Yogoda Satsanga Palpara Mahavidyalaya

Department of Computer Science
Session:-2018-2019

TEACHING PLAN

Semester	Paper	Unit/Module		Teacher	No. of lectures	To be completed by
Semester-1	C1T1 : Programming Fundamentals using C/C++	C Language	1. Introduction to C	Mr. Sourav Chakraborty(Part time Teacher)		1st Month
			2. Data Types, Variables, Constants, Operators and Basic I/O			1st Month
			3. Expressions, Conditional Statements and Iterative Statements		30	2nd month
			4. Functions and Arrays			2nd month
			5. Derived Data Types(Structures and Unions)			3rd month
			6. Pointers References in C			4tn month
		C ++ Languag	1. Memory Allocation in C++			1st Month

		e				
			2. File I/O, Preprocessor Directives			2nd month
			3. Using Classes in C++			3rd month
			4. Overview of Function Overloading and Operator Overloading	Mrs. Sova Pal (Bera) (Associate Professor)		4th month
			5. Inheritance, Polymorphism and Exception Handling			5th Month
	C1 P1 : Programming Fundamentals using C/C++ Lab	C Language	1. Introduction to C			1st Month
			2. Data Types, Variables, Constants, Operators and Basic I/O			1st Month
			3. Expressions, Conditional Statements and Iterative Statements	Mr. Sourav Chakraborty(Part time Teacher)	30	2nd month
			4. Functions and Arrays			2nd month

			5. Derived Data Types(Structures and Unions)			3rd month
			6. Pointers References in C			4th month
		C ++ Language	1. Memory Allocation in C++			1st Month
			2. File I/O, Preprocessor Directives			2nd month
			3. Using Classes in C++			3rd month
			4. Overview of Function Overloading and Operator Overloading	Mrs. Sova Pal (Bera) (Associate Professor)		4th month
			5. Inheritance, Polymorphism and Exception Handling			5th Month
	C2T2 : Computer System Architecture	Digital Electronics	1. Introduction Logic gates, boolean algebra, combinational circuits, circuit simplification, flip-flops and sequential circuits, decoders, multiplexers, registers, counters and memory units.	Mr. Anustup Bera(Part Time Teacher)	30	1st Month And 2nd month

			2. Data Representation and Basic Computer Arithmetic			3rdmonth And 4thMonth
		Computer Architecture	Basic Computer Organization and Design			1stMonth
			Central Processing Unit	Mr. Suman Mondal (Assistant Professor)	30	2ndmonth
			Memory Organization			3rdmonth
			Input-Output Organization			4thMonth
	C2P2 : Computer System Architecture	**Digital Experiment**	1. Design and implement a full adder circuit using NAND gates only. 2. Design and implement a J. K. flip-flop. 3. Design and implement a 4 bit	Mr. Suman Mondal (Assistant Professor)	30	1stMonth

			adder using flip-flop.			
			4. Design and implement a 4 bit synchronous counter. 5. Design and implement a 8:1 multiplexer. 6. Design and implement a D flip-flop.			2nd month
			7. Design and implement a half subtractor using NAND gates only. 8. Design and implement a 3×8 decoder. 9. Design and implement a 8 bit parity generator. 10. Design and implement a two bit digital comparator.			3rd month And 4th Month
		Computer Architecture	Basic Computer Organization and Design			1st Month
			Central Processing Unit	Mr. Suman Mondal (Assistant Professor)	30	2nd month

			Memory Organization			3rd month
			Input-Output Organization			4th Month
	GE-I T1 : Computer Fundamentals	**Data Representation:**	Number systems and character representation, binary arithmetic		50	1st Month
		Human Computer Interface	Types of software, Operating system as user interface, utility programs			1st Month
		Devices	Input and output devices (with connections and practical demo), keyboard, mouse, joystick, scanner, OCR, OMR, bar code reader, web camera, monitor, printer, plotter	Mr. Suman Mondal (Assistant Professor)		2nd month
		Memory	Primary, secondary, auxiliary memory, RAM, ROM, cache memory, hard disks, optical disks			3rd month
		Computer Organisation and Architecture	C.P.U., registers, system bus, main memory unit, cache memory, Inside a computer, SMPS, Motherboard			4th Month

	GE-I P1: Computer Fundamentals Lab	**MS Word**	1.Prepare**a grocery list** having four columns (Serial number, the name of the product, quantity and price) for the month of April, 06. 2. Create a **telephone directory**. 3.Design a **time-table form** for your college.	Mr. Suman Mondal (Assistant Professor)	50	1st Month
			4.XYZ Publications plans to release a new book designed as per your syllabus. Design the **first page of the book**			1st Month
			5.Wrapping of text around the image. 6.Convert text to a table, using comma as delimiter			2nd month
		MS Excel	1.Enter data in Excel Sheet 2.A company XYZ Ltd. pays a monthly salary to its employees which consists of			3rd month

			basic salary, allowances & deductions.			
			3.Create Payment Table for a fixed Principal amount, variable rate of interests and time 4.Use an array formula to calculate Simple Interest for given principal amounts given the rate of Interest and time			4th Month
Semester-II	**C3T: Programming in Java**	**Introduction to Java**	Java Architecture and Features, Understanding the semantic and syntax differences between C++ and Java, Compiling and Executing a Java Program, Variables, Constants, Keywords Data Types, Operators (Arithmetic, Logical and Bitwise) and Expressions	Mr. Sourav Chakraborty(Part time Teacher)	50	1st Month

		Arrays, Strings and I/O	Creating & Using Arrays (One Dimension and Multi-dimensional), Referencing Arrays Dynamically, Java Strings, Simple I/O using System out and the Scanner class, Byte and Character streams, Reading/Writing from console and files.			2nd month
		Object-Oriented Programming Overview	Principles of Object-Oriented Programming, Defining & Using Classes, Controlling Access to Class Members, Class Constructors, Method Overloading, Class Variables & Methods, Objects as parameters, final classes, Object class, Garbage Collection.			3rd month
		Inheritance, Interfaces, Packages, Enumerations, Autobox	Inheritance: (Single Level and Multilevel, Method Overriding, Dynamic Method Dispatch, Abstract Classes), Interfaces and Packages, Extending interfaces and packages,			3rd month

		ing and Metadata	Package and Class Visibility, Using Standard Java Packages (util, lang, io, net), Wrapper Classes, Autoboxing/Unboxing, Enumerations and Metadata.			
		Exception Handling, Threading, Networking and Database Connectivity	Exception types, uncaught exceptions, throw, built-in exceptions, Creating your own exceptions; Multi-threading.			4th Month
		Applets and Event Handling	Java Applets: Introduction to Applets, Writing Java Applets, Working with Graphics, Incorporating Images & Sounds. Event Handling Mechanisms, Listener Interfaces			4th Month
	C3P: Programming in Java (Lab)	**Introduction to Java**	1. To find the sum of any number of integers entered as command line arguments	Mr. Sourav Chakraborty(Part time Teacher)	50	1st Month

