Sem.	Course Code	Core Paper – I	Total Marks:100		Hours Per Week	Credits
I	21PBKCT101	COMPUTER ARCHITECTURE	CIA : 50	ESE :50	4	4

Course Objectives: On successful completion of the course the students will have:

1. Understood the computer architecture, Number system, I/O systems, Registers and Memory
2. Skills to frame Boolean equations for ICs and simplify the equations to frame simple ICs.
3. Enhanced knowledge in Computer Architecture to attain Employability opportunity.

Course Outcomes (CO): On completion of the course, students should be able to

CO 1	Draw combinatorial circuits using various basic gates	
CO 2	Simplify the Boolean expressions using Karnaugh Map	K1
CO 3	Write micro operations and instructions for ALU	–
CO 4	Categorize and apply different addressing modes and instruction formats	K6
CO 5	Explore the hardware and software structure of different types of memories	

K1 :Remember; K2: Understand; K3 :Apply; K4: Analyze; K5 : Evaluate; K6 :Create

Unit –I :

Digital Logic Circuits: Digital Computers – Logic Gates – Boolean Algebra – Map Simplification – Combinational Circuits – Flip-flops – Sequential Circuits; Digital Components : Integrated Circuits – Decoders – Multiplexers – Registers – Binary Counters – Memory Unit

Unit –II :

Data representation: Data types – Complements – Fixed-point representation – Floating-point representation – Error Detection codes

Unit –III :

Registers Transfer and Micro operations : Registers Transfer Language – Register Transfer – Bus and memory transfers – Arithmetic micro operations- Logic and shift micro operations- Arithmetic logic shift unit

Unit –IV :

CPU: Register and stack organization – Instruction formats – Addressing modes – Data transfer and manipulation – Program control – RISC

Unit –V :

Input-output organization: Peripheral devices – I/O interface – Asynchronous data transfer. Memory organization: Memory hierarchy – Main memory – Auxiliary memory – Associative memory – Cache memory – Virtual memory

Skill Development Activities:

1. Draw the circuit of an 8-bit parity generator/checker having eight inputs and two outputs, one for even and the other for odd parity. Derive the value of the eighth input when the circuit is used to generate an even parity bit for seven message bits.

2. A digital system has three registers: AR, BR and PR. Three flip-flops provide the control functions for the system: S is a flip-flop which is enabled by an external signal to start the system's operation; F and R are used for sequencing the micro-operations. A fourth flip-flop, D is set by the digital system when the operation is completed. The function of the system is described by the following register transfer operation

S : PR← 0, S ←0, D←0, F←1
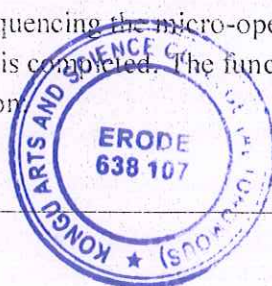
P : F←0. if (AR =0) then (D←1). if (AR≠0) then (R←1)

R : PR ←PR+BR. AR ←1, R←0, F←1

a) Show that the digital system multiplies the contents of AR and BR and places the product in PR

b) Draw a block diagram of the hardware implementation. Include a "start" input to set flip-flop S and a "done" output from flip-flop D

3. Assume that you have a computer with 1 clock cycle per instruction (1 CPI) when all accesses to memory are in cache. The only accesses to data come from load and store instructions. Those accesses account for 25 % of the total number of instructions. Miss penalty is 50 clock cycles and miss rate is 5 %. Determine the speedup obtained when there is no cache miss compared to the case when there are cache misses.
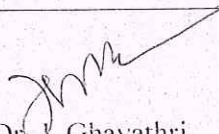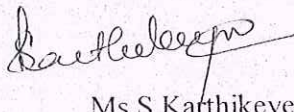
TEXT BOOKS

| 1 | Computer System Architecture, M.Morris Mano, Pearson Education 3rd edition. 2007 |

REFERENCE BOOKS

1	Digital principles and applications, Albert Paul Malvino, Donald P Leach, TMH, 1996.
2	Microprocessors and its Applications - Ramesh S. Goanka
3	Computer Architecture. M. Carter, Schaum's outline series, TMH.

Web Resources

| 1 | https://www.booksfree.org/computer-system-architecture-morris-mano-third-edition-pdf/ |

Course Designed By	Verified By	Approved By HOD
Dr. J. Ghayathri	Ms.S.Karthikeyeni	Dr.B.Jayanthi

QUESTION PAPER PATTERN

| SECTION-A(10 X 1 = 10 Marks)
Answer ALL the questions
Choose the correct answer.
Four options should be given
('None of these' should be avoided) | SECTION-B(5 X 3 = 15 Marks)
Answer ALL the questions
Either or type
Two questions from each unit | SECTION-C(5 X 5 = 25 Marks)
Answer ALL questions
Question Number: 16 to 19
(Either or type)
Question Number 20 is Compulsory - Case Study |

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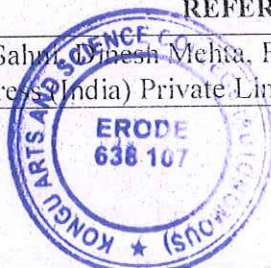
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Mapping of COs with POs and PSOs:

PO/PSO CO	PO							PSO				
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	L	L	M	M	M	L	M	M	S
CO2	S	M	S	L	M	L	L	L	M	M	S	M
CO3	S	S	M	M	M	L	L	S	M	M	S	L
CO4	S	M	M	M	L	L	L	M	M	M	M	M
CO5	M	S	S	M	L	L	M	M	L	S	L	L

S-Strong, M-Medium, L-Low

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Sem.	Course Code	Core Paper – II	Total Marks:100		Hours Per Week	Credits
I	21PBKCT102	DATA STRUCTURES	CIA : 50	ESE :50	4	4

Course Objectives: On successful completion of the course the students will have:

1. Understood the linear and non-linear data structures.
2. Understood searching and sorting techniques.
3. Employability opportunities by enhancing the knowledge in data structures.

Course Outcomes (CO): On completion of the course, students should be able to

CO 1	Choose an appropriate data structure for an application	
CO 2	Utilize linked list concepts in various applications	K1
CO 3	Explain the representation of Stacks, Queues and Graphs	–
CO 4	Discuss the operations on Trees and Graphs	K6
CO 5	Apply the concept of searching and sorting in the real world problems	

K1 :Remember; K2: Understand; K3 :Apply; K4: Analyze; K5 : Evaluate; K6 :Create

Unit –I :

Introduction and Overview: Definitions – Concept of Data Structures – Overview of Data Structures – Implementation of Data Structures. **Arrays:** Definition – Terminology – One-Dimensional Array – Multidimensional Arrays – Pointer Arrays

Unit –II :

Linked Lists: Definition – Single Linked List – Circular Linked List - Double Linked Lists – Circular Double Linked List. **Tables:** Hash Tables

Unit –III :

Stacks: Definition – Representation of a Stack – Operation of Stacks. **Queues:** Introduction – Definition – Representation of Queues – Various Queue Structures

Unit –IV :

Trees: Basic Terminologies – Definition and Concepts - Representation of Binary Tree – Operations on a Binary Tree. **Graphs:** Introduction - Graph Terminologies - Representation of Graphs – Operations on Graphs.

Unit –V :

Internal Sorting: Searching - Insertion Sort – Quicksort – 2-Way Merge Sort – Heap Sort – Sorting on Several Keys

Skill Development Activities:

1. Consider an array with N elements. Perform a search for an array element based on its value or its index.
2. Apply the stack algorithm to transform the following Infix expression (a+b)*(a-d) to Prefix and Postfix expression.
3. Form a heap from the set {40,80,35,90,45,50,70}.

TEXT BOOKS

1	DebasisSamanta, Classic Data Structures, Second Edition, PHI, 2012 – Unit I - IV.
2	Ellis Horowitz, SartajSahni, Fundamentals of Data Structures, 1976 – Unit - V

REFERENCE BOOKS

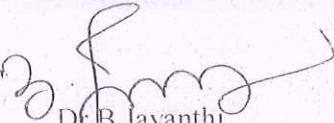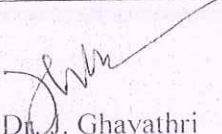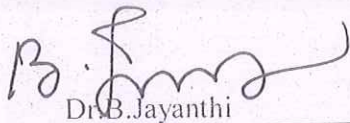| 1	Ellis Horowitz, SartajSahni, Dinesh Mehta, Fundamentals of Data Structures in C++, Second Edition Universities Press (India) Private Limited, 2007

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2 G.A.V. Pai, Data Structures and Algorithms - Concepts, Techniques and Applications, TMH Publishing Company Limited, 2008.

