E.M.G. YADAVA WOMEN'S COLLEGE, MADURAI – 625 014.

(*An Autonomous Institution – Affiliated to Madurai Kamaraj University*)

Re-accredited (**3rd Cycle**) with Grade **A+** & **CGPA 3.51** by NAAC

DEPARTMENT OF COMPUTER APPLICATIONS

CBCS With OBE

BACHELOR OF COMPUTER APPLICATIONS

PROGRAMME CODE - J

COURSE STRUCTURE

(w.e.f. 2022 – 2023 Batch onwards)

Annexure - 17

E.M.G. YADAVA WOMEN'S COLLEGE, MADURAI -14.

(An Autonomous Institution – Affiliated to Madurai Kamaraj University)
(Re –accredited (3rd cycle) with Grade A+ and CGPA 3.51 by NAAC)

DEPARTMENT OF COMPUTER APPLICATIONS – UG
CBCS with OBE
COURSE STRUCTURE
(w.e.f. 2022 – 2023 Batch onwards)

Semester	Part	Course Code	Title of the Course	Teaching hrs (per week)	Duration of Exam (hrs.)	Marks allotted			Credits
						CIA	S.E	Total	
III	I	**22OU1TA3**	Tamil	6	3	25	75	100	3
	II	**22OU2EN3**	English	6	3	25	75	100	3
	III	**22OUCA31**	**Core –** Java Programming	4	3	25	75	100	3
	III	**22OUCA32**	**Core –** Relational Database Management System	4	3	25	75	100	4
	III	**22OUCA3P**	**Core** - Java Programming Lab	3	3	40	60	100	3
	III	**22OUCAGEMA3**	**GEC** – Mathematics 2 - Numerical Methods	5	3	25	75	100	5
	IV	**22OUCASE3P**	**SEC -** RDBMS Lab	2	2	40	60	100	2
IV	I	**22OU1TA4**	Tamil	6	3	25	75	100	3
	II	**22OU2EN4**	English	6	3	25	75	100	3
	III	**22OUCA41**	**Core –**Data Structures and Computer Algorithms	4	3	25	75	100	3
	III	**22OUCA42**	**Core -**Data Communication and Computer Networks	4	3	25	75	100	4
	III	**22OUCA4P**	**Core** - Data Structures and Computer Algorithms Lab	3	3	40	60	100	3
	III	**22OUCAGEMA4**	**GEC -** Mathematics –3- Resource Management Techniques	5	3	25	75	100	5
	IV	**22OUCASE4P**	**SEC -** Networking Lab	2	2	40	60	100	2

GEC – Generic Elective Courses
SEC – Skill Enhancement Course
IDC – Inter Disciplinary Course
***AECC* –** Ability Enhancement Compulsory Course
DSEC – Discipline Specific Elective Course

NOTE:
The students are permitted to obtain additional credits (Optional)

1. MOOCs / SWAYAM / NPTEL Courses(Online)

Annexure - 17

Compulsory Courses:

Year	Semester	Nature of Course	Course code	Title of the Course	Hours	Offered to students of
I	I	Add on Course	22CAAOC 22CAAOCP	1. Open Source Technology 2.Open Source Technology Lab	30 Hrs	I B.C.A
II	III	Certificate Course	22CAC 22CACP	1.Multimedia Technology 2. Multimedia Lab	90 Hrs	II Year students of all other disciplines
III	V	Value Added Course	22CAVAC 22CAVACP	1.Cloud Computing with Microsoft Azure 2. Cloud Computing with Microsoft Azure - Lab	30 Hrs	III B.C.A

Department of Computer Applications				Class: II B.C.A				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Hours/ Week**	**CIA**	**External Exam**	**Total**
III	Core	22OUCA31	Java Programming	3	4	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	**Employability Oriented**	**Entrepreneurship oriented**
✔	✔	

Course Objectives:

1. Understand the basic concepts of OOPs.
2. Apply the looping statements to solve the mathematical problems.
3. Analyze different types of arrays and apply the concepts in Real time applications
4. Studies the concept of multithread and error.
5. Comprehend the Applet and java Servlet in java

Course Content:

Unit-I Fundamentals of Object-Oriented Programming: Introduction-Basic concepts of OOPs. **Java Evolution:** Java Features. **Overview of Java Language:** Simple Java Program-Java program Structure-Implementing a Java Program - Java Virtual Machine-Command Line Arguments. **Constants, Variables & Data types**: Introduction-Constants-Variables-Data Types-Declaration of Variables-Giving Values to Variables-Scope of Variables-Symbolic Constants-Type Casting-Getting Values of Variables. **Operators and Expressions:** Introduction-Arithmetic Operators-Relational Operators –Logical Operators –Assignment Operators -Increment and Decrement Operators-Conditional Operator –Bitwise Operators - Special Operators-Mathematical functions.

Unit-II Decision Making and Branching: Introduction-Decision making with if statement-Simple if Statement-The if…Else statement-Nesting of if…Else Statements-The Else if Ladder-Switch statement-The ? : Operator. **Decision Making and Looping**: Introduction-while Statement-do Statement-for Statement-Jumps in Loops-Labeled Loops. **Classes, Objects and Methods**: Introduction-Defining a Class-Fields Declaration-Method of Declaration-Creating Objects-Accessing Class Members-Constructors-Method Overloading-Static Members-Nesting of Methods-Inheritance: Extending a Class-Overriding Methods-Final

Variables and Methods-Final classes - Finalizer Methods-Abstract Methods and Classes-Visibility control.

Unit-III Arrays, Strings and Vectors: Introduction-One-dimensional Arrays-Creating An Array-Two-dimensional Arrays-Strings-Vectors-Wrapper Classes-Enumerated types. **Interfaces: Multiple Inheritances**: Introduction-Defining Interfaces-Extending Interfaces-Implementing Interfaces-Accessing Interface Variables. **Packages: Putting Classes Together:** Introduction-Java API Packages-Using System packages -Naming Conventions-Creating Packages-Accessing a Package-Using a Package-Adding a Class to a Package-Hiding Classes-Static Import.

Unit-IV Multithreaded Programming: Introduction-Creating Threads-Extending the thread Class-Stopping and Blocking a Thread-Life Cycle of a Thread. **Managing Errors and Exceptions:** Introduction-Types of errors - Exceptions-Syntax of Exception Handling Code-Multiple Catch Statements-Using Finally Statement.

Unit-V Applet Programming: Introduction- Applet Life Cycle- Applet tag. **Managing Input/output Files in Java**: Byte Stream classes - Character stream classes- Other Stream classes. **Java Database Connectivity:** Introduction – JDBC Architecture. **Java Servlets & Java Server:** Introduction – Evolution of N-Tier Architecture – Overview Servlets.