			2. To find the factorial of a given number 3. To learn use of single dimensional array by defining the array dynamically. 4. To learn use of lenth in case of a two dimensional array 5. To convert a decimal to binary number			
		Arrays, Strings and I/O	6. To check if a number is prime or not, by taking the number as input from the keyboard 7. To find the sum of any number of integers interactively, i.e., entering every number from the keyboard, whereas the total number of integers is given as a command line argument 8. Write a program			2nd month

			that show working of different functions of String and String Buffer classs like set Charat (set Length (), append (), insert (), concat ()and equals ().			
		Object-Oriented Programming Overview	9. Write a program to create a class with methods where distance is computed in terms of feet and inches, how to create objects of a class and to see the use of this pointer 10. Write a program to show that during function overloading, if no matching argument is found, then java will apply automatic type conversions(from lower to higher data type)			3rd month

			11. Write a program to show the difference between public and private access specifiers. The program should also show that primitive data types are passed by value and objects are passed by reference and to learn use of final keyword			
		Inheritance, Interfaces, Packages, Enumerations, Autoboxing and Metadata	12. Write a program to demonstrate the concept of boxing and unboxing. 13. Create a multi-file program where in one file a string message is taken as input from the user and the function to display the message on the screen is given in another file (make use of Scanner package in this program).			3rd month

			14. Write a program to create a multilevel package and also creates a reusable class to generate Fibonacci series, where the function to generate fibonacii series is given in a different file belonging to the same package. 15. Write a program that creates illustrates different levels of protection in classes/subclasses belonging to same package or different packages			
		Exception Handling, Threading, Networking and Database	16. Write a program that takes two numbers a and b as input, computes a/b, and invokes Arithmetic Exception to generate a			4th Month

		Connectivity	message when the denominator is zero. 17. Write a program to show the use of nested try statements that emphasizes the sequence of checking for catch handler statements. 18. Write a program to demonstrate priorities among multiple threads.			
		Applets and Event Handling	19. Write a program to demonstrate different mouse handling events like mouse Clicked (), mouse Entered (), mouse Exited (), mouse Pressed, mouse Released () and mouse Dragged (). 20. Write a program to demonstrate different keyboard handling events. 21. Write a program to generate a			4th Month

			window without an applet window using main () function.			
	C4T: Discrete Structures	**Introduction**	Sets - finite and Infinite sets, uncountably Infinite Sets; functions, relations, Properties of Binary Relations, Closure, Partial Ordering Relations; counting - Pigeonhole Principle, Permutation and Combination; Mathematical Induction, Principle of Inclusion and Exclusion	Mr. Suman Mondal (Assistant Professor)	33	1st Month
		Growth of Functions	Asymptotic Notations, Summation formulas and properties, Bounding Summations, approximation by Integrals			2nd month
		Recurrences	Recurrence Relations, generating functions, Linear Recurrence Relations with constant coefficients and their solution, Substitution Method, Recurrence Trees, Master			3rd month

			Theorem			
		Graph Theory	Basic Terminology, Models and Types, multigraphs and weighted graphs, Graph Representation, Graph Isomorphism, Connectivity, Euler and Hamiltonian Paths and Circuits, Planar Graphs, Graph Coloring, Trees, Basic Terminology and properties of Trees, Introduction to Spanning Trees	Mrs. Sova Pal (Bera) (Associate Professor)	15	1st Month And 2nd month
		Propositional Logic	Logical Connectives, Well-formed Formulas, Tautologies, Equivalences, Inference Theory	Mr. Suman Mondal (Assistant Professor)	12	4th Month
	GE 2 T : Introduction to Database System	Database	Introduction to database, relational data model, DBMS architecture, data independence, DBA, database users, end users, front end tools	Mrs. Sova Pal (Bera) (Associate Professor)	60	1st Month
		E-R Modeling	Entity types, entity set, attribute and key, relationships, relation types, E- R diagrams, database design using ER			2nd month

			diagrams			
		Relational Data Model	Relational model concepts, relational constraints, primary and foreign key, normalization: 1NF, 2NF, 3NF			3rd month
		Structured Query Language	SQL queries, create a database table, create relationships between database tables, modify and manage tables, queries, forms, reports, modify, filter and view data.			4th Month
	GE2 P : Introduction to Database System (Lab)	Structured Query Language	1) Create a database having two tables with the specified fields, to computerize a library system of a Delhi University College. Library Books (Accession number, Title, Author, Department, Purchase Date, Price) Issued Books (Accession number, Borrower)	Mrs. Sova Pal (Bera) (Associate Professor)	60	1st Month
			2) Create the following tables and answer the queries given below: Customer (Cust ID, email, Name, Phone, Referrer ID) Bicycle			2nd month

			(Bicycle ID, Date Purchased, Color, Cust ID, Model No) Bicycle Model (Model No, Manufacturer, Style) Service (Start Date, Bicycle ID, End Date)			
			3) Create the following tables, enter at least 5 records in each table and answer the queries given below. EMPLOYEE (Person_Name, Street, City) WORKS (Person_Name, Company_Name, Salary) COMPANY (Company_Name, City) MANAGES (Person_Name, Manager_Name)			3rdmonth
			4) Create the following tables, enter at least 5 records in each table and answer the queries given below. Suppliers (SNo, Sname, Status, SCity) Parts (PNo, Pname, Colour, Weight, City) Project (JNo, Jname, Jcity) Shipment (Sno, Pno, Jno, Qunatity)			4thMonth

Semester-III	C5T: Data Structures	Arrays	Single and Multi-dimensional Arrays, Sparse Matrices (Array and Linked Representation)			1st Month
		Stacks	Implementing single / multiple stack/s in an Array; Prefix, Infix and Postfix expressions, Utility and conversion of these expressions from one to another; Applications of stack; Limitations of Array representation of stack	Mr. Anustup Bera(Part time Teacher)	60	1st month
		Linked Lists	Singly, Doubly and Circular Lists (Array and Linked representation); Normal and Circular representation of Stack in Lists; Self Organizing Lists; Skip Lists			2nd month
		Queues	Array and Linked representation of Queue, De-queue, Priority Queues			2nd month
		Recursion	Developing Recursive Definition of Simple Problems and their implementation; Advantages and Limitations of Recursion;			3rd month