Web Resources

1 https://sonucgn.files.wordpress.com/2018/01/data-structures-by-d-samantha.pdf
2 https://fdocuments.in/document/fundamentals-of-data-structures-ellis-horowitz-sartaj-sahnipdf.html

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Dr.B.Jayanthi	Dr.J. Ghayathri	Dr.B.Jayanthi

QUESTION PAPER PATTERN

SECTION-A(10 X 1 = 10 Marks) Answer ALL the questions Choose the correct answer Four options should be given ('None of these' should be avoided)	SECTION-B(5 X 3 = 15 Marks) Answer ALL the questions Either or type Two questions from each unit	SECTION-C(5 X 5 = 25 Marks) Answer ALL questions Question Number: 16 to 19 (Either or type) Question Number 20 is Compulsory - Case Study

Mapping of COs with POs and PSOs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	M	M	M	M	S	M	L	S	M	S
CO2	M	S	S	L	L	L	M	M	L	S	L	M
CO3	S	S	L	M	M	M	M	S	S	L	M	M
CO4	S	L	M	L	M	M	L	S	S	M	M	L
CO5	M	S	S	M	L	M	S	L	M	M	M	S

S-Strong, M-Medium, L-Low

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Sem.	Course Code	Core Paper – III	Total Marks:100		Hours Per Week	Credits
I	21PBKCT103	RELATIONAL DATABASE MANAGEMENT SYSTEMS	CIA : 50	ESE :50	4	4

Course Objectives: On successful completion of the course the students should have:

1. Acquired Knowledge and Applications of Database Models and Emerging Trends
2. Capable of Framing structured queries to get solution or report for a particular task
3. Refined the database tables to make it more efficient using the normalization techniques
4. Employability opportunities by enhancing the knowledge in Relational Database Management System.

Course Outcomes (CO): On completion of the course, students should be able to

CO 1	Explain the features of database management systems	
CO 2	Design relational models for real life applications and also construct queries with constraints and keys using SQL	K1 – K6
CO 3	Apply the concept of transaction, concurrency control and recovery mechanism in database.	
CO 4	Identify the use of normalization and functional dependency in database design	
CO 5	Discuss the architecture for Parallel, Distributed and Object Database Systems	

K1 :Remember; K2: Understand; K3 :Apply; K4: Analyze; K5 : Evaluate; K6 :Create

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. Database design & ER diagrams – Entities, Attributes, and Entity Sets – Relationships and Relationship Sets- Additional feature of the ER model- conceptual Database design with the ER model.

Unit –II :

Relational Model: Integrity constraints over relations – Enforcing integrity constraints – Querying relational data – Logical database design: ER to Relational –Introduction to Views – Destroying / Altering Tables & Views. Relational Algebra and Calculus: Relational Algebra – Relational Calculus

Unit –III :

SQL: Queries, Programming, Triggers: The form of a basic SQL Query – UNION, INTERSECT and EXCEPT – Nested Queries – Aggregate operators – Null values –Complex integrity constraints in SQL - Triggers & Active data bases. Transaction Management
Overview: The ACID Properties - Transactions & Schedules – Concurrent execution of Transactions – Lock-based concurrency control – Performance of Locking –Transaction support in SQL.

Unit –IV :

Schema Refinement and Normal forms: Introduction to Schema refinement – Functional dependencies – Reasoning about functional dependencies – Normal forms –Properties of Decompositions – Normalization – Schema Refinement in data base design – other kinds of dependencies. Security: Introduction to Database security -Access control – Discretionary Access control – Mandatory Access control – Additional issues to security. Concurrency control : 2PL, Serializability and Recoverability – Introduction to Lock Management - Lock Conversions –Specialized Locking techniques - Concurrency control without locking

Unit –V :

Parallel & Distributed databases: Introduction – Architecture for parallel databases – Parallel Query evaluation – Parallelizing individual operations –Parallel Query Optimization – Introduction to distributed Database – Distributed DBMS architecture sorting data in a distributed DBMS. Object Database Systems:
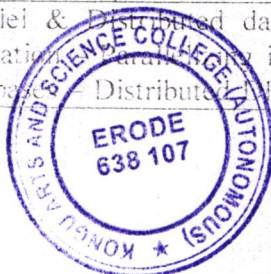
Motivation Example – Structured data types – Operation on structured data types – Encapsulation & ADTS – Inheritance - Objects. OIDS and Reference Types - Database design for and ORDBMS – OODBMS – Comparing RDBMS, OODBMS and ORDBMS.

Skill Development Activities:

1. A manufacturing company produces products. The following product information is stored: product name, product ID and quantity on hand. These products are made up of many components. Each component can be supplied by one or more suppliers. The following component information is kept: component ID, name, description, suppliers who supply them, and products in which they are used. Draw ERD to show how you would track information.
2. Demonstrate how to convert a database into 1NF, 2NF, 3NF.
3. Illustrate the transaction sequence for debiting a bank account.

TEXT BOOKS

| 1 | Raghu Ramakrishnan, Johannes Gehrke –"Database Management Systems", Third Edition, McGraw-Hill Higher Education |
| 2 | Silberschatry, Korth, Sundarshan, "Database system Concepts", Fourth Edition, McGraw-Hill Higher Education |

REFERENCE BOOKS

| 1 | Elmasri, Navathe, "Fundamentals of Database Systems", Third Edition, Pearson Education Asia |
| 2 | S.S. Khandare, "Database Management and Oracle Programming", First Edition, 2004, S.Chand and Company Ltd. |

Web Resources

| 1 | https://www.javatpoint.com/what-is-rdbms |
| 2 | https://www.tutorialspoint.com/sql/sql-rdbms-concepts.htm |

Course Designed By	Verified By	Approved By HOD
Mr. S. Vijayakumar	Dr. J. Ghayathri	Dr.B.Jayanthi

QUESTION PAPER PATTERN

| SECTION-A(10 X 1 = 10 Marks) Answer ALL the questions Choose the correct answer **Four options** should be given ('**None of these**' should be avoided) | SECTION-B(5 X 3 = 15 Marks) Answer ALL the questions Either or type Two questions from each unit | SECTION-C(5 X 5 = 25 Marks) Answer ALL questions Question Number: 16 to 19 (Either or type) Question Number 20 is Compulsory - Case Study |

Mapping of COs with POs and PSOs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	L	L	L	M	M	S	L	M	L	M
CO2	M	M	S	L	M	L	L	S	L	M	M	L
CO3	S	S	M	M	M	M	M	M	M	S	M	S
CO4	S	M	M	M	L	M	M	S	M	M	S	S
CO5			S	M	L	M	S	M	L	L	S	S

S-Strong, M-Medium, L-Low
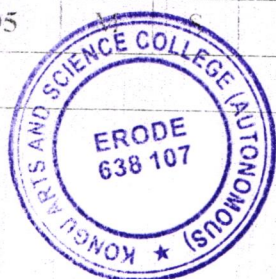
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Sem.	Course Code	Core Paper – IV	Total Marks:100		Hours Per Week	Credits
I	21PBKCT104	JAVA PROGRAMMING	CIA : 50	ESE :50	4	4

Course Objectives: On successful completion of the course the students will have:

1. Understood the primary structures of writing Java programs
2. Knowledge to design and program stand-alone Java applications
3. Employability opportunities by enhancing the knowledge in Java Programming.