Book for Study:

E. Balagurusamy, (2015) *Programming with JAVA*, 6th Edition, TMH Publication, New Delhi.

Chapters:

Unit-I : 1.1,1.3,2.2,3.2,3.5,3.9,3.10,3.11,4.1 to 4.11,5.1 to 5.15

Unit-II : 6.1 to 6.8, 7.1 to 7.6, 8.1 to 8.16, 8.18

Unit-III : 9.1 to 9.8, 10.1 to 10.5, 11.1 to 11.11

Unit- IV : 12.1 to 12.11, 13.1 to 13.7, 13.9

Unit -V : 14.1,14.5,16.1, 16.4,16.17,18.1,18.2,19.1,19.2,19.6

Books for References:

1.Hari Mohan Pandey (2012) ,*Java Programming* , 1st Edition.

2. Ken Arnold , David Holmes (2008) , *The Java Programming Language* , 3rd Edition ,Pearson Education.

3. Danny Goodman (2005), *Java Script Bible*, 4thEdition ,WILEY -Dreamtech India Pvt.ltd India.

Web Resources/ E.Books:

1. https://www.tutorialspoint.com/java/java_tutorial.pdf
2. https://www.javatpoint.com/java-basics
3. https://www.coursehero.com/file/58621561/java-book-pdf-by-balaguruswamypdf/

Pedagogy:

Chalk and Talk, PPT, group discussion, quiz, ICT tools and Peer Teaching.

Rationale for nature of Course:

Knowledge and Skill: To make students aware of the role of Programming skill in Java and improve their program writing in Java Programming

Activities to be given: Students shall be allow to write program in many concepts

Course Learning Outcomes (CLO's):

CLO	Course Outcomes Statement	Knowledge According to Bloom's Taxonomy (Up to K level)
CLO1	Understand the Basic concepts of OOPs.	K1 to K3
CLO2	Study the Various branching, looping statements in Java	K1 to K4
CLO3	Apply knowledge to develop java Programs by implementing Arrays and String manipulation	K1 to K4
CLO4	Identify how to create multithread programming used in Java	K1 to K4
CLO5	Analyze the Concept of applet and Java Servlets.	K1 to K4

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	2	1	1	2	2	2
CLO2	3	3	2	3	2	1
CLO3	3	2	2	3	2	2
CLO4	2	3	2	3	2	1
CLO5	2	2	3	3	2	1

1-Basic Level 2- Intermediate Level 3- Advanced Level

LESSON PLAN: TOTAL HOURS (60 HRS)

UNIT	DESCRIPTION	HRS	MODE
I	Fundamentals of Object-Oriented Programming: Introduction -Basic concepts of OOPs. Java Evolution: Java Features. Overview of Java Language: Simple Java Program-Java program Structure-Implementing a Java Program - Java Virtual Machine-Command Line Arguments. Constants, Variables & Data types: Introduction-Constants-Variables-Data Types-Declaration of Variables-Giving Values to Variables-Scope of Variables-Symbolic Constants-Type Casting-Getting Values of Variables. Operators and Expressions: Introduction-Arithmetic Operators-Relational Operators –Logical Operators –Assignment Operators - Increment and Decrement Operators-Conditional Operator –Bitwise Operators -Special Operators-Mathematical functions.	15	Chalk and Talk, PPT, group discussion , quiz, on the spot test
II	Decision Making and Branching: Introduction-Decision making with if statement-Simple if Statement-The if…Else statement-Nesting of if…Else Statements-The Else if Ladder-Switch statement-The ? : Operator. Decision Making and Looping: Introduction-while Statement-do Statement-for Statement-Jumps in Loops-Labeled Loops. Classes, Objects and Methods: Introduction-	10	Chalk and Talk, PPT, group discussion, quiz, on the spot test

	Defining a Class-Fields Declaration-Method of Declaration-Creating Objects-Accessing Class Members-Constructors-Method Overloading-Static Members-Nesting of Methods-Inheritance: Extending a Class-Overriding Methods-Final Variables and Methods-Final classes-Finalizer Methods-Abstract Methods and Classes-Visibility control.		
III	Arrays, Strings and Vectors: Introduction-One-dimensional Arrays- Creating An Array-Two-dimensional Arrays-Strings-Vectors-Wrapper Classes-Enumerated types. Interfaces: Multiple Inheritances: Introduction- Defining Interfaces-Extending Interfaces- Implementing Interfaces-Accessing Interface Variables. Packages: Putting Classes Together: Introduction-Java API Packages-Using System packages-Naming Conventions-Creating Packages-Accessing a Package-Using a Package-Adding a Class to a Package-Hiding Classes-Static Import.	10	Chalk and Talk, PPT, group discussion, quiz, on the spot test
IV	Multithreaded Programming: Introduction - Creating Threads-Extending the thread Class-Stopping and Blocking a Thread-Life Cycle of a Thread. Managing Errors and Exceptions: Introduction-Types of errors-Exceptions-Syntax of Exception Handling Code-Multiple catch Statements-Using Finally Statement.	12	Chalk and Talk, PPT, group discussion, quiz, on the spot test

V	Applet Programming: Introduction- Applet Life Cycle- Applet tag. Managing Input/output Files in Java: Byte Stream classes-Character stream classes- Other Stream classes. Java Database Connectivity: Introduction – JDBC Architecture. Java Servlets & Java Server: Introduction – Evolution of N-Tier Architecture – Overview Servlets.	13	Chalk and Talk, PPT, group discussion, quiz, on the spot test

Course Designer

Dr.(Mrs.) S. VIJAYASANKARI

Department of Computer Applications				Class: II B.C.A				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Hours/ Week**	**CIA**	**External Exam**	**Total**
III	Core	22OUCA32	Relational Database Management System	4	4	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	**Employability Oriented**	**Entrepreneurship oriented**
✔	✔	

Course Objectives:

1. Master the basics of SQL and construct queries using SQL
2. Understand the relational database design principles.
3. Provide data integrity Constraints
4. Apply the Normal form and Functional Dependencies
5. Analyze the concept of Internet Applications in Database Management System

Course Content:

Unit -I Overview of Database Systems: Managing Data – A Historical Perspective – File Systems Versus a DBMS – Advantages of a DBMS – Describing and Storing Data in a DBMS – Queries in a DBMS – Transaction Management – Structure of a DBMS – People Who Work with Databases. **Introduction to Database Design:** Database Design and ER Diagrams – Entities, Attributes, and Entity Sets – Relationships and Relationship Sets – Additional Features of ER Model – Conceptual Design with the ER Model.

Unit -II The Relational Model: Introduction to the Relational Model – Integrity Constraints over Relations – Enforcing Integrity Constraints – Querying Relational Data – Logical Database Design: ER to Relational – Introduction to Views – Destroying / Altering Tables and Views. **Overview of Storage And Indexing:** Data on External Storage – File organizations and Indexing - Index Data Structures – Comparison of File Organization.