			Understanding what goes behind Recursion (Internal Stack Implementation)			
		Trees	Introduction to Tree as a data structure; Binary Trees (Insertion, Deletion , Recursive and Iterative Traversals on Binary Search Trees); Threaded Binary Trees (Insertion, Deletion, Traversals); Height-Balanced Trees (Various operations on AVL Trees). Tree traversal techniques.			3rd month
		Searching and Sorting	Linear Search, Binary Search, Comparison of Linear and Binary Search, Selection Sort, Insertion Sort, Bubble Sort, Quick Sort, Comparison of Sorting Techniques			4th month
		Hashing	Introduction to Hashing, Efficiency of Rehash Methods, Resolving collision by Open Addressing, Coalesced Hashing, Separate Chaining, Dynamic and Extendible Hashing.			4th month

	C5P: Data Structures Lab	Searching and Sorting	1. Write a program to search an element from a list. Give user the option to perform Linear or Binary search. Use Template functions. 2. WAP using templates to sort a list of elements. Give user the option to perform sorting using Insertion sort, Bubble sort or Selection sort.	Mr. Anustup Bera(Part time Teacher)	60	1st month
		Stacks	3. Perform Stack operations using Array implementation. Use Templates.			1st month
		Linked Lists	4. Implement Linked List using templates. Include functions for insertion, deletion and search of a number, reverse the list and concatenate two linked lists (include a function and also overload operator +). 5. Implement Doubly Linked List using templates. Include functions for insertion, deletion and search of a number, reverse the			2nd month

			list. 6. Implement Circular Linked List using templates. Include functions for insertion, deletion and search of a number, reverse the list.			
		Queues	7. Perform Queues operations using Circular Array implementation. Use Templates. 8. Create and perform different operations on Double-ended Queues using Linked List implementation.			3rd month
		Recursion	9. WAP to calculate factorial and to compute the factors of a given no. (i) using recursion, (ii) using iteration 10. (ii) WAP to display fibonacci series (i)using recursion, (ii) using iteration 11. WAP to calculate GCD of 2 number (i) with recursion (ii) without recursion			4th month
		Trees	12. WAP to create a Threaded Binary Tree			4th month

			as per in order traversal, and implement operations like finding the successor / predecessor of an element, insert an element, in order traversal. 13. WAP to implement various operations on AVL Tree.			
	C6T: Operating Systems	Introduction	Basic OS functions, resource abstraction, types of operating systems– multiprogramming systems, batch systems , time sharing systems; operating systems for personal computers & workstations, process control & real time systems.	Mrs. Sova Pal (Bera) (Associate Professor)	60	1st month
		Operating System Organization	Processor and user modes, kernels, system calls and system programs.			1st month
		Process Management	System view of the process and resources, process abstraction, process hierarchy, threads, threading issues, thread libraries;			2nd month

			Process Scheduling, non-pre-emptive and pre-emptive scheduling algorithms; concurrent processes, critical section, semaphores, methods for interprocess communication; deadlocks.			
		Memory Management	Physical and virtual address space; memory allocation strategies – fixed and variable partitions, paging, segmentation, virtual memory			3rd month
		File and I/O Management	Directory structure, file operations, file allocation methods, device management.			4th month
		Protection and Security	Policy mechanism, Authentication, Internal access Authorization.			4th month
	C6P: Operating Systems Lab	C/ C++ programs	1. Write a program (using fork () and/or exec () commands) where parent and child execute: a) same program, same code. b) same program, different code. c) before	Mr. Suman Mondal (Assistant Professor)	50	1st month And 2nd month And 3rd month And

			terminating, the parent waits for the child to finish its task. 2. Write a program to report behaviour of Linux kernel including kernel version, CPU type and model. (CPU information) 3. Write a program to report behaviour of Linux kernel including information on configured memory, amount of free and used memory (memory information). 4. Write a program to print file details including owner access permissions, file access time, where file name is given as argument. 5. Write a program to copy files using system calls. 6. Write program to implement FCFS scheduling algorithm. 7. Write program to implement Round Robin scheduling algorithm. 8. Write program to implement SJF			4th month

			scheduling algorithm. 9. Write program to calculate sum of n numbers using thread library. 10. Write a program to implement first-fit, best-fit and worst-fit allocation strategies			
	C7T: Computer Networks	Introduction to Computer Networks	Network definition; network topologies; network classifications; network protocol; layered network architecture; overview of OSI reference model; overview of TCP/IP protocol suite.	Mr. Suman Mondal (Assistant Professor)	60	1st month
		Data Communication Fundamentals and Techniques	Analog and digital signal; data-rate limits; digital to digital line encoding schemes; pulse code modulation; parallel and serial transmission; digital to analog modulation-; multiplexing techniques- FDM, TDM; transmission media.			1st month
		Networks Switchin	Circuit switching; packets witching- connectionless			2nd month

		g Techniques and Access mechanisms	datagram switching, connection-oriented virtual circuit switching; dial-up modems; digital subscriber line; cable TV for data transfer.			
		Data Link Layer Functions and Protocol	Error detection and error correction techniques; data-link control- framing and flow control; error recovery protocols- stop and wait ARQ, go-back-n ARQ; Point to Point Protocol on Internet.			2nd month
		Multiple Access Protocol and Networks	CSMA/CD protocols; Ethernet LANS; connecting LAN and back-bone networks- repeaters, hubs, switches, bridges, router and gateways;			3rd month
		Networks Layer Functions and Protocols	Routing; routing algorithms; network layer protocol of Internet- IP protocol, Internet control protocols.			3rd month
		Transport Layer Functions and Protocols	Transport services- error and flow control, Connection establishment and release – three way handshake;			4th month
		Overvie	Overview of DNS			4th

		w of Application layer protocol	protocol; overview of WWW &HTTP protocol.			month
	C7P: Computer Networks Lab		1. Simulate Cyclic Redundancy Check (CRC) error detection algorithm for noisy channel. 2. Simulate and implement stop and wait protocol for noisy channel. 3. Simulate and implement go back n sliding window protocol. 4. Simulate and implement selective repeat sliding window protocol. 5. Simulate and implement distance vector routing algorithm 6. Simulate and implement Dijkstra algorithm for shortest path routing. 7. Experiments for capturing and analyzing data packets using Wire Shark. • Experiments on filtering packets • Experiments on	Mr. Suman Mondal (Assistant Professor)	60	1st month And 2nd month And 3rd month And 4th month

