THE STANDARD FIREWORKS RAJARATNAM COLLEGE FOR WOMEN (AUTONOMOUS),
SIVAKASI – 626 123.
(Affiliated to Madurai Kamaraj University, Re-accredited with A+ Grade by NAAC,
College with Potential for Excellence by UGC and Mentor Institution under UGC PARAMARSH)

DEPARTMENT OF COMPUTER SCIENCE SF

UG DEGREE PROGRAMME IN COMPUTER SCIENCE

PROGRAMME EDUCATIONAL OBJECTIVES The Graduates will	
PEO1.	be competent software professionals, take up progressive careers in industry and pursue higher studies
PEO2.	be proficient in developing innovative solutions to complex real life problems using existing and novel technologies and become ethical and responsible towards themselves, coworkers, society and nation
PEO3.	adapt to new technologies and constantly upgrade their skills to be a successful Entrepreneur

PROGRAMME LEARNING OUTCOMES By the completion of the B.Sc Degree Programme in Computer Science, the learners will be able to	
PLO1.	Apply the knowledge of Arts, Science and Humanities to address fundamental and complex questions appropriate to their programmes.
PLO2.	Make use of appropriate knowledge and skills to identify, formulate, analyze and solve problems in order to reach substantiated conclusions.
PLO3.	Critically analyze research processes, products and practices with a view of strategic use of data in their field.
PLO4.	Demonstrate skills in oral and written communication and make use of ICT in various learning ambience.
PLO5.	Interact productively with people from diverse backgrounds as both leaders/mentors and team members with integrity and professionalism.
PLO6.	Defend the society against gender and environmental issues with moral and ethical awareness.
PLO7.	Formulate their own educational needs in a changing world in ways sufficient to maintain their competence and to allow them to contribute to the advancement of knowledge.

COURSE LEARNING OUTCOME

Core Course	
Course Code: 23GSC11	**Course Title:** PYTHON PROGRAMMING
On successful completion of the course, the learners should be able to	
CLO1[K2]	explain the basics of python, functions, data structures and files
CLO2[K3]	develop simple programs using control statements, data structures in python
CLO3[K4]	analyze the functions, strings and modules and compare the various data structures
CLO4[K5]	choose the appropriate methods for handling files and justify the usage of data structures
CLO5[K6]	build python scripts using functions and files

Core Course	
Course Code: 23GSC1L	**Course Title:** PYTHON PROGRAMMING LAB
On successful completion of the course, the learners should be able to	
CLO1[K2]	express in own words about the concepts and logic used in Python programs
CLO2[K3]	write Python programs for scientific and general applications
CLO3[K4]	debug the Python programs and correct the syntax and logical errors
CLO4[K5]	check output for special cases and validate the input and output with appropriate messages
CLO5[K6]	make modifications in the program logic to improve the efficiency of Python programs

Generic Elective Course	
Course Code: 23GSEG11	**Course Title:** DIGITAL LOGIC FUNDAMENTALS
On successful completion of the course, the learners should be able to	
CLO1[K2]	classify various gates, binary codes and illustrate laws and theorems of Boolean Algebra
CLO2[K3]	convert numbers from one radix to another, apply binary addition, subtraction, 2's complement addition, subtraction and build logic circuits with optimal design
CLO3[K4]	analyze the working of flip-flops, register and memory
CLO4[K5]	evaluate the usage of multiplexer, decoder, flip flop, register, counters and memory
CLO5[K6]	design a digital circuit using the knowledge acquired from combinational logic, sequential logic and K-map

Foundation Course	
Course Code: 23GSFC1L	**Course Title:** STRUCTURED PROGRAMMING LAB
On successful completion of the course, the learners should be able to	
CLO1[K2]	explain the key concepts and logic used in C programs
CLO2[K3]	write C programs for scientific and general applications
CLO3[K4]	debug the C programs and correct the syntax and logical errors
CLO4[K5]	check output for special cases and validate the input and output with appropriate messages
CLO5[K6]	make modifications in the program logic to improve the efficiency of C programs

Core Course	
Course Code: 23GSC21	**Course Title:** DATA STRUCTURES AND ALGORITHMS
On successful completion of the course, the learners should be able to	
CLO1[K2]	explain the abstract data types of linear and non-linear data structures
CLO2[K3]	implement various operations on linear and non-linear data structures
CLO3[K4]	analyze the efficiency of algorithms in divide and conquer, greedy method, dynamic programming and backtracking
CLO4[K5]	interpret evaluation of expressions and choose the appropriate methods to solve the problem
CLO5[K6]	devise algorithms for tree traversals, graph operations, backtracking and divide and conquer problems