Unit -III SQL Queries, Constraints, Triggers: The Form of a Basic SQL Query - UNION, INTERSECT, and EXCEPT – Nested Queries – Aggregate Operators – Null Values – Complex Integrity Constraints in SQL – Triggers and Active Databases – Designing Active Databases.

Unit- IV Schema **Refinement and Normal Forms:** Introduction to Schema Refinement – Functional Dependencies – Reasoning about FD's – Normal Forms – Properties of Decompositions – Normalization – Schema Refinement in Database Design – Other Kinds of Dependencies

Unit –V Internet Applications: Introduction-Internet Concepts-HTML Documents-XML Documents-The Three-Tier Application Architecture. **Security and Authorization:** Introduction to Database Security - Access Control – Discretionary Access Control – Mandatory Access Control – Security for Internet Applications – Additional Issues Related to Security.

Book for Study:

Raghu Ramakrishnan and Johannes Gehrke, (2003),Database Management Systems, McGraw Hill International Edition, 3rd Edition.

Chapters:

Unit -I: 1.1 – 1.9, 2.1 – 2.5

Unit -II: 3.1 – 3.7, 8.1 to 8.4

Unit -III: 5.2 – 5.9

Unit- IV: 19.1 – 19.8

Unit- V: 7.1 to 7.5, 21.1 to 21.6

Books for References:

1. G.K. Gupta, Database Management Systems, (2015), McGraw Hill Education, 4th reprint.
2. Abraham Silberschatz, Henry F.Korth, S.Sudarshan, (2010),Database System Concepts, McGraw Hill, 6th Edition.
3. R.Pannerselvam, (2015), Database Management Systems, PHI Learning, 2nd Edition.

Web Resources/ E.Books:

1. http://www.rjspm.com/PDF/BCA-428%20Oracle.pdf
2. https://www.slideshare.net/Bathshebaparimala/rdbms-notes
3. https://www.javatpoint.com/what-is-rdbms

Pedagogy:

Chalk and Talk, PPT, group discussion, quiz, ICT tools and Peer Teaching.

Rationale for nature of Course:

Knowledge and Skill: To make students aware of the database management system (DBMS) that stores data in a row-based table structure which connects related data elements.

Activities to be given: Students shall be allow to write Queries in many concepts

Course Learning Outcomes (CLO's):

CLO	Course Outcomes Statement	Knowledge According to Bloom's Taxonomy (Up to K level)
CLO1	Understand the Basic concept of SQL Queries	K1 to K4
CLO2	Study the Various Relational Model, Storage and Indexing	K1 to K4
CLO3	Apply SQL Queries, Constraints and Triggers	K1 to K4
CLO4	Identify the Normal Form and Functional Dependencies	K1 to K4
CLO5	Analyze Internet Application in Database and Security mechanism	K1 to K4

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	2	1	1	2	2	2
CLO2	3	2	2	3	2	1
CLO3	3	2	2	3	2	2
CLO4	2	3	2	3	2	1
CLO5	2	2	3	3	2	1

1-Basic Level 2- Intermediate Level 3- Advanced Level

Annexure - 17

LESSON PLAN: TOTAL HOURS(60HRS)

UNIT	DESCRIPTION	HRS	MODE
I	Overview of Database Systems: Managing Data – A Historical Perspective – File Systems Versus a DBMS – Advantages of a DBMS – Describing and Storing Data in a DBMS – Queries in a DBMS – Transaction Management – Structure of a DBMS – People Who Work with Databases. Introduction to Database Design: Database Design and ER Diagrams – Entities, Attributes, and Entity Sets – Relationships and Relationship Sets – Additional Features of ER Model – Conceptual Design with the ER Model.	10	Chalk and Talk, PPT, group discussion , quiz, on the spot test
II	The Relational Model: Introduction to the Relational Model – Integrity Constraints over Relations – Enforcing Integrity Constraints – Querying Relational Data – Logical Database Design: ER to Relational – Introduction to Views – Destroying / Altering Tables and Views. Overview of Storage And Indexing: Data on External Storage – File organizations and Indexing - Index Data Structures – Comparison of File Organization.	10	Chalk and Talk, PPT, group discussion , quiz, on the spot test
III	SQL Queries, Constraints, Triggers: The Form of a Basic SQL Query - UNION, INTERSECT, and EXCEPT – Nested Queries – Aggregate Operators – Null Values – Complex Integrity Constraints in	12	Chalk and Talk, PPT, group discussion , quiz, on the spot test

	SQL – Triggers and Active Databases – Designing Active Databases.		
IV	Schema Refinement and Normal Forms: Introduction to Schema Refinement – Functional Dependencies – Reasoning about FD's – Normal Forms – Properties of Decompositions – Normalization – Schema Refinement in Database Design – Other Kinds of Dependencies	14	Chalk and Talk, PPT, group discussion , quiz, on the spot test
V	Internet Applications: Introduction-Internet Concepts-HTML Documents-XML Documents-The Three-Tier Application Architecture. Security and Authorization: Introduction to Database Security - Access Control – Discretionary Access Control – Mandatory Access Control – Security for Internet Applications – Additional Issues Related to Security.	14	Chalk and Talk, PPT, group discussion , quiz, on the spot test

Course Designer

MRS. R. KEERTHANA

Annexure - 17

Department of Computer Applications				Class: II B.C.A				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Hours/ Week**	**CIA**	**External Exam**	**Total**
III	Core	22OUCA3P	Java Programming Lab	3	3	40	60	100

Nature of the Course		
Knowledge and Skill Oriented	**Employability Oriented**	**Entrepreneurship oriented**
✔	✔	

PROGRAM LIST

1. Print prime numbers
2. Single Inheritance
3. Multiple Inheritances
4. Function over loading
5. Function Overriding
6. Array
7. Matrix multiplication
8. Interface
9. Packages.
10. Exception Handling
11. Constructor
12. Multithread program
13. FileInputStream/ FileOutPutStream Classes
14. Appending a Files
15. String is palindrome or not
16. Login Authentication
17. Applet that displays a simple message.
18. Marquee of Text
19. Mouse Event
20. Display an Image
21. FileInputStream/ FileOutPutStream Classes.
22. Creating a MenuBar

23. Draw a figure using Graphics.
24. Display a different Shape.
25. Display a Clock.

Books for References:

1. Hari Mohan Pandey (2012) ,*Java Programming* , 1st Edition.
2. Ken Arnold , David Holmes (2008) , *The Java Programming Language* , 3rd Edition ,Pearson Education.
3. Danny Goodman (2005), *Java Script Bible*, , 4thEdition ,WILEY -Dreamtech India Pvt.ltd India.

