COMMISSONERATE OF COLLEGIATE EDUCATION,

GOVT. DEGREE COLLEGE

RAJAMPET, KADAPA. Dt.

(Affiliated to Yogi Vemana University, Kadapa.)

TEACHING PLAN

ACADEMIC YEAR 2024-2025

Name of the Department : Mathematics

NAME OF THE LECTURER : Dr M. Jayachandra Babu

Course / Group : '

Subject / Page : Mathematics – Group Theory,
Computer Science – Data Structures, Operating System

Sl.No.	Subject	Paper	Page No.
1			
2			
3			
4			

Teaching Plan / Lesson No.

Name of the Topic	Groups
Hours required	5
Learning Objectives	After completion of this topic, students will be able to define group and discuss some properties related to groups
Previous knowledge to be reminded	sets, functions
Examples / Illustrations	$(\mathbb{Z}, +)$ is a group
Additional inputs	Application of group theory
Teaching Aids used	Blackboard, chalkpiece
References cited	Topics in Algebra By I.N. Herstein
Student Activity Planned after the teaching	Assignment, Seminar, slip test
Activity planned outside the class room, if any	
Any other activity	
Topic Synopsis	*(Continue on the reverse side if needed)* Group: Let G be a non-empty set and $*$ be a binary operation on G then $(G, *)$ is said to be a group if it satisfies the following 1. Associative property: $a*(b*c) = (a*b)*c$ $\forall a, b, c \in G$ 2. Identity property: For each $a \in G$, there exists an element $e \in G$ such that $a*e = e*a = a$ 3. Inverse property: For each $a \in G$, there exists an element $b \in G$ such that $a*b = b*a = e$

H. Jayan

Signature of the Lecturer

* In a group G, identity element is unique

* In a group G, inverse of any element is unique

* The set Q_+ of all positive rational numbers form an abelian group under the composition defined by o such that $a \circ b = \frac{ab}{3}$ for $a, b \in Q_+$

* The set of matrices $A_\alpha = \begin{pmatrix} \cos\alpha & -\sin\alpha \\ \sin\alpha & \cos\alpha \end{pmatrix}$, $\alpha \in R$ form a group w.r.t matrix multiplication if $\cos\theta = \cos\phi \Rightarrow \theta = \phi$

* The set Z of all integers form an abelian group w.r.t the operation defined by $a \circ b = a + b + 2$ for all $a, b \in Z$

* Let $(G, \cdot)$ be an algebraic structure. Then $(G, \cdot)$ is a group iff (i) $a, b, c \in G \Rightarrow (ab)c = a(bc)$ (ii) $ax = b$, $ya = b$ have unique solutions in G for every $a, b \in G$

* The fourth of roots of unity form an abelian group w.r.t multiplicati

* If every element of a group G is its own inverse then $(G, \cdot)$ is an abelian group.

* The set $G = \{ \cdots -3m, -2m, -m, 0, m, 2m, 3m, \cdots \}$ is an abelian group w.r.t usual addition, m being a fixed integer

Teaching Plan / Lesson No.

Name of the Topic	Groups (Cont:,)
Hours required	5
Learning Objectives	After completion of this topic, students will be able to use the addition and multiplication modulo m
Previous knowledge to be reminded	Groups
Examples / Illustrations	$\mathbb{Z}_5 = \{0,1,2,3,4\}$ is an abelian group w.r.t addition modulo 5 i.e $+_5$
Additional inputs	–
Teaching Aids used	Blackboard, chalkpiece
References cited	Topics in Algebra By I.N. Herstein
Student Activity Planned after the teaching	Assignment, slip test
Activity planned outside the class room, if any	
Any other activity	
Topic Synopsis	*(Continue on the reverse side if needed)* Cancellation laws: Let G be a group. Then for $a,b,c \in G$, $ab = ac \Rightarrow b = c$ (left cancellation law) and $ba = ca \Rightarrow b = c$ (right cancellation law) * In a non-identity group G, for $a, b, x, y \in G$, the equations $ax = b$ and $ya = b$ have unique solutions

