridges, Repeaters, Hubs, Bridges, Switches, Routers and Gateways, Virtual LANs.

UNIT III
The Network Layer: Network Layer Design Issues: Store and Forward Packet Switching, Services provided to the Transport Layer, Implementation of Connectionless Services, Implementation of Connection Oriented Services, Comparison of Virtual Circuit and Datagram Subnets. **Routing Algorithms:** The Optimality Principle, Shortest Path Routing, Flooding, Distance Vector Routing, Link State Routing, Hierarchical Routing, Broadcast Routing, Multicast Routing. **Internet Working:** How

Networks Differ, How Networks can be Connected, Concatenated Virtual Circuits, Connectionless Internetworking, Tunneling, Internetwork Routing, Packet Fragmentation. **The Network Layer in the Internet:** The IPVersion 4 Protocol, IP address, Internet Control Protocols, OSPF, The Internet Gateway Routing Protocol, BGP, The Exterior Gateway Routing Protocol.

UNIT IV

The Transport Layer: The Transport Service: Services provided to the Upper Layers, Transport Services Primitives, Berkeley Sockets. **Elements of Transport Protocols**: Addressing, Connection Establishment, Connection Release, Flow Control and Buffering, Multiplexing. **The Internet Transport Protocols:** Introduction to UDP: Remote Procedure Call, The Real Time Transport Protocol. **The Internet Transport Protocols:** TCP Introduction to TCP, The TCP Service Model, The TCP Protocol, The TCP Segment Header, TCP Connection Establishment, TCP Connection Release, Modeling TCP Connection Management, TCP Sliding Window TCP Congestion Control, TCP Timer Management, Future of TCP.

UNIT V

The Application Layer: DNS: The Domain Name System: The DNS Name Space, Resource Records, Name Servers. **Electronic Mail**: Architecture and Services, The User Agent, Message Formats, Message Transfer, Final Delivery. **The World Wide Web**: Architecture Overview, Static Web Pages, Dynamic Web Pages and Web Applications, HTTP-The Hyper Text Transfer Protocol. **Streaming Audio and Video**: Digital Audio, Digital Video, Streaming Stored Media, Streaming Live Media, Real Time Conferencing. **Network Security:** Introduction to Cryptography, Public Key Algorithms - RSA.

Prescribed Text Book			
	Author	Title	Publisher
1	Andrew S. Tanenbaum	Computer Networks	Fifth Edition, Pearson Chapters: 1.1 to 1.5, 2.2, 3.1 to 3.4, 4.3, 4.4, 4.6, 4.8 5.1, 5.2.1 to 5.2.8, 5.5, 5.6.1 to 5.6.4,5.6.6,5.6.7 6.1.1 to 6.1.3, 6.2.1 to 6.2.5, 6.4, 6.5, 7.1 ,7.2, 7.3.1 to 7.3.4, 7.4.1 to 7.4.5 ,8.1.1,8.3.1

Reference Text Books			
	Author	Title	Publisher
1	Behrouz A Forouzan Firouz Mosharaff	Computer Networks - A TopDown Approach	McGrawhill Education(India) Special Indian Edition
2	James F.Kurose, Keith W. Ross	Computer Networking - A Top-Down Approach	6e, Pearson
3	Larry Peterson and Bruce Davie	Computer Networks - A System Approach	5e, Elsevier India

M.Sc.,(COMPUTER SCIENCE) DEGREE EXAMINATIONS-NOVEMBER 2019
SECOND SEMESTER
COMPUTER NETWORKS

Time 3 Hours   Max.Marks: 70
Answer all questions. All question carry equal marks.   5 × 14 M

1) a) What is a Computer Network? Write uses of Computer Networks. 7M   CO1, L1
    b) Explain briefly about Twisted Pair Cables. 7M   CO1, L2
                                                    (or)
    c) What are the functions of Data Link Layer? 7M   CO1, L1
    d) Compare OSI and TCP/IP Reference Models. 7M   CO1, L2

2) a) Explain Ethernet Frame Format.7M   CO2, L2
    b) Explain the 802.11 Protocol Stock. 7M   CO2, L2
                                                    (or)
    c) Explain the 802.15 version of the Bluetooth Protocol Architecture. 7M   CO2, L2
    d) Explain Spanning Tree Bridges. 7M   CO2, L2

3) a) Discuss Network Layer Design issues. 7M   CO3, L6
    b) Explain Shortest Path Routing Algorithm with an example. 7M   CO3, L2
                                                    (or)
    c) Discuss BGP - The Exterior Gateway Routing Protocol. 7M   CO3, L6
    d) Explain Connectionless Internet Working. 7M   CO3, L2

4) a)   Explain elements of Transport Protocols.7M   CO4, L2
    b)   Explain TCP Congestion Control. 7M   CO4, L2
                                                    (or)
    c)   Explain wireless TCP and UDP. 7M   CO4, L2
    d) Explain Remote Procedure Call. 7M   CO4, L2

5) a)   Discuss Architecture and Services of Electronic Mail. 7M   CO5, L6
    b)   Explain Video Compression. 7M CO5, L2
                                                    (or)
    c)   Discuss HTML and give the basic tags available in HTML.7M   CO5, L6
    d)   Explain HTTP Protocol.7M   CO5, L2

COURSE	COURSE CODE	L	T	P	C	Year
OPERATIONS RESEARCH	CS2T 2	4	-	-	4	2019-20

Course Outcomes:
1. Understand the meaning, scope and role of computers in operations research, formulate the liner programming problems using graphical method, simplex method and artificial variable techniques.
2. Examine transportation problems and drive their optimum solution.
3. Inspect assignment problems and drive their optimum solution.
4. How game theorists think and approach a strategic problem.
5. Apply the concepts of PERT and CPM for decision making and optimally managing projects.

UNIT I
Linear programming: Nature, Meaning and Scope of Operations Research, Role of Computers in OR, Introduction and Formulation of LP problems, Linear Programming: Graphical Solution for Two Variable Problem, Simplex Method, Artificial Variable Technique: Big M and Two-Phase Methods

UNIT II
Transportation Problem: L. P Formulation of the Transportation Problem, Tabular Representation, Initial Basic Feasible Solution (I.B.F.S.) to Transportation Problem: North West Corner, Least Cost, Vogel's Approximation Methods, The Optimality Test, Transportation Algorithm, MODI (Modified Distribution Method), Some Exceptional Cases: Unbalanced, Prohibited, Maximization Transportation Problems, Time minimization Transportation problem, Simple Problems.

UNIT III
Assignment Problem: Mathematical formulation of the problem, Hungarian method for Assignment problem, Special cases in Assignment problems: Unbalanced, Prohibited, Maximization, Travelling Salesman Problem, A Typical Assignment Problem, Simple Problems.

UNIT IV
Game Theory: Introduction, Pure Strategy, Mixed Strategy, Two Person Zero Sum Game, Minimax-Maximin Criteria, Solution of Games with Saddle Point, Solution of Game without Saddle Point, Principle of Dominance, Solution of game Without Saddle Point, Graphical Method for $2 \times N$ and $M \times 2$ Games, Solution of Game without Saddle Point - Simplex Method, Simple Problems.

UNIT V
Project Management: Introduction, Rules for Network Construction, Network Diagram Representation, Critical Path Analysis-Forward Pass Calculation, Backward Pass Calculation; Float and Slack Times, Project Evaluation and Review Technique(PERT), Simple Problems.

Prescribed Text Book			
	Author	Title	Publisher
1	KantiSwarup, P.K.Gupta, Man Mohan	Operations Research	15th Edition, 2010, Sultan Chand & Sons, New Delhi.

Prescribed Text Books			
	Author	Title	Publisher
1	S.D.Sharma, HimanshuSharma	Operations Research Theory, Methods and Applications	Improved and Enlarged Edition, Kedar NathRamNath & Co., Meerut.
2	Dr. R. K. Gupta	Krishna's Operations Research	27thEdition,2010, Krishna Prakashan Media (P) Ltd., Meerut

3	J.K.Sharma	Operations Research: Theory and Applications	5th Edition, 2013, Macmillan.
4	Hamdy	Operations Research: An Introduction	A.Taha, 9th edition ,2010, Prentic Hall.

M.Sc.,(COMPUTER SCIENCE) DEGREE EXAMINATIONS-NOVEMBER 2019
SECOND SEMESTER
OPERATIONS RESEARCH

Time 3 Hours   Max.Marks: 70
Answer all questions. All question carry equal marks.   5 × 14 M

Duration: 3 hours   **Maximum Marks: 70** marks

1) a) Explain the properties of linear programming.   7M   CO1, L2
   b) Translate the following L.P.P graphically   7M   CO1, L2
          max $Z = 2x1 + 3x2$
                 S.C $x1+x2 \leq 1$
                     $3x1+x1 \leq 4$
                     $x1,x2 \geq 0$
                                    (or)
   c) illustrate the L.P.P using simplex method.   14M   CO1, L2
          max $Z = 5x1 + 7x2$
                 S.C $x1+x2 \leq 4$
                     $3x1-8x2 \leq 24$
                     $10x1+7x2 \leq 35$
                     $x1,x2 \geq 0$

2) a) Explain algorithm to solve the transportation problem. 7M   CO2, L2
   b) Illustrate the following transportation problem. 7M   CO2,L2

	A	B	C	Available
I	6	8	4	14
II	4	0	8	12
III	1	2	6	5
Required	6	10	15	

                                    (or)
   c) Explain MODI method procedure.7M   CO2, L2
   d) Explain balanced & unbalanced transportation problem, prohibited transportation problem with
       examples 7M   CO2, L2

3) a) Apply the procedure of Hungarian method. 7M   CO3, L3
   b) Construct mathematical formulation of assignment problem. 7M   CO3, L3

<center>(or)</center>

c) Develope the following assignment problem using Hungarian method. 14M   CO3, L3

	A	B	C	D	E
1	11	10	18	5	9
2	14	13	12	19	6
3	5	3	4	2	4
4	15	18	17	9	12
5	10	11	19	6	14

4) a) Determine the 2 X n game graphically   14M   CO4, L5
   Player B

Player A $\begin{bmatrix} 1 & 3 & 11 \\ 8 & 5 & 2 \end{bmatrix}$

b) Solve the following payoff matrix determine the optimal strategies and the value of game. 7M
                                                                           CO4, L5

B

A $\begin{bmatrix} 5 & 1 \\ 3 & 4 \end{bmatrix}$

<center>(or)</center>

c) Explain dominance property with example . 7M   CO4, L5
d) Explain the procedure of graphical method in Game Theory 7M   CO4, L5

5) a) Compare PERT and CPM. 7M CO5, L2
   b) Explain the following CO5, L2
        i) Total float   ii) Free float   iii) Critical path.
<center>(or)</center>
   c) A project is composed of seven activities whose time estimates are below Activity 14M CO5, L2

I	J	Optimistic	Most likely	Pessimistic
1	2	1	2	5
1	3	2	4	9
1	4	2	2	8
2	5	4	3	5
3	5	2	5	4
4	6	2	8	4
5	6	5	8	3

   i) show the project network
   ii) show the expected duration and variance of each activity.

iii) Show the critical path and expected project completion time.

COURSE	COURSE CODE	L	T	P	C	Year
THEORY OF COMPUTATION	CS2T3A	4	-	-	4	2019-20

Course Outcomes:
1. Design Finite Automata for Regular Languages.
2. Construct the Regular Expressions and Design their Finite Automata.
3. Design Context Free grammars for Context Free Languages.
4. Design Push Down Automata for Context Free Languages.
5. Design Turing Machines for Recursively Enumerable Languages.

UNIT I
Fundamentals, Introduction to Finite Automata:
Finite Automaton Model, Acceptance of Strings and Languages, Deterministic Finite Automata, Non-Deterministic Finite Automata, Transition Diagrams, NFA with E-Transitions, Acceptance of Languages, Conversions and Equivalence: Equivalence between NFA with and without E-Transitions, NFA to DFA Conversion, Minimization of FSM, Equivalence between two FSM's Finite Automata with Output-Moore and Mealy Machines.

UNIT II
Regular Languages:
Regular Sets, Regular Expressions, Identity Rules, Constructing Finite Automata for a given Regular Expression, Conversion of Finite Automata to Regular Expressions, Pumping Lemma of Regular Sets, Closure Properties of Regular Sets.

UNIT III
Grammar Formalism:
Regular Grammars-Right Linear and Left Linear Grammars, Context Free Grammar, Derivation Trees, Right most and Leftmost Derivation of Strings, Ambiguity in Context Free Grammars, Minimization of Context Free Grammars, Chomsky Normal Form, Greiback Normal Form, Pumping Lemma for Context Free Languages, Enumeration Properties of CFL.

UNIT IV
Push Down Automata:
Push Down Automata (Definition and Model), Acceptance of CFL, Acceptance by Final State and Acceptance by Empty Stack and its Equivalence, Equivalence of CFL and PDA, Interco Version.

UNIT V
Turing Machine:
Turing Machine (Definition and Model), Design of Turing Machine, Computable Functions, Techniques of Turing Machine Construction.

Undesirability:
Properties of Recursively Enumerable Languages, Universal Turing Machines (Without any Reference to Undesirable Problems), Undesirability of Post Correspondence Problem.

The Chomsky Hierarchy: Regular Grammars, Unrestricted Grammars, Context Sensitive Languages.