Web Resources / E.Books:

1.https://www.bharathuniv.ac.in/downloads/csc/BCS6L3Programming%20in%20Java%20Lab.pdf

2.https://www.atri.edu.in/images/pdf/departments/JAVA%20PROGRAMMING%20%20MANUAL.pdf

3 http://www.jnit.org/wp-content/uploads/2020/04/4CS4-25-Java-Lab-Manual.pdf

Pedagogy

Practical Test with viva voce, Group Discussion, Interaction, Quiz.

LESSON PLAN FOR PRACTICAL: TOTAL HOURS (45 HRS)

CYCLE	DESCRIPTION	HRS	MODE
1	1.Print prime numbers 2.Single Inheritance 3. Multiple Inheritances 4.Function over loading 5. Function Overriding	8	Writing and executing the program in a system

2	6.Array 7. Matrix multiplication 8. Interface 9. Packages. 10. Exception Handling	10	Writing and executing the program in a system
3	11. Constructor 12. Multithread program 13 FileInputStream/ FileOutPutStream Classes 14.Appending a Files 15. String is palindrome or not	11	Writing and executing the program in a system
4	16.Login Authentication 17.Applet that displays a simple message. 18.Marquee of Text 19.Mouse Event 20. Display an Image	8	Writing and executing the program in a system
5	21.FileInputStream/FileOutPutStream Classes. 22.Creating a MenuBar 23.Draw a figure using Graphics. 24. Display a different Shape. 25.Display a Clock.	8	Writing and executing the program in a system

Course Designer

MRS. P. INDHUJA

Annexure - 17

EVALUATION (PRACTICAL)
Core Lab / Skill Enhancement Course Lab

Internal (Formative) : 40 marks

External (Summative) : 60 marks

Total :100 marks

Question Paper Pattern for Internal Practical Examination: 40 Marks

- ✓ There will be Two Internal Practical Examination.
- ✓ Duration of Internal Examination will be 2 hours.

S.No	Components	Marks
1.	I – Writing the Program (2x8)	16
2.	II – Test and Debug the Program (2x4)	08
3.	III - Printing the Correct Output (2x4)	08
4.	IV- Viva	03
5.	V –Record book	05
	Total	**40**

Question Paper Pattern for External Practical Examination: 60 Marks

- ✓ Duration of External Examination will be 3 hours.

S.No	Components	Marks
1.	I – Writing the Program (2x10)	20
2.	II – Test and Debug the Program (2x10)	20
3.	III- Printing the Correct Output (2x5)	10
4.	IV – Viva	5
5.	V - Record book	5
	Total	**60**

Annexure - 17

Department of Computer Applications				Class: II B.C.A				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Hours/ Week**	**CIA**	**External Exam**	**Total**
III	Core	22OUCASE3P	RDBMS Lab	2	2	40	60	100

Nature of the Course		
Knowledge and Skill Oriented	**Employability Oriented**	**Entrepreneurship oriented**
✔	✔	

PROGRAM LIST

SQL QUERIES:

1. DDL Commands.

i. Creating objects: tables, views, users, sequences, Collections etc.

ii. Privilege management through the Grant/Revoke commands

iii. Transaction processing using Commit/Rollback

iv. Save points.

2. DML Commands

3. Create a table Student-master with the following fields client_no,name, address, city, state, pincode, remarks, bal_due with suitable data types. Insert and Delete data into client_master.

i. Create another table supplier_table from client_master. Select all the fields and rename client_no with supplier_no and name with supplier_name.

ii. Insert data into client_master

iii. Insert data into supplier_master from client_master.

iv. Delete the selected row in the client_master.

4. Multi-table queries(JOIN OPERATIONS)

i. Simple joins (no INNER JOIN)

ii. Inner-joins (two and more (different) tables) & Inner-recursive-joins (joining to itself)

iii. Outer-joins (restrictions as part of the WHERE and ON clauses)

iv. Using where & having clauses

5.Set Oriented Operations (Union, Difference, Intersection, division)

6. Create a table student_master with the following fields name, regno, dept and year with suitable data types. Use Select command to do the following.

i. Select the student's name column.

ii. Eliminate the duplicate entry in table.

iii. Sort the table in alphabetical order.

iv. Select all the Students of a particular department.

7. Create a table sales_order_details with the s_order_no as primary key and with the following fields: product_no, description, qty_ordered, qty_disp,product_rate, profit_percent, sell_price, supplier_name.Processing the selection operation

8. Create a Employee table with following Fields Eno,Ename,jobtype,manager,hire date,dno,commission,salary, Processing of sub queries & multiple sub queries.

9.Nested queries

i. In, Not In

ii. Exists, Not Exists

iii. Dynamic relations (as part of SELECT, FROM, and WHERE clauses)

PL/SQL QUERIES:

10. i. Programs using named and unnamed blocks

ii. Programs using Cursors, Cursor loops and records

11.i. Creating stored procedures, functions and packages

ii. Triggers and auditing triggers

12.Create a table master book to contain the information of magazine code, magazine name and publisher. Weekly/biweekly/monthly, price. Write PL/SQL block to perform insert, update and delete operations on the above table.

13. Create a table to contain phone number, user name, address of the phone user. Write a function to search for a address using phone numbers.

14. Create a table stock to contain the item-code, item-name, current stock, date of last purchase. Write a stored procedure to seek for an item using item-code and delete it, if the date of last purchase is before 1 year from the current date. If not, update the current stock.

15.Create a table to contain the information about the voters in a particular constituency. Write a proper trigger to update or delete a row in the table.

Annexure - 17

LESSON PLAN FOR PRACTICAL: TOTAL HOURS (30 HRS)

CYCLE	DESCRIPTION	HRS	MODE
1	1. DDL Commands. i. Creating objects: tables, views, users, sequences, Collections etc. ii. Privilege management through the Grant/Revoke commands iii. Transaction processing using Commit/Rollback iv. Save points. 2. DML Commands	5	Writing and executing the program in a system
2	3. Create a table Student-master with the following fields client_no,name, address, city, state, pincode, remarks, bal_due with suitable data types. Insert and Delete data into client_master. i. Create another table supplier_table from client_master. Select all the fields and rename client_no with supplier_no and name with supplier_name. ii. Insert data into client_master iii. Insert data into supplier_master from client_master. iv. Delete the selected row in the client_master. 4. Multi-table queries(JOIN OPERATIONS) i. Simple joins (no INNER JOIN) ii. Inner-joins (two and more (different) tables) & Inner-recursive-joins (joining to itself) iii Outer-joins (restrictions as part of the WHERE and ON clauses) iv. Using where & having clauses	3	Writing and executing the program in a system