			inspecting packets			
	SEC-1T: Programming in MATLAB	Unit I-	Introduction to Programming: Components of a computer, working with numbers, Machine code, Software hierarchy	Mr. Suman Mondal (Assistant Professor)	40	1st month
		Unit II-	Programming Environment: MATLAB Windows, A First Program, Expressions, Constants, Variables and assignment statement, Arrays			1st month
		Unit III-	Graph Plots: Basic plotting, Built in functions, Generating waveforms, Sound replay, load and save.			2nd month
		Unit IV-	Procedures and Functions: Arguments and return values, M-files, Formatted console input-output, String handling.			2nd month
		Unit V-	Control Statements: Conditional statements: If, Else, Else-if, Repetition statements: While, for loop.			3rd month
		Unit VI-	Manipulating Text: Writing to a text file, Reading from a text			4th month

			file, Randomising and sorting a list, searching a list.			
		Unit VII-GUI Interface	Attaching buttons to actions, Getting Input, Setting Output.			4th month
	SEC1P: Software Lab Based on MatLab	Matlab Programming	1. A supermarket conveyor belt holds an array of groceries. The price of each product (in pounds) is [0.6, 1.2 ,0.5, 1.3] ; while the numbers of each product are [3, 2 ,1 ,5]. Use MATLAB to calculate the total bill. 2. The sortrows(x) function will sort a vector or matrix X into increasing row order. Use this function to sort a list of names into alphabetical order. 3. The —identity‖ matrix is a square matrix that has ones on the diagonal and zeros elsewhere. You can generate one with the eye() function in MATLAB.	Mr. Suman Mondal (Assistant Professor)	60	1st month And 2nd month

			Use MATLAB to find a matrix B, such that when multiplied by matrix A=[1 2; -1 0] the identity matrix I=[1 0; 0 1] is generated. That is A*B=I. 4. Create an array of N numbers. Now find a single MATLAB statement that picks out from that array the 1,4,9,16,…,√Nth entries, i.e. those numbers which have indices that are square numbers. 5. Draw a graph that joins the points (0,1), (4,3), (2,0) and (5,-2).			
			6. Calculate and replay 1 second of a sinewave at 500Hz with a sampling rate of 11025Hz. Save the sound to a file called "ex35.wav". Plot the first 100 samples. 7. Calculate and replay a 2 second chirp. That is, a sinusoid that steadily			3rd month And 4th month

			increases in frequency with time, from say 250Hz at the start to 1000Hz at the end. 8. Build a square wave by adding together 10 odd harmonics: 1f, 3f, 5f, etc. The amplitude of the nth harmonic should be 1/n. Display a graph of one cycle of the result superimposed on the individual harmonics. 9. Write a function called FtoC (ftoc.m) to convert Fahrenheit temperatures into Celsius. Make sure the program has a title comment and a help page. Test from the command window with: i. FtoC(96) ii. lookfor Fahrenheit iii. help FtoC 10. Write a program to input 2 strings from the user and to print out (i) the			

			concatenation of the two strings with a space between them, (ii) a line of asterisks the same length as the concatenated strings, and (iii) the reversed concatenation. For example: i. Enter string 1: Mark ii. Enter string 2: Huckvale iii. Mark Huckvale iv. ********** v. elavkcuHkraM			
	GE3P: Introduction to Programming	Introduction to C and C++	History of C and C++, Overview of Procedural Programming and Object-Orientation Programming, Using main() function, Compiling and Executing Simple Programs in C++.	Mr. Suman Mondal (Assistant Professor)	30	1st month
		Data Types, Variables, Constants, Operators and Basic I/O	Declaring, Defining and Initializing Variables, Scope of Variables, Using Named Constants, Keywords, Data Types, Casting of Data Types, Operators (Arithmetic, Logical and Bitwise), Using			2nd month

			Comments in programs			
		Expressions, Conditional Statements and Iterative Statements	Simple Expressions in C++ (including Unary Operator Expressions, Binary Operator Expressions), Understanding Operators Precedence in Expressions, Conditional Statements (if construct, switch-case construct)			3rd month
		Functions and Arrays	Utility of functions, Call by Value, Call by Reference, Functions returning value, Void functions, Inline Functions, Return data type of functions, Functions parameters, Differentiating between Declaration and Definition of Functions Creating and Using One Dimensional Arrays (Declaring and Defining an Array, Initializing an Array, Accessing individual elements			4th month

			in an Array			
		Derived Data Types (Structures and Unions)	Understanding utility of structures and unions, Declaring, initializing and using simple structures and unions, Manipulating individual members of structures and unions, Array of Structures, Individual data members as structures	Mrs. Sova Pal (Bera) (Associate Professor)	30	1st month
		File I/O, Preprocessor Directives	Opening and closing a file (use of fstream header file, ifstream, ofstream and fstream classes), Reading and writing Text Files, Using put(), get(), read() and write() functions			2nd month
		Using Classes in C++	Principles of Object-Oriented Programming, Defining & Using Classes, Class Constructors, Constructor Overloading, Function overloading in classes, Class Variables &Functions, Objects as parameters, specifying the Protected and Private			3rd month

			Access,			
		Inheritance and Polymorphism	Introduction to Inheritance and Polymorphism			4th month
	GE3P: Introduction to c/c++ Programming Lab	c/c++ Programming	1. Write a program to find greatest of three numbers. 2. Write a program to find gross salary of a person 3. Write a program to find grade of a student given his marks. 4. Write a program to find divisor or factorial of a given number. 5. Write a program to print first ten natural numbers. 6. Write a program to print first ten even and odd numbers. 7. Write a program to find grade of a list of students given their marks. 8. Create Matrix	Mr. Suman Mondal (Assistant Professor)	30	1st month And 2nd month And 3rd month And 4th month

			class. Write a menu-driven program to perform following Matrix operations (2-D array implementation): a) Sum b) Difference c) Product d) Transpose			
Semester-IV	C8T: Design and Analysis of Algorithms	Introduction	Basic Design and Analysis techniques of Algorithms, Correctness of Algorithm.	Mr. Suman Mondal (Assistant Professor)	60	1st month
		Algorithm Design Techniques	Iterative techniques, Divide and Conquer, Dynamic Programming, Greedy Algorithms.			1st month
		Sorting and Searching Techniques	Elementary sorting techniques, Merge Sort, Heap Sort, Quick Sort, Sorting in Linear Time - Bucket Sort, Radix Sort and Count Sort, Searching Techniques, Medians & Order Statistics, complexity analysis;			2nd month
		Lower Bounding Techniques	Decision Trees			2nd month
		Balanced	Red-Black Trees			3rd