M. Dayanand

Signature of the Lecturer

* Let G be a set of n^{th} roots of unity Then G is an abelian group w.r.t multiplication

Addition modulo m

Let $a, b \in Z$ and m be a fixed positive integer. If r is the remainder $(0 \le r < m)$ when $a+b$ is divided by m Then we define $a +_m b = r$ and we read '$a +_m b$' as 'a addition modulo m b'

Ex: $2 +_5 3 = 1$

Multiplication modulo m

If a and b are integers and p is a fixed positive integer and if ab is divided by p such that r is the remainder $(0 \le r < p)$, we define $a \times_p b = r$. we read $a \times_p b$ as 'a multiplication modulo p' b

Ex: $2 \times_5 3 = 1$, $2 \times_6 5 = 1$

* The set $G = \{0, 1, 2, \cdots m-1\}$ of first m non-negative integers is an abelian group w.r.t the operation addition modulo m.

* The set of non-zero residue classes modulo a prime integer p forms an abelian grp of order $p-1$ w.r.t multiplication of residue classes.

Teaching Plan / Lesson No.

Name of the Topic	order of an element of a group
Hours required	5
Learning Objectives	After completion of this topic, students will be able to find the order of any element of a finite group
Previous knowledge to be reminded	Groups
Examples / Illustrations	In $\mathbb{Z}_6$, $O(2)=3$ $(3\cdot 2=0)$ In $G=\{1,-1\}$, $O(-1)=2$ $((-1)^2=1)$
Additional inputs	
Teaching Aids used	Blackboard, Chalkpiece
References cited	Topics in Algebra By I.N. Herstein
Student Activity Planned after the teaching	Assignment
Activity planned outside the class room, if any	
Any other activity	
Topic Synopsis	*(Continue on the reverse side if needed)* * Let G be a group and a be any element of G. Then the order of the element a is defined as the least positive integer n such that $a^n=e$ If there exists no positive integer n such that $a^n=e$ then we say that a is of infinite order (or) zero order

M. Sajad

Signature of the Lecturer

* The order of every element of a finite group is finite and less than or equal to the order of the group

* In a group G, $o(a) = o(a^{-1})$ $\forall a \in G$

* If a is an element of a group G such that $o(a) = n$ then $a^m = e$ iff $n | m$

* If a is an element of order n of a group G and $(p, n) = 1$ Then $o(a^p) = n$

* Let G be an abelian group. If $a, b \in G$ such that $o(a) = m$, $o(b) = n$ and $(m, n) = 1$ then $o(ab) = mn$

* In a group G, if $a \in G$ and $o(a) = m$ then $o(a^k) = \frac{m}{(m,k)}$

* For any two elements $a, b \in G$, $o(a) = o(b^{-1}ab)$

* In $\mathbb{Z}_6 = \{0, 1, 2, 3, 4, 5\}$

$o(1) = 6$, $o(2) = 3$, $o(3) = 2$, $o(4) = 3$, $o(5) = 6$ and $o(0) = 1$

* If every element of a group G except the identity element is of order two then the group is abelian.

Teaching Plan / Lesson No.

Name of the Topic	Subgroups
Hours required	5
Learning Objectives	After completion of this topic, students will be able to find the subgroups of a group and discuss some properties of subgroups
Previous knowledge to be reminded	Groups
Examples / Illustrations	$(\mathbb{Z}, +)$ is a subgroup of $(\mathbb{Q}, +)$ $(\mathbb{Z}, \cdot)$ is not a subgroup of $(\mathbb{Q}, \cdot)$ because $(\mathbb{Z}, \cdot)$ is not a group
Additional inputs	–
Teaching Aids used	Blackboard, Chalkpiece
References cited	Topics in Algebra By I. N. Herstein
Student Activity Planned after the teaching	Assignment, Slip test
Activity planned outside the class room, if any	–
Any other activity	–
Topic Synopsis	*(Continue on the reverse side if needed)* Subgroup: Let G be a group and H be a non-empty subset of G. If H is also a group under the same operation as in G then H is called a subgroup of G. * The identity of a subgroup H of a group is same as the identity of G