Course Outcomes (CO): On completion of the course, students should be able to

CO 1	Define the program structure	
CO 2	Represent programming logics using operators, controls, loops and arrays	K1 – K6
CO 3	Utilize the concepts of inheritance and exceptions in the programs and handle files.	
CO 4	Explain the String functions and to handle files	
CO 5	Define how image and regular expression are implemented in GUI	

K1 :Remember; K2: Understand; K3 :Apply; K4: Analyze; K5 : Evaluate; K6 :Create

Unit –I :
Overview of java: Object-Oriented Programming - Control Statements & Blocks of Code – Lexical Issues – The Java Class Libraries. Data Types, Variables, and Arrays: The Primitive Types – Literals – Variables – Type Conversion and Casting – Automatic Type Promotion in Expressions – Arrays - Strings

Unit –II :
Operators: Arithmetic, Bitwise, Relational Operators, Boolean Logical, Assignment and "?" Operators – Operator Precedence – Control Statements: Selection, Iteration and Jump Statements – Classes: Class Fundamentals – Declaring Objects – Object Reference Variables – Methods – Constructors – this keyword – Garbage Collection – finalize() – Stack Class

Unit –III :
Inheritance: Basics – Superclass –Multilevel Hierarchy – Method Overriding – Dynamic Method Dispatch – Abstract Classes – final class – Object Class - Packages and Interfaces: Packages – Access Protection – Importing Packages - Interfaces – Exception Handling: Fundamentals – Types – Uncaught Exceptions – try and Catch – Multiple catch Clauses – Nested try Statements – throw – throws – finally – Built-in Exceptions – Exception Subclasses – Chained Exceptions
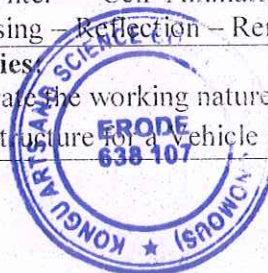
Unit –IV :
String Handling: Constructors – String Length – Special String Operations – Characters Extraction – String Comparison – Searching & Modifying a String – Data Conversion – StringBuffer – StringBuilder - Input / Output: I/O Classes and Interfaces – File – AutoCloseable, Closeable, and Flushable Interfaces – I/O Exceptions – Stream Classes – Byte & Character Streams - Serialization.

Unit –V :
Applet Class: Types – Basics – Architecture – Applet Skeleton – Display Methods – Requesting Repainting – Status Window – HTML APPLET Tag – Passing Parameters to Applets – Images: File Formats – Image Fundamentals – ImageObserver – Double Buffering – MediaTracker – ImageProducer – ImageConsumer – ImageFilter – Cell Animation – Regular Expressions: Core Java API Packages – Regular Expression Processing – Reflection – Remote Method Invocation (RMI) – Text Formatting

Skill Development Activities
1. Prepare a video to illustrate the working nature of control statements and blocks of code
2. Develop an inheritance structure for a Vehicle System.

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3. Design an applet for a moving cat.

TEXT BOOKS

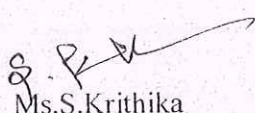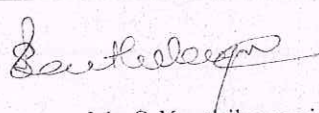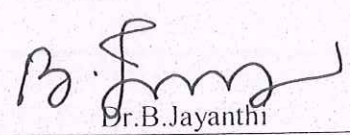| 1 | Herbert Schildt, Java The Complete Reference, Eighth Edition, TMH Publications, 2011 (Unit I: Chapters 2 , 3 :   Unit II: Chapters 4, 5, 6 : Unit III: Chapters 8, 9, 10 Unit IV: Chapters 15, 19; Unit V: Chapters 22, 26, 28) |

REFERENCE BOOKS

| 1 | UttamK.Roy, Advanced Java Programming. Oxford University Press, 2015. |
| 2 | Deitel and Deitel. JAVA How to Program, Third Edition, PHI/Pearson Education. Asia |

Web Resources

| 1 | https://www.javatpoint.com/java-programs |
| 2 | https://www.tutorialspoint.com/java/index.htm |

Course Designed By	Verified By	Approved By HOD
Ms.S.Krithika	Ms.S.Karthikeyeni	Dr.B.Jayanthi

QUESTION PAPER PATTERN

SECTION-A(10 X 1 = 10 Marks) Answer ALL the questions Choose the correct answer **Four options** should be given ('**None of these**' should be avoided)	SECTION-B(5 X 3 = 15 Marks) Answer ALL the questions Either or type Two questions from each unit	SECTION-C(5 X 5 = 25 Marks) Answer ALL questions Question Number: 16 to 19 (Either or type) Question Number 20 is Compulsory - Case Study

Mapping of COs with POs and PSOs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	M	L	L	M	M	M	S	M	M	M
CO2	M	L	M	L	M	L	M	M	S	M	M	S
CO3	S	S	M	M	M	M	M	L	M	L	S	M
CO4	S	M	M	M	L	M	S	M	M	L	M	S
CO5	M	S	S	M	L	S	M	S	L	L	S	L

S-Strong, M-Medium, L-Low

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Sem.	Course Code	Elective– I	Total Marks:100		Hours Per Week	Credits
I	21PBKET105	CLOUD COMPUTING	CIA : 50	ESE :50	4	3

Course Objectives: On successful completion of the course the students will have:

1. Understood the basic concepts of Cloud Computing Architectures, Applications and Storages
2. Knowledge to define the cloud service models and the Technological Drivers for Cloud Computing
3. Acquire knowledge about IaaS, SaaS and PaaS, Cloud Security

Course Outcomes (CO): On completion of the course, students should be able to

CO 1	Explain the concepts of Cloud Computing, Architecture and deployment models	
CO 2	Utilize the Cloud Service models in application development	K1 – K6
CO 3	Describe Virtualization and cloud-aware SaaS applications / PaaS technology	
CO 4	Handle the services offered by Cloud service providers	
CO 5	Discuss the security issues in cloud	

K1 :Remember; K2: Understand; K3 :Apply; K4: Analyze; K5 : Evaluate; K6 :Create

Unit –I :

Cloud Computing Fundamentals: Motivation for Cloud Computing - Defining Cloud Computing - 5-4-3 Principles of Cloud computing - Cloud Ecosystem - Requirements for Cloud Services - Cloud Application - Benefits and Drawbacks.
Cloud Computing Architecture and Management: Introduction - Cloud Architecture - Anatomy of the Cloud - Network Connectivity in Cloud Computing - Applications on the Cloud - Managing the Cloud - Migrating Application to Cloud.
Cloud Deployment Models: Introduction - Private Cloud - Public Cloud - Community Cloud - Hybrid Cloud.

Unit –II :

Cloud Service Models: Introduction - Infrastructure as a Service - Platform as a Service - Software as a Service. Technological Drivers for Cloud Computing: Introduction - SOA and Cloud – Virtualization - Multicore Technology - Memory and Storage Technologies - Networking Technologies - Programming Models - Pervasive Computing - Operating System - Application Environment.

Unit –III :

Virtualization: Introduction - Virtualization Opportunities - Approaches to Virtualization - Hypervisors - From Virtualization to Cloud Computing.
Software Development in Cloud: Introduction - Different Perspectives on SaaS Development - New Challenges - Cloud-Aware Software Development Using PaaS Technology.

Unit –IV :

Networking for Cloud Computing: Introduction - Overview of Data Center Environment - Networking Issues in Data Centers - Transport Layer Issues in DCNs - TCP Enhancements for DCNs.
Cloud Service Providers: Introduction – EMC – Google - Amazon Web Services – Microsoft – IBM - SAP Labs – Salesforce – Rackspace – VMware – Manjrasoft.

Unit –V :

Open Source Support for Cloud: Introduction - Open Source Tools for IaaS - Open Source Tools for PaaS - Open Source Tools for SaaS - Open Source Tools for Research - Distributed Computing Tools for Management of Distributed Systems Security in Cloud Computing: Introduction - Security Aspects -
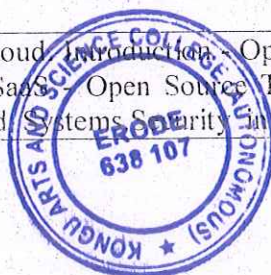
Sem.	Course Code	Core Practical– 1 DATA STRUCTURES LAB USING JAVA	Total Marks: 100		Hours Per Week	Credits
I	21PBKCP109		CIA : 50	ESE :50	4	3

Course Objectives: On successful completion of the course the students will have:

1. Acquire knowledge to implement the concepts of data structures in Java Programming
2. Posses skills to connect server and client for communication
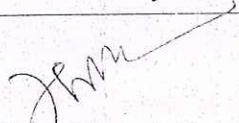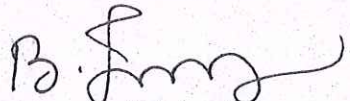3. The skill set of applying regular expression for pattern matching

Course Outcomes (CO): On completion of the course, students should be ableto

CO 1	Implement Hash table and Array structure to produce List, Stack and Queue structures	
CO 2	Use recursive and non-recursive functions to implement tree traversals	K1
CO 3	Apply appropriate Searching and Sorting Methods for a given list of items	–
CO 4	Invoke the remote methods in an application using Remote Method Invocation	K6
CO 5	Create an applet application to demonstrate an Image and Pattern Matching	

K1 :Remember; K2: Understand; K3 :Apply; K4: Analyze; K5 : Evaluate; K6 :Create

List of Programs

1. Write a Java program to implement a list using Hashtable.

2. Write Java programs to implement the Stack Operations using an array

3. Write Java programs to implement the Queue Operations using an array.

4. Write Java programs that use recursive and non-recursive functions to traverse the given binary tree in (a) Preorder (b) Inorder(c) Postorder.