		Trees				month
		Advanced Analysis Technique	Amortized analysis			3rd month
		Graphs	Graph Algorithms– Breadth First Search, Depth First Search and its Applications, Minimum Spanning Trees.			4th month
		String Processing	String Matching, KMP Technique			4th month
	C8P: Design and Analysis of Algorithms Lab		1. i. Implement Insertion Sort (The program should report the number of comparisons). ii. Implement Merge Sort (The program should report the number of comparisons) 2. Implement Heap Sort (The program should report the number of comparisons) 3. Implement Randomized Quick sort (The program should report the number of	Mr. Suman Mondal (Assistant Professor)		1st month And 2nd month And 3rd month And 4th month

			comparisons) 4. Implement Radix Sort 5. Create a Red-Black Tree and perform following operations on it: i. Insert a node ii. Delete a node iii. Search for a number & also report the color of the node containing this number. 6. Write a program to determine the LCS of two given sequences 7. Implement Breadth-First Search in a graph 8. Implement Depth-First Search in a graph 9. Write a program to determine the minimum spanning tree of a graph For the algorithms at S. No 1 to 3 test run the algorithm on 100 different inputs of sizes varying from 30			

			to 1000. Count the number of comparisons and draw the graph. Compare it with a graph of nlogn.			
	C9T: Software Engineering	Introduction	The Evolving Role of Software, Software Characteristics, Changing Nature of Software, Software Engineering as a Layered Technology, Software Process Framework, Framework and Umbrella Activities, Process Models, Capability Maturity Model Integration (CMMI).	Mr. Anustup Bera(Part time Teacher)	60	1st month
		Requirement Analysis	Software Requirement Analysis, Initiating Requirement Engineering Process, Requirement Analysis and Modeling Techniques, Flow Oriented Modeling, Need for SRS, Characteristics and Components of SRS.			1st month
		Software Project Management	Estimation in Project Planning Process, Project Scheduling.			2nd month

		Risk Management	Software Risks, Risk Identification, Risk Projection and Risk Refinement, RMMM Plan.			2nd month
		Quality Management	Quality Concepts, Software Quality Assurance, Software Reviews, Metrics for Process and Projects.			3rd month
		Design Engineering	Design Concepts, Architectural Design Elements, Software Architecture, Data Design at the Architectural Level and Component Level, Mapping of Data Flow into Software Architecture, Modeling Component Level Design.			3rd month
		Testing Strategies & Tactics	Software Testing Fundamentals, Strategic Approach to Software Testing, Test Strategies for Conventional Software, Validation Testing, System testing Black-Box Testing, White-Box Testing and their type, Basis Path Testing.			4th month

	C9P: Software Engineering Lab	Practical	1.Criminal Record Management: Implement a criminal record management system for jailers, police officers and CBI officers 2. DTC Route Information: Online information about the bus routes and their frequency and fares 3. Car Pooling: To maintain a web based intranet application that enables the corporate employees within an organization to avail the facility of carpooling effectively. 4. Patient Appointment and Prescription Management System 5. Organized Retail Shopping Management Software 6. Online Hotel	Mr. Sourav Chakraborty(Part time Teacher)	60	1st month And 2nd month And 3rd month And 4th month

			Reservation Service System 7. Examination and Result computation system 8. Automatic Internal Assessment System 9. Parking Allocation System 10. Wholesale Management System			
	C10T: Database Management Systems	Introduction	Characteristics of database approach, data models, database system architecture and data independence	Mrs. Sova Pal (Bera) (Associate Professor)	60	1st month
		Entity Relationship(ER) Modeling	Entity types, relationships, constraints.			1st month
		Relation data model	Relational model concepts, relational constraints normalization, relational algebra, SQL queries			2nd month
		Database design	Mapping ER/EER model to relational database, functional dependencies,			3rd month

			Lossless decomposition, Normal forms (up to BCNF).			
		Transaction Processing	ACID properties, concurrency control			3rd month
		File Structure and Indexing	Operations on files, File of Unordered and ordered records, overview of File organizations, Indexing structures for files(Primary index, secondary index, clustering index), Multilevel indexing using B and B+ trees.			4th month
	C10P: Database Management Systems Lab	SQL	Create and use the following database schema to answer the given queries EMPLOYEE Schema Field Type NULL KEY DEFAULT Eno Char(3) NO PRI NIL Ename Varchar(50) NO NIL Job_type Varchar(50) NO NIL Manager Char(3) YES FK NIL Hire_date Date NO NIL Dno Integer YES FK NIL Commission Decimal(10,2) YES NIL Salary	Mrs. Sova Pal (Bera) (Associate Professor)	60	1st month

			Decimal(7,2) NO NIL DEPARTMENT Schema Field Type NULL KEY DEFAULT Dno Integer NO PRI NUL Dname Varchar(50) YES NUL Location Varchar(50) YES New Delhi			
		Query List	1. Query to display Employee Name, Job, Hire Date, Employee Number; for each employee with the Employee Number appearing first. 2. Query to display unique Jobs from the Employee Table. 3. Query to display the Employee Name concatenated by a Job separated by a comma. 4. Query to display all the data from the Employee Table. Separate each Column by a comma and name the said column as THE_OUTPUT. 5. Query to display the Employee Name			2nd month And 3rd month And 4th month

			and Salary of all the employees earning more than $2850. 6. Query to display Employee Name and Department Number for the Employee No= 7900. 7. Query to display Employee Name and Salary for all employees whose salary is not in the range of $1500 and $2850. 8. Query to display Employee Name and Department No. of all the employees in Dept 10 and Dept 30 in the alphabetical order by name. 9. Query to display Name and Salaries represented by asterisks, where each asterisk (*) signifies $100. 10. Query to display the Highest, Lowest, Sum and Average Salaries of all the			

			employees 30. Query to display the number of employees performing the same Job type functions. 11. Query to display the no. of managers without listing their names. 12. Query to display the Department Name, Location Name, No. of Employees and the average salary for all employees in that department. 13. Query to display Name and Hire Date for all employees in the same dept. as Blake. 14. Query to display the Employee No. and Name for all employees who earn more than the average salary. 15. Query to display Employee Number and Name for all			

			employees who work in a department with any employee whose name contains a _T'. 16. Query to display the names and salaries of all employees who report to King. 17. Query to display the department no, name and job for all employees in the Sales department.			
	SEC2T: HTML Programming	Unit-I	Introduction	Mr. Suman Mondal (Assistant Professor)	40	1st month
		Unit-II: The Basics	The Head, the Body, Colors, Attributes, Lists, ordered and unordered			1st month
		Unit-III: Links	Introduction Relative Links, Absolute Links, Link Attributes, Using the ID Attribute to Link Within a Document.			2nd month
		Unit-IV: Images	Putting an Image on a Page Using Images as Links, Putting an Image in the			2nd month