M. Jayaraj

Signature of the Lecturer

* If H is a subgroup of G then $H = H^{-1}$

* If H is any subgroup of a group G then $HH = H$

* A non-empty subset H of a group G is a subgroup of G iff

(i) $a, b \in H \Rightarrow ab \in H$ (ii) $a \in H \Rightarrow a^{-1} \in H$

* A non-empty subset H of a group G is a subgroup of G iff $a, b \in H \Rightarrow ab^{-1} \in H$

* A necessary and sufficient conditions for a non-empty subset of a group G to be a subgroup of G is $HH^{-1} \subseteq H$

* A necessary and sufficient condition for a non-empty subset of a group G to be a subgroup of G is $HH^{-1} = H$

* The necessary and sufficient condition for a finite subset H of a group G to be a subgroup of G is $a, b \in H \Rightarrow ab \in H$

Teaching Plan / Lesson No.

Name of the Topic	Subgroups
Hours required	5
Learning Objectives	After completion of this topic, Students will be able to discuss the algebra of subgroups
Previous knowledge to be reminded	Subgroups
Examples / Illustrations	$H_1 = \{0,3\}$ and $H_2 = \{0,2,4\}$ are subgroups of $(\mathbb{Z}_6 = \{0,1,2,3,4,5\}, +_6)$ and $H_1 \cap H_2 = \{0\}$ is also the same
Additional inputs	
Teaching Aids used	Blackboard, Chalkpiece
References cited	Topics in Algebra By I.N. Herstein
Student Activity Planned after the teaching	Seminar
Activity planned outside the class room, if any	
Any other activity	
Topic Synopsis	*(Continue on the reverse side if needed)* * If H and K are two subgroups of a group G then HK is a subgroup of G iff $HK = KH$ Proof: $HK = (HK)^{-1} = K^{-1}H^{-1} = KH$ $(HK)(HK)^{-1} = (HK)(K^{-1}H^{-1}) = H(KK^{-1})H^{-1} = HKH^{-1}$ $= KHH^{-1} = KH = HK$

M. Tajer

Signature of the Lecturer

* If H_1 and H_2 are two subgroups of a group G then $H_1 \cap H_2$ is a subgroup of G

* The ~~necessary~~ union of two subgroups of a group need not be a subgroup of the group.

For example, $H_1 = \{0, 3\}$ and $H_2 = \{0, 2, 4\}$ are subgroups of $\mathbb{Z}_6$

but $H_1 \cup H_2 = \{0, 2, 3, 4\}$ is not a subgroup of $\mathbb{Z}_6$

because $2 + 3 = 5 \notin H_1 \cup H_2$

* The union of two subgroups of a group is a subgroup iff one is contained in the other.

* Every subgroup of an abelian group is an abelian group

Teaching Plan / Lesson No.

Name of the Topic	Cosets and Lagrange's theorem
Hours required	5
Learning Objectives	After completion of this topic, students will be able to define the coset and discuss some properties of cosets
Previous knowledge to be reminded	Subgroups
Examples / Illustrations	For $H = \{3n \mid n \in \mathbb{Z}\}$, $0+H$, $1+H$ and $2+H$ are the only distinct left cosets
Additional inputs	Applications of Lagrange's theorem
Teaching Aids used	Blackboard, Chalkpiece
References cited	Topics in Algebra By I. N. Herstein
Student Activity Planned after the teaching	Skip test
Activity planned outside the class room, if any	
Any other activity	
Topic Synopsis	*(Continue on the reverse side if needed)* Coset: Let H be a subgroup of a group G and $a \in G$. Then the set $aH = \{ah \mid h \in H\}$ is called a left coset of H in G generated by a and $Ha = \{ha \mid h \in H\}$ is called a right coset of H in G generated by a