5. Write a Java program to implement a Binary Search

6. Write a Java program for sorting a given list of names in ascending order using Heap Sort.

7. Write a java program that illustrates the Client Server Communication using RMI.

8. Write a Java program that illustrates how inheritance is implemented.

9. Develop a java program using Image class

10. Implement Java Program for Pattern Matching in Regular Expression.

Course Designed By	Verified By	Approved By HOD
Ms.S.Krithika	Dr.J.Ghayathri	Dr.B.Jayanthi

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Mapping of COs with POs and PSOs:

PO/PSO	PO							PSO				
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	L	L	S	M	M	L	M	S	M
CO2	S	M	S	M	M	L	S	L	L	M	L	S
CO3	S	S	M	M	M	L	L	M	M	L	M	M
CO4	S	M	M	M	L	M	S	S	M	M	M	S
CO5	M	S	S	M	L	M	M	M	L	M	M	M
S-Strong, M-Medium, L-Low												

Sem.	Course Code	Core Practical– II	Total Marks:100		Hours Per Week	Credits
I	21PBKCP110	RELATIONAL DATABASE MANAGEMENT SYSTEMS LAB	CIA : 50	ESE :50	4	3

Course Objectives: On successful completion of the course the students will have:

1. Skills to design and build a database system using Structured Query Language
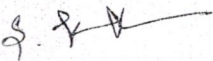2. Knowledge to apply the built-in functions of SQL in query processing

Course Outcomes (CO): On completion of the course, students should be able to

CO 1	Draw Entity-Relationship Diagram for the database systems	
CO 2	Evaluate the mapping between entities and relationship using Schema	K1 – K6
CO 3	Implement the DML , DDL, DCL and TCL Commands	
CO 4	Build a database system using Views and SET Operators	
CO 5	Implement PL/SQL Controls, Triggers, Procedures and Packages	

K1 :Remember; K2: Understand; K3 :Apply; K4: Analyze; K5 : Evaluate; K6 :Create

List of Programs

1. Draw an E-R diagram for a Student database and perform the DDL, DQL and DML commands

2. Create database Schema for a Employee-Pay Scenario and present the relational model

3. Write SQL query to implement JOINS, GROUP BY & ORDER BY commands

4. Write a SQL queries for Creating Views (with and without check option), Dropping views and Selecting from a view

5. Write SQL queries using SET Operators

6. Develop a Bank Amount Transaction database and implement Transaction commands

7. Write a SQL query to implement KEY constraints

8. Write a PL/SQL Program by using Iterative Controls and Loops

9. Write Program by the use of PL/SQL Procedures and Packages

10. Create a program to Implement PL/SQL Triggers and Cursors

Course Designed By	Verified By	Approved By HOD
Ms.S.Krithika	Mr. S. Vijayakumar	Dr.B.Jayanthi

Mapping of COs with POs and PSOs:

PO/ PSO	PO							PSO				
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	M	L	M	M	M	L	M	M	L
CO2	S	M	S	M	M	L	L	L	L	M	M	M
CO3	S	S	S	M	M	L	L	M	M	L	S	M
CO4	S	M	M	S	L	M	L	M	M	L	M	L
CO5	M	S	S	S	L	L	M	M	L	L	S	M
S-Strong, M-Medium, L-Low												

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Sem.	Course Code	Core Practical– III	Total Marks:50		Hours Per Week	Credits
I	21PBKCP111	DATA VISUALIZATION LAB	CIA : 25	ESE : 25	2	2

Course Objectives: On successful completion of the course the students will have:

1. Analyze and create effective data visualizations in order to provide new insights
2. Skills to prepare the visual reports for decision support system

Course Outcomes (CO): On completion of the course, students should be ableto

CO 1	Compute Mathematical functions in Excel	
CO 2	Formulate Statistical functions in Excel	K1 - K6
CO 3	Create dashboard to visualize data in real life applications	
CO 4	Analyze data through pivot table	
CO 5	Convert unstructured file to structured file	

K1 :Remember; K2: Understand; K3 :Apply; K4: Analyze; K5 : Evaluate; K6 :Create

PROGRAM LIST

1. Enter the following data in an Excel worksheet:

Reg.No	Name	Tamil	English	Maths	History	Science	Total	Result	Class	Rank
M01	Anand	40	45	80	78	90				
M02	Moorthy	50	52	54	54	40				
M03	Lokesh	82	42	52	25	58				
M04	Patel	58	25	60	89	78				
M05	Suresh	45	87	47	39	58				
M06	Ganesan	87	90	89	45	39				
M07	Ravi	29	45	70	40	48				
M08	Madhan	45	39	52	59	49				
M09	Karthick	90	40	69	64	28				

a) Calculate the TOTAL values using SUM Function.
b) Calculate the RESULT and CLASS values using IF function.
c) Calculate the RANK values based on RESULT using RANK Function
d) Compute and find the average mark for all subjects.
e) Find the total number of students with First Class using COUNTIF function.
f) Create a new sheet with the same table data, sort and filter the table using rank values

2. Enter the following data in an Excel worksheet:

S.No.	Goods	Quantity	Cost	Discount	Revenue
1	Bat	263	2000	5%	26300
2	Cricket ball	590	50	10%	2950
3	Basketball	68	500		34000
4	Cotton T-Shirt	730	490	40%	143080
5	Slipper	321	250	20%	16050
6	Basketball net	39	150		5850
7	Basketball bat	76	2500	5%	9500

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8	Dumbles-5Kg	125	1150	10%	14375
9	Dumbles-10Kg	99	2150	10%	21285
10	Shorts	620	350	40%	86800
11	Jacket	465	2500	20%	232500
12	Sneakers	1032	3000	50%	1548000
13	Skipping rope	320	120	15%	5760

a) Find out how many items were on discount using COUNT.

b) Find out how many items/pieces of equipment are sold by the store using COUNTA.

c) What products are not in the discount section using COUNTBLANK.

d) Are there any products sold having cost more than 2000 along with a discount rate greater than 50% using COUNTIFS.

e) Find out the average number of goods sold.

f) Find the median of the number of goods sold in our sports store.

g) Find the most frequent discount value given by the sports store using MODE.

h) Find out the standard deviation to see the level of dispersion using STDEV.

3. Create a dashboard for Online Sales Tracking system.

4. Draw the Pivot table for the following data:

TripID	Late	Bus Driver	Weekday	Time
1	12	John	Wednesday	8:45 AM
3	1	Paulo	Tuesday	9:25 AM
5	3	Mark	Tuesday	9:25 AM
7	45	Raymond	Thursday	9:25 AM
9	61	Mark	Friday	9:25 AM
11	2	Monica	Tuesday	8:45 AM
13	5	John	Tuesday	8:45 AM
121	10	John	Wednesday	7:15 AM
127	-2	Mark	Monday	9:25 AM
16	14	John	Wednesday	7:15 AM
98	0	Raymond	Friday	9:25 AM
103	-1	Paulo	Friday	9:25 AM
108	3	Mark	Friday	8:00 AM
113	45	John	Monday	9:25 AM
118	7	John	Monday	8:45 AM
757	17	Paulo	Wednesday	9:25 AM
477	8	John	Tuesday	9:25 AM
133	19	Raymond	Tuesday	8:00AM
138	22	John	Tuesday	7:15 AM
128	0	John	Monday	7:15 AM
19	2	John	Monday	8:45 AM
21	7	Paulo	Thursday	9:25 AM
23		Paulo	Monday	8:45 AM
25		Mark	Thursday	8:00AM
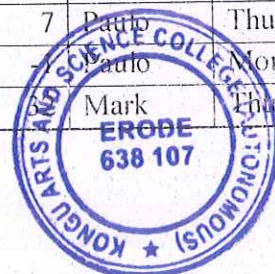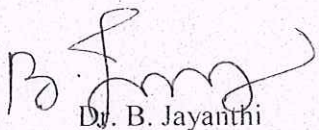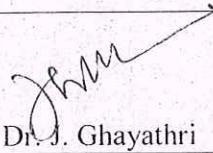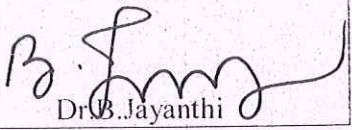
27	2	John	Monday	8:00AM
143	23	John	Friday	9:25 AM
123	14	Raymond	Thursday	8:45 AM
15	7	Paulo	Wednesday	8:45 AM
758	9	Monica	Tuesday	9:25 AM
17	29	Paulo	Thursday	7:15 AM
401	12	Raymond	Tuesday	9:25 AM
712	11	Raymond	Tuesday	8:45 AM
91	-1	Raymond	Tuesday	7:15 AM
92	7	Paulo	Wednesday	8:45 AM
112	31	Paulo	Wednesday	9:25 AM
94	0	Monica	Wednesday	9:25 AM
814	14	Paulo	Monday	7:15 AM
917	-1	Monica	Tuesday	8:00 AM