Prescribed Text Book			
	Author	Title	
1	Hopcroft H.E. and Ullman J.D.	Introduction to Automata Theory Languages and Compilation	Pearson

Reference books		
Author	Title	Publisher
1 A A Puntambekar	Formal Languages & Automata Theory	Technical
2 John C Martin	Introduction to languages and the Theory	TMH

M.Sc.,(COMPUTER SCIENCE) DEGREE EXAMINATIONS-NOVEMBER 2019
SECOND SEMESTER
THEORY OF COMPUTATION

Time 3 Hours   Max.Marks: 70
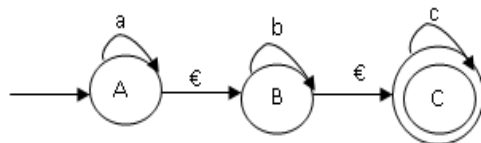   **Answer all questions. All question carry equal marks.**   **5 × 14 M**

1 a) Construct the DFA which takes binary numbers as input and produces residue modulo 3 as output.7M CO1, L6

   b) Construct the DFA over ∑={a,b}which contains set of all strings whose length is:7M CO1, L6
      (i)   Exactly 2
      (ii) Atmost 2
      (iii) Atleast 2

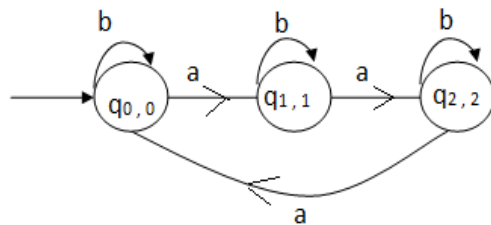   (or)
   c) Change the following e-NFA into DFA via NFA. 7M   CO1, L6

   d) Change the following Moore machine into Mealy machine. 7M CO1, L6

2) a) Construct the regular expressions for the languages over ∑={a,b} which contains set of all strings in which:
      (i) Number of a's are exactly 2 (ii) Number of a's are atleast 2
      (iii) Number of a's are atmost 2 (iv)Starts with 'a' (v) Ends with 'a'
       (vi) Contains 'a'   7M   CO2, L6
   b) Formulate Regular expression for the following Finite Automata. 7M   CO2, L6
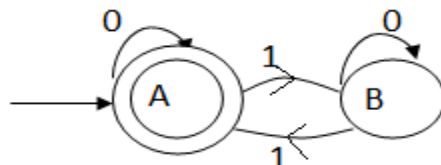
<center>(or)</center>

c) Construct the finite automata for the following regular expressions. 7M   CO3, L6

    (i) ϕ (ii) ε (iii) a* (iv) ab* (v) (ab+ba)* (vi) (ab)*

d) Test Pumping Lemma on Regular Language $L=\{a^n b^n / n>=1\}$. 7M   CO3, L6

3) a) Show that the following grammar is ambiguous and convert it into unambiguous grammar.

<div align="right">7M CO3, L2</div>

<center>E→E+E | E*E | id</center>

b) Illustrate the process of identifying Left Linear Regular grammar for the Automata: 7M CO3, L2
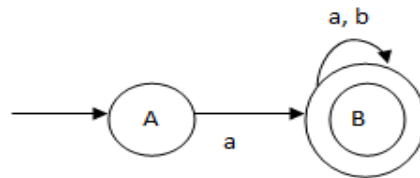
c) Demonstrate the   (or)   process of removing Left Recursion
from the following grammars: 7M CO3, L2

       (i)   A→Aα | β (ii) S→S0S1S | 01

d) Translate the following Non-Deterministic Regular grammar to Deterministic Regular grammar.
   7M CO3, L2

          A→αβ1 | αβ2 | αβ3

4) a) Design a Push Down Automata for the context Free Language. 7M   CO4, L6

    $L=\{a^n b^n / n>=1\}$
      Show both representations of PDA-State Transition Diagram and Transition function.

  b) Change the following CFG to PDF. 7M   CO4, L6

    S→ aA2 | aA3
    A2→ aA2A3 | aA3A3
    A3→ b

<center>(or)</center>

c) Design a Push Down Automata for the context Free Language. 7M   CO4, L6

    $L =\{wcw^R / w\varepsilon(a,b)^+\}$.

  c) Test whether the following languages are Context Free languages or not-Justify
       your answers. 7M CO4, L6

     (i) $L=\{a^m b^n c^p / m+n=p\}$ (ii) $L=\{a^m b^n c^p / m+p=n\}$ (iii) $L=\{a^m b^n c^p / m=n+p\}$

5) a) Design a Turing Machine for accepting the string $0^n 1^n / n>=1$ 7M   CO5, L6
  b) Design a Turing Machine that compute 1's complement. 7M CO5, L6

<center>(or)</center>

c) Propose that the Halting Problem of a Turing Machine is Undecidable.7M CO5, L6
d) Test Post Correspondence Problem on the lists M={abb,aa,aaa} and N={bba,aaa,aa}. 7M CO5, L6

Parvathaneni Brahmayya Siddhartha College of Arts & Science, Vijayawada - 520 010.
(An Autonomous College in the jurisdiction of Krishna University)
M.Sc., (Computer Science) Programme - II Semester

COURSE	COURSE CODE	L	T	P	C	Year
SOFTWARE ENGINEERING	CS2T4	4	-	-	4	2019-20

Course Outcomes:
1. Understand various software engineering methods, practices, process models and agile development strategies.
2. Illustrate core principles, requirements & modelling concepts.
3. Identify different software testing approaches and various aspects of software quality assurance.
4. Classify various process & project management concepts.
5. Estimate software projects, & performs formal methods modelling.

UNIT I
Software and Software Engineering: The Nature of Software: Defining Software, Software Application Domains, Legacy Software, The Unique Nature of WebApps, Software Engineering, The Software Process, Software Engineering Practices: The Essence of Practice, General Principles, Software Myths.
Process Models: A Generic Process Model: Defining a Framework Activity, Identifying a Task Set, Process Patterns, Process Assessment and Improvement, Prescriptive Process Models:The Waterfall Model, Incremental Process Models, Evolutionary Process Models, Concurrent Models, A Final Word on Evolutionary Processes, Specialized Process Models: Component-Based Development, The Formal Methods Model, Aspect-Oriented Software Development, The Unified Process:A Brief History, Phases of the Unified Process, Personal and Team Process Models: Personal Software Process (PSP), Team Software Process (TSP).
Agile Development: What Is Agility, Agility and the Cost of Change, What Is an Agile Process: Agility Principles, The Politics of Agile Development, Human Factors, Extreme Programming (XP): XP Values, The XP Process, Industrial XP, The XP Debate, Other Agile Process Models: Adaptive Software Development (ASD), Scrum, Dynamic Systems Development Method (DSDM), Crystal, Feature Driven Development (FDD), Lean Software Development (LSD), Agile Modeling (AM), Agile Unified Process (AUP).
UNIT II
Principles that Guide Practice: Core Principles: Principles That Guide Process, Principles That Guide Practice, Principles That Guide Each Framework Activity: Communication Principles, Planning Principles, Modeling Principles, Construction Principles, Deployment Principles.
Requirements Modeling: Scenarios, Information, and Analysis Classes: Requirements Analysis: Overall Objectives and Philosophy, Analysis Rules of Thumb, Domain Analysis, Requirements Modeling Approaches, Scenario-Based Modeling: Creating a Preliminary Use Case, Refining a Preliminary Use Case, Writing a Formal Use Case, UML Models That Supplement the Use Case: Developing an Activity Diagram, Swimlane Diagrams.
Data Modeling Concepts: Data Objects, Data Attributes, Relationships, Class-Based Modeling: Identifying Analysis Classes, Specifying Attributes, Defining Operations, Class-Responsibility-Collaborator (CRC) Modeling, Associations and Dependencies, Analysis Packages.
UNIT III
Software Quality Assurance: Background Issues, Elements of Software Quality Assurance, SQA Tasks, Goals, and Metrics: SQA Tasks, Goals, Attributes, and Metrics, Formal Approaches to SQA, Statistical Software Quality Assurance: A Generic Example, Six Sigma for Software Engineering, Software Reliability: Measures of Reliability and Availability, Software Safety, The ISO 9000 Quality Standards, The SQA Plan.

Software Testing Strategies: A Strategic Approach to Software Testing:Verification and Validation, Organizing for Software Testing, Software Testing Strategy-The Big Picture, Criteria for Completion of Testing, Strategic Issues, Test Strategies for Conventional Software: Unit Testing, Integration Testing, Test Strategies for Object-Oriented Software: Unit Testing in the OO Context, Integration Testing in the OO Context, Test Strategies for WebApps, Validation Testing: Validation-Test Criteria, Configuration Review, Alpha and Beta Testing, System Testing: Recovery Testing, Security Testing, Stress Testing, Performance Testing, Deployment Testing, The Art of Debugging:The Debugging Process, Psychological Considerations, Debugging Strategies, Correcting the Error

Testing Conventional Applications: Software Testing Fundamentals, Internal and External Views of Testing, White-Box Testing, Basis Path Testing: Flow Graph Notation, Independent Program Paths, Deriving Test Cases, Graph Matrices, Control Structure Testing: Condition Testing, Data Flow Testing, Loop Testing, Black-Box Testing: Graph-Based Testing Methods, Equivalence Partitioning, Boundary Value Analysis, Orthogonal Array Testing,

UNIT IV

Project Management Concepts: The Management Spectrum: The People, The Product, The Process, The Project, People: The Stakeholders, Team Leaders, The Software Team, Agile Teams, Coordination and Communication Issues, The Product:Software Scope, Problem Decomposition, The Process: Melding the Product and the Process, Process Decomposition,The Project, The W5HH Principles.

Process and Project Metrics: Metrics in the Process and Project Domains:Process Metrics and Software Process Improvement, Project Metrics, Software Measurement: Size-Oriented Metrics, Function-Oriented Metrics, Reconciling LOC and FP Metrics, Object-Oriented Metrics, Use-Case–Oriented Metrics, WebApp Project Metrics, Metrics for Software Quality: Measuring Quality, Defect Removal Efficiency.

UNIT V

Formal Modeling And Verification: The Cleanroom Strategy, Functional Specification: Black-Box Specification, State-Box Specification, Clear-Box Specification, Cleanroom Design: Design Refinement, Design Verification, Cleanroom Testing: Statistical Use Testing, Certification, Formal Methods Concepts, Applying Mathematical Notation for Formal Specification, Formal Specification Languages: Object Constraint Language (OCL), The Z Specification Language.

Estimation for Software Projects: Resources: Human Resources, Reusable Software Resources, Environmental Resources, Software Project Estimation, Decomposition Techniques: Software Sizing, Problem-Based Estimation, An Example of LOC-Based Estimation, An Example of FP-Based Estimation, Empirical Estimation Models: The Structure of Estimation Models, The COCOMO II Model, The Software Equation, Estimation for Object-Oriented Projects.

Prescribed Text Book			
	Author	Title	Publisher
1	Roger S Pressman	Software Engineering-A Practitioner's Approach	Seventh Edition, McGraw-Hill, a business unit of The McGraw-Hill Companies, Inc., 2010

Reference books			
	Author	Title	Publisher
1	Sommerville	Software engineering	7th edition, Pearson education
2	S.A.Kelkar	Software Engineering - A Concise Study	PHI.
3	Waman S.Jawadekar	Software Engineering	TMH.
4	AH Behforooz and Frederick J.Hudson	Software Engineering Fundamentals	Oxford (2008)

M.Sc.,(COMPUTER SCIENCE) DEGREE EXAMINATIONS-NOVEMBER 2019
SECOND SEMESTER
SOFTWARE ENGINEERING

Time 3 Hours   Max.Marks: 70
Answer all questions. All question carry equal marks.   5 × 14 M

1) a) Explain various types of Software Myths in detail. 14M   CO1, L2
                                (or)
   b) Illustrate any two Evolutionary Process Models. 14M   CO1, L2

2) a) Explain Modeling Principles. 7M CO2, L2
   b) Illustrate a Class Diagram and explain in detail 7M   CO2, L2
                                (or)
   c) Explain in detail about Scenario Based Modeling 14M   CO2, L2

3) a) What is White Box Testing? Demonstrate various techniques of White Box Testing. CO3, L1
                                                             14M
                                (or)
   b) What is Software Reliability? Explain in detail. 7M   CO3, L1
   c) What are Recovery Testing and Stress Testing in System Testing?. 7M   CO3, L1

4) a) Explain various entities of Management Spectrum. 7M   CO4, L2
   b) Outline W^5HH Principles. 7M   CO4, L2
                                (or)
   c) Explain the term Defect Removal Efficiency. 7M   CO4, L2
   d) Summarize Size-Oriented Metrics. 7M   CO4, L2

5) a) Explain Clean Room Software Engineering. 14M   CO5, L2
                                (or)
   b) Explain the Z Specification Language. 7M   CO5, L2
   c) Summarize ISO 9000 Quality Standards. 7M   CO5, L2

Parvathaneni Brahmayya Siddhartha College of Arts & Science, Vijayawada - 520 010.
(An Autonomous College in the jurisdiction of Krishna University)
M.Sc., (Computer Science) Programme - II Semester

COURSE	COURSE CODE	L	T	P	C	Year
OPERATING SYSTEMS	CS2T 5	4	-	-	4	2019-20

Course Outcomes:
1. Understand the basic concepts of operating system, its functions and services.
2. Applying concepts of threads, process synchronization & CUP scheduling.
3. Understand deadlock, main memory & virtual memory.
4. Explain mass storage structure, file system interface & file system implementation.
5. Understanding on protection & security.

UNIT I
Introduction: What Operating Systems Do, Computer System Organization, Computer System Architecture, Operating System Structure, Operating System Operations, Process Management, Memory Management, Storage Management, Protection and Security, Kernel Data Structures, Computing Environments, Open Source Operating Systems.
Operating-System Structures: Operating System Services, User and Operating System Interface, System Calls, Types of System Calls, System Programs, Operating System Design and Implementation, Operating System Structure.
Processes: Process Concept, Process Scheduling, Operations on Processes, Inter Process Communication, Communication in Client-Server Systems.
UNIT II
Threads: Overview, Multicore Programming, Multithreading Models, Thread Libraries, Implicit Threading, Threading Issues.
Process Synchronization: Background, The Critical Section Problem, Peterson's Solution, Synchronization Hardware, Mutex Locks, Semaphores, Classic Problems of Synchronization, Monitors.
CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Thread Scheduling, Multiple Processor Scheduling.
UNIT III
Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.
Main Memory: Swapping, Contiguous Memory Allocation, Segmentation, Paging, Structure of the Page Table, Intel 32 and 64-bit Architectures.
Virtual Memory: Background, Demand Paging, Copy-on-Write, Page Replacement, Allocation of Frames, Thrashing.

UNIT IV
Mass Storage Structure: Overview of Mass Storage Structure, Disk Structure, Disk Attachment, Disk Scheduling, Swap Space Management, RAID Structure.
File System Interface: File Concept, Access Methods, Directory and Disk Structure, File System Mounting, Protection.
File System Implementation: File System Structure, File System Implementation, Directory Implementation, Allocation Methods, Free Space Management, Efficiency and Performance, Recovery.