M. Jayaraj

Signature of the Lecturer

* If H is any subgroup of a group G and $h \in G$ then $hH = H = Hh$

* If a, b are any two elements of a group G and H is any subgroup of G then $Ha = Hb \Leftrightarrow ab^{-1} \in H$ and $aH = bH \Leftrightarrow a^{-1}b \in H$

* If a, b are any two elements of a group G and H is any subgroup of G then $a \in bH \Leftrightarrow aH = bH$ and $a \in Hb \Leftrightarrow Ha = Hb$

* Any two left (right) cosets of a subgroup are either disjoint or identical

* Let H be any subgroup of a group G. Then there exists a bijection between any left cosets of H in G.

* If H is any subgroup of a group G then there is a one-to-one correspondence between the set of all distinct left cosets of H in G and the set of all distinct right cosets of H in G

Lagrange's Theorem

The order of a subgroup of a finite group divides the order of the group

Converse of the above Theorem is not true

For example, Take $H = \{1, -1\}$ and $G = \{1, -1, i, -i\}$

Then H is a subset of G and $o(H) = 2 / 4 = o(G)$

but H is not a subgroup of G

Teaching Plan / Lesson No.

Name of the Topic	Normal Subgroups
Hours required	15
Learning Objectives	After completion of this topic, students will be able to define normal subgroup and discuss some properties of normal subgroups
Previous knowledge to be reminded	Subgroups and Cosets
Examples / Illustrations	$H = \{1, -1\}$ is a normal subgroup of $G = \{1, -1, i, -i\}$
Additional inputs	Sylow Theorems
Teaching Aids used	Blackboard, Chalkpiece
References cited	Topics in Algebra By I.N. Herstein
Student Activity Planned after the teaching	Assignment, Seminar, Slip Test
Activity planned outside the class room, if any	
Any other activity	
Topic Synopsis	*(Continue on the reverse side if needed)* Normal Subgroup: A subgroup H of a group G is said to be a normal subgroup of G if $xhx^{-1} \in H$ $\forall x \in G, h \in H$ $\Leftrightarrow$ A subgroup H of a group G is normal iff $xHx^{-1} = H \ \forall x \in G$

M. Fayad

Signature of the Lecturer

* A Subgroup H of a group G is a normal Subgroup of G iff each left coset of H in G is a right coset of H in G

* A Subgroup H of a group G is a normal Subgroup of G iff the product of two right (left) cosets of H in G is again a right (left) coset of H in G.

* Every Subgroup of an abelian group is normal.

* If G is a group and H is a subgroup of index 2 in G Then H is a normal Subgroup of G

* The intersection of any two normal Subgroups of a group G is a normal Subgroup of G

* A normal Subgroup of a group G is Commutative with every complex of G

* If N is any normal subgroup of G and H is any Subgroup of G Then HN is a Subgroup of G

* If H is a Subgroup of G and N is a normal Subgroup of G then
(i) $H \cap N$ is a normal Subgroup of N (ii) N is a normal Subgroup of HN

* If N, M are normal Subgroups of G Then NM is also a normal subgroup of G

* If M, N are two normal Subgroups of G such that $M \cap N = \{e\}$ Then every element of M commutes with every element of N

Teaching Plan / Lesson No.

Name of the Topic	Homomorphism, Isomorphism of Groups
Hours required	15
Learning Objectives	After completion of this topic, students will be able to find that given map is a homomorphism and learn some properties related to homomorphism
Previous knowledge to be reminded	Groups and normal subgroups
Examples / Illustrations	$f:(\mathbb{Z},+)\to(\mathbb{Z},+)$ defined as $f(x)=x+1$ is not a homomorphism
Additional inputs	
Teaching Aids used	Blackboard, Chalkpiece
References cited	Topics in Algebra By I.N. Herestein
Student Activity Planned after the teaching	Slip Test, Assignment and Seminar
Activity planned outside the class room, if any	
Any other activity	
Topic Synopsis	*(Continue on the reverse side if needed)* $(G,*)$ and (G',o) are two groups. If $f:G\to G'$ is a function satisfying the condition $f(x*y)=f(x)\,o\,f(y)$ for $x,y\in G$ then f is called a group homomorphism Kernel of a homomorphism f is defined as $\ker f=\{x\in G / f(x)=e'\}$ (e' is identity in G')