5. Convert Text file to CSV file using various formats

Course Designed By	Verified By	Approved By HOD
Dr. B. Jayanthi	Dr. J. Ghayathri	Dr.B.Jayanthi

Mapping of COs with POs and PSOs:

PO/ PSO	PO							PSO				
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	L	L	M	M	M	L	M	S	M
CO2	S	M	S	M	M	L	L	L	L	M	M	M
CO3	S	S	M	M	M	M	L	M	M	L	M	S
CO4	S	M	M	M	M	M	M	M	M	M	S	M
CO5	M	S	S	M	L	L	M	M	M	M	M	S

S-Strong, M-Medium, L-Low

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Sem.	Course Code	Core Paper –V	Total Marks:100		Hours Per Week	Credits
		OPERATING SYSTEMS			4	4
II	21PBKCT201		CIA : 50	ESE :50		

Course Objectives: On successful completion of the course the students will have:

1. Understood about operating systems, process management, CPU scheduling, memory management and secondary storage management.
2. Understood the concepts using LINUX operating system
3. Employability opportunities by enhancing the knowledge in Operating Systems

Course Outcomes (CO): On completion of the course, students should be ableto

CO 1	Define the basic features of operating system	
CO 2	Explore process scheduling algorithms.	K1 – K6
CO 3	Handle the deadlock conditions during Multi process scheduling	
CO 4	Apply the memory management allocation strategies	
CO 5	Describe the architecture of LINUX and internal representation of files.	

K1 :Remember; K2: Understand; K3 :Apply; K4: Analyze; K5 : Evaluate; K6 :Create

Unit –I :

INTRODUCTION: Definition of OS-Mainframe System-Desktop Systems-Multi processor System-Distributed-Clustered-Real time Systems-Handheld Systems-Operating System Structure-System Components-Services-System Calls-System Programs-System Design and Implementation.

Unit –II :

PROCESS MANAGEMENT: Concepts-Process Scheduling-Operations on Processes-Cooperating Processes-Inter Process Communication-CPU Scheduling-Scheduling Concepts Criteria-Scheduling Algorithms-Multiprocessor Scheduling-Real time Scheduling.

Unit –III :

PROCESS SYNCHRONIZATION: Critical Section-Synchronization Hardware Semaphores-Problems of Synchronization-Critical Regions-Monitors-Deadlocks Characterization-Handling Deadlocks-Deadlock Prevention – Avoidance-Detection-Deadlock Recovery.

Unit –IV :

MEMORY MANAGEMENT: Storage Hierarchy-Storage Management Strategies Contiguous-Non Contiguous Storage Allocation-Single User-Fixed Partition-Variable Partition Swapping-Virtual Memory-Basic Concepts-Multilevel Organization-Block Mapping-Paging Segmentation-Page Replacement Methods-Locality-Working Sets

Unit –V :

I/O AND FILE SYSTEMS: Disk Scheduling-File Concepts-File System Structure-Access Methods-Directory Structure-Protection-Directory Implementation-Allocation Methods-Free Space Management
Case Study: Linux Operating System – Commands, Shell Programming, Report writing

Skill Development Activities:
1. Create a short video about the installation process of any one operating system.
2. Differentiate the real operations between smart phones OS with Laptop OS with Live Demo.
3. Illustrate the deadlock occurrence and recovery with real time example.

TEXT BOOKS

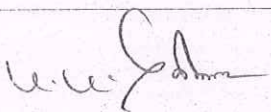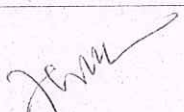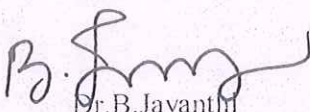| 1	Silberschatz and Galvin, Operating System Concepts, 6th Edition, John Wiley & Sons, Inc., 2004
2	Milankovic M., Operating System Concepts and Design, 2nd Edition, McGraw Hill, 1992.
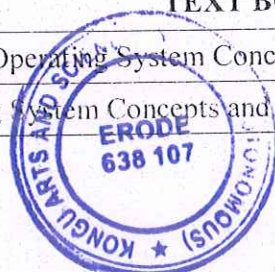
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REFERENCE BOOKS

1. P.C.Bhatt, An Introduction to Operating Systems-Concepts and Practice, Prentice Hall Of India, 2004
2. H.M.Deitel, An Introduction to Operating Systems, 2nd Edition, Pearson Education, 2002

Web Resources

1. https://www.javatpoint.com/os-tutorial
2. https://www.tutorialspoint.com/operating_system/index.htm

Course Designed By	Verified By	Approved By HOD
Mr.K.K.Sureshkumar	Dr.J.Ghayathri	Dr.B.Jayanthi

QUESTION PAPER PATTERN

SECTION-A(10 X 1 = 10 Marks) Answer ALL the questions Choose the correct answer **Four options** should be given (**'None of these'** should be avoided)	SECTION-B(5 X 3 = 15 Marks) Answer ALL the questions Either or type Two questions from each unit	SECTION-C(5 X 5 = 25 Marks) Answer ALL questions Question Number: 16 to 19 (Either or type) Question Number 20 is Compulsory - Case Study

Mapping of COs with POs and PSOs:

PO/ PSO CO	PO							PSO				
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	M	S	M	S	S	S	S	M	S
CO2	S	S	S	S	S	S	S	M	S	S	S	M
CO3	M	S	M	M	M	M	S	M	S	S	M	M
CO4	S	M	S	S	S	L	M	S	S	S	L	M
CO5	S	S	M	M	S	M	S	S	M	S	M	S

S-Strong, M-Medium, L-Low

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Sem.	Course Code	Core Paper– VI	Total Marks:100		Hours Per Week	Credits
II	21PBKCT202	.NET PROGRAMMING	CIA : 50	ESE :50	4	4

Course Objectives: On successful completion of the course the students will have:

1. Understood .NET technologies concepts
2. Understood the programming concepts of C#
3. Skills to develop web applications using ASP.NET through C#

Course Outcomes (CO): On completion of the course, students should be able to

CO 1	Explain the architecture of .NET framework and object oriented programming concepts	
CO 2	Understood the basic programming concepts of C#	K1
CO 3	Know the data accessing with database	–
CO 4	Develop the web applications using ASP.NET through C#	K6
CO 5	Create ASP.NET applications using standard .NET controls	

K1 :Remember; K2: Understand; K3 :Apply; K4: Analyze; K5 : Evaluate; K6 :Create

Unit –I :

Evolution of .NET - Benefits of .NET Framework - Architecture of the .NET Framework - Performing Basic IDE Operations.
Creating a simple C# Console Application - Identifiers and keywords- Data Types, Variables, and Constants - Expressions and Operators

Unit –II :

Namespaces - The System Namespace - Classes and Objects Constructors and destructors – Delegates - Events -Control Flow Statements - Exception Handling - Checked and Unchecked Statements

Unit –III :

Data Access with ADO.NET- ASP.NET Essentials: Describing the ASP.NET Life Cycle - Creating a Sample Web Application - Creating a Sample Web Site.

Unit –IV :

Developing a Web Application: Specifying a Location for a Web Application - File Types - Exploring ASP.NET Web Pages - Code Render Blocks - Coding Models - Page Directives - Working with Server Controls. **Application Structure and State:** Structure of an Application - The Global.asax application File - Using States - HTTP Handlers - Generic Handlers - Post back and Cross-Page Posting.