UNIT V
I/O Systems: Hardware, Application I/O Interface, Kernel I/O Subsystem, Transforming I/O Requests to Hardware Operations, STREAMS, Performance.

Protection: Goals of Protection, Principles of Protection, Domain of Protection, Access Matrix, Implementation of the Access Matrix.
Security: The Security Problem, Program Threats, System and Network Threats, Cryptography as a Security Tool, User Authentication, Firewalling to Protect Systems and Networks.

Prescribed Text Book			
	Author	Title	Publisher
1	Abraham Silberschatz, Peter Baer Galvin, Greg Gagne	Operating System Concepts	Ninth Edition, Wiley, 9th Edition, 2015

Reference Text Books			
	Author	Title	Publisher
1	William Stallings	Operating Systems-Internals and Design Principles	Fifth Edition, Pearson Education (2007)
2	Achyut S Godbole	Operating Systems	Second Edition, TMH (2007).
3	Flynn/McHoes	Operating Systems	Cengage Learning (2008).
4	Deitel & Deitel	Operating Systems	Third Edition, Pearson Education (2008)

CS2T5

M.Sc.,(COMPUTER SCIENCE) DEGREE EXAMINATIONS-NOVEMBER 2019
SECOND SEMESTER
OPERATING SYSTEMS

Time 3 Hours   Max.Marks: 70
Answer all questions. All question carry equal marks.   **5 × 14 M**

1)   a) Explain various Functions of Operating Systems.7M   CO1,L2
        b) Explain various types of System Calls.7M   CO1, L2
                                (or)
        c) Explain Inter Process Communication. 7M   CO1, L2
        d) Illustrate Process State Life Cycle and explain in detail.7M   CO1, L2

2)   a) What is Thread? Explain Multithreading Model.7M   CO2, L1
        b) What is Semaphore? Explain in detail.7M   CO2, L1
                                (or)

c) What is Dining- Philosophers problem explain with an example. 7M   CO2, L1
d) What is the difference between Pre-emptive and Non- pre-emptive scheduling? 7M
                                                                    CO2, L1

3)   a) Explain about Banker's Algorithm for Dead Lock Avoidance with example.14M
CO3,L2
                            (or)
        b) Explain various Page Replacement Algorithms. 14M   CO3,
L2

4)   a) Explain various File Operations. 7M   CO4, L2
        b) Explain about various File Allocation Methods.7M   CO4, L2
                            (or)
        c) Explain various RAID levels. 7M   CO4, L2
        d) Explain the term Free Space Management. 7M   CO4, L2

5)   a) List various Principles of Protection.7M   CO5,L1
        b) What are Streams? Explain in detail.7M   CO5, L1
                            (or)
        c) What is Access Matrix? Explain in detail with example. 7M   CO5, L1
        d) List and explain types of System & Network Threats. 7M   CO5, L1

P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE :: VIJAYAWADA-10
(An Autonomous College in the jurisdiction of Krishna University)
M.Sc.,(Computer Science) Programme – III Semester

COURSE	COURSE CODE	L	T	P	C	Year
PHP WITH MY SQL (Add-on course)	**CS3A1**	**-**	**-**	**45**	**4**	**2019-20**

Course Outcomes:
1. To list various Data Types, Constraints, Control Structures, Functions, Object Orient Features and Architectures.
2. To understand introduction of PHP, Basics. Object oriented features, SQL Statements, Functions, Web services.
3. To illustrate Function, Arrays, Control Structures, Regular Expressions, Object Oriented Features.
4. To apply Function, Arrays, Control Structures, Regular Expressions, Object Oriented Features and Web services.
5. To analyze My SQL Concepts, Protocols, Mail Services.

UNIT I

An Introduction to PHP: History of PHP, Versions and Differences between them, Practicality, Power, Installation and configuring Apache and PHP.

PHP Basics:

Default Syntax: Styles of PHP Tags, Comments in PHP, Output functions in PHP, Datatypes in PHP, Configuration Settings, Error Types.

Variables in PHP: Variable Declarations, Variable Scope, PHP's Super global Variables, Variable Variables.

Constants in PHP: Magic Constants, Standard Pre-defined Constants, Core Pre-defined Languages, User-defined Constants.

UNITII

Control Structures: Execution Control Statements, Conditional Statements, Looping Statements with Real-time Examples.

Functions: Creating Functions, Passing Arguments by Value and Reference, Recursive Functions.

Arrays: What is an Array?, How to create an Array, Traversing Arrays, Array Functions.

Include Functions: Include, Include_once, Require, Require_once

Regular Expressions: Validating text boxes, emails, phone number,etc, Creating custom regular expressions

UNIT III

Object-Oriented Programming in PHP: **Classes, Objects, Fields, Properties_set(), Constants, Methods, Encapsulation, Inheritance and types, Polymorphism, Constructor and Destructor, Static Class Members, Instance of Keyword, Helper Functions, Object Cloning and Copy, Reflections**

PHP with MySQL: What is MySQL, Integration with MySQL, MySQL functions, Gmail Data Grid options, SQL Injection, Uploading and downloading images in Database, Registration and Login forms with validations, Paging, Sorting

UNIT IV

Date and Time Functions:

Authentication: HTTP Authentication, PHP Authentication, Authentication Methodologies.

Cookies: Why Cookies, Types of Cookies, How to Create and Access Cookies.

Sessions: Session Variables, Creating and Destroying a Session, Retrieving and Setting the Session ID, Encoding and Decoding Session Data, Auto-Login, Recently Viewed Document Index.

Web Services: Why Web Services, RSS Syntax, SOAP, How to Access Web Services.

XML Integration: What is XML, Create a XML file from PHP with Database records Reading Information from XML File.

UNIT V

MySQL Concepts: Introduction, Storage Engines, Functions, Operators, Constraints, DDL commands, DML Commands, DCL Command, TCL Commands, Views, Joins, Cursors, Indexing, Stored Procedures, MySQL with PHP Programming, MySQL with Sqlserver(Optional).

Special Delivery: Protocols, HTTP Headers and types, Sending Mails using PHP, Email with Attachment, File Uploading and Downloading using Headers, Implementing Chatting Applications using PHP and Ajax, SMS Gateways and sending SMS to Mobiles, Payments gateways and How to Integrate them

With Complete: MVC Architecture, DRUPAL, JOOMLA, Word Press, AJAX, CSS, JQUERY (Introduction and few plugins only).

Prescribed Text Book

S.No.	Author	Title	Publisher
1.	David Sklar	Learning PHP	Oreilly, 2016

Reference Text Book

S.No.	Author	Title	Publisher
1.	Robin Nixon	Learning PHP,SQL & Java Script	Oreilly, 4th Editon, Dec 2014
2.	Thomas Pichler	PHP 7	Lean Publishing, 2017

P.B. Siddhartha College of Arts & Science, Vijayawada – 520 010.
(An Autonomous College in the jurisdiction of Krishna University)
M.Sc., (Computer Science) Programme - III Semester

COURSE	COURSE CODE	L	T	P	C	YEAR
WEB TECHNOLOGIES LAB	CS3L1	-	-	6	3	2020-21

Course Outcomes:
At the end of the course the student:
1. Able to build functional web applications HTML. (CO1)
2. Use JavaScript, VBScript and DHTML for web designing. (CO2)
3. Code using XML and PHP for integrating with web pages. (CO3)
4. Create dynamic web pages wherein client interaction is facilitated using advanced server technology like JSP. (C04)
5. Integrate offline data storage, background processes and APIs using database connectivity and ASP. (CO5)

HTML:
1. Develop HTML code to provide intra document linking. (CO1, L3)
2. Develop HTML code to provide inter document linking. (CO1, L3)
3. Develop a program to implement the three types of lists. (CO1, L3)
4. Create a HTML page using frames. (CO1 ,L6)
5. Develop a program to embed college picture into your web page and   develop a short note on your college using paragraph tag. (CO1,L3)
6. Illustrate a suitable example; depict how we can align text using a table tag as follows. (CO1, L2)

II MCA	Pass percenetage=95%
	Fail percentage=5%
III MCA	Pass percenetage=97%
	Fail percentage=3%

7. Develop a program to create the time table as follows: (CO1, L3)

8. Create a Registration form that interacts with the user. Collect login   name, password, date of birth,sex, address, qualification and display a "Thank you for registering" message when the user submits the form. (CO1, L6)

Login name:

Enter Password:

Reenter Password:

Birthdate:

Sex: Female
                  Male

Enter Address

Enter qualification

Login   Login   clear   clear

Java Script:
9. Develop a script to compare two strings using String object. (CO2, L3)
10. Develop a script to generate random numbers within 1 to 10 and display the numbers in a table. (CO2, L3)
11. Develop a Java Script to update the information into the array, in the "onClick" event of the button "Update". (CO2, L3)
12. Create a web page for a shopping mall that allows the user to tick   off his purchases and obtain the bill with the total being added up   simultaneously. (CO2, L6)

Item details	Price of item	Click here to select
	8399	☐
	5000	☑
	450	☑
	399	☐
	YOUR TOTAL BILL IS 5450	

13. Develop a script to find the duplicate elements of an array. (CO2,L3)
14. Develop a script which generates a different greeting each time the script is executed. (CO2,L3)
15. Develop a JavaScript to check the number is Armstrong number or not by getting the number from textbox and the result is displayed in a alert dialog box. (CO2,L3)
16. Develop a java script code that accepts user name and password from user, Check their correctness and display appropriate alert messages. (CO2,L3)

VB Script:

17. Develop a script that takes input from user and displays the same in upper case and lowercase. (CO2,L3)
18. Develop a program to implement cookies in VB Script. (CO2,L3)

DHTML:

19. Create an inline style sheet. Illustrate the use of an embedded style sheet. (CO2,L6)
20. Create an external style sheet to illustrate the "Font" elements. (CO2, L6)
21. Develop a program to switch on and off light using onClick event. (CO2, L3)
22. Illustrate different types of filters (at least six) on a sample text. (CO2, L2)
23. Develop a program to illustrate tabular data control for data binding. (CO2, L3)

XML:

24. Create a small XML file designed to contain information about student performance on a module. Each student has a name, a roll number, a subject mark and an exam mark. (CO3, L6)
25. Create a internal DTD file. (CO3, L6)
26. Create an external DTD file. (CO3, L6)
27. Create a XSLT style sheet to display the student data as an HTML table. (CO3, L6)

PHP:

28. Find the factorial of a given number using PHP declarations and expressions. (CO3, L1)
29. Develop a PHP program that interacts with the user .Collect first name last name and date of birth and displays that information back to the user. (CO3, L3)

JSP:

30. Develop a program to implement JSP directives. (CO4, L3)
31. Develop a JSP program for session tracking. (CO4, L3)

ASP:

32. Develop an Asp program to change the background of a page based on the user's choice. (CO5,L3)
33. Develop an Asp Program to retrieve data from students table. (CO5, L3)
34. Develop an Asp program to insert data into student table. (CO5, L3)

P.B. Siddhartha College of Arts & Science, Vijayawada – 520 010.
(An Autonomous College in the jurisdiction of Krishna University)
M.Sc., (Computer Science) Programme - III Semester

COURSE	COURSE CODE	L	T	P	C	YEAR
DATA MINING LAB	CS3L2	-	-	6	3	2020-21

Course Outcomes:

After completion of the course the student should be able
1. To understand the various kinds of tools.(CO1)
2. Apply mining techniques for realistic data.(CO2)
3. To understand the basic concepts in R. (CO3)
4. To understand how to import and export CSV files and package installation in R.(CO4)
5. To develop and visualization of data mining algorithms in R.(CO5)

Using Weka Tool:

1.   How to create and load data set in weka (CO1, L1)

2.   List all the categorical (or nominal) attributes and the real-valued attributes separately.
(CO1,L1)

3.   Generate association rules using Weka. (CO1, L1)

4.   Implement Multilayer Perceptron or Neural Network .(CO1, L3)

5.   Implement time series forecasting .(CO1, L3)

 Using R Programming:

1.   Import data into R from text and excel files using read.table () and read.csv ()
functions.(CO4, L1)

2.   Generate association rules using aprior algorithm in R(CO5, L1)

3.   Implement k-Means clustering algorithm using R. .(CO5, L3)

4.   Implement k-Medoids clustering using R.(CO5, L3)

5.   Implement hierarchical clustering using R. .(CO5, L3)

6.   Implement Density based clustering using R.(CO5, L3)

7.   Implement Decision tree in R using package party and rparty.CO5, (L3)

8.   Implement k-Nearest Neighbour using R. .(CO5, L3)

9.   Detecting and removing outlier using R.(CO5, L1)

10.   Implement Linear Regression using R.(CO5, L3)

11.   Implement Naive Bayes classification using R.(CO5, L3)

12.   Finding Outlier Detection by Clustering using R.(CO5, L1)

13.   Implement time series analysis using R.(CO5, L3)

14.   Implement Outlier Detection with LOF using R(CO5, L3)

15.   Implement Multiple Linear Regression using R.(CO5, L3)

16.   Implement Outlier Detection from Time Series.(CO5, L3)

17.   Implement Neural Network using R.(CO5,L3)

18.   Implement word count using R.(CO5, L3)

19.   Implement Time Series Decomposition using R.(CO5, L3)

20.   Implement Time Series Forecasting using R.(CO5, L3)

21.   Implement Hierarchical Clustering with Euclidean Distance.(CO5, L3)

22.   Implement Hierarchical Clustering with Dynamic Time Wrapping Distance.(CO5, L3)

SYLLABI
M.Sc. Computer Science
P.B. Siddhartha College of Arts & Science, Vijayawada – 520 010.
(An Autonomous College in the jurisdiction of Krishna University)
M.Sc., (Computer Science) Programme - III Semester

COURSE	COURSE CODE	L	T	P	C	Year
INTERNET OF THINGS	CS3T1	4	-	-	4	2020-2021

Course Outcomes:

On successful completion of this course, the students:
1. Understand the visual sense of IOT from worldwide context. (CO1)
2. Determine the market orientation of IOT. (CO2)
3. Use of devices, gateways, and data management in IOT. (CO3)
4. Building state of art architecture in IOT.
5. Application of IOT in industrial and commercial building automation and real world design constraint.