			Background			
		Unit V: Tables	Creating a Table Table Headers, Captions,Spanning Multiple Columns,Styling Table			3rd month
		Unit VI: Forms	Basic Input and Attributes Other Kinds of Inputs, Styling forms with CSS,Where To Go From Here			4th month
	SEC2P: Software Lab Based on HTML	The Basics	Q.1 Create an HTML document with the following formatting options: 1. Bold 2. Italics 3. Underline 4. Headings (Using H1 to H6 heading styles) 5. Font (Type, Size and Color) 6. Background (Colored background/Image in background) 7. Paragraph 8. Line Break 9. Horizontal Rule 10. Pre tag	Mr. Suman Mondal (Assistant Professor)	40	1st month
		Lists	Q.2 Create an HTML document which consists of: I. Ordered List			1st month

			II. Unordered List III. Nested List			
		Images	Putting an Image on a Page Using Images as Links, Putting an Image in the Background			2nd month
		Tables	Creating a Table Table Headers, Captions,Spanning Multiple Columns,Styling Table			3rd month
		Forms	Basic Input and Attributes Other Kinds of Inputs, Styling forms with CSS,Where To Go From Here			4th month
		frame	Create HTML documents (having multiple frames) .			4th month
	GE4T: Programming in Python	Planning the Computer Program:	Concept of problem solving, Problem definition, Program design, Debugging, Types of errors in programming, Documentation.	Mr. Sourav Chakraborty(Part time Teacher)	60	1st month
		Techniques of Problem Solving:	Flowcharting, decision table, algorithms, Structured programming concepts, Programming methodologies viz.			1st month

			top-down and bottom-up programming.			
		Overview of Programming :	Structure of a Python Program, Elements of Python			2nd month
		Introduction to Python:	Python Interpreter, Using Python as calculator, Python shell, Indentation. Atoms, Identifiers and keywords, Literals, Strings, Operators(Arithmetic operator, Relational operator, Logical or Boolean operator, Assignment, Operator, Ternary operator, Bit wise operator, Increment or Decrement operator)			2nd month
		Creating Python Programs:	Input and Output Statements, Control statements(Branching, Looping, Conditional Statement, Exit function, Difference between break, continue and pass.), Defining Functions, default arguments, Errors and Exceptions.			3rd month

		Strings and Lists	String as a compound data type, Length, Traversal and the for loop, String slices, String comparison, A find function, Looping and counting, List values, Accessing elements, List length, List membership, Lists and for loops, List operations, List deletion. Cloning lists, Nested lists			3rd month
		Object Oriented Programming:	Introduction to Classes, Objects and Methods, Standard Libraries			4th month
		Data Structures:	Arrays, list, set, stacks and queues.			4th month
		Searching and Sorting:	Linear and Binary Search, Bubble, Selection and Insertion sorting.			5th month
	GE4P: Programming in Python Lab	Practical	1.Using for loop, print a table of Celsius/Fahrenheit equivalences. Let c be the Celsius temperatures ranging from 0 to 100, for each value of c, print the corresponding Fahrenheit	Mr. Sourav Chakraborty(Part time Teacher)	60	1st month And 2nd month And 3rd month And 4th month

			temperature. 2. Using while loop, produce a table of sins, cosines and tangents. Make a variable x in range from 0 to 10 in steps of 0.2. For each value of x, print the value of sin(x), cos(x) and tan(x). 3. Write a program that reads an integer value and prints —leap year‖ or —not a leap year‖. 4.Write a function that takes an integer _n‘ as input and calculates the value of 1 + 1/1! + 1/2! + 1/3! + … + 1/n 6. Write a function that takes an integer input and calculates the factorial of that number. 5. Write a function that takes a string input and checks if it‘s a palindrome or not.			

			6. Write a list function to convert a string into a list, as in list (_abc‘) gives [a, b, c]. 7. Write a program to generate Fibonacci series. 8. Write a program to check whether the input number is even or odd. 9. Write a program to compare three numbers and print the largest one. 10. Write a program to print factors of a given number. 11. Write a method to calculate GCD of two numbers. 12. Write a program to create Stack Class and implement all its methods. (Use Lists). 13. Write a program to create Queue Class and implement all its methods. (Use			

			Lists) 14. Write a program to implement linear and binary search on lists. 15. Write a program to sort a list using insertion sort and bubble sort and selection sort.			
Semester-V	C11T: Advanced Java	Java	Use of Objects, Array and Array List class	Mr. Suman Mondal (Assistant Professor)	60	1st month
		JavaScript	Data types, operators, functions, control structures, events and event handling.			1s month
		JDBC	JDBC Fundamentals, Establishing Connectivity and working with connection interface, working with statements, Creating and Executing SQL Statements, Working with Result Set Objects.			2nd month
		JSP	Introduction to Java			3rd

			Server Pages, HTTP and Servlet Basics, The Problem with Servlets, The Anatomy of a JSP Page, JSP Processing, JSP Application Design with MVC, Setting Up the JSP Environment, Implicit JSP Objects, Conditional Processing, Displaying Values, Using an expression to Set an Attribute, Declaring Variables and Methods, Error Handling and Debugging, Sharing Data Between JSP Pages, Requests, and Users, Database Access.			month
		Java Beans	Java Beans Fundamentals, JAR files, Introspection, Developing a simple Bean, Connecting to DB.			4th month
	C11P: Advanced Java (Lab)	Practical	1.HTML to Servlet Applications 2. Applet to Servlet Communication 3. Designing online	Mr. Suman Mondal (Assistant Professor)	60	1st month And 2nd month And 3rd month

			applications with JSP 4. Creating JSP program using JavaBeans 5. Working with Enterprise JavaBeans 6. Performing Java Database Connectivity. 7. Creating Web services with RMI. 8. Creating and Sending Email with Java 9. Building web applications			And 4th month
	C12T: Theory of Computation	Languages	Alphabets, string, language, Basic Operations on language, Concatenation, KleeneStar	Mrs. Sova Pal (Bera) (Associate Professor)	60	1st month
		Finite Automata and Regular Languages	Regular Expressions, Transition Graphs, Deterministics and non-deterministic finite automata, NFA to DFA Conversion, Regular languages and their relationship			2nd month