Unit –V :

Web Forms: Standard Controls - Navigation Controls: Tree View, Menu, and Sitemap Path – Validation Controls: Unobtrusive Validation in ASP.NET Web Forms - The BaseValidator Class - The Required Field Validator Control - The RangeValidator Control - **Working with Databasecontrols.**

Skill Development Activities:
1. Create a website for a manufacturing company that is in the starting stage.
2. Design a webpage to display the number of users currently accessing the web server.
3. Develop a ecommerce customer registration web application form with necessary validations.
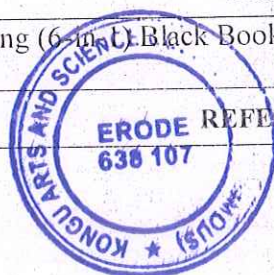
TEXT BOOKS

1	.NET 4.5 Programming (6-in-1) Black Book, Dreamtech Press, Kogent Learning Solutions Incorporation, 2013.

REFERENCE BOOKS

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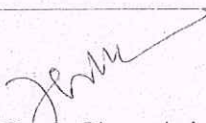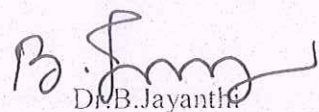
1	Adrian Turtschi, DotThatCom.com, Jason Werry, Greg Hack, Joseph Albahari, SaurabhNandu and Wei Meng Le. C#.net Web Developer's Guide. Syngress.2002.
2	C. Muthu, Visual C#.Net, Vinay Nicole Imprints Pvt. Ltd., Chennai, 2008.
3	Herbert Schildt. C# 2.0: The Complete Reference. Tata McGraw Hill Edition, Second Edition, 2006.

Web Resources	
1	https://www.tutorialspoint.com/asp.net/index.htm
2	https://www.javatpoint.com/net-framework

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Ms. S. Krithika	Dr. J. Ghayathri	Dr.B.Jayanthi

QUESTION PAPER PATTERN

SECTION-A(10 X 1 = 10 Marks) Answer ALL the questions Choose the correct answer Four options should be given ('None of these' should be avoided)	SECTION-B(5 X 3 = 15 Marks) Answer ALL the questions Either or type Two questions from each unit	SECTION-C(5 X 5 = 25 Marks) Answer ALL questions Question Number: 16 to 19 (Either or type) Question Number 20 is Compulsory - Case Study

Mapping of COs with POs and PSOs:

PO/ PSO CO	PO							PSO				
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	L	M	S	S	L	L	M	L	M
CO2	S	M	S	M	M	S	S	M	S	M	M	M
CO3	S	L	M	M	M	L	L	M	S	M	L	M
CO4	S	M	M	M	L	L	L	M	M	M	M	M
CO5	M	L	M	M	L	L	M	M	M	S	S	M
S-Strong, M-Medium, L-Low												

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Sem.	Course Code	Core Paper –VII COMPUTER NETWORKS		Total Marks:100		Hours Per Week	Credits
II	21PBKCT203			CIA : 50	ESE :50	4	4

Course Objectives: On successful completion of the course the students will have:

1. Understood the features of computer networks and its importance in communication and resource sharing.
2. Understood OSI reference model and related models.
3. Knowledge to apply algorithms related to network scheduling and error detection and correction.
4. Understood and apply the design issues in construction of computer networks.

Course Outcomes (CO): On completion of the course, students should be able to

CO 1	Outline the fundamental components of computer networking.	
CO 2	Explain the functions of physical layer	K1 – K6
CO 3	Apply different techniques in error detection and correction during data transmission.	
CO 4	Discuss how routing protocols works in network and transport layer	
CO 5	Describe the Design issues in session, presentation and application layer	

K1 :Remember; K2: Understand; K3 :Apply; K4: Analyze; K5 : Evaluate; K6 :Create

Unit –I :	INTRODUCTION

Introduction: Use of computer networks – Network Hardware – Network software – Reference models – Example of networks

Unit –II :	PHYSICAL LAYER

The Physical Layer: The Theoretical basis for data communication – Guided transmission Media – Wireless transmission – Communication satellites – The Public switched Telephone network – Cable Television – Mobile telephone system

Unit –III :	DATA LINK LAYER

Data link layer: Data link layer design issues – Error detection and correction – Elementary data link protocols – Sliding window protocols – Protocol Verification - Example data link Protocols

Unit –IV :	NETWORK & TRANSPORT LAYERS

Network layer : Network layer design issues – Routing algorithms – Congestion, Control algorithms – Quality of service – Internetworking – Network layer in the internet.
Transport layer: The transport service – Elements of transport protocol – A simple transport protocol - The internet Transport Protocols : UDP – The Internet Transport Protocols : TCP - Performance issues

Unit –V :	SESSION, PRESENTATION & APPLICATION LAYERS

Session layer : Design issues - Presentation layer : Cryptography – Application layer : Design issues, file transfer, E-mail.

Skill Development Activities:
1. Draw a network map of our college with components.
2. Create a Network Topology by cPonnecting the two Switches to the Router, with each Switch having one PC and two Laptops connected to itself all using Ethernet connections. Connect the Router with the Wireless Router using the Cross-Over connection, place both Smart Phones and additional Laptop near the Wireless Router also placing the Wireless Signal above the Wireless Router.
3. Demonstrate the configuration of IP address for a Server.

TEXT BOOKS

1	Andrew S. Tanenbaum, "Computer Networks", IV Edition, PHI/Pearson Education, Unit I-V

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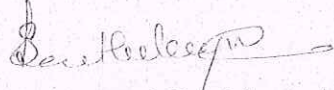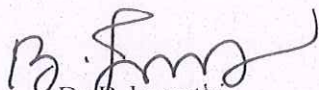(AUTONOMOUS)
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| 2 | P. Green – Computer Network Architectures and Protocols. Plenum Press. 1982. |
| 3 | Harry Katzan – An Introduction to "Distributed Data Processing". A Petrocelli Book. New York / Princeton |

REFERENCE BOOKS

| 1 | Leon Garcia – Communication Networks : Fundamental Concepts & Key Architecture. TMH. |
| 2 | Hari&Barani. "Projects in Networking", 2005. SCITECH Publications |

Web Resources

| 1 | https://www.javatpoint.com/computer-network-tutorial |
| 2 | https://www.geeksforgeeks.org/computer-network-tutorials |

Course Designed By	Verified By	Approved By HOD
Ms. S. Krithika	Ms.S.Karthikeyeni	Dr.B.Jayanthi

QUESTION PAPER PATTERN

SECTION-A(10 X 1 = 10 Marks)
Answer ALL the questions
Choose the correct answer
Four options should be given
('**None of these**' should be avoided)

SECTION-B(5 X 3 = 15 Marks)
Answer ALL the questions
Either or type
Two questions from each unit

SECTION-C(5 X 5 = 25 Marks)
Answer ALL questions
Question Number: 16 to 19
(Either or type)
Question Number 20 is Compulsory - Case Study

Mapping of COs with POs and PSOs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	S	L	M	M	M	L	S	M	S
CO2	S	M	S	S	M	M	L	L	M	S	M	S
CO3	S	S	M	M	M	L	M	M	M	L	S	M
CO4	S	M	M	M	L	M	L	M	M	M	M	M
CO5	M	S	S	M	M	L	M	M	L	L	S	S

S-Strong, M-Medium, L-Low

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Sem.	Course Code	Core Paper – VIII	Total Marks:100		Hours Per Week	Credits
		SOFTWARE ENGINEERING			4	4
II	21PBKCT204		CIA : 50	ESE :50		

Course Objectives: On successful completion of the course the students will have:

1. Understand the software development models and ethics
2. The capability to plan and maintain software quality
3. Employability opportunities by enhancing the knowledge in Software Engineering

Course Outcomes (CO): On completion of the course, students should be able to

CO 1	Compare and apply the suitable software design model for the particular task	
CO 2	Gather the requirements for the software project and do validation	K1
CO 3	Design architectural and UML model for the projects	–
CO 4	Apply suitable testing methods to proof the software free of error	K6
CO 5	Work with team and be able to manage teams	

K1 :Remember; K2: Understand; K3 :Apply; K4: Analyze; K5 : Evaluate; K6 :Create

Unit –I :

Introduction: Professional Software Development – Software Engineering Ethics – Case Studies. Software Processes: Software Process Models – Process Activities – Coping with Change – Rational Unified Process. Agile Software Development: Agile Methods – Plan-Driven and Agile Development – Extreme Programming – Agile Project Management – Scaling Agile Methods.