UNIT I

Introduction to Internet of Things: Introduction, Physical Design of IOT, Logical Design of IOT, IOT Enabling Technologies, IOT Level and Deployment Templates.

Domain specific IOT: Introduction, Home Automation, Cities, Environment, Energy, Retail, Logistics, Agriculture, Industry, Health & Lifestyle.

UNIT II

IOT & M2M: Introduction, M2M, Differences between IOT & M2M, SDN & NFV for IOT.

IOT System Management with NETCONF- YANG: Need for IOT System Management, Simple Network Management Protocol, Network Operator Requirement, NetConf.

UNIT III

M2M to IOT - An Architectural Overview: Building Architecture, Main Design Principles and Needed Capabilities, An IoT Architecture Outline, Standards Considerations.

Real-World Design Constraints: Introduction, Technical Design Constraints-Hardware is Popular Again, Data Representation and Visualization, Interaction and Remote Control.

UNIT IV

Asset Management: Introduction, Expected Benefits, e-Maintenance in the M2M Era, Hazardous Goods Management in the M2M Era .

Industrial Automation: Service-Oriented Architecture-Based Device Integration, SOCRADES: Realizing the Enterprise Integrated Web of Things, IMC-AESOP: from the Web of Things to the Cloud of Things.

UNIT V

Commercial Building Automation: Introduction, Case Study: Phase One-Commercial Building Automation Today, Case Study: Phase Two - Commercial Building Automation in the Future.

Smart Cities: Introduction Smart Cities, The Need, Smart Cities-A Working Definition, Smart Cities -Some Examples, Roles, Actors, Engagement Transport and Logisticsan IoT Perspective.

Prescribed Text Books			
	Author	Title	Publisher
1	Vijay Madisetti and Arshdeep Bahga.	Operating Systems-Internals and Design PrinciplesInternet of Things (A Hands-on-Approach).	1st Edition, VPT, 2014. (UNIT-I,II)
2	Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle	From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence	1st Edition, Academic Press, 2014. (UNIT-III,IV,V)

MODEL QUESTION PAPERS

M.Sc. (Computer Science)

CS3T1

M.Sc.,(COMPUTER SCIENCE) DEGREE EXAMINATIONS-NOVEMBER 2020
THIRD SEMESTER
INTERNET OF THINGS

Time 3 Hours   Max.Marks: 70
Answer all questions. All question carry equal marks.   5 × 14 M

1. a) Define IoT? Explain the *Characteristics of IoT*. 7M. (CO1, L1)
    b) Explain *Logical Design of IoT*.7M (CO1, L2)
                                    Or

c) Explain *IoT Enabling Technologies*. 14 M (CO1, L2)

2. a) Explain the difference between IoT and M2M? 7M (CO2, L2)
    b) Explain M2M? 7M (CO2, L2)

    Or

    c) Explain about *Simple Network Management Protocol (SNMP)*. 7M (CO2, L2)
    d) Explain *Network Operator Requirements*? 7M (CO2, L2)

3. a) Explain *IoT Architecture* in detail. 14M (CO3, L2)

    Or

    b) Explain the following *Technical Design Constraints* 14M (CO3, L2)
        1. Functional Requirements   2. Sensing and Communication Fields
        3. Power   4. Gateway   5. Non-functional Requirements
        6. Financial Cost

4   a) Explain about *e- Maintenance* in M2M era.14M. (CO4, L2)

    Or

    b) Explain about IMC-AESOP from the *Web of Things* to the *Cloud of Things*. 14M
    (CO4, L2)

5   a) Explain todays *Commercial Building Automation*. 14M (CO5, L2)

    Or

    b) What is *IoT Perspective* of *Transport* and *Logistics*.14M (CO3, L1)

P.B. Siddhartha College of Arts & Science, Vijayawada – 520 010.
(An Autonomous College in the jurisdiction of Krishna University)
M.Sc., (Computer Science) Programme - III Semester

COURSE	COURSE CODE	L	T	P	C	Year
DESIGN & ANALYSIS OF ALGORITHMS	CS3T2	3	1	-	4	2020-2021

Course Outcomes:

On successful completion of this course, the students:
1. Understanding basic ideas about algorithms and the concept of data structures. (CO1)
2. Computing complexity measures of algorithms, including recursive algorithms using recurrence relations. (CO2)
3. Applying the design techniques to solve complex problems. (CO3)
4. Analyzing the problems based on their space and time complexities. (CO4)
5. Ability to categorize the problems as NP-Hard and NP -Complete problems. (CO5)

UNIT I

Introduction: What IS Algorithm, Algorithm Specification Pseudocode Conventions, Recursive Algorithms, Performance Analysis: Space Complexity Time Complexity, Asymptotic Notation, Performance Measurement, Randomized Algorithms: Basics of Probability Theory, Randomized Algorithms Identifying the Repeated Element, Primality Testing: Advantages and Disadvantages.

Elementary Data Structures: Stacks and Queues, Trees: Terminology, Binary Trees, Dictionaries: Binary Search Trees, Priority Queues, Heaps , Heapsort , Sets and Disjoint Set Union: Introduction-Union and Find Operations, Graphs: Introduction, Definitions, Graph Representations.

UNIT II

Divide -and -Conquer: General Method, Defective Chess Board, Binary Search, Finding Maximum and Minimum, Merge Sort, Quick Sort, Selection Problem, Strassen's Matrix Multiplication, Convex Hull: Some Geometric Primitives, The Quick Hull Algorithm, Graham's Scan, An O(nlogn) Divide and Conquer Algorithm.

The Greedy Method: The General Method, Container Loading, Knapsack Problem, Tree Vertex Splitting, Job Sequencing with Deadlines, Minimum Cost Spanning Trees: Prim's Algorithm, Kruskal's Algorithm, Optimal Storage on Tapes, Optimal Merge Patterns, Single Source Shortest Paths.

UNIT III

Dynamic Programming: The General Method, Multi Stage Graphs, All Pairs Shortest Paths, Single Source Shortest Paths, Optimal Binary Search Trees, String Editing -0/1 Knapsack, Reliability Design, The Traveling Sales Person Problem, Flow Shop Scheduling.

Basic Traversal and Search Techniques: Techniques for Binary Trees, Techniques for Graphs: Breadth First Search and Traversal-Depth First Search, Connected Components and Spanning Trees, Bi-Connected Components and DFS.

UNIT IV

Backtracking: The General Method, The 8-Queens Problem, Sum of Subsets, Graph Coloring, Hamiltonian Cycles, Knapsack Problem.

Branch and Bound : The Method: Least Cost Search, The 15 Puzzle Control Abstractions for LC Search, Bounding, FIFO Branch and Bound , LC Branch and Bound, 0/1 Knapsack Problem, LC Branch and Bound Solution, FIFO Branch and Bound Solution, Traveling Sales person.

UNIT V

NP-Hard and NP -complete problems: Basic Concepts: Non Deterministic Algorithms, The Classes NP Hard and NP Complex, Cook's Theorem, NP Hard Graph Problems, Clique Decision Problem, Node Cover Decision Problem Chromatic Number Decision Problem, Directed Hamiltonian Cycle, Traveling Sales Person Decision Problem, AND/OR Graph Decision Problem, NP-Hard Scheduling Problems, Scheduling Identical Processors, Flow Shop Scheduling, Job Scheduling, NP-Hard Code Generation Problems, Code Generation With Common Sub Expressions, Implementing Parallel Assignment Instructions, Some Simplified NP-Hard Problems.

Prescribed Text Book			
S.No	Author	Title	Publisher
1	Sartaj Sahni	Fundamentals of Computer Algorithms	Second Edition, Universities Press (2008)

Reference Text Books			
S.N	Author	Title	Publisher
1	Anany Levitin	Introduction to the Design &	Second Edition, Pearson
2	I.Chandra Mohan	Design and Analysis of Algorithms	PHI
3	Prabhakar Gupta, Vineet Agrawal	Design and Analysis of Algorithms	PHI
4	Parag Himanshu,	Design and Analysis of Algorithms	Pearson Education (2008)

M.Sc.,(COMPUTER SCIENCE) DEGREE EXAMINATIONS-NOVEMBER 2020
THIRD SEMESTER
DESIGN & ANALYSIS OF ALGORITHMS
Time 3 Hours   Max.Marks: 70
Answer all questions. All question carry equal marks.   5 × 14 M

1. a) Define *Time Complexity* and *Space Complexity* and explain three notations used to represent Time Complexity. (CO1,L1)

   b) Define a *Data Structure*. Explain various types of data structures with examples. (CO1, L1)
                                                    Or
   c) List advantages and disadvantages of *Randomized Algorithms* with examples. (CO1, L1)

   d) Explain in detail about *Heap Sort Technique* with an example.(CO1, L2)

2. a) Illustrate the application of *divide_ and_ conquer* approach on Quick Sort with an example.(CO2,L2)

   b) Explain *Kruskal's Algorithm* to find minimum cost spanning tree with an example. (CO2, L2)
                                                    Or
    c) Explain the application of *Greedy Method* on an example *Job Sequencing Problem*. (CO2, L2)

   d) Explain *Single Source Shortest Path* algorithm with suitable example. (CO2, L2)

3. a) Illustrate the application of dynamic programming on Travelling Salesman Problem. (CO3, L2)

   b) Discuss the procedure of finding *Optimal Binary Search Tree* using Dynamic Programming with example. (CO3, L6)
                                                    Or
    c) Solve a *Flow Shop Scheduling Problem* using *Dynamic Programming* with example. (CO3,L3)

   d) Distinguish between DFS & BFS with an example. (CO3, L4)

4. a) Solve *4-Queens Problem* using *Back Tracking*. (CO4, L3)

   b) Solve *0/1-Knapsack Problem* using *Branch and Bound* technique. (CO4, L3)
                                                    Or

c) Explain the *Sum of Subsets Problem.* How it can be solved using *Back Tracking Technique?*. (CO4, L2)

d) Solve a *15-Puzzle Problem* using *Branch and Bound Technique.* (CO4, L3)

5 .a) Distinguish between *Deterministic* & *Non Deterministic* Algorithms with examples. (CO5, L4)

b) Explain the procedure of determining a given problem as NP Hard Problem. (CO5, L2)

Or

c) Discuss various *NP Hard Scheduling Problems.* (CO5, L6)

d) Discuss various *NP Hard Graph Problems.* (CO5, L6)

P. B. Siddhartha College of Arts & Science, Vijayawada – 520 010.
(An Autonomous College in the jurisdiction of Krishna University)
M.Sc., (Computer Science) Programme - III Semester

COURSE	COURSE CODE	L	T	P	C	Year
WEB TECHNOLOGIES	CS3T4	4	-	-	4	2020-2021

Course Outcomes:

On successful completion of this course, the students:
1. Students are able to describe the concepts of WWW including browser and HTTP protocol and various HTML tags and use them to develop the user friendly web pages. (CO1)
2. Students will be able to use the JavaScript and VBScript to develop the dynamic web pages. (CO2)
3. Students will be able to define the CSS with its types and develop the modern web pages using the HTML and XML elements with different layouts as per need of applications. (CO3)
4. Students use server side scripting with PHP to generate the web pages dynamically using the database connectivity. (CO4)
5. Develop the modern Web applications using the client and server side technologies and the web design fundamentals. (CO5)

UNIT I

Introduction: What is Internet, History of Internet, Internet Services and Accessibility, Uses of the Internet, Protocols, Web Concepts: The Client/Server Model, Retrieving Data from the Web, How the Web Works?, Web Browsers, Searching information on the Web, Internet Standards.
HTML: Outline of an HTML Document, Head Section Body Section: Headers, Paragraphs, Text Formatting, Linking, Internal Linking, Embedded Images, Lists, Tables, Frames, Other Special Tags and Characters, HTML Forms.

UNIT II

Java Script: Introduction to Scripting, Control Statements I, Control Statements II, Functions, Arrays, Objects, Document Object Model, Events.
VB Script: Introduction, Embedded VBScript code in an HTML Document, Comments, Variables, Array Variables, Operator, Assignment Operators, Numerical Operators, String Concatenation, Procedures, Sub Procedure, Function Procedure, Conditional Statements, Looping Statements, Object and VB script, Cookies, Cookie Variables, Creating a Cookie, A Cookie with Multiple Values, Reading Cookie Value.

UNIT III

Dynamic HTML (DHTML): Introduction, Cascading Style Sheets (CSS), Coding CSS, Properties of Tags, Property Values, Other Style Properties, In Line Style Sheets, Embedded Style Sheets, External Style Sheets, Grouping, Inheritance, Class as Selector, ID as Selector,

Contextual Selector, Pseudo Classes and Pseudo Elements, Positioning, Backgrounds, Element Dimensions, DHTML Document Object Model and Collections, Using the Collections All, Moving Object around the Document, Event Handling, Assigning Event Handlers, Event Bubbling, Filters and Transition Filters, Transitions, Data Binding, Using Tabular Data Control, Sorting Data, Dynamic Sorting, Filtering.

XML: Introduction, HTML vs. XML, Syntax of XML Document, XML Attributes, Use of elements vs. Use of Attributes, XML Validation, Well Formed XML Documents, Valid XML Documents, XML DTD: internal DTD, external DTD, the buildings blocks of XML documents, DTD Elements: Declaring an Element, Empty Elements, Elements with Data, Elements with Children, Wrapping, Declaring only one Occurrence of the Same Elements, Declaring Minimum one Occurrence of the Same Element, Defining Zero or One Occurrence of the Same Element, Declaring Mixed Content, DTD Attributes: Declaring Attributes, Default Attribute Value, Implied attribute, required attribute, fixed attribute value, enumerated attribute values, DTD Entries, DTD Validation, XSL, XSL Transformation, XML NameSpaces, XML Schema.

UNIT IV

Servlets: Introduction, Advantages of Servlets over CGI, Installing Servlets, The Servlet Life Cycle, Servlets API, A Simple Servlet, Handling HTTP *Get* requests, Handling HTTP Post Requests, Cookies, Session Tracking, Multi Tier Applications using Database Connectivity, Servlets Chaining.