3	6. Create a table student_master with the following fields name, regno, dept and year with suitable data types. Use Select command to do the following. i. Select the student's name column. ii. Eliminate the duplicate entry in table. iii. Sort the table in alphabetical order. iv. Select all the Students of a particular department. 7. Create a table sales_order_details with the s_order_no as primary key and with the following fields: product_no, description, qty_ordered, qty_disp,product_rate,	7	Writing and executing the program in a system
4	8. Create a Employee table with following Fields Eno,Ename,jobtype,manager,hire date,dno,commission,salary, Processing of sub queries & multiple sub queries. 9.Nested queries i. In, Not In ii. Exists, Not Exists iii. Dynamic relations (as part of SELECT, FROM, and WHERE clauses) 10. i. Programs using named and unnamed blocks ii. Programs using Cursors, Cursor loops and records 11.i. Creating stored procedures, functions and packages ii. Triggers and auditing triggers	8	Writing and executing the program in a system

5	12.Create a table master book to contain the information of magazine code, magazine name and publisher. Weekly/biweekly/monthly, price. Write PL/SQL block to perform insert, update and delete operations on the above table. 13. Create a table to contain phone number, user name, address of the phone user. Write a function to search for a address using phone numbers. 14. Create a table stock to contain the item-code, item-name, current stock, date of last purchase. Write a stored procedure to seek for an item using item-code and delete it, if the date of last purchase is before 1 year from the current date. If not, update the current stock. 15.Create a table to contain the information about the voters in a particular constituency. Write a proper trigger to update or delete a row in the table.	7	Writing and executing the program in a system

Course Designer

MRS. R. KEERTHANA

Annexure - 17

EVALUATION (PRACTICAL)
Core Lab / Skill Enhancement Course Lab

Internal (Formative) : 40 marks

External (Summative) : 60 marks

Total : 100 marks

Question Paper Pattern for Internal Practical Examination: 40 Marks

- ✓ There will be Two Internal Practical Examination.
- ✓ Duration of Internal Examination will be 2 hours.

S.No	Components	Marks
1.	I – Writing the Program (2x8)	16
2.	II – Test and Debug the Program (2x4)	08
3.	III - Printing the Correct Output (2x4)	08
4.	IV- Viva	03
5.	V –Record book	05
	Total	**40**

Question Paper Pattern for External Practical Examination: 60 Marks

- ✓ Duration of External Examination will be 3 hours.

S.No	Components	Marks
1.	I – Writing the Program (2x10)	20
2.	II – Test and Debug the Program (2x10)	20
3.	III- Printing the Correct Output (2x5)	10
4.	IV – Viva	5
5.	V - Record book	5
	Total	**60**

Department of Computer Applications				Class: II BCA				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Hours/ Week**	**CIA**	**External Exam**	**Total**
IV	Core	22OUCA41	Data Structures and Computer Algorithms	3	4	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	**Employability Oriented**	**Entrepreneurship Oriented**
✔	✔	

Course Objectives

1. Understand the basic concept to process the data
2. Apply array using linked list, queue and stack concept
3. Apply the concept of Trees and graphs
4. Understand the Algorithm concept to sort and find the minimum distance
5. Identify the Greedy method and Backtracking

Course Content:

Unit-I Introduction And Overview: Introduction-Basic Terminology; Elementary Data Organization - Data Structures - Data Structure Operations. **String Processing:** Introduction – Basic Terminology – Storing Strings - Character Data Type – String Operation. **Arrays Records and Pointers:** Introduction-Linear Arrays-Representation of Linear Arrays in Memory-Traversing Linear Arrays-Inserting and Deleting-Searching; Linear Search - Multidimensional Arrays.

Unit-II Linked Lists: Introduction-Linked Lists- Header Linked Lists -Two-way Lists. **Stacks, Queues, Recursion:** Introduction - Stacks – Array Representation of Stack- Linked Representation of Stack- Towers of Hanoi - Queues – Linked Representation of Queues - Deques-Priority Queues.

Unit- III Trees: Introduction- Binary Trees - Representation of Binary Trees in Memory – Traversing Binary Trees – Binary Search Trees. **Graphs and Their Applications:** Introduction-Graph Theory Terminology- Warshall's Representation of a graph - Operations on Graphs.

Unit- IV Introduction: What is an Algorithm? – Algorithm Specification – Performance Analysis – **Divide and Conquer:** General method – Binary Search – Finding the Maximum and Minimum – Merge Sort – Quick Sort.

Unit -V The Greedy Method: General Method – Knapsack problem – Job Sequencing with Deadlines – Minimum cost Spanning trees-Prim's Algorithm – Kruskal Algorithm – Optimal Storage on tapes – Optimal merge patterns – Single –sources Shortest Paths-**Backtracking:** The General Method – The 8-Queens Problem.

Books for study:

1. Seymour Lipschutz,(2013), *Data Structures*, McGraw Hill Education(India) Pvt Ltd, New Delhi, Revised 1st Edition.

Chapters :

Unit – I : 1.1 to 1.4, 3.1 to 3.5, and 4.1, to 4.5, 4.7, and 4.8

Unit – II : 5.1, 5.2, 5.9, 5.10, 6.1 to 6.4, 6.8, 6.10 to 6.13

Unit – III: 7.1 to 7.4, 7.7, 8.1, 8.2, 8.4, 8.6

2. Ellis Horrowitz, SaratajSahni, SanguthevarRajasekaran, (2008), *Computer Algorithms / C++*, Universities Press Pvt Ltd, Hyderabad, 2nd Edition.

Chapters :

Unit IV : 1.1 to 1.3, 3.1,3.3 to 3.6

Unit V : 4.1,4.3,4.5,4.6-4.6.1,4.6.2,4.7 to 4.9,7.1,7.2

Books for References:

1. D.Malik , *Data Structures using C++* , Cengage Learning , 2nd Edition , 2009
2. Mark Allen Weiss , *Data Structures and Algorithm Analysis in C++* , PHI , 3rd Edition, 2006
3. Mark Allen weiss, *Data structures & algorithms analysis In C++*,Dorlingkindersely(India) PvtLtd,Pearson Education,1st Edtion,2007.

Web Resources / E.Books:

1. https://www.geeksforgeeks.org/data-structures/#practice
2. https://www.codechef.com/certification/data-structures-and-algorithms/prepare
3. https://www.pepcoding.com/resources/

Pedagogy:

Chalk and Talk, PPT, Group discussion, Quiz.

Rationale for nature of Course:

Knowledge and Skill: To make students allows storing data while maintaining the data's correctness and efficiency in a computer program.

Activities to be given: Students shall be allowed to write program in many concepts.