M. Tajan

Signature of the Lecturer

* Every homomorphic image of a group is a group

* Every homomorphic image of an abelian group is an abelian group

* Let G, G' be two group, $f: G \to G'$ be a homomorphism and e, e' be identity in G, G' respectively then (i) $f(e) = e'$ (ii) $f(a^{-1}) = [f(a)]^{-1}$ $\forall a \in G$

* If $f: G \to G'$ is a homomorphism then $\ker f$ is a normal subgroup of G

* If $f: G \to G'$ is an epimorphism then $\ker f = \{e\}$ iff f is an isomorphism

* Fundamental Theorem of homomorphism of groups

Every homomorphic image is isomorphic to some quotient group

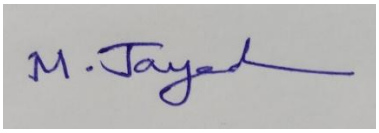
Teaching Notes

For

Database Management Systems

Teaching Plan No.-1

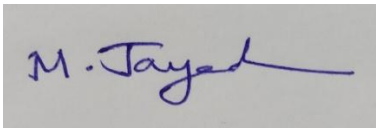
Name of the topic	**Overview of Database Management System**
Hours required	12
Learning Objectives	Differentiate between database systems and file based systems
Previous Knowledge to be reminded	Data & information, spread sheets
Eaxmples/Illustrations	College database
Additional Inputs	
Teaching Aids used	PPT, LCD Projector, Computer Lab
References cited	Database Management Systems by Raghu Ramakrishnan, McGrawhill
Student Activity planned after teaching	Seminar Presentation on Database Management Systems
Activity planned outside the Class room, if any	
Any other activity	
Topic Synopsis	Introduction to data, information, database, database management systems, file-based system, Drawbacks of file-Based System, database approach, Classification of Database Management Systems, advantages of database approach, Various Data Models, Components of Database Management System, three schema architecture of data base, costs and risks of database approach.



Signature of the Lecturer

Teaching Plan No.-2

Name of the topic	**Entity-Relationship Model**
Hours required	12
Learning Objectives	Understand the building blocks of ER model Design a database using ER model
Previous Knowledge to be reminded	Data & information, spread sheets
Eaxmples/Illustrations	ER diagram Hospital administration
Additional Inputs	
Teaching Aids used	PPT, LCD Projector, Computer Lab
References cited	Database Management Systems by Raghu Ramakrishnan, McGrawhill
Student Activity planned after teaching	Case Study on ER model and EER model
Activity planned outside the Class room, if any	
Any other activity	
Topic Synopsis	Introduction, the building blocks of an entity relationship diagram, classification of entity sets, attribute classification, relationship degree, relationship classification, reducing ER diagram to tables, enhanced entity-relationship model (EER model), generalization and specialization, **IS A** relationship and attribute inheritance, multiple inheritance, constraints on specialization and generalization, advantages of ER modeling.



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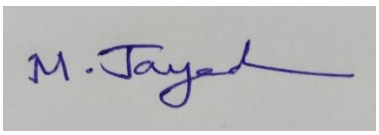
Teaching Plan No.-3

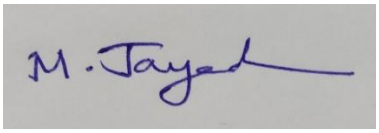
Name of the topic	**Relational Model**
Hours required	12
Learning Objectives	Understand the concept of Relational model Use relational model in database design Understand relational algebra Learn Normalization of databse schema
Previous Knowledge to be reminded	Data & information, spread sheets
Eaxmples/Illustrations	Creation of college database and establish relationships between tables
Additional Inputs	
Teaching Aids used	PPT, LCD Projector, Computer Lab
References cited	Database Management Systems by Raghu Ramakrishnan, McGrawhill
Student Activity planned after teaching	Exercise on Normalization
Activity planned outside the Class room, if any	
Any other activity	
Topic Synopsis	Introduction, CODD Rules, relational data model, concept of key, relational integrity, relational algebra, relational algebra operations, advantages of relational algebra, limitations of relational algebra, relational calculus, tuple relational calculus, domain relational Calculus (DRC), Functional dependencies and normal forms upto 3rd normal form.