PHP: Introduction, PHP basics, String Processing and Regular Expressions, Form Processing and Business Logic, Connecting to a Database, Using Cookies, Dynamic Content, Operator Precedence Chart.

UNIT V

Java Server Pages (JSP): Introduction, Advantages of JSP, Developing first JSP, Components of JSP, Reading Request Information, Retrieving the Data Posted from a HTML File to a JSP File, JSP Sessions, Cookies, Disabling Sessions.

Active Server Pages (ASP): Introduction, Advantages of ASP, First ASP Script, Processing ASP Scripts with Forms, Variables and Constructs, Subroutines, Include/Virtual, ASP Cookies, ASP Objects, Connecting to Data with ASP.

Prescribed Text Book			
S.No.	Author	Title	Publisher
1	N.P.Gopalan, J.Akilandeswari	Web Technologies-A Developer's Perspective	PHI(2008)
2	Harvey M. Deitel and Paul 1. Deitel	Internet and World Wide Web How To Program, 5e	Prentice Hall; 4th edition

Reference Text Books			
S.No.	Author	Title	Publisher
1	Robert W. Sebesta	Programming the world wide web.	Third Edition, Pearson Education (2007)

2	Anders Moller and Michaelschwarzbach	An Introduction to XML and web technologies.	Addison Wesley (2006)
3	Chris Battes	Web programming-Building Internet Application.	Second Edition, Wiley (2007).
4	Jeffrey C. fackson	Web Technologies- Computer Science Perspective.	Pearson Education (2008).

CS3T4

M.Sc.,(COMPUTER SCIENCE) DEGREE EXAMINATIONS-NOVEMBER 2020
THIRD SEMESTER
WEB TECHNOLOGIES

Time 3 Hours   Max.Marks: 70
Answer all questions. All question carry equal marks.   5 × 14 M

1.   a) What is Internet? Explain services of internet. (CO1, L1) 7M

      b) What is *Web Browser*? Explain it in detail. (CO1, L1) 7M
                                    Or
     c) Illustrate *frame set* and *frame* attributes by writing program. (CO1, L2) 7M

     d) Explain *Client -Server Architecture* of World Wide Web. (CO1, L2) 7M

 2.   a) Explain the scope of *Java Script Variables* with example. (CO2, L2) 7M

      b) Explain briefly the characteristic of *Array Objects*. (CO2, L2) 7M
                                    Or
     c) Explain *Document Object Model* in Java Script briefly. (CO2, L2) 14M

3.   a) Discuss building an *External Style Sheet*. Explain advantages and disadvantages of
    External Style Sheets with an example. (CO3, L6) 14M
                                    Or
      b) Discuss *Tabular Data Control* with an example. (CO3, L6) 7M

      c) What is DTD? Explain the building blocks of DTD. (CO3, L1) 7M

4.   a) Explain the *Life Cycle* of Servlets. Write the session tracker that tracks the number of
    access and   last access of data of a particular web page. (CO4, L2) 14M
                                    Or

b) Explain *String Processing* and *Regular Expressions*. (CO4, L2) 7M

c) Demonstrate concept of *cookies*. (CO4, L2) 7M

5. a) Explain components of JSP and write a JSP program to accept *username* and *password* from a user and validate them. (CO5, L2) 14M

<div align="center">Or</div>

b) Explain JDBC packages with example. (CO5, L2) 7M

c) Compare between JDBC servlets and JDBC JSP with example. (CO5, L2) 7M

P. B. Siddhartha College of Arts & Science, Vijayawada – 520 010.
(An Autonomous College in the jurisdiction of Krishna University)
M.Sc., (Computer Science) Programme - III Semester

COURSE	COURSE CODE	L	T	P	C	Year
MOBILE COMPUTING	CS3T5	4	-	-	4	2020-2021

Course Outcomes:

On successful completion of this course, the students:
1. Understand the basic concepts of Worldwide Networks, Wireless Transmission and Generations of Mobile Systems. (CO1)
2. Perceive the architecture and common technologies for mobile communication. (CO2)
3. Grasp the IP Network Protocols and methods used in IP Routing of Packets. (CO3)
4. Apprehend the working of Mobile Transport Layer and Wireless TCP. (CO4)
5. Gains knowledge regarding the Next Generation Networks and File Systems.(CO5)

UNIT I

Introduction: World Wide Networks: Computer Networking, Significance of TCP/IP Protocol Stack in World Wide Networking, Internet Applications.

Wireless Networks: Limitations, Mobile Computing Paradigm, Promises/Novel Application.

Generation of Mobile Systems: Features of First Generation, Second Generation, Third Generation, Fourth Generation and Comparison.

UNIT II

Mobile System Architectures: GSM:System Architecture, Functional Subsystems of GSM: Radio Interfaces, Protocols, Handover, New Data Services.

GPRS: System Architecture, Protocol Layers, Comparison of GSM & GPRS

Mobility Management: Location Management, Handover, Mobility Management in GSM & GPRS.

Wireless Access Technologies: WPAN, Bluetooth, WLAN, Wi-Fi, WMAN, Wi-MAX.

UNIT III

IPV4: Features of IPV4, Classes in IPV4 Addressing.

Mobile IP: Entities and Terminology, IP Packet Delivery, Agent Discovery, Registration, Tunneling and Encapsulation, IPV6, IPV4 versus IPV6.

UNIT IV

Mobile Transport Layer: Traditional TCP: Congestion Control, Slow Start, Fast Retransmit/Fast Recovery, Implications of Mobility.

Wireless TCP: Indirect TCP, Snooping TCP, Mobile TCP, Fast Retransmit/Fast Recovery, Transmission/Time out Freezing, Selective Retransmission, Transaction Oriented TCP, TCP over 2.5/3G Wireless Networks.
UNIT V

Next Generation Networks: Architecture of NGN, Core Network, Access Network, Capabilities of NGN, Characteristics of NGN, Generalised Mobility on NGN, Transport Independent Service Paradigm.

File Systems: Coda, Little Work, Ficus, Mio-NFS, Rover Mobile Operating Systems: Symbian, Android Wireless Markup Language (WML) and WML Script, Extensible Mark up Language and its Applications.

Prescribed Text Books			
	Author	Title	Publisher
1	Jochen Schiller	Mobile Communications	Pearson Education, Second Edition 2002
2	Mobile Computing	Rajkamal	Oxford (2008)

Reference Text Book			
	Author	Title	Publisher
1	Ashok K Talukder and Roopa R Yavagal	Mobile Computing	TMH (2008)

M.Sc.,(COMPUTER SCIENCE) DEGREE EXAMINATIONS-NOVEMBER 2020
THIRD SEMESTER
MOBILE COMPUTING

Time 3 Hours   **Max.Marks: 70**
Answer all questions. All question carry equal marks.   **5 × 14 M**

1. a) Explain significance of *TCP/IP Protocol Stack*. (CO1, L1) 14 M
                        Or
   b) i) Illustrate *Internet Applications*. (CO1, L2) 4 M

      ii) Illustrate features of 1G, 2G, 3G, 4G in Mobile Computing. (CO1, L2) 10 M

1. a) Explain *GSM System Architecture* with a neat diagram. (CO2, L1) 14 M
                        Or
   b) i) Discuss *handover* in GSM. (CO2, L6) 7 M

      ii) Illustrate the features of WMAN, WiMAX. (CO2, L2) 7 M

3. a) i) What are the features of IPV4? (CO3, L1) 7 M

      ii) Compare IPV4 and IPV6. (CO3, L2) 7 M
                        Or
   b) Explain about the working of *IP Packet Delivery*. (CO3, L2) 14 M

4. a) What are the functions of *Snooping Sub Layer* in the *TCP Protocol*? How do the TCP
      Packets Transfer from a Mobile Node to the Receiver End? (CO4, L1) 14 M
                        Or
   b) Explain *Mobile TCP*. How does a *Supervisory Host* send *TCP Packets* to the mobile
      node and to fixed TCP connection. (CO4, L2) 14 M

1. a) Explain about *NGN Characteristics* and *Architecture* with a neat diagram. (CO5, L2)
      14 M
                        Or
   b) Discuss ANDROID OS features. (CO5, L6) 14 M

P. B. Siddhartha College of Arts & Science, Vijayawada – 520 010.
(An Autonomous College in the jurisdiction of Krishna University)
M.Sc., (Computer Science) Programme - III Semester

COURSE	COURSE CODE	L	T	P	C	Year
PRINCIPLES OF DISTRIBUTED DATABASE SYSTEMS	CS3T5i	4	-	-	4	2020-2021

Course Outcomes:

On successful completion of this course, the students:
1. Gains the knowledge on Distributed *Database Design*, *Database Interaction* and *Cleaning*. (CO1)
2. Understands *Data Access* and *Query Processing*. (CO2)
3. Able to apply *Query Optimization* and *Multi Database Query Processing* techniques. (CO3)
4. Apprehend *Distributed Concurrency Control* and *Distributed DBMS Reliability*. (CO4)
5. Understands *Parallel Database Systems*, *Parallel Query Processing* and *Distributed Object and Storage*. (CO5)

UNIT I

Distributed Database Design:
Top-Down Design Process, Distribution Design Issues: Reasons for Fragmentation, Fragmentation Alternatives, Degree of Fragmentation, Correctness Rules of Fragmentation, Allocation Alternatives, Information Requirements, ***Fragmentation*:** Horizontal Fragmentation, Vertical Fragmentation, Hybrid Fragmentation, ***Allocation*:** Allocation Problem, Information Requirements, Allocation Model, Solution Methods, ***Data Directory.***
Database Integration:
***Bottom-Up Design Methodology, Schema Matching*:** Schema Heterogeneity, Constraint-based Matching Approaches, Learning-based Matching, Combined Matching Approaches, ***Schema Integration, Schema Mapping*:,** Mapping Creation, Mapping Maintenance, ***Data Cleaning*.**

UNIT II

Data and Access Control:
***View Management*:** Views in Centralized DBMS, Views in Distributed DBMS, Maintenance of Materialized Views, ***Data Security*:** Discretionary Access Control, Multilevel Access Control, Distributed Access Control, ***Semantic Integrity Control*:** Centralized Semantic Integrity Control, Distributed Semantic Integrity Control.
Overview of Query Processing:
***Query Processing Problem*, *Objectives of Query Processing*, *Complexity of Relational Algebra Operations*, *Characterization of Query Processors*:** Languages, Types of Optimization, Optimization Timing, Statistics, Decision Sites, Exploitation of the Network Topology, ***Layers of Query Processing*:** Query Decomposition, Data Localization, Global Query Optimization, Distributed Query Execution.

UNIT III

Query Optimization: Search Space, Search Strategy, Distributed Cost Model. **Centralized Query Optimization:** Dynamic Query Optimization, Static Query Optimization,   Hybrid Query

Optimization,**Join Ordering in Distributed Queries:** Join Ordering, Semijoin Based Algorithms, Join versus Semijoin, **Distributed Query Optimization:** Dynamic Approach, Static Approach, Hybrid Approach.

Multidatabase Query Processing: Issues in Multi Database Query Processing, Multidatabase Query Processing Architecture, **Query Rewriting Using Views:** Datalog Terminology, Rewriting in GAV, Rewriting in LAV, **Query Optimization and Execution**: Heterogeneous Cost Modeling, Heterogeneous Query Optimization, Adaptive Query Processing, **Query Translation and Execution.**

UNIT IV

Distributed Concurrency Control: Serializability Theory, Taxonomy of Concurrency Control Mechanisms, Locking-Based Concurrency Control Algorithms: Centralized 2PL, Distributed 2PL, **Timestamp-Based Concurrency Control Algorithms:** Basic TO Algorithm, Conservative TO Algorithm, Multiversion TO Algorithm, **Optimistic Concurrency Control Algorithms, Deadlock Management:** Deadlock Prevention, Deadlock Avoidance, Deadlock Detection and Resolution, **"Relaxed" Concurrency Control:** Non-Serializable Histories, Nested Distributed Transactions.

Distributed DBMS Reliability: Reliability Concepts and Measures: System, State, and Failure, Reliability and Availability, Mean Time between Failures/Mean Time to Repair, **Failures in Distributed DBMS:** Transaction Failures, Site (System) Failures, Media Failures, Communication Failures, **Local Reliability Protocols:** Architectural Considerations, Recovery Information, Execution of LRM Commands, Check pointing, Handling Media Failures, **Distributed Reliability Protocols:** Components of Distributed Reliability Protocols, Two-Phase Commit Protocol, Variations of 2PC,

Dealing with Site Failures: Termination and Recovery Protocols for 2PC, Three-Phase Commit Protocol, **Network Partitioning:** Centralized Protocols, Voting-based Protocols, **Architectural Considerations.**

UNIT V

Parallel Database Systems: Parallel Database System Architectures: Objectives, Functional Architecture, Parallel DBMS Architectures, *Parallel Data Placement, Parallel Query Processing*: Query Parallelism, Parallel Algorithms for Data Processing, Parallel Query Optimization, *Load Balancing*: Parallel Execution Problems, Intra-Operator Load Balancing, Inter-Operator Load Balancing, Intra-Query Load Balancing, *Database Clusters*: Database Cluster Architecture, Replication, Load Balancing, Query Processing, Fault Tolerance.

Distributed Object Database Management: *Fundamental Object Concepts and Object Models*: Object, Types and Classes, Composition (Aggregation), Sub classing and Inheritance.