			with finite automata, Pumping lemma and closure properties of regular languages			
		Context free languages	Context free grammars, parse trees, ambiguities in grammars and languages, Pushdown automata (Deterministic and Non-deterministic), Pumping Lemma, Properties of context free languages, normal forms.			3rd month
		Turing Machines and Models of Computations	RAM, Turing Machine as a model of computation, Universal Turing Machine, Language acceptability, decidability, halting problem, Recursively enumerable and recursive language unsolvability problems.			4th month
	DSE-1T: Microprocessor - 8085	Microprocessor architecture:	Internal architecture, system bus architecture, memory and I/O interfaces.	Mr. Anustup Bera(Part time Teacher)	40	1st month
		Microprocessor	Register Organization,			2nd month

		programming:	instruction formats, assembly language programming.			and 3rd month
		Interfacing:	Memory address decoding, I/O interface, keyboard, display, timer, interrupt controller, DMA controller, video controllers, communication interfaces.			4th month
	DSE1P: Microprocessor (Lab)	Assembly Language Programming	1. Write a program for 32-bit binary division and multiplication 2. Write a program for 32-bit BCD addition and subtraction 3. Write a program for linear search and binary search. 4. Write a program to add and subtract two arrays 5. Write a program for binary to ascii conversion 6. Write a program for ascii to binary	Mr. Anustup Bera(Part time Teacher)	40	1st month And 2nd month And 3rd month And 4th month

			conversion 7. To write an ALP program to display the keyboard status using 8086. 8. To write an ALP program for displaying the Digital clock. 9. To write and implement the program for stepper motor using 8085 10. To write a program to Print RAM size and system date using 8086. 11. To write an ALP program for password checking using 8086. 12. To write a Program using 8086 for Copying 12 Bytes of Data from Source to Destination & Verify. 13. To search the character in a string using 8086			

			14. To sort the given number in ascending order using 8086. 15. To convert a given binary to BCD. 16. To write an assembly language program to convert an 8 bit binary data to BCD using 8085 microprocessor kit			
	DSE2T: Machine Learning	Introduction:	Concept of Machine Learning, Applications of Machine Learning, Key elements of Machine Learning, Supervised vs. Unsupervised Learning, Statistical Learning: Bayesian Method, The Naive Bayes Classifier.	Mr. Anustup Bera(Part time Teacher)	60	1st month
		Software for Machine Learning and Linear Algebra Overview:	Plotting of Data, Vectorization, Matrices and Vectors: Addition, Multiplication, Transpose and Inverse using available tool such as MATLAB.			1st month
		Linear Regressi	Prediction using Linear Regression,			2nd month

		on:	Gradient Descent, Linear Regression with one variable, Linear Regression with multiple variables, Polynomial Regression, Feature Scaling/Selection.			
		Logistic Regression:	Classification using Logistic Regression, Logistic Regression vs. Linear Regression, Logistic Regression with one variable and with multiple variables.			2nd month
		Regularization:	Regularization and its utility: The problem of Over fitting, Application of Regularization in Linear and Logistic Regression, Regularization and Bias/Variance.			3rd month
		Neural Networks:	Introduction, Model Representation, Gradient Descent vs. Perceptron Training, Stochastic Gradient Descent, Multilayer Perceptrons, Multiclass Representation, Backpropagation Algorithm.			4th month
	DSE2P:	MABLAB	1. Perform	Mr.	60	1st

	Machine Learning (Lab)	/Octave	elementary mathematical operations in Octave/MATLAB like addition, multiplication, division and exponentiation. 2. Perform elementary logical operations in Octave/MATLAB (like OR, AND, Checking for Equality, NOT, XOR). 3. Create, initialize and display simple variables and simple strings and use simple formatting for variable. 4. Create/Define single dimension / multi-dimension arrays, and arrays with specific values like array of all ones, all zeros, array with random values within a range, or a diagonal matrix. 5. Use command to compute the size of a	Suman Mondal (Assistant Professor)		month And 2nd month And 3rd month And 4th month

			matrix, size/length of a particular row/column, load data from a text file, store matrix data to a text file, finding out variables and their features in the current scope. 6. Perform basic operations on matrices (like addition, subtraction, multiplication) and display specific rows or columns of the matrix. 7. Perform other matrix operations like converting matrix data to absolute values, taking the negative of matrix values, additing/removing rows/columns from a matrix, finding the maximum or minimum values in a matrix or in a row/column, and finding the sum of some/all elements in a matrix.			

			8. Create various type of plots/charts like histograms, plot based on sine/cosine function based on data from a matrix. Further label different axes in a plot and data in a plot. 9. Generate different subplots from a given plot and color plot data. 10. Use conditional statements and different type of loops based on simple example/s. 11. Perform vectorized implementation of simple matrix operation like finding the transpose of a matrix, adding, subtracting or multiplying two matrices. 12. Implement Linear Regression problem. For example, based on a dataset			

			comprising of existing set of prices and area/size of the houses, predict the estimated price of a given house. 13. Based on multiple features/variables perform Linear Regression. For example, based on a number of additional features like number of bedrooms, servant room, number of balconies, number of houses of years a house has been built – predict the price of a house. 14. Implement a classification/ logistic regression problem. For example based on different features of student's data, classify, whether a student is suitable for a particular activity. Based on the available dataset, a student can also implement another classification problem like			

			checking whether an email is spam or not. 15. Use some function for regularization of dataset based on problem 14. 16. Use some function for neural networks, like Stochastic Gradient Descent or back propagation - algorithm to predict the value of a variable based on the dataset of problem 14.			
Semester-VI	C13T : Artificial Intelligence	Unit-1. Introduction	Introduction to Artificial Intelligence, Background and Applications, Turing Test and Rational Agent approaches to AI, Introduction to Intelligent Agents, their structure, behavior and environment.	Mr. Suman Mondal (Assistant Professor)	60	1st month
		Unit-2. Problem Solving and Searching	Problem Characteristics, Production Systems, Control Strategies, Breadth First Search, Depth First Search,			1st month