Unit –II :

Requirements Engineering: Functional and Non-Functional Requirements – Software Requirements Document – Requirements Specification, Engineering Process, Elicitation and analysis, Validation and Management. System Modeling: Context Models – Interaction Models – Structural Models – Behavioral Models – Model-Driven Engineering

Unit –III :

Architectural Design: Architectural Design Decisions, Views and Patterns – Application Architectures. Design and Implementation: Object-Oriented Design Using the UML – Design Patterns – Implementation Issues – Open Source Development.

Unit –IV :

Software Testing: Development Testing – Test-Driven Development – Release Testing – User Testing. Software Evolution: Evolution Process – Program Evolution Dynamics – Software Maintenance – Legacy System Management.

Unit –V :

Project Management: Risk Management – Managing People- Team Work. Project Planning: Software Pricing – Plan-Driven Development – Project Scheduling – Agile Planning – Estimation Techniques. Quality Management: Software Quality and Standards – Reviews and Inspections – Software Measurement and Metrics.

Skill Development Activities:

1. Let a Company called ABC group makes consumer products for safe home and releases for commercial use. There is a Software Engineering Team consists of members and team manages. Give a write up on the discussion of the team members and head for selecting the process model.

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2. Consider you are developing software for a departmental store in an urban city. To go for design phase, you have to complete the requirement gathering. Sketch the requirements gathering activities carried out by your software development team.

3. Consider you are developing a dynamic website for an autonomous college. Draw the use case diagram for the design of the website. Along with use case diagram sketch the navigation flow for the website.
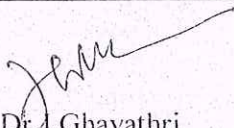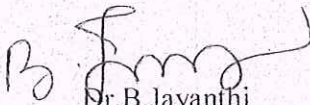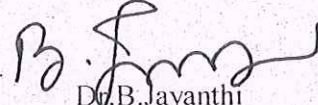
TEXT BOOKS

| 1 | Ian Sommerville, Software Engineering, Pearson India Education, Ninth Edition, 2011 |

REFERENCE BOOKS

| 1 | Roger S. Pressman, Software Engineering A Practitioners Approach , Sixth Edition, McGrawHill, 2005 |
| 2 | Richard Fairley, Software Engineering Concepts, , TataMcGrawHill Edition, 1997 |

Web Resources

| 1 | shorturl.at/yzBU4 |
| 2 | https://iansommerville.com/software-engineering-book/slides/ |

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QUESTION PAPER PATTERN

| SECTION-A(10 X 1 = 10 Marks) Answer ALL the questions Choose the correct answer Four options should be given ('None of these' should be avoided) | SECTION-B(5 X 3 = 15 Marks) Answer ALL the questions Either or type Two questions from each unit | SECTION-C(5 X 5 = 25 Marks) Answer ALL questions Question Number: 16 to 19 (Either or type) Question Number 20 is Compulsory – Case Study |

Mapping of COs with POs and PSOs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	L	L	M	M	M	L	M	S	M
CO2	S	M	S	L	M	L	L	L	S	M	S	M
CO3	S	S	M	M	M	L	S	M	M	L	S	S
CO4	S	M	M	M	L	M	M	M	M	S	S	M
CO5	M	S	S	M	M	S	M	M	L	L	M	S

S-Strong, M-Medium, L-Low

Sem.	Course Code	Elective– II BUSINESS INTELLIGENCE	Total Marks:100		Hours Per Week	Credits
II	21PBKET207		CIA : 50	ESE :50	4	3

Course Objectives: On successful completion of the course the students should have:

1. Understood the primary concepts of business intelligence
2. Gain knowledge to analyze data sets using the essential concepts

Course Outcomes (CO): On completion of the course, students should be ableto

CO 1	Remember and view the basics of business view & IT, digital data structure and OLTP	
CO 2	Elucidate the definition of business intelligence and basics of data integration programming logics using controls, loops and arrays	K1 — K6
CO 3	Comprehend the data modeling, metrics and performance Management	
CO 4	Understand and prepare the reports using statistical methods	
CO 5	Present the applications of analytics and further movement of BI	

K1 :Remember; K2: Understand; K3 :Apply; K4: Analyze; K5 : Evaluate; K6 :Create

Unit –I :

Business view of Information Technology Applications: Business Enterprise Organization, Its functions, and core business process – Business Excellence Framework – Key purpose of using IT in Business – Characteristics of Internet-ready IT Applications – Enterprise Applications and Bespoke IT Applications - Case Study Briefs.

Types of Digital Data: Introduction – 'GoodLife' Database – Structured Data – Unstructured Data – Semi-Structured Data - Difference between Semi-Structured and Structured Data.

Introduction to OLTP and OLAP : OLTP – OLAP – OLAP Architectures – OLTP and OLAP – Role of OLAP Tools in the BI Architecture – OLAP Operations on Multidimensional Data – Leveraging ERP Data Using Analytics.

Unit –II :

Getting Started with Business Intelligence : Using Analytical Information for Decision Support – Information Sources and BI – Definitions and Examples in Business Intelligence, Data Mining, Analytics, Machine Learning , Data Science – Perspectives of 'Data' – Business Intelligence(BI) Defined – BI & Stated Objectives – Questions about BI (Where, What and When) –Evolution of BI and Role of DSS, EIS, MIS, and Digital Dashboards – Need for BI – BI for Past, Present and Future – The BI value chain – Introduction to Business Analytics.

BI Definitions and Concepts: BI Component Framework – Who is for BI – BI Users –Business Intelligence Applications – BI Roles and Responsibilities – Best Practices BI/DW – The Complete BI professional – Popular BI Tools.

Basics of Data Integration: Need for Data Warehouse – Definition of Data Warehouse – Data Mart – ODS – Ralph Kimball's Approach Vs W.H. Immon's Approach – Goals of Data Warehouse – Constitutes of a Data Warehouse – Extract, Transform, Load – Data Integration – Data Integration Techniques – Data Quality – Data Profiling – A case Study from the Healthcare Domain.

Unit –III :

Multidimensional Data Modeling: Introduction – Data Modeling Basics – Types of Data Model – Data Modeling Techniques – Fact Table – Dimension Table – Typical dimension Models – Dimensional Modeling Life Cycle – Designing the Dimensional Model.

Measures, Metrics, KPIs and Performance Management : Understanding measures and Performance – Measurement System Terminology – Navigating a Business Enterprise, Role of Metrics, and Metrics Supply Chain – "Fact Based Decision Making" and KPIs – KPI Usage in Companies – Origins of

Business Metrics and KPIs – Measures to Business Decisions connection Dots.

Unit –IV :

Basics of Enterprise Reporting: Reporting Perspectives Common to all levels of Enterprise – Report Standardization and Presentation Practices – Enterprise Reporting Characteristics in OLAP World – Balanced Scorecard – Dashboards – Creating Dashboards – Scorecards Vs. Dashboards – The Buzz Behind Analysis.

Understanding Statistics: Role of Statistics in Analytics – Data, Data Description and Summarization – Statistical Tests – Understanding Hypothesis and t-Test – Correlation Analysis – Regression – ANOVA – The F-Test – Time Series Analysis.

Unit –V :

Application of Analytics: Application of Analytics – Analytics in Industries – Application of Analytics. BI Road Ahead: Understanding BI and Mobility – BI and Cloud Computing – Business Intelligence for ERP systems – Social CRM and BI.

Skill Development Activities:

1. Design a database for a Car showroom.
2. Design a BI for a health care domain.
3. Construct and analyze the relationship between BI and ERP.