Prescribed Text Book			
	Author	Title	Publisher
1	M. Tamer Ozsu, Patrick Valduriez	Principles of Distributed Database Systems	Springer, Third Edition, 201. ISBN 978-1-4419-8833-1

Reference Text Books			
	Author	Title	Publisher
1	Chhanda Ray	Distributed Database Systems	Pearson, 2009 ISBN: 978-81-317-2718-8
2	Saeed K.Rahimi and Frank S.Haug	Distributed Database Management Systems: A Practical Approach	IEEE Computer Society, 2010 ISBN: 978-0-470-40745-5

M.Sc.,(COMPUTER SCIENCE) DEGREE EXAMINATIONS-NOVEMBER 2020
THIRD SEMESTER
PRINCIPLES OF DISTRIBUTED DATABASE SYSTEMS

Time 3 Hours   Max.Marks: 70
Answer all questions. All question carry equal marks.   5 × 14 M

1. a) What types of *Fragmentations* can be applied in Distributed Databases? (CO1, L1)
    14M

Or

    b) What is *Data Dictionary* ? Explain in detail. (CO1, L1) 7M
    c) What is *Data Cleaning* ? Explain in detail. (CO1, L1)   7M

2. a) Illustrate various *Access Controls Mechanisms* of Distributed DBMS.   (CO2, L2)
    14M

Or

    b) Illustrate about *Data Localization* in Distributed DBMS. (CO2, L2) 7M
    c) Summarize the objectives of *Query Processing.* (CO2, L2) 7M

3.   a) Explain various *Centralized Query Optimization* approaches. (CO3, L2) 14M

Or

    b) Demonstrate various issues in *Multi Database Query Processing*. (CO3, L2) 7M

    c) Illustrate about *Query Translation and Execution.* (CO3, L2) 7M

4. a) Illustrate various *Timestamp-Based Concurrency Control Algorithms.*   (CO4, L2) 14M

Or

    b) Illustarte*various failures* in distributed DBMS. (CO4, L2) 7M

    c) Demonstrate about *Two-Phase Commit Protocol.* (CO4, L2) 7M

5. a) What are various aspects of *Distributed Object Database Management*? (CO5, L1)
    14M

Or

    b) What is *Load Balancing* ? Explain in detail. (CO5, L1)   14M

P.B College of Arts & Science, Vijayawada – 520 010.
(An Autonomous College in the jurisdiction of Krishna University)
M.Sc., (Computer Science) Programme - III Semester

COURSE	COURSE CODE	L	T	P	C	Year
TCP/IP	CS3T5ii	4	-	-	4	2020-2021

Course Outcomes:

On successful completion of this course, the students:
1. Able to understand TCP/IP, OSI Models and it Importance   (CO1)
2. Gains the knowledge on *Internet Protocol* with routing algorithms and IPV4. (CO2)
3. Student is able to understand how routing is done and Internet Protocol V6 (IPng) and its advantages over IPV4.(CO3)
4. Gains the knowledge on *TCP Protocol* and various congestion avoidance techniques. (CO4)
5. Able to understand basic CISCO router *functionality* and *precautions* while selecting the router accessories and simple configuration.(CO5)

UNIT I
Methods of Information Transmissio*n*: Synchronous Transmission, Packet Transmission, Asynchronous Transmission, **Virtual Circuit**

Computer Networking : Layer 1 Routing, Layer 2 Routing, Layer 3 Routing,
Introduction to Network Protocols: OSI Reference Model, TCP/IP Protocol Stack

UNIT II
Internet Protocol : IP Datagram, Internet Control Message Protocol, Fragmentation, Optional Entries in the IP Header, ARP and RARP Protocols, Internet Group Management Protocol, Multicast and Link Protocol.

IPV4: IPV4 address format, IP Classes, Network address, Host Address, Subnet mask, IPV4 Header.

Routing: Forwarding and Screening, Routing Processing, Handling Routing Tables,Routing Protocols, Neutral Exchange Point.

UNIT III
IPV6: Next Versions of IPV6 Datagram, ICMP version 6 Protocol : Address Resolution, Router Discovery, Redirect, IP Addresses.

Transmission Control Protocol: TCP Segments, TCP Header Options, Establishing and Terminating a connection with TCP, Determining the Connection State, Response Delay Techniques, Window Technique, Network Congestion.

User Datagram Protocol: Fragmentation, Broadcasts and Multicasts.

UNIT IV
Domain Name System: Domain and Subdomains, Name Syntax, Reverse Domains, Resource records, DNS Protocol, DNS query.

Telnet :NVT Protocol, Telnet Protocol Commands.

FTP: Architecture, Active Mode / Passive Mode of FTP Protocol Communication.

HTTP: Client - Server, Proxy, Gateway, URI, HTTP Request, HTTP Response, Other Header Fields.
E-mail: Architecture, Message Format, MIME, SMTP, ESMTP, POP3, IMAP4.

UNIT V

CISCO Routers: Interface Identification, Cables, Memory, Console. Commands, Configuration, Debugging.

Prescribed Text Books			
	Author	Title	Publisher
1	Libor Dostálek Alena Kabelová	Understanding TCP/IP	PACKT Publishing
2	E.Bryan	A Professional's Guide to Data Communication in a TCP/IP World	Artech House, Inc

Reference Text Books			
	Author	Title	Publisher
1	Comer	Internetworking with TCP/IP	PHI, Volume 1
2	Behrouz A. Forouzan	TCP/IP Protocol Suite	TMH

M.Sc.,(COMPUTER SCIENCE) DEGREE EXAMINATIONS-NOVEMBER 2020
THIRD SEMESTER
TCP/IP

Time 3 Hours   **Max.Marks: 70**
Answer all questions. All question carry equal marks.   **5 × 14 M**

1. a) Explain *OSI Reference Model*. (CO1, L2)

   b) Explain *Ethernet Technology*, *Switched Ethernet* and *Asynchronous Transfer Mode*. (CO1, L2)

<div align="center">Or</div>

   c) Distinguish between *OSI* versus *TCP / IP*. (CO1, L4)

   d) Explain various *Switching Devices.* (CO1, L4)

2. a) Explain *IPV4 Header Format.* (CO2, L2)

<div align="center">Or</div>

   b) Explain *Internet Control Message Protocol.* (CO2, L2)

   c) Explain role of sub-netting in *IP Address.* (CO2, L2)

3. a) Explain *IPV6 Protocol*. (CO3, L2)

<div align="center">Or</div>

   b) Explain process of establishing and terminating a connection with TCP. (CO3, L2)

4. a) Explain *Domain Name System* with neat diagrams. (CO4, L2)

<div align="center">Or</div>

   b) Write notes on *Email Architecture.* (CO4, L2)

   c) Write short notes on *HTTP Request* and *HTTP Response* with examples. (CO4, L2)

5. a) Explain *Privileged* and *Non-Privileged* modes in configuring *Cisco Router*. (CO5, L2)

<div align="center">Or</div>

   b) Explain role of debugging in *Cisco Router*. (CO5, L2)

P.B. Siddhartha College of Arts & Science, Vijayawada – 520 010.
(An Autonomous College in the jurisdiction of Krishna University)
M.Sc., (Computer Science) Programme - III Semester

COURSE	COURSE CODE	L	T	P	C	Year
CRYPTOGRAPHY & NETWORK SECURITY	CS3T5iii	4	-	-	4	2020-2021

Course Outcomes:

On successful completion of this course, the students able to:
1. Identify some of the factors driving the need for network security. (CO1)
2. Identify and classify particular examples of attacks. (CO2)
3. Define the terms vulnerability, threat and attack. (CO3)
4. Identify physical points of vulnerability in simple networks. (CO4)
5. Compare and contrast symmetric and asymmetric encryption systems and their vulnerability to attack, and explain the characteristics of hybrid systems. (CO5)

UNIT I

Introduction: Security Trends, The OSI Security Architecture, Security Attacks, Security Services, Security Mechanisms, A Model for Network Security.

Classical Encryption Techniques: Symmetric Cipher Model, Substitution Techniques, Transposition Techniques, Rotor Machines, Steganography.

Advanced Encryption Standard: Evaluation Criteria for AES, The AES Cipher.

Confidentiality using Symmetric Encryption: Placement of Encryption Function, Traffic Confidentiality, Key Distribution, Random Number Generator.

UNIT II

Public Key Cryptography and RSA: Principles of Public Key Crypto Systems, The RSA Algorithm.

Key Management: Other Public-Key Crypto Systems: Key Management, Diffie-Hellman Key Exchange.

Message Authentication and Hash Functions: Authentication Requirements, Authentication Functions, Message Authentication Codes, Hash Functions, Security of Hash Functions and Macs.

UNIT III
Digital Signatures And Authentication Protocols: Digital Signatures, Authentication Protocols, Digital Signature Standard.

Authentication Applications: Kerberos, X.509 Authentication Servic.

Email Security: Pretty Good Privacy, S/MIME.

UNIT IV

IP Security: IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload

Web Security: Web Security Considerations, Secure Socket Layer and Transport Layer Security.

UNIT V

Intruders: Intruders, Intrusion Detection, Password Management.

Firewalls: Firewall Design Principles, Trusted Systems, Common Criteria for Information Technology, Security Evaluation.

Prescribed Text Book			
	Author	**Title**	**Publisher**
1	William Stallings	Cryptography and Network Security	PHI, Fourth Edition

Reference Text Book			
	Author	**Title**	**Publisher**
1	William Stallings	Network Security Essentials-Applications and Standards	Pearson Education (2007), Third Edition.
2	Chris McNab	Network Security Assessment	OReilly (2007), 2nd
3	Jon Erickson	Hacking-The Art of Exploitation	Press (2006),SPD
4	Neal Krawety	Introduction to Network Security	Thomson (2007).
5	Ankit Fadia	Network Security-A Hackers Perspective	Macmillan (2008)

M.Sc.,(COMPUTER SCIENCE) DEGREE EXAMINATIONS-NOVEMBER 2020
THIRD SEMESTER
CRYPTOGRAPHY & NETWORK SECURITY
Time 3 Hours   Max.Marks: 70
Answer all questions. All question carry equal marks.   5 × 14 M

1)   a) Explain various *Security Attacks* and *Security Mechanism*. (CO1, L2) 7M

      b) Explain *Substitution Techniques* in *Encryption* with examples. (CO1, L2) 7M
                                                    Or
      c) Explain *AES Cipher Encryption*. (CO1, L2) 14M

2)   a) Apply RSA Algorithm with p=3, q=11, d=7 find e and what is the cipher text character
         corresponding to the plain text character N using the number corresponding to the letter
         the number 1 stands for 'A'. (CO2, L3)   7M

      b) Explain *Message Authentication*. 7M (CO2, L2)
                                                    Or
      c) Discuss about security of *Hash Functions* and *MAC's*. 7M (CO2, L6)

      d) Explain briefly *Diffie-Hellman Key* exchange. (CO2, L2) 7M

3)   a) Explain PGP and discuss how authentication and confidentially is provided using PGP?
      (CO3, L2) 7M

      b) Illustrate *kerberos*. (CO3, L2) 7M
                                                    Or
      c) Explain *X.509 Authentication Services* (or) *Standards Authentication Procedure*. (CO3, L2)
   7M

      d) Explain *S / MIME Functionality*. (CO3, L2) 7M

4)   a) Explain how *IP Security* is maintained through *IP SEC*. (CO4, L2) 7M

      b) What is the difference between *SSL Connection & SSL Session*? and what services are
       provided   by *SSL Record Protocol*? (CO4, L1) 7M
                                                    Or
      c) Discuss *Encapsulating Security Payload*. (CO4, L6) 7M

      d) Describe *Web Security*. (CO4, L6) 7M

5. a) Who is an *Intruder* ? Discuss what are the problems that may intruder create and explain how
      to overcome those problem. (CO5, L1) 14M
                                                    Or

b) What is Firewall? Explain *common type firewalls* and *principles of firewall design*. (CO5, L1)   14M

P. B. Siddhartha College of Arts & Science, Vijayawada - 520 010.
(An Autonomous College in the jurisdiction of Krishna University)
M.Sc(Computer Science)., Programme – III Semester

COURSE	COURSE CODE	L	T	P	C	Year
DATA MINING TECHNIQUES	CS3T6	4	-	-	4	2020-21

Course Outcomes:
On successful completion of this course, the students:
1. Understand the basics of data mining and data pre-processing techniques. (CO1)
2. Aware of constructing the data warehouse, OLAP and relevant data model concepts.(CO2)
3. understand the Frequent Itemset Mining Methods and different levels in association rules (CO3)
4. understand the basic concepts in classification and advanced classification methods by implementing various algorithms.(CO4)
5. Should be able to find the similarities among the data using clustering algorithms and outlier analysis.(CO5)

UNIT I

Introduction: What is Data mining? , What Kind of Data can be mined, what kinds of Patterns can be mined, Major Issues in Data Mining**.**

Data Preprocessing: Data Preprocessing :An Overview,Data Cleaning, Data Integration, Data Reduction-Overview of Data Reduction Strategies, Attribute Subset Selection, Regression and log linear Models. Histograms and clustering, Data Transformation- Data Transformation strategies Overview, Data Transformation by Normalisation, Discretization by Binning.

UNIT II
Data Warehousing and OLAP: Data warehouse: Basic Concepts -What Is a Data Warehouse?, Difference between Operational Database Systems and Data Warehouses, Why have a separate Data warehouse?, Data Warehousing:A Multiered Architecture, Data warehouse Models, Extraction, transformation and loading, Metadata Repository ,Datawarehouse Modeling: Datacube and OLAP- A Multidimensional Data Model -From Tables and Spreadsheets to Data Cubes ,Stars, Snowflakes, and Fact Constellations: Schemas for Multidimensional Data Models ,Dimensions: The Role of Concept Hierarchies, Measures: their categorisation and computation, Typical OLAP Operations in the Multidimensional Data Model, A Starnet Query Model for Querying Multidimensional Databases,
UNIT III
Mining Frequent patterns, Associations: Basic concept- Market basket analysis: A Motivational Example, Frequent Itemsets, closed itemsets and Association Rules, Frequent itemset Mining Methods

Advanced Pattern Mining:
Pattern Mining: A Road Map, Pattern Mining in Multilevel, Multidimensional Space-Mining Multilevel association rules, Mining Multi Dimensional Associations, Mining Quantitative Association Rules.

UNIT IV
Classification: Basic Concepts:
Basic concepts-What Is Classification? General Approaches to classification, Decision tree Induction-Decision tree induction, Attribute selection measures, tree pruning, Scalability and Decision Tree Induction, Bayes Classification Methods - Bayes Theorem, Navie Bayesian classification.

Classification: Advanced Methods:
Bayesian Belief Networks-Concepts and mechanisms, Training Bayesian Belief Networks Classification by Back Propagation.