		Techniques	Hill climbing and its Variations, Heuristics Search Techniques: Best First Search, A* algorithm, Constraint Satisfaction Problem, Means-End Analysis, Introduction to Game Playing, Min-Max and Alpha-Beta pruning algorithms.			
		Unit-3. Knowledge Representation	Introduction to First Order Predicate Logic, Resolution Principle, Unification, Semantic Nets, Conceptual Dependencies, Frames, and Scripts, Production Rules, Conceptual Graphs. Programming in Logic (PROLOG)			2nd month
		Unit-4. Dealing with Uncertainty and Inconsistencies	Truth Maintenance System, Default Reasoning, Probabilistic Reasoning, Bayesian Probabilistic Inference, Possible World Representations.			3rd month
		Unit-5. Understanding Natural	Parsing Techniques, Context-Free and Transformational Grammars, Recursive			4th month

		Languages	and Augmented Transition Nets.			
	C13P: Artificial Intelligence Lab	prolog program	1. Write a prolog program to calculate the sum of two numbers. 2. Write a prolog program to find the maximum of two numbers. 3. Write a prolog program to calculate the factorial of a given number. 4. Write a prolog program to calculate the nth Fibonacci number. 5. Write a prolog program, insert_nth(item, n, into_list, result) that asserts that result is the list into_list with item inserted as the n'th element into every list at all levels. 6. Write a Prolog program to remove the Nth item from a list.	Mr. Suman Mondal (Assistant Professor)	60	1st month And 2nd month And 3rd month And 4th month

			7. Write a Prolog program, remove-nth(Before, After) that asserts the After list is the Before list with the removal of every n‘th item from every list at all levels 8. Write a Prolog program to implement append for two lists. 9. Write a Prolog program to implement palindrome(List). 10. Write a Prolog program to implement max(X,Y,Max) so that Max is the greater of two numbers X and Y. 11. Write a Prolog program to implement maxlist(List,Max) so that Max is the greatest number in the list of numbers List.			

			12. Write a Prolog program to implement sumlist(List,Sum) so that Sum is the sum of a given list of numbers List. 13. Write a Prolog program to implement two predicates evenlength(List) and oddlength(List) so that they are true if their argument is a list of even or odd length respectively. 14. Write a Prolog program to implement reverse(List,Reversed List) that reverses lists. 15. Write a Prolog program to implement maxlist(List,Max) so that Max is the greatest number in the list of numbers List using cut predicate. 16. Write a Prolog			

			program to implement GCD of two numbers. 17. Write a prolog program that implements Semantic Networks/Frame Structures			
	C14T: Computer Graphics	Unit-1. Introduction	Basic elements of Computer graphics, Applications of Computer Graphics.	Mr. Anustup Bera(Part time Teacher)	60	1st month
		Unit-2. Graphics Hardware	Architecture of Raster and Random scan display devices, input/output devices.			1st month
		Unit-3. Fundamental Techniques in Graphics	Raster scan line, circle and ellipse drawing, thick primitives, Polygon filling, line and polygon clipping algorithms, 2D and 3D Geometric Transformations, 2D and 3D Viewing Transformations (Projections- Parallel and Perspective), Vanishing points.			2nd month
		Unit-4.Geometric Modeling	Representing curves & Surfaces.			2nd month

		Unit-5.Visible Surface determination	Hidden surface elimination.			3rd month
		Unit-6.Surface rendering	Illumination and shading models. Basic color models and Computer Animation.			4th month
	C14P: Computer Graphics Lab	List of Practical:	1. Write a program to implement Bresenham's line drawing algorithm. 2. Write a program to implement mid-point circle drawing algorithm. 3. Write a program to clip a line using Cohen and Sutherland line clipping algorithm. 4. Write a program to clip a polygon using Sutherland Hodgeman algorithm. 5. Write a program to apply various 2D transformations on a 2D object (use homogenous	Mr. Sourav chakraborty(Part time Teacher)	40	1st month And 2nd month And 3rd month And 4th month

			coordinates). 6. Write a program to apply various 3D transformations on a 3D object and then apply parallel and perspective projection on it. 7. Write a program to draw Hermite/Bezier curve.			
	DSE3T: Numerical Methods	Introduction	Floating point representation and computer arithmetic, Significant digits, Errors: Round-off error, Local truncation error, Global truncation error, Order of a method, Convergence and terminal conditions, efficient computations Bisection method, Secant method, Regula-Falsi method Newton- Raphson method, Newton‘s method for solving nonlinear systems Gauss elimination method (with row	Mrs. Sova Pal (Bera) (Associate Professor)	60	1st month

			pivoting) and Gauss-Jordan method, Gauss Thomas method for tridiagonal systems Iterative methods: Jacobi and Gauss-Seidel Interative methods Interpolation: Lagrange‘s form and Newton‘s form Finite difference operators, Gregory Newton forward and backward differences Interpolation			
		Piecewise polynomial interpolation:	Linear interpolation, Cubic spline interpolation (only method)			2nd month
		Numerical differentiation	First derivatives and second order derivatives, Richardson extrapolation			3rd month
		Numerical integration:	Trapezoid rule, Simpson‘s rule (only method), Newton−Cotes open formulas			3rd month
		Extrapolation methods:	Romberg integration, Gaussian quadrature, Ordinary differential equation: Euler‘s			4th month

			method			
		Modified Euler‘s methods :	Heun method and Mid-point method, Runge-Kutta second methods: Heun method without iteration, Mid-point method and Ralston‘s method Classical 4th order RungeKutta method, Finite difference method for linear ODE.			4th month
	DSE3P: Numerical Methods Lab	List of Practical:	1. Find the roots of the equation by bisection method. 2. Find the roots of the equation by secant/ Regula -Falsi method. 3. Find the roots of the equation by Newton‘s method. 4. Find the solution of a system of nonlinear equation using Newton‘s method. 5. Find the solution of tridiagonal system using Gauss Thomas method.	Mrs. Sova Pal (Bera) (Associate Professor)	40	1st month And 2nd month And 3rd month And 4th month

			6. Find the solution of system of equations using Jacobi/Gauss-Seidel method. 7. Find the cubic spline interpolating function. 8. Evaluate the approximate value of finite integrals using Gaussian/Romberg integration. 9. Solve the boundary value problem using finite difference method.			
	DSE-4: Dissertation / Project work		The students will be allowed to work on any project based on the concepts studied in core / elective or skill based elective courses.	Mrs. Sova Pal (Bera) (Associate Professor) , Mr. Suman	60	1st month And 2nd month And 3rd month And 4th month

				Mondal (Assistant Professor), Mr. Anustup Bera(Part time Teacher) Mr. Sourav chakraborty(Part time Teacher)		