Course learning Outcomes (CLO's):

CLO	Course learning Outcomes (CLO's)	Knowledge (According to Bloom's Taxonomy)
CLO1	Understand to Examine the Basic Concepts of Data Structure Operations	K1 to K3
CLO2	Identify how linked list and stack is used	K1 to K3
CLO3	Apply the Knowledge to Develop Data Structure Programs by implementing Binary Tree and Graphs	K1 to K3
CLO4	Apply the Knowledge to Construct Data Structure Algorithm based Programs using Divide and Conquer and Sorting.	K1 to K3
CLO5	Analyze the Concept of Algorithms using Greedy Method	K1 to K3

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	2	2	3	2	2	1
CLO2	2	3	3	2	2	2
CLO3	1	2	3	2	3	2
CLO4	3	3	2	2	3	2
CLO5	2	3	3	2	3	2

1-Basic Level 2- Intermediate Level 3- Advanced Level

Annexure - 17

LESSON PLAN: TOTAL HOURS (60HRS)

UNIT	DESCRIPTION	HRS	MODE
I	Introduction and Overview: Introduction-Basic Terminology; Elementary Data Organization-Data Structures-Data Structure Operations. String Processing: Introduction – Basic Terminology – Storing Strings - Character Data Type – String Operation. Arrays Records and Pointers: Introduction-Linear Arrays-Representation of Linear Arrays in Memory-Traversing Linear Arrays-Inserting and Deleting-Searching; Linear Search - Multidimensional Arrays.	12	Chalk and Talk, PPT, group discussion, OHP presentations, quiz, on the spot test and Virtual Labs.
II	Linked Lists: Introduction-Linked Lists-Header Linked Lists -Two-way Lists. Stacks, Queues, Recursion: Introduction - Stacks – Array Representation of Stack-Linked Representation of Stack- Towers of Hanoi - Queues – Linked Representation of Queues - Deques-Priority Queues.	10	Chalk and Talk, PPT, group discussion, OHP presentations, quiz, on the spot test and Virtual Labs.
III	Trees: Introduction- Binary Trees - Representation of Binary Trees in Memory – Traversing Binary Trees – Binary Search Trees-Graphs and Their Applications: Introduction-Graph Theory Terminology- Warshall's Representation of a graph - Operations on Graphs.	10	Chalk and Talk, PPT, group discussion, OHP presentations, quiz, on the spot test and Virtual Labs

IV	Introduction: What is an Algorithm? – Algorithm Specification – Performance Analysis – Divide and Conquer: General method – Binary Search – Finding the Maximum and Minimum – Merge Sort – Quick Sort.	14	Chalk and Talk, PPT, group discussion, OHP presentations, quiz, on the spot test and Virtual Labs
V	The Greedy Method: General Method – Knapsack problem – Job Sequencing with Deadlines – Minimum cost Spanning trees-Prim's Algorithm – Kruskal Algorithm – Optimal Storage on tapes – Optimal merge patterns – Single –sources Shortest Paths-Backtracking: The General Method – The 8-Queens Problem.	14	Chalk and Talk, PPT, group discussion , OHP presentations, quiz, on the spot test and Virtual Labs

Course Designer

MRS. K. KRISHNAVENI

Department of Computer Applications				Class: II BCA				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Hours/ Week**	**CIA**	**External Exam**	**Total**
IV	Core	22OUCA42	Data Communication and Computer Networks	4	4	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	**Employability Oriented**	**Entrepreneurship Oriented**
✔	✔	

Course Objectives

1. To understand the basic Concepts of Network architecture.
2. To study the data representation and error detection.
3. Access the concept of Wide area networks.
4. Understand the Concept of integrated services.
5. Identify the Network applications and security.

Course Content:

Unit : I Introduction: A Brief History – Application – Computer Networks – Categories of Networks – Standards and Standards Organizations. **Network Architectures and OSI Model:** Network Architecture – Open Systems and OSI Model - TCP/IP Architecture – Advantages and Disadvantages of Layer Architectures - Distributed Systems and Client-Server Models.

Unit: II Communication Media and Data Transmission: Data Representation and Transmission –Fourier Analysis–Analog and Digital Data Transmission – Modulation and Demodulation - Transmission media –Wireless Communications – Data Transmission Basics – Transmission Mode – Interfacing - Multiplexing. **Error Detection and Correction:** Types of Errors – Error Detection – Error Correction.

Unit: III Data Link Control and Protocol Concepts: Flow Control – Error Control– Asynchronous Protocols – Synchronous Protocols – High-Level Data Link Control (HDLC). Wide Area Networks: WAN Transmission Methods - WAN Transmission Equipments – WAN Design and Multicast Considerations – WAN Protocols.

Unit : IV Integrated Services and Routing Protocols: Integrating Services – ISDN Services –ISDN Topology – ISDN Protocols – Broadband ISDN – Asynchronous Transfer Mode (ATM) –Principal Characteristics of ATM–Frame Relay. **Internetworking:** Principles of Internetworking – Datagram and Virtual Circuit Services - Routing Principles – Internetwork Protocols (IP) –Shortcomings of IPv4 - IP Next Generation.

Unit: V Network Applications: Client-Server Model – Domain Name System (DNS) – Telnet – File transfer And Remote File Access – Electronic Mail – World Wide Web (WWW). Networking Security: Fundamental Concepts – A Model for Network Security–Malicious Software – Security Services and Cryptography–Security Network Using Firewall– Intrusion Detection – Network Security Tools

Book for study:

Brijendra Singh,(2014), *Data Communications and Networks,* 4th Edition, PHI Learning Private Limited,,New Delhi.

Chapters:

Unit - I : 1.1-1.4, 1.8, and 2.1-2.5.

Unit - II : 3.1-3.9,3.11, 4.1- 4.3.

Unit - III : 6.1-6.5, 8.1, 8.3, 8.4, 8.5.

Unit - IV : 9.1-9.8, 12.1 -12.3, 12.5 - 12.7.

Unit - V : 14.1 - 14.6, 16.1, 16.4 -16.9.

Books for Reference:

1. Comer,(2004),*Computer Networks & Internet with Internet Applications*, 4th Edition, PearsonEducation, Pearson Prentice Hall, NewDelhi .

2. Achyut s Godbole ,AtulKahate ,(2013), *Data Communications And Networks*, 2nd Edition, TataMcGrawHill.

3.SiminHaykinsS, (2006),*Communication System*,4th Edition,Tata McGraw- Hill, New Delhi.

Web Resources / E.Books:

1.http://eti2506.elimu.net/Introduction/Books/Data%20Communications%20and%20Networking%20By%20Behrouz%20A.Forouzan.pdf

2.https://www.tutorialspoint.com/data_communication_computer_network/data_communication_computer_network_tutorial.pdf

3. http://www.faadooengineers.com/threads/3371-Data-communication-and-networking-Ebook-PDF-DCN-Ebook

Pedagogy:

Chalk and Talk, PPT, Group discussion,Quiz.