UNIT V
Cluster Analysis Introduction: What is Cluster Analysis? Requirements for Cluster Analysis, A Partitioning Methods-k-means,K-medoid, Hierarchical Methods- Agglomerative versus Divisive Hierarchical clustering, Distance measures in Algorithmic methods, BRICH: Multiphase hierarchical Clustering using Clustering Feature Trees, Chameleon Hierarchical Clustering, Density Based Methods**:** DBSCAN.

Outlier Detection:
What are Outliers Analysis? Types of outliers, challenges of outlier Detection.

Text Books			
	Author	Title	Publisher
1	Jiawei Han, Micheline Kamber	Data mining : Concepts & Techniques	Morgan Kaufmann 3rd Edition Chapter-1 1.2,1.3,1.4,1.7 Chapter-3 3.1,3.2,3.3,3.4(3.4.1,3.4.4,3.4.5,3.4.6,3.4.7) Chapter-4 4.1 to 4.2 Chapter-6 6.1 to 6.2 Chapter-7 7.1,7.2(7.2.1 to7.2.3) Chapter-8 8.1,8.2(8.2.1,8.2.2,8.2.3,8.2.4),8.3 Chapter-9 9.1 to 9.2 Chapter-10 10.1,10.2,10.3(10.3.1,10.3.2,10.3.3,10.3.4),10.4(10.4.1) Chapter-12 12.1(12.1.1,12.1.2,12.1.3)

Reference Books

	Author	Title	Publisher
1	Ralph Kimball	The Data Warehousing	Wiley
2	S.N.Sivanandam, S.Sumathi	Data Mining-Concepts, Tasks and Techniques	Thomson

CS3T6
M.Sc.,(COMPUTER SCIENCE) DEGREE EXAMINATIONS-NOVEMBER 2019
THIRD SEMESTER
DATA MINING TECHNIQUES

Time 3 Hours   **Max.Marks: 70**
Answer all questions. All question carry equal marks.   **5 × 14 M**

1. a) Define *Data Mining.* Describe the functionalities of Data Mining 7M (CO1, L5)
   b) What is *Noisy Data*? Explain the *Binning Methods* for Data Smoothing. 7M (CO1, L5)
                                        Or
   c) Explain about *Data Cleaning* and *Data Transformation* in *Data Preprocessing* 14M (CO1, L5)

2. a) Define *Data Warehouse*. Differentiate *Operational Databases* and *Data Warehouses*. 14M (CO2, L3)
                                        Or
   b) Explain different schemas used in *Multidimensional Data Models* with diagrams.7M (CO2, L5)
   c) Discuss about OLAP operations in *Multidimensional Data Models* 7M (CO2, L5)

3. a) Explain the *Frequent Itemset Generation* in the *Apriori Algorithm.* 7M (CO3, L5)
   b) Explain different types of *Association Rules* 7M (CO3, L5)
                           Or
   c) Implement *FP-Growth Algorithm* with example 14M (CO3, L4)

4. a) Discuss briefly how classification is done using *Decision Tree*. 7M (CO4, L5)
   b) Explain algorithm for *Decision Tree Induction* 7M (CO4, L5)
                           Or
   c) State and explain *Bayes Theorem. 7*M (CO4, L5)
   d) Describe *Bayesian Belief Network*. 7M (CO4, L5)

5. a) Explain *Partitioning Methods* in *Cluster Analysis* with examples 14M (CO5, L5)
                        (OR)
   b) Explain *Chameleon & BIRCH Hierarchical* Clustering7M (CO5, L5)
   c) Define *Outliers*. Explain different types of outliers. 7M (CO5, L5)

Parvathaneni Brahmayya Siddhartha College of Arts & Science, Vijayawada - 520 010.
(An Autonomous College in the jurisdiction of Krishna University)
M.Sc., (Computer Science) Programme - IV Semester

COURSE	COURSE CODE	L	T	P	C	Year
BIG DATA AND ANALYTICS LAB	CS4L2	-	-	6	3	2019-20

Lab List

1. Hadoop standalone installation in Linux.

2. Hadoop installation on windows environment- VM virtual box.

3. Exploring Hadoop Distributed File System (HDFS).

4. Map Reduce Program - Word Count (Python).

5. Write a Map Reduce Program that mines weather data. (Python).

6. Installation of Apache Pig.

7. Pig-Basic Operations: LOAD, FOREACH, GENERATE, GROUP, JOIN, DUMP / STORE.

8. Run Hive then use Hive to create, alter, and drop databases, tables, views, functions, and indexes.

9. Installation of MongoDB.

10. CRUD (Create, Read, Update and Delete) operations in MongoDB.

11. Implementation of Aggregate and Map Reduce function in MongoDB.

12. Creating New Workbooks, Opening Existing Workbooks in Tableau.

13. Prepare Bar Chart, Line / Area Chart, Pie Charts in Tableau.

Parvathaneni Brahmayya Siddhartha College of Arts & Science, Vijayawada - 520 010.
(An Autonomous College in the jurisdiction of Krishna University)
M.Sc., (Computer Science) Programme - IV Semester

COURSE	COURSE CODE	L	T	P	C	Year
ARTIFICIAL INTELLIGENCE & MACHINE LEARNING	CS4T2A	3	1	-	4	2019-20

Course Outcomes:

1. Identify problems that are amenable to AI techniques and analyse search techniques to solve those problems.
2. Awareness of representation languages like first order logic.
3. Formalize and implement different AI algorithms, various Knowledge Representations and identify the importance of planning to solve AI problems.
4. Understands about basics of machine learning and conceptual learning.
5. To acquire knowledge about ANN and Instance based learning.

UNIT I
Introduction: What Is AI? The Foundations of Artificial Intelligence, The History of Artificial Intelligence.
Solving Problems by Searching: Problem Solving Agents, Example Problems, Searching for Solutions, Uninformed Search Strategies, Informed (Heuristic) Search Strategies, Heuristic Functions.

UNIT II
First Order Logic: Representation Revisited, Syntax and Semantics of First Order Logic, Using First Order Logic, Knowledge Engineering in First Order Logic.
Inference in First Order Logic: Propositional versus First Order Inference, Unification and Lifting, Forward Chaining, Backward Chaining, Resolution.

UNIT III
Classical Planning: Definition of Classical Planning ,Algorithms for Planning as State Space Search, Planning Graphs, Other Classical Planning Approaches, Analysis of Planning Approaches.
Knowledge Representation: Ontological Engineering, Categories and Objects Events, Mental Events and Mental Objects.

UNIT IV
Learning from Examples: Forms of Learning, Supervised Learning ,Learning Decision Trees, Evaluating and Choosing the Best Hypothesis, The Theory of Learning, Regression and Classification with Linear Models.
Reinforcement Learning: Introduction, Passive Reinforcement Learning, Active Reinforcement Learning, Generalization in Reinforcement Learning, Policy Search, Applications of Reinforcement Learning.

UNIT V
Artificial Neural Networks: Neural Network Representation, Appropriate Problems for Neural Network Learning, Perceptrons, Multilayer Networks and the Back Propagation Algorithm, Remarks on the Back Propagation Algorithm, Recurrent Networks, Dynamically Modifying Network Structure.
Instance Based Learning: Introduction, K-Nearest Neighbour Learning, Locally Weighted Regression, Radial Basis Functions, Case Based Reasoning.

Prescribed Text Books			
S.No	Author	Title	Publisher
1	Stuart J. Russell and Peter Norvig	Artificial Intelligence A Modern Approach	Prentice Hall, Third edition,2010 1.1,1.2,1.3,3.1,3.2,3.3,3.4,3.5,3.6,8.1,8.2,8.3,8.4,9.1,9.2,9.3,9.4,9.5, 10.1,10.2,10.3,10.4,10.5,12.1,12.2, 12.3,12.4,18.1,18.2,18.3,18.4,18.5, 18.6,21.1, 21.2, 21.3, 21.4, 21.5, 21.6
2	Tom.M. Mitchell	Machine Learning	TMH(2013)4.2,4.3,4.4,4.5,4.6,4.8.3 ,4.8.4,8.1,8.2,8.3,8.4,8.5

Reference Books			
S.No	Author	Title	Publisher
1	Winston. P.H	Artificial Intelligence	Addison Wesley (1993)
2	Peter Flach	Machine Learning The Art and Science of Algorithms that Make Sense of Data	Cambridge University Press
3	Elaine Rich& Kevin Knight	Artificial Intelligence	TMH (1991)

CS4T2A

M.Sc.,(COMPUTER SCIENCE) DEGREE EXAMINATIONS-NOVEMBER 2019
FOURTH SEMESTER
ARTIFICIAL INTELLIGENCE & MACHINE LEARNING
Time 3 Hours   **Max.Marks: 70**
Answer all questions. All question carry equal marks.   **5 × 14 M**

1. a) What is AI? Discuss the Heuristic Search Techniques for solving problems. 14M
   (or)
   b) Discuss Problem Solving Agents with Examples. 14M

2. a) Explain the Syntax and Semantics of First Order Logic. 14M
   (or)
   b) Demonstrate the concept of resolution with an example.14M

3. a) Explain how to design algorithms for Planning as State Space Search.14M
   (or)
   b) Discuss Ontological Engineering in Knowledge Representation. 14M

4. a) Describe Learning Decision Trees and Evaluating and Choosing Best
       Hypothesis. 14M

                                    (or)

    b) Explain Policy Search and Applications of Reinforcement Learning. 14M

5. a) Discuss the Back Propagation Algorithm, Remarks on the Back Propagation
    Algorithm
        Algorithm. 14M

                                    (or)

    b) How does K-Nearest Neighbour Learning help in Instance Based
       Learning and also state the Importance of Radial Basis Functions. 14M

COURSE	COURSE CODE	L	T	P	C	Year
BIGDATA AND ANALYTICS	CS4T4i	4	-	-	4	2019-20

Course Outcomes:
Upon successful completion of this course, the student will be able to understand:
1. Big data and its role in daily life.
2. How data is stored and processed in Hadoop.
3. Modern databases used in Big Data Analytics.
4. Visualization of data with Tableau.

UNIT I
Types of Digital Data: Classification of Digital Data.
Introduction to Big Data: Characteristics of Data, Evolution of Big Data, Definition of Big Data, Challenges with Big Data, What is Big Data?, Other Characteristics of Data, Why Big Data?, Traditional Business Intelligence versus Big Data, Typical Data Warehouse Environment, Typical Hadoop Environment, Coexistence of Big Data and Data Warehouse, What is Changing in the realms of Big Data.
Big Data Analytics: What is Big Data Analytics, What Big Data Analytics is not?, Why this sudden Hype around Big Data Analytics?, Classification of Analytics, Greatest Challenges that Prevent Business from Capitalizing Big Data, Top Challenges facing Big Data, Why Big Data Analytics Important?, What Kind of Technologies are we looking toward to help meet the challenges posed by Big Data?, Data Science, Data Scientist, Terminologies used in Big Data Environments.
UNIT II
Hadoop: Features of Hadoop, Key advantages of Hadoop, Versions of Hadoop, Overview of Hadoop Ecosystem, Hadoop Distributions, Why Hadoop?, Why not RDBMS, RDBMS versus Hadoop, Distribution Computing Challenges, History of Hadoop, Hadoop Overview, Hadoop Distributed File System.
Processing Data with Hadoop: Managing Resource and Applications with Hadoop with YARN (Yet Another Recourse Negotiator), Interacting with Hadoop Ecosystem.
UNIT III
Introduction to Map Reduce Programming: Introduction, Mapper, Reducer, Combiner, Partitioner, Searching, Sorting, Compression,
NoSQL: Where it is used?, What is it?, Types of NoSQL Databases, Why NoSQL?, Advantages of NoSQL, What we miss with NoSQL?, Use of NoSQL in Industry, SQL vrsus NoSQL.
MongoDB: What is MongoDB?, Why MongoDB?, Using JavaScript, Script Object Notation, Generating Unique Key, Support for Dynamic Queries, Storing Binary Data, Replication, Sharding, Updating Information in Place, Terms used in RDBMS and MongoDB, Data Types in MongoDB, MongoDB Query Language?

UNIT IV
Hadoop Eco System
Hive: What is Hive?, Hive Architecture, Hive Data Types, Hive File Format, Hive Query Language (HQL), RC File Implementation, User Defined Function.
PIG: What is PIG?, Anatomy of Pig, Pig on Hadoop, Pig Philosophy, Use Case for Pig, Pig Latin, Data type in Pig, Running Pig, Execution Mode of Pig, HDFS Commands, Relational Operators, Eval Funtions, Complex Data Types, User Defined Functions, Parameter Substitution.
HBase: HBasics, Concepts, Clients, HBase versus RDBMS.

UNIT V

Introduction to Tableau: What is Tableau?, Opening Existing Workbooks, Creating New Workbooks, Tableau.

Basic Visualization Design: Using Show Me, Choosing Mark Types, Color, Size, Shape, and Label Options, Choosing Color Options, Setting Mark Size, Choosing Shapes, Text Tables and Mark Labels, Formatting Options, Evaluating Multiple Measures, Shared Axis Charts, Measure Names and Measure Values, Dual Axis Charts.

Connecting to Data: Connecting to Various Data Sources, The Data Source Page.

Customizing Your View of the Data: Changing Data Type, Modifying Dimension / Measure Assignment, Hiding, Renaming, and Combining Fields, Splitting Fields, Changing the Default Field Appearance, Organizing Dimensions in Hierarchies Using Table or Folder View, Saving and Sharing Metadata

Extracting Data, Data Blending, Moving from Test to Production Database,(Top 10 Chart Types: Bar Chart, Line/Area Chart, Pie Chart, Text Table/Crosstab, Scatter Plot, Bubble Chart, Bullet Graph, Box Plot, Tree Map, Word Cloud.