TEXT BOOKS

1	Fundamentals of Business Analytics, R.N. Prasad &SeemaAcharya, Wiley India Pvt. Ltd, New Delhi, 2nd Edition, 2016

REFERENCE BOOKS

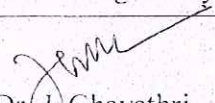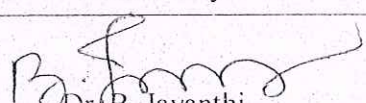| 1	Business Intelligence, A Managerial Approach, Efraim Turban, Ramesh Sharda, Dursan Delen& David King, Pearson Education Inc., 2nd Edition, 2014
2	Business Analytics – an application focus, PurbaHaladyRao, Prentice Hall of India, New Delhi, 2013.
3	Next Generation Business Intelligence – A Knowledge –based Approach, Rajendra M Sonar, Vikas Publishing House Pvt. Ltd. New Delhi, 2011.
4	Business Intelligence, Microsoft Press, Elizabeth Vitt, Michael Luckevich&StaciaMisner, Prentice Hall of India, New Delhi, 2005

Web Resources

1	https://www.scribd.com/doc/161105888/business-analytics-pdf

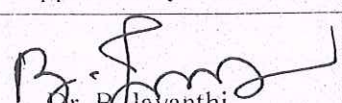| Course Designed By	Verified By	Approved By HOD
Dr. J. Ghayathri	Dr.B. Jayanthi	Dr. B. Jayanthi

QUESTION PAPER PATTERN

SECTION-A(10 X 1 = 10 Marks)	SECTION-B(5 X 3 = 15 Marks)	SECTION-C(5 X 5 = 25 Marks)
Answer ALL the questions Choose the correct answer **Four options** should be given ('None of these' should be avoided)	Answer ALL the questions Either or type Two questions from each unit	Answer ALL questions Question Number: 16 to 19 (Either or type) Question Number 20 is Compulsory - Case Study

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Mapping of COs with POs and PSOs:

PO/PSO CO	PO							PSO				
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	S	M	S	S	M	L	S	M	S
CO2	S	M	S	M	L	L	M	M	M	L	M	M
CO3	S	S	M	M	S	L	S	L	M	M	M	S
CO4	S	M	M	L	S	S	M	S	L	M	M	M
CO5	M	S	S	S	M	M	M	M	S	M	S	M

S-Strong, M-Medium, L-Low

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Sem.	Course Code	Core Practical – IV	Total Marks: 100		Hours Per Week	Credits
		LINUX LAB				
II	21PBKCP209		CIA : 50	ESE :50	4	3

Course Objectives: On successful completion of the course the students will have:

1. Skills to write system program using the open software
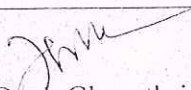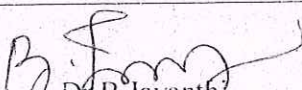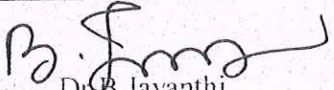2. knowledge to control the operations of the system using the open source environment

Course Outcomes (CO): On completion of the course, students should be ableto

CO 1	Demonstrate the Linux commands and file handling utilities by using Linux shell environment.	K1 – K6
CO 2	Evaluate the concept of shell scripting programs by using an AWK commands.	
CO 3	Create, change and remove the directory	
CO 4	Illustrate the concept of client-server communication	
CO 5	Implement CPU Scheduling	

K1 :Remember; K2: Understand; K3 :Apply; K4: Analyze; K5 : Evaluate; K6 :Create

PROGRAM LIST

1. Virtual File System (VFS) Implementation in Linux
2. Implement Linux Kernel Module Program.
3. Implement Deadlock Avoidance Using Semaphores
4. Implement CPU scheduling policy in a Linux OS.
5. Write a C program that illustrates two processes communicating using Shared memory
6. Write a shell script that receives any number of file names as arguments, checks if every argument supplied is a file or directory and reports accordingly that whenever the argument is a file it reports number of lines present in it
7. Write an awk script to count number of lines in a file that does not contain vowels
8. Write a C program to list every file in directory, its inode number and file name
9. Write a C program that receives a message from message queue and display them
10. Write a C program that illustrate the suspending and resuming process using signal

Course Designed By	Verified By	Approved By HOD
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Mapping of COs with POs and PSOs:

PO/ PSO	PO							PSO				
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	L	L	M	M	M	L	M	S	M
CO2	S	M	S	M	M	L	M	L	M	M	S	M
CO3	S	S	M	M	M	M	M	M	M	L	S	S
CO4	S	M	M	M	M	L	M	M	M	M	S	M
CO5	M	S	S	M	L	M	M	M	L	M	M	S

S- Strong, M-Medium, L-Low

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Sem.	Course Code	Core Practical – V	Total Marks:100		Hours Per Week	Credits
II	21PBKCP210	.NET PROGRAMMING LAB	CIA : 50	ESE :50	4	3

Course Objectives: On successful completion of the course the students will have:

1. Practical knowledge in C# Programming
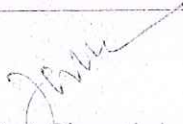2. Skills in developing web applications using ASP.NET

Course Outcomes (CO): On completion of the course, students should be able to

CO 1	Design, document, code and test small C# console and GUI Applications	
CO 2	Create simple application using standard web controls	K1 – K6
CO 3	Implement various ASP.NET controls for different applications	
CO 4	Design and debug web applications using ASP.NET	
CO 5	Create database driven ASP.NET web applications	

K1 :Remember; K2: Understand; K3 :Apply; K4: Analyze; K5 : Evaluate; K6 :Create

PROGRAM LIST

1. Write a Program in C# to find the second largest element in a single dimensional array.

2. Write a Program in C# to Check whether a number is Palindrome or not.

3. Write a Program in C# to implement Stack operations.

4. Implement linked lists in C# using the existing collections name space.

5. Write a program to display a feedback form. The different options for the list box must be DOTNET, OSS, CST, DS, ADIS. When the 'Submit' Form button is clicked after entering the data, a message must be displayed as "Submission Accepted" or "Invalid. ReEnter".

6. Write a program that gets user input such as the user name, mode of payment, appropriate credit card. After the user enters the appropriate values the Validation button must validates the values entered.

7. Write an application using ad-rotator control to change advertisements on client side request.

8. Create a web page using ASP.NET and C#.Net to display the cricket score from the table event (id, name, score). Refresh the website automatically after every 30 seconds

9. Create a web application using ASP.NET and ADO.NET to insert 3 records inside the SQL database table having following fields (DeptId, DeptName, EmpName, Salary). Update the salary for any one employee and increment it to 25% of the present salary. Perform delete operation on a particular row of the database table.

10. Create a Login Module which adds Username and Password in the database using ASP.NET and ADO.NET and consider Username in the database should be as a primary key.

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Mapping of COs with POs and PSOs:

PO/ PSO CO	PO							PSO				
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	L	L	M	M	M	L	M	S	M
CO2	S	M	S	M	M	L	L	L	L	S	S	M
CO3	S	S	M	S	M	M	M	M	M	M	M	S
CO4	S	M	M	M	L	M	L	M	S	S	S	M
CO5	M	S	S	M	M	L	M	M	L	M	M	S
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Sem.	Course Code	Core Practical– VI GOOGLE WEB DESIGNER LAB	Total Marks:50		Hours Per Week	Credits
II	21PBKCP211		CIA : 25	ESE : 25	2	2

Course Objectives: On successful completion of the course the students will have:

1. Design dynamic web advertisements effectively
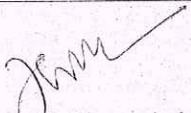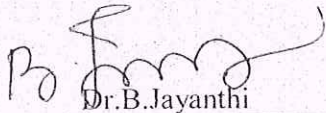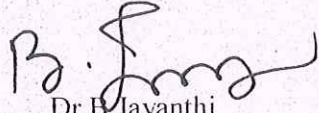2. Skills to create smart websites seamlessly on their own

Course Outcomes (CO): On completion of the course, students should be able to

CO 1	Design online real time web advertisement	
CO 2	Incorporate animation in web advertisements	K1 – K6
CO 3	Create websites with images and Videos	
CO 4	Insert customized maps in the web pages	
CO 5	Draw workflow design for the ads and WebPages of a website	

K1 :Remember; K2: Understand; K3 :Apply; K4: Analyze; K5 : Evaluate; K6 :Create

Program List	
1.	Create an Ad using Google web Designer
2.	Create an animated Ad using GWD
3.	Develop codes using GWD
4.	Design a website using the various Medias added to it (images, videos, maps and others)
5.	Create a dynamic workflow using GWD

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Mapping of COs with POs and PSOs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
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CO2	S	M	S	M	M	L	M	L	M	M	S	M
CO3	S	S	M	M	M	L	L	M	M	L	S	S
CO4	S	M	M	M	L	M	M	M	M	L	S	M
CO5	M	S	S	M	L	L	M	M	L	L	M	S

S-Strong, M-Medium, L-Low

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