Signature of the Lecturer

Teaching Plan No.-4

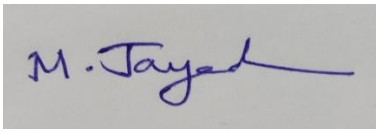
Name of the topic	**Structured Query Language**
Hours required	12
Learning Objectives	Understand SQL commands Use SQL commands for creating and manipulating data stored in databases.
Previous Knowledge to be reminded	Data & information, spread sheets
Eaxmples/Illustrations	Creation of database table, insert,update,delete and view data using SQL commands
Additional Inputs	
Teaching Aids used	PPT, LCD Projector, Computer Lab
References cited	Database Management Systems by Raghu Ramakrishnan, McGrawhill
Student Activity planned after teaching	Competition on SQL Query Writing
Activity planned outside the Class room, if any	
Any other activity	
Topic Synopsis	Introduction, Commands in SQL, Data Types in SQL, Data Definition Language, Selection Operation, Projection Operation, Aggregate functions, Data Manipulation Language, Table Modification Commands, Join Operation, Set Operations, View, Sub Query.



Signature of the Lecturer

Teaching Plan No.-5

Name of the topic	**PL/SQL**
Hours required	12
Learning Objectives	Understand PL/SQL Language Elements Write PL/SQL programs to work with databases.
Previous Knowledge to be reminded	Data & information, spread sheets,SQL commands
Eaxmples/Illustrations	PL/SQL Programs using control structures
Additional Inputs	
Teaching Aids used	PPT, LCD Projector, Computer Lab
References cited	Database Management Systems by Raghu Ramakrishnan, McGrawhill
Student Activity planned after teaching	Peer Review of PL/SQL code
Activity planned outside the Class room, if any	
Any other activity	
Topic Synopsis	Introduction, Shortcomings of SQL, Structure of PL/SQL, PL/SQL Language Elements, Data Types, Operators Precedence, Control Structure, Steps to Create a PL/SQL Program, Iterative Control, Procedure, Function, Database Triggers, Types of Triggers.



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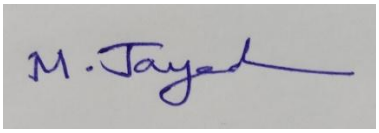
Teaching Notes

For

Problem Solving Using C

Teaching Plan No.-1

Name of the topic	**Introduction to computer and programming**
Hours required	7
Learning Objectives	Understand the working of a digital computer To explore basic knowledge on computers Learn to write algorithms and design flowchart
Previous Knowledge to be reminded	Basic computer knowledge
Eaxmples/Illustrations	Making tea, process of college admission
Additional Inputs	
Teaching Aids used	PPT, LCD Projector, Computer Lab
References cited	Computer fundamentals and programming in C, REEMA THAREJA, OXFORD UNIVERSITY PRESS
Student Activity planned after teaching	Online Quiz
Activity planned outside the Class room, if any	Identify the different types of computers,printers,networking devices and their configurations in the college premises.
Any other activity	
Topic Synopsis	Introduction, Basic block diagram, functions of various components of computer, Concepts of Hardware and software, Types of software, Compiler and interpreter, Concepts of Machine level, Assembly level and high-level programming, Flowcharts and Algorithms



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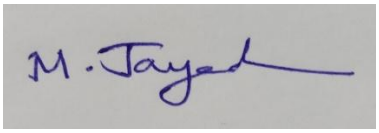
Teaching Plan No.-2