Prescribed Text Book			
	Author	Title	Publisher
1	Seema Acharya, Subhashini Chellappan	BigData and Analytics	Wiley Publications.(Unit I, II, III,IV)
2	George Peck	Tableau 9 - The official guide	Mcgraw hill - 2016

Reference Text Books			
	Author	Title	Publisher
1	Nathan, Marz James Warren	Big Data Principles and Best Practices of Scalable Real Time Data Systems	MANNING Publications 2015
2	Tom White	Hadoop: The Definitive Guide	O'Reilly, Yahoo Press, 3e
3	Stirrup,Nandeshwar,Ohmann ,Floyd	Tableau: Creating Interactive Data Visualizations	Packt Publishing 2016

CS4T4i

M.Sc.,(COMPUTER SCIENCE) DEGREE EXAMINATIONS-NOVEMBER 2019
FOURTH SEMESTER
BIG DATA AND ANALYTICS

Time 3 Hours   Max.Marks: 70
Answer all questions. All question carry equal marks.   5 × 14 M

1) a) Explain the Various Types of Cloud with neat diagrams. 7M

b) Compare and contrast Cloud Computing Architecture with Peer to Peer Architecture.7M
                                    (or)
   c) What is Virtualization? Describe its benefits and levels.7M
   d) Explain the Virtualization Structures and Virtualization Mechanisms. 7M

2) a) Explain Cloud Computing Services.   14M
                                    (or)
    b) Describe Open -Source Cloud Architectures. 14M

3) a) What are the requirements of Cloud Application?   7M
    b) Explain Service Oriented Architecture for Cloud Applications. 7M
                                    (or)
    c) Describe the Big Table as Google's NoSQL System. 7M
    d) Explain Elastic Block Store. 7M

4) a) Explain the Risks in Cloud Computing. 14M
                                    (or)
   a) Describe the AAA Model for Clouds.   14M

5) a) Explain the stages during the development process of Cloud Applications.   7M
   b) How can we use Agile Software Development for Cloud Applications?   7M
                                    (or)
   c) Write a short note on the benefits and challenges of Mobile Cloud Computing. 7M
   d) Explain the architecture of Mobile Cloud Computing. 7M

Parvathaneni Brahmayya Siddhartha College of Arts & Science, Vijayawada - 520 010.
(An Autonomous College in the jurisdiction of Krishna University)
M.Sc., (Computer Science) Programme - IV Semester

COURSE	COURSE CODE	L	T	P	C	Year
e-Governance	CS4T4ii	4	-	-	4	2019-20

Course Outcomes:
1. Understand the role of IT in business.
2. Understand the basic concepts of e-commerce.
3. Use different types of e-commerce web sites and different modes of payments
4. Understand security and legal issues in e-Governance.
5. Understand IT act in India.

UNIT I
History of e-commerce: Definition, Classification-B2B, B2C, C2C, G2C, B2G sites, e-commerce   in Education, Financial, Auction, News, Entertainment Sectors, Doing e-Commerce.

UNIT II
e-Payment Systems : Main Concerns in Internet Banking, Digital Payment Requirements, Digital Token Based e-Payment Systems, Classification of New Payment Systems- Credit Cards, Debit Cards, Smart Cards, e-Credit Accounts, e-Money, Risk and e-Payment Systems, Designing e-Payment Systems.

UNIT III
e-Governance: Introduction, Business of Government, Need for Change, Architecture of e-Governance, Architecture Technology Requirements-Generic Requirements, Application Requirements , Market Opportunity in e-Governance, e-Business, Government Online, Obstacles to Counter, Four Phases of e-Governance-G2B; G2C; G2E, G2G,Case Studies in India.

UNIT IV
Public-Private-Partnership :A New Model in Governance, Outsourcing e-Government Activities, Technology in Government - Smart Cards in the Indian Scenario, Biometrics in the Indian Scenario, Location Based Service System (LBS), Application of LBS in Government Sector.

UNIT V
Open Source Software: Future of e-Governance Assignments and Activities, M-Commerce, Case Study of two Internationally Successful e-Commerce Web Sites, IT act (India) and e-commerce.

Prescribed Text Book			
	Author	Title	Publisher
1	Erfan Turban	Electronic Commerce - A Managerial Perspective	Pearson.

Reference Books		
	Author	Title	Publisher
1	P T Joseph S.J,	E-Commerce-An Indian Perspective	4th Edition, PHI

| 2 | R Kalokota, Andrew V. Winston, | Electronic Commerce - A Manger's guide | Pearson |
| 3 | David Whiteley | E-Commerce Strategy, Technologies and Applications | TMH |

M.Sc.,(COMPUTER SCIENCE) DEGREE EXAMINATIONS-NOVEMBER 2019
FOURTH SEMESTER
e-GOVERNANCE

Time 3 Hours   Max.Marks: 70
Answer all questions. All question carry equal marks.   5 × 14 M

1) a) Distinguish between B2B, B2C, C2C, G2C, B2G sites.14M
                                   (or)
   b) Discuss about various application domains of e-Commerce. 14M

2) a) What are various digital payment requirements?7M
    b) List and explain the risks involved in e-payment systems. 7M
                                   (or)
    b) Distinguish between credit cards, debit cards, smart cards, e-credit accounts, e-money.
14M

3) a) Illustrate the architecture of e-Governance. 7M
    b) Explain about Generic and application requirements of e-Governance. 7M
                                   (or)
    c) Distinguish between four phases of e-Governance – G2B, G2C, G2E, G2G. 14M

4) a) Explain about the usage of Smart Cards and Biometrics in Indian Scenario. 14M
                                   (or)
   a)   Discuss about Location Based Service System (LBS) and its application in Government
          sector.
                                                                                  14M

5) a) Discuss about the future of e-Governance Assignments and Activities. 14M
                                   (or)
   b) Discuss about the pros and cons of IT act (India). 14M

COURSE	COURSE CODE	L	T	P	C	Year
CYBER SECURITY	CS4T4iii	4	-	-	4	2019-20

Course Outcomes:
1. Understand foundational theory behind information security.
2. Acquires knowledge on basic principles and techniques for designing a secure system.
3. Familiar with possible attacks and defence work in practice.
4. Assess likelihood of threats
5. Understand protections and limitations provided by today's technology.

UNIT I
Introduction to Cybercrime:
Introduction, Cybercrime and Information Security, Who are Cybercriminals, Classifications of Cybercrimes, Cybercrime: The legal Perspectives and Indian Perspective, Cybercrime and the Indian ITA 2000, A Global Perspective on Cybercrimes.
Cyber offenses: Introduction, How, Criminals plan the Attacks, Social Engineering, Cyber Stalking, Cyber Cafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector, Cloud Computing.
UNIT II
Cybercrime:Mobile and Wireless Devices
Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication Service Security, Attacks on Mobile/Cell Phones, Laptops.
UNIT III
Phishing and Identity Theft:
Phishing: Methods of Phishing, Phishing Techniques, Spear Phishing, Types of Phishing Scams, Phishing Toolkits and Spy Phishing, Phishing Counter Measures.
Identity theft: Personally Identifiable Information (PII), Types of Identity Theft, Techniques of ID Theft, Identity Theft: Counter Measures, How to efface your Online Identity.
UNIT IV
Understanding Computer Forensics : Introduction, Historical background of Cyber Forensics, Digital Forensics Science, The Need for Computer Forensics, Cyber Forensics and Digital Evidence, Forensics Analysis of Email, Digital Forensics Lifecycle, Chain of Custody Concept, Network Forensics, Approaching a Computer, Forensics Investigation, Challenges in Computer Forensics, Special Tools and Techniques, Forensics Auditing.
UNIT V
Cyber Security: Organizational Implications Introduction, Cost of Cybercrimes and IPR issues, Web threats for Organizations, Security and Privacy Implications, Protecting People's Privacy in the Organization.

Prescribed Text Book		
	Authors	Title	Publisher
1	Nina Godbole and Sunil Belapure	Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives	Wiley INDIA

Reference Text Books		
	Author	Title	Publisher

1	Chwan-Hwa(john) Wu,J.David Irwin	Introduction to Cyber Security	CRC Press T&F Group
2	James Graham, Richard Howard and Ryan Otson	Cyber Security Essentials	CRC Press.

M.Sc.,(COMPUTER SCIENCE) DEGREE EXAMINATIONS-NOVEMBER 2019
FOURTH SEMESTER
CYBER SECURITY

Time 3 Hours   **Max.Marks: 70**
Answer all questions. All question carry equal marks.   **5 × 14 M**

1. a) What is cyber crime? How do we classify cyber crimes and what are the   different types of cyber criminals? 14M

(or)

b) Explain the difference between passive and active attacks with examples and   what are the different attacks launched with attack vector. Explain. 14M

2. a) What kind of attacks are possible on mobile/cell phones? Explain with examples.   14M

(or)

b) What kinds of cyber security measures an organization should have to take in case of portable storage devices? prepare security guidelines which can be   implemented in an organization.

14M

3. a) What is phishing? What are the different methods of phishing attack. 14M

(or)

b) What is whaling? Explain the difference between whaling and spear phishing and difference between spam and hoax mails. 14M

4. a) Explain how the "chain of custody" concept applies in computer/digital forensics and explain the difference between digital forensics and computer forensics. 14M

(or)

b) Explain how an email can be traced for forensic purpose. outline the various steps involved.

14M

5. a) What is a "security breach",SI and SPI ?Explain with appropriate examples. 14M

(or)

b) Explain "data veillance" and "browse-fingerprinting".Do these phenomena threaten our outline privacy? How. 14M

Parvathaneni Brahmayya Siddhartha College of Arts & Science, Vijayawada - 520 010.
(An Autonomous College in the jurisdiction of Krishna University)
M.Sc., (Computer Science) Programme - IV Semester

COURSE	COURSE CODE	L	T	P	C	Year
SOFTWARE TESTING METHODOLOGIES	CS4T4iv	4	-	-	4	2019-20

Course Outcomes:
1. Understand purpose of testing, models of testing, taxonomy of bugs, Flow Graph & Path Testing .
2. Implement Transaction Flow Testing, Data Flow Testing.
3. Know Domain Testing, Path Product and Regular Expression.
4. Familiar with Syntax Testing & Logic Based Testing.
5. Understand Transition Testing, Graph Matrices.

UNIT I
Introduction: Purpose of Testing, Dichotomies, Model for Testing.
Taxonomy of Bugs: Consequences of Bugs, Taxonomy of Bugs.
Flow Graphs and Path Testing: Basics Concepts of Path Testing, Predicates, Path Predicates and Achievable Paths, Path Sensitizing, Path Instrumentation, Implementation and Application of Path Testing.
UNIT II
Transaction Flow Testing: Transaction Flows, Transaction Flow Testing Techniques.
Dataflow Testing: Basics of Dataflow Testing, Strategies in Dataflow Testing, Application of Dataflow Testing.
UNIT III
Domain Testing: Domains and Paths, Nice & ugly Domains, Domain Testing, Domains and Interface Testing, Domains and Testability.
Paths, Path Products and Regular Expressions: Path Products & Path Expression, Reduction Procedure, Applications, Regular Expressions & Flow Anomaly Detection.
UNIT IV
Syntax Testing: Why What and How, A Grammar for Formats, Test Case Generation, Implementation and Application, Testability Tips.
Logic Based Testing: Overview, Decision Tables, Path Expressions, KV Charts, Specifications.
UNIT V
State, State Graphs and Transition Testing: State Graphs, Good & Bad State Graphs, State Testing, Testability Tips.
Graph Matrices and Application: Motivational Overview, Matrix of Graph, Relations, Power of a Matrix, Node Reduction Algorithm, Building Tools.
Note: Student should be given an exposure to a tool like JMeter or Winrunner.

Prescribed Text Book		
Author	Title	Publisher
1 Baris Beizer	Software Testing Techniques	Dreamtech, Second Edition.
2 Dr.K.V.K.K.Prasad	Software Testing Tools	Dreamtech

Reference Text Books		
Author	Title	Publisher
1 The Craft of Software Testing	Brian Marick	Pearson Education
2 Software Testing	P.C.Jorgensen	3rd edition, Aurbach Publications(Dist. by SPD).
3 Software Testing in the Real World	Edward Kit	Pearson
4 Effective Methods of Software Testing	Perry, John Wiley	2nd Edition, 1999

5	Art of Software Testing	Meyers, John Wiley	
6	Software Testing	N.Chauhan	Oxford University Press.
7	Software Testing	M.G.Limaye	TMH
8	Software Testing	S.Desikan, G.Ramesh	Pearson
9	Foundations of Software Testing	D.Graham & Others	Cengage Learning.

CS4T4iv

M.Sc.,(COMPUTER SCIENCE) DEGREE EXAMINATIONS-NOVEMBER 2019
FOURTH SEMESTER
SOFTWARE TESTING METHODOLOGIES

Time 3 Hours   **Max.Marks: 70**
Answer all questions. All question carry equal marks.   **5 × 14 M**

1. a) State and explain various dichotomies in Software testing. 14 M
(or)
   b) State and explain Predicate Blindness with examples. 7 M
   c) Write in detail about Predicate Interpretation and Predicate Coverage. 7 M

2. a) What is meant by Program's Control Flow? How is it useful for Path Testing? 7 M
   b) State and explain various Path Selection Rules? 7 M
(or)
   c) Write a short notes on the following 7 M
      (i) Slicing & Dicing (ii) Data Flow (iii) Debugging.
   d) Define Transaction & Transaction Flow Testing with an example. 7 M

3. a) What is meant by Domain Testing? Discuss about Nice and Ugly Domains. 7 M
   b) Write a short note on Domain Dimensionality. 7 M
(or)
   c) Explain Regular Expressions and Flow Anomaly Detection with an example. 14 M

4.a) Explain Unreachable States and Dead States in detail?. 7 M
   b) Define State Testing? What is the impact of Bugs in State Testing. 7 M
(or)
   c) What are the rules for Boolean Algebra? Illustrate the rules to the following expression and explain. 14 M

$$N6 = A + \overline{A}\,\overline{B}\,\overline{C}$$

$$N8 = (N6)B + \overline{A}B = AB + \overline{A}\overline{B}\overline{C}B + \overline{A}B$$

$$N11 = (N8)C + N6)\overline{B}C$$

$$N12 = N11 + \overline{A}\,\overline{B}\,C$$

$$N2 = N12 + (N8)\overline{C} + (N6)\,\overline{B}\,\overline{C}$$

5) a) Write a Partition Algorithm. 7 M
   b) Write about loops in matrix representation. 7 M
                                        (or)
   c) Discuss Node Reduction Algorithm. 7 M
   d) How a Node Reduction Optimization can be done. 7 M