Rationale for nature of Course:

Knowledge and Skill: Data communications refers to the transmission of this digital data between two or more computers and a computer network or data network is a telecommunications network that allows computers to exchange data.

Activities to be given: Students shall be allowed to write the many concepts in Networking

Course learning Outcomes (CLO's):

CLO	Course learning Outcomes (CLO's)	Knowledge (According to Bloom's Taxonomy)
CLO1	Understand to Examine the Basic Concepts of Network architecture.	K1 to K3
CLO2	Identify the data representation and error detection.	K1 to K3
CLO3	Apply the Knowledge to Wide area Network	K1 to K3
CLO4	Apply the Knowledge to Concept of integrated services and IPV4 Generation.	K1 to K3
CLO5	Analyze the Concept of Network Security Tools	K1 to K3

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	2	2	3	2	2	1
CLO2	2	3	3	2	2	2
CLO3	1	2	3	3	3	2
CLO4	3	3	2	3	3	2
CLO5	2	3	3	2	3	2

1-Basic Level 2- Intermediate Level 3- Advanced Level

LESSON PLAN: TOTAL HOURS (60 HRS)

UNIT	DESCRIPTION	HRS	MODE
I	Introduction: A Brief History – Application – Computer Networks – Categories of Networks – Standards and Standards Organizations. Network Architectures and OSI Model: Network Architecture – Open Systems and OSI Model - TCP/IP Architecture – Advantages and Disadvantages of Layer Architectures - Distributed Systems and Client-Server Models.	12	Chalk and Talk, PPT, group discussion , OHP presentations, quiz, on the spot test and Virtual Labs.
II	Communication Media and Data Transmission: Data Representation and Transmission –Fourier Analysis–Analog and Digital Data Transmission – Modulation and Demodulation - Transmission media –Wireless Communications – Data Transmission Basics – Transmission Mode – Interfacing - Multiplexing. Error Detection and Correction: Types of	10	Chalk and Talk, PPT, group discussion , OHP presentations, quiz, on the spot test and Virtual Labs.

	Errors – Error Detection – Error Correction.		
III	Data Link Control and Protocol Concepts: Flow Control – Error Control– Asynchronous Protocols – Synchronous Protocols – High-Level Data Link Control (HDLC). Local Area Networks: LAN Transmission Equipment – Ethernet: IEEE Standard 802.3 - Token Bus: IEEE Standard 802.4 - Token Ring: IEEE Standard 802.5 – Fiber Distributed Data Interface (FDDI) – Distributed Queue Dual Bus - (DQDB): IEEE Standard 802.6 – Ethernet Technologies.	10	Chalk and Talk, PPT, group discussion , OHP presentations, quiz, on the spot test and Virtual Labs
IV	Integrated Services and Routing Protocols: Integrating Services – ISDN Services –ISDN Topology – ISDN Protocols – Broadband ISDN – Asynchronous Transfer Mode (ATM) – Principal Characteristics of ATM– FrameRelay. Internetworking: Principles of Internetworking – Datagram and Virtual Circuit Services - Routing Principles – Internetwork Protocols (IP) – Shortcomings of IPv4 - IP Next Generation.	14	Chalk and Talk, PPT, group discussion , OHP presentations, quiz, on the spot test and Virtual Labs

V	Network Applications: Client-Server Model – Domain Name System (DNS) – Telnet – File transfer And Remote File Access – Electronic Mail – World Wide Web (WWW). Networking Security: Fundamental Concepts – A Model for Network Security–Malicious Software – Security Services and Cryptography– Security Network Using Firewall– Intrusion Detection – Network Security Tools	14	Chalk and Talk, PPT, group discussion , OHP presentations, quiz, on the spot test and Virtual Labs

COURSE DESIGNER

MRS. P. INDHUJA

Annexure - 17

Department of Computer Applications				Class : II B.C.A				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Hours/ Week**	**CIA**	**External Exam**	**Total**
IV	Core	22OUCA4P	Data Structures and Computer Algorithms Lab	3	3	40	60	100

Nature of the Course		
Knowledge and Skill Oriented	**Employability Oriented**	**Entrepreneurship oriented**
✔	✔	

PROGRAM LIST

Data Structures:

1. Implementing Stack as an array.
2. Create a singly linked list of integers.
3. Convert Infix expression to Post fix expression using Stack.
4. Implements Heap sort algorithm for sorting a list of integers in ascending order.
5. Implementing Queue as an Array.
6. Implements Merge sort algorithm for sorting a list of integer in ascending order.
7. Implementing Circular Queue.
8. Implementation of insert function
9. Create a doubly linked list of elements
10. Implement Binary Search Tree.
11. Representation of Graph.
12. Search for a key element in a list of elements using linear search
13. The implementation of insert function
14. AVL Tree Insertion deletion of elements
15. Binary search tree of integers.

Algorithms:

1. Linear Search
2. Binary Search
3. Bubble Sort Algorithm.
4. Insertion Sort Algorithm.
5. Merge Sort Algorithm.
6. Selection Sort Algorithm.
7. Knapsack Problem.
8. Prim’s Algorithm.

Books for References:

1. D.Malik (2009) , *Data Structures using C++* , 2nd Edition, Cengage .

2. Mark Allen Weiss (2006), *Data Structures and Algorithm Analysis in C++* , 3rd Edition, PHI.

3.SartajSalini , Dinesh Mehta , Ellis Horowitz (2006), *Fundamentals of Data Structures in C++* , 2nd Edition ,Silicon Publications.

Web Resources/ E.Books:

1. https://www.nrcmec.org/pdf/Manuals/CSE/student/21%20DATA%20STRUCTURES%20LAB(16-17).pdf
2. https://mis.alagappauniversity.ac.in/siteAdmin/ddeadmin/uploads/1/PG_MCA_Computer%20Applications_315%2014%20_%20Data%20Structure%20Using%20C++%20Lab%20_%20MCA.pdf
3. https://www.rgmcet.edu.in/assets/img/departments/CSE/materials/R19/21/PCDS%20LAB.pdf

Pedagogy

Practical Test with viva voce, Group Discussion, Interaction, Quiz.