Name of the topic	**Fundamentals of C**
Hours required	8
Learning Objectives	Understand basic concepts of C programming Learn how to solve common types of computing problems.
Previous Knowledge to be reminded	Algoriths and flowcharts
Eaxmples/Illustrations	Adding two numbers, calculate simple interest etc.
Additional Inputs	
Teaching Aids used	PPT, LCD Projector, Computer Lab
References cited	E. Balagurusamy, "Programming in ANSI C", Tata McGraw Hill, 6th Edn, ISBN-13: 978- 1- 25- 90046-2
Student Activity planned after teaching	Online Quiz, Programming practice in computer lab.
Activity planned outside the Class room, if any	
Any other activity	
Topic Synopsis	History of C, Features of C, C Tokens-variables and keywords and identifiers, constants Data types, Rules for constructing variable names, Operators, Structure of C program, Input /output statements in C Formatted and Unformatted I/O



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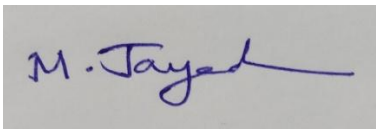
Teaching Plan No.-3

Name of the topic	**Control statements in C**
Hours required	10
Learning Objectives	Understand and apply the if, if-else, and else if ladder statements Master the use of while, for, and do-while loops Analyze and develop a solution to a given problem with suitable control structures
Previous Knowledge to be reminded	Algorithms and flowcharts, structure of C
Eaxmples/Illustrations	Find the sum of individual digits of a positive integer Generate Fibonacci sequence Check whether a number is Armstrong or not. Generate all the prime numbers between 1 and n
Additional Inputs	
Teaching Aids used	PPT, LCD Projector, Computer Lab
References cited	E. Balagurusamy, "Programming in ANSI C", Tata McGraw Hill, 6th Edn, ISBN-13: 978- 1- 25- 90046-2
Student Activity planned after teaching	Online Quiz, Structured Programming Assignment.
Activity planned outside the Class room, if any	
Any other activity	
Topic Synopsis	**Decision making statements:** if, if else, else if ladder, switch statements. **Loop control statements**: while loop, for loop do-while loop. **Jump Control statements:** break, continue and goto.



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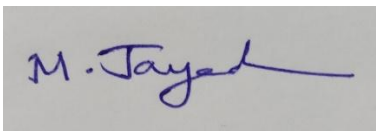
Teaching Plan No.-4

Name of the topic	**Arrays & Strings in C**
Hours required	10
Learning Objectives	Apply the derived data types in program solutions Learn how to declare, initialize, and access elements of an array using indexing. Learn how to declare, initialize, and access characters in a string using indexing.
Previous Knowledge to be reminded	Algorithms and flowcharts, structure of C
Eaxmples/Illustrations	Addition and Multiplication of two matrices
Additional Inputs	
Teaching Aids used	PPT, LCD Projector, Computer Lab
References cited	E. Balagurusamy, "Programming in ANSI C", Tata McGraw Hill, 6th Edn, ISBN-13: 978- 1- 25- 90046-2
Student Activity planned after teaching	Online Quiz, Array and String Program Debugging.
Activity planned outside the Class room, if any	
Any other activity	
Topic Synopsis	**Arrays:** One Dimensional arrays - Declaration, Initialization and Memory representation; Two Dimensional arrays - Declaration, Initialization and Memory representation. **Strings**: Declaring & Initializing string variables; String handling functions, Character handling functions



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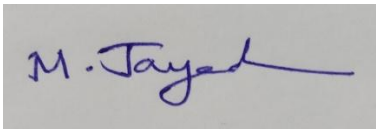
Teaching Plan No.-5

Name of the topic	**Functions in C**
Hours required	6
Learning Objectives	Understand the syntax and components of a C function Understand how to invoke a function Learn different ways to pass arguments to functions, including call by value and call by reference. Understand the concept of variable scope
Previous Knowledge to be reminded	Algorithms and flowcharts, structure of C
Eaxmples/Illustrations	Demonstrate Call by Value and Call by Reference mechanism Find GCD of Two numbers using Recursion
Additional Inputs	
Teaching Aids used	PPT, LCD Projector, Computer Lab
References cited	E. Balagurusamy, "Programming in ANSI C", Tata McGraw Hill, 6th Edn, ISBN-13: 978- 1- 25- 90046-2
Student Activity planned after teaching	Online Quiz,Pair Programming Exercise on Functions
Activity planned outside the Class room, if any	
Any other activity	
Topic Synopsis	Function Prototype, definition and calling. Return statement. Nesting of functions. Categories of functions. Recursion, Parameter Passing by address & by value. Local and Global variables. **Storage classes**: automatic, external, static and register.



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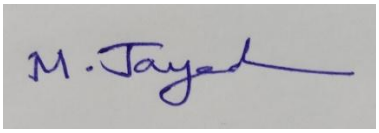
Teaching Plan No.-6

Name of the topic	**Pointers in C**
Hours required	6
Learning Objectives	Apply the derived data types in program solutions Learn how to declare, initialize, and access elements of an array using indexing. Learn how to declare, initialize, and access characters in a string using indexing.
Previous Knowledge to be reminded	Algorithms and flowcharts, structure of C
Eaxmples/Illustrations	Perform various operations using pointers
Additional Inputs	
Teaching Aids used	PPT, LCD Projector, Computer Lab
References cited	E. Balagurusamy, "Programming in ANSI C", Tata McGraw Hill, 6th Edn, ISBN-13: 978- 1- 25- 90046-2
Student Activity planned after teaching	Online Quiz, Programming practice in computer lab.
Activity planned outside the Class room, if any	
Any other activity	
Topic Synopsis	**Pointers:** Pointer data type, Pointer declaration, initialization, accessing values using pointers. Pointer arithmetic. Pointers and arrays, pointers and functions.



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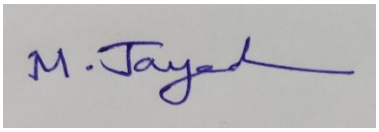
Teaching Plan No.-7

Name of the topic	**Dynamic Memory Management in C**
Hours required	6
Learning Objectives	Understand the concept of dynamic memory allocation and its advantages over static memory allocation. Learn malloc, calloc, realloc, and free functions and their usage.
Previous Knowledge to be reminded	Arrays,functions and pointers in C
Eaxmples/Illustrations	Usage of dynamic memory management functins.
Additional Inputs	
Teaching Aids used	PPT, LCD Projector, Computer Lab
References cited	E. Balagurusamy, "Programming in ANSI C", Tata McGraw Hill, 6th Edn, ISBN-13: 978- 1- 25- 90046-2
Student Activity planned after teaching	Online Quiz, Programming practice in computer lab.
Activity planned outside the Class room, if any	
Any other activity	
Topic Synopsis	**Dynamic Memory Management:** Introduction, Functions- malloc, calloc, realloc, free



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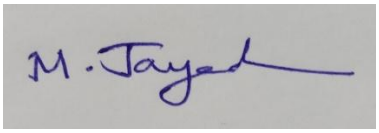
Teaching Plan No.-8

Name of the topic	**Structures and Unions in C**
Hours required	6
Learning Objectives	Define structures and unions in C programming Differentiate between structures and unions Access and modify members of structures & unions
Previous Knowledge to be reminded	Arrays,functions and pointers in C
Eaxmples/Illustrations	Read data of 10 employees with a structure
Additional Inputs	
Teaching Aids used	PPT, LCD Projector, Computer Lab
References cited	E. Balagurusamy, "Programming in ANSI C", Tata McGraw Hill, 6th Edn, ISBN-13: 978- 1- 25- 90046-2
Student Activity planned after teaching	Online Quiz, Appropriate use of structures and nested structures.
Activity planned outside the Class room, if any	
Any other activity	
Topic Synopsis	**Structures:** Basics of structure, structure members, accessing structure members, nested structures, array of structures, structure and functions, structures and pointers. **Unions:** Union definition; difference between Structures and Unions.



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