LESSON PLAN FOR PRATICAL: TOTAL HOURS (45 HRS)

CYCLE	DESCRIPTION	HRS	MODE
1	Data Structures: 1. Implementing Stack as an array. 2. Create a singly linked list of integers. 3. Convert Infix expression to Postfix expression using Stack. 4. Implements Heap sort algorithm for sorting a list of integers in ascending order. 5. Implementing Queue as an Array.	15	Writing and executing the program in a system
2	6. Implements Merge sort algorithm for sorting a list of integer in ascending order. 7. Implementing Circular Queue. 8.Implementation of insert function 9. Create a doubly linked list of elements 10. Implement Binary Search Tree	10	Writing and executing the program in a system

3	11. Representation of Graph. 12.Search for a key element in a list of elements using linear search 13. The implementation of insert function 14. AVL Tree Insertion deletion of elements 15. Binary search tree of integers.	5	Writing and executing the program in a system
4	Algorithms: 1. Linear Search 2. Binary Search 3. Bubble Sort Algorithm. 4. Insertion Sort Algorithm.	5	Writing and executing the program in a system
5	Algorithms: 5. Merge Sort Algorithm. 6. Selection Sort Algorithm. 7. Knapsack Problem. 8. Prim's Algorithm.	10	Writing and executing the program in a system

Course Designer

MRS. K. KRISHNAVENI

Annexure - 17

EVALUATION (PRACTICAL)

Core Lab / Skill Enhancement Course Lab

Internal (Formative) : 40 marks

External (Summative) : 60 marks

Total : 100 marks

Question Paper Pattern for Internal Practical Examination: 40 Marks

- ✓ There will be Two Internal Practical Examination.
- ✓ Duration of Internal Examination will be 2 hours.

S.No	Components	Marks
1.	I – Writing the Program (2x8)	16
2.	II – Test and Debug the Program (2x4)	08
3.	III - Printing the Correct Output (2x4)	08
4.	IV- Viva	03
5.	V –Record book	05
	Total	**40**

Question Paper Pattern for External Practical Examination: 60 Marks

- ✓ Duration of External Examination will be 3 hours.

S.No	Components	Marks
1.	I – Writing the Program (2x10)	20
2.	II – Test and Debug the Program (2x10)	20
3.	III- Printing the Correct Output (2x5)	10
4.	IV – Viva	5
5.	V - Record book	5
	Total	**60**

Department of Computer Applications				Class : II B.C.A				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Hours/ Week**	**CIA**	**External Exam**	**Total**
IV	Skill Enhancement Course	22OUCASE4P	Networking Lab	2	2	40	60	100

Nature of the Course		
Knowledge and Skill Oriented	**Employability Oriented**	**Entrepreneurship Oriented**
✔	✔	✔

PROGRAM LIST

1. Study of different types of Network cables
2. Study of Network Devices in Detail.
3. Study of network IP.
4. Connect the computers in Local Area Network.
5. Study of basic network command and Network configuration commands.
6. Performing an Initial Switch Configuration
7. Performing an Initial Router Configuration
8. Configuring and Troubleshooting a Switched Network
9. Connecting a Switch
10. Configuring WEP on a Wireless Router
11. Using the Cisco IOS Show Commands
12. Examining WAN Connections
13. Interpreting Ping and Trace route Output
14. Demonstrating Distribution Layer Functions
15. Print a Client Address at Server End
16. Exploring Different LAN Switch Options
17. Implement three nodes point – to – point network with duplex links.
18. Implement an Ethernet LAN using n nodes
19. Study of Simple Network using Hubs.
20. Study of Networks using Hubs.
21. Simulation of DNS using UDP sockets.
22. Write a code simulating ARP protocols.
23. Write a code simulating RARP protocols.

24. Study of TCP/UDP performance using Simulation tool.

25. Simulation of Distance Vector Routing algorithm.

26. Simulation of error correction code (like CRC).

27. Performance evaluation of Routing protocols using Simulation tool.

Books for Reference:

1. Comer,(2004), Computer Networks & Internet with Internet Applications, 4th edition Pearson Education, Pearson Prentice Hall, NewDelhi ,

2. Achyut s Godbole , Atul Kahate, (2013) , Data Communications And Networks 2nd Editon, Tata McGraw Hill , 2nd Edition , 2013.

3. Simin Haykins S, (2006) , Communication System,4th Edition Tata McGraw- Hill, New Delhi,

Web Resources/ E.Books:

1. https://www.scribd.com/document/531794678/DCN-Lab-Manual-JNUH-Hyderabad
2. http://iotmumbai.bharatividyapeeth.edu/media/pdf/lab_manuals/Manual_CM4I_DCC_22414_120421.pdf
3. https://www.studocu.com/row/document/unknown/data-communication/dcn-lab-manual-data-communication/10436159

Pedagogy

Practical Test with viva voce, Group Discussion, Interaction, Quiz.

LESSON PLAN FOR PRACTICAL: TOTAL HOURS (30HRS)

CYCLE	DESCRIPTION	HRS	MODE
1	1. Study of different types of Network cables 2. Study of Network Devices in Detail. 3. Study of network IP. 4. Connect the computers in Local Area Network. 5. Study of basic network command and Network configuration commands.	6	Writing and executing the program in a system
2	6. Performing an Initial Switch Configuration 7. Performing an Initial Router Configuration 8. Configuring and Troubleshooting a Switched Network	5	Writing and executing the

	9. Connecting a Switch 10. Configuring WEP on a Wireless Router 11. Using the Cisco IOS Show Commands 12. Examining WAN Connections		program in a system
3	13. Interpreting Ping and Trace route Output 14. Demonstrating Distribution Layer Functions 15. Print a Client Address at Server End 16. Exploring Different LAN Switch Options 17. Implement three nodes point – to – point network with duplex links. 18. Implement an Ethernet LAN using n nodes	6	Writing and executing the program in a system
4	19. Study of Simple Network using Hubs. 20. Study of Networks using Hubs. 21. Simulation of DNS using UDP sockets. 22. Write a code simulating ARP protocols. 23. Write a code simulating RARP protocols.	5	Writing and executing the program in a system
5	24. Study of TCP/UDP performance using Simulation tool. 25. Simulation of Distance Vector Routing algorithm. 26. Simulation of error correction code (like CRC). 27. Performance evaluation of Routing protocols using Simulation tool.	8	Writing and executing the program in a system

Course Designer

MRS. P. INDHUJA

Annexure - 17

EVALUATION (PRACTICAL)
Core Lab / Skill Enhancement Course Lab

Internal (Formative) : 40 marks

External (Summative) : 60 marks

Total : 100 marks

Question Paper Pattern for Internal Practical Examination: 40 Marks

- ✓ There will be Two Internal Practical Examination.
- ✓ Duration of Internal Examination will be 2 hours.

S.No	Components	Marks
1.	I – Writing the Program (2x8)	16
2.	II – Test and Debug the Program (2x4)	08
3.	III - Printing the Correct Output (2x4)	08
4.	IV- Viva	03
5.	V –Record book	05
	Total	**40**

Question Paper Pattern for External Practical Examination: 60 Marks

- ✓ Duration of External Examination will be 3 hours.

S.No	Components	Marks
1.	I – Writing the Program (2x10)	20
2.	II – Test and Debug the Program (2x10)	20
3.	III- Printing the Correct Output (2x5)	10
4.	IV – Viva	5
5.	V - Record book	5
	Total	**60**