Core Course	
Course Code: 23GSC2L	**Course Title:** DATA STRUCTURES AND ALGORITHMS LAB
On successful completion of the course, the learners should be able to	
CLO1[K2]	express in own words the concepts in data structures and algorithms
CLO2[K3]	write simple C++ programs to implement the algorithms and data structures
CLO3[K4]	debug the programs and correct the syntax and logical error
CLO4[K5]	check output for special cases and validate the input and output with appropriate messages
CLO5[K6]	make modifications in the program logic to improve the efficiency of program

Discipline Specific Elective	
Course Code: 23GSDE21	**Course Title:** OBJECT ORIENTED PROGRAMMING IN C++
On successful completion of the course, the learners should be able to	
CLO1[K2]	explain the features of object oriented paradigm and constructs
CLO2[K3]	implement object oriented programming concepts to solve problems using C++
CLO3[K4]	compare and analyze the features of object oriented programming
CLO4[K5]	justify and assess the importance of object oriented characteristics
CLO5[K6]	construct classes for a given problem using appropriate encapsulation and design principles

Discipline Specific Elective	
Course Code: 23GSDE22	**Course Title:** INTRODUCTION TO DATA SCIENCE
On successful completion of the course, the learners should be able to	
CLO1[K2]	explain the basics of Data Science and Big data
CLO2[K3]	apply various Algorithms in Data Science
CLO3[K4]	analyze the building properties of Data Science, Hadoop and concepts in Case study
CLO4[K5]	evaluate the outcome using machine learning algorithm and MapReduce, ACID, CAP & BASE
CLO5[K6]	optimize the solution for problems using machine learning algorithms

Core Course	
Course Code: 23GSC31	**Course Title:** DATABASE MANAGEMENT SYSTEMS
On successful completion of the course, the learners should be able to	
CLO1[K2]	explain the DBMS concepts, data models, database architecture, and SQL relational database terminology
CLO2[K3]	construct E-R models, translate them into relational tables, and build SQL query constructs
CLO3[K4]	distinguish and compare different data models used to represent a database and various normal forms
CLO4[K5]	criticize a database design and improve the design by normalization
CLO5[K6]	create SQL Queries, PL/SQL blocks, exceptions, and triggers

Core Course	
Course Code: 23GSC3L	**Course Title:** DATABASE MANAGEMENT SYSTEMS LAB
On successful completion of the course, the learners should be able to	
CLO1[K2]	express in own words about the database concepts and logic used in PL/SQL
CLO2[K3]	write SQL queries and PL/SQL programs for scientific and general applications
CLO3[K4]	debug the SQL queries and PL/SQL programs and correct the syntax and logical errors
CLO4[K5]	check output for special cases and validate the input and output with appropriate messages
CLO5[K6]	make modifications in the program logic to improve the efficiency of SQL and PL/SQL programs

Generic Elective Course	
Course Code: 23GSEG31	**Course Title:** OPTIMIZATION TECHNIQUES
On successful completion of the course, the learners should be able to	
CLO1[K2]	summarize various algorithms and rules used in solving OR problems
CLO2[K3]	solve all problems of Linear Programming, Transportation, Assignment and Network scheduling
CLO3[K4]	analyze various problems for infeasibility, degeneracy, unboundedness and alternate solutions
CLO4[K5]	find the best suitable method for obtaining optimal solution to Linear Programming, Transportation, Assignment problems
CLO5[K6]	formulate the real world decision making problems into mathematical models

Skill Enhancement Course – Discipline Specific Course	
Course Code: 23GSDS3L	**Course Title:** WEB DESIGNING LAB
On successful completion of the course, the learners should be able to	
CLO1[K2]	express in own words about the HTML tags and logic used in JavaScript programs
CLO2[K3]	writing HTML and JavaScript programs for web pages
CLO3[K4]	debug the HTML and JavaScript programs and correct the syntax and logical errors
CLO4[K5]	check output for special cases and validate the input and output with appropriate messages
CLO5[K6]	make modifications in the program logic to improve the efficiency of HTML and JavaScript programs

Skill Enhancement Course – Entrepreneurial Skill	
Course Code: 23GSES31	**Course Title:** DIGITAL MARKETING
On successful completion of the course, the learners should be able to	
CLO1[K2]	explain the key components of digital marketing
CLO2[K3]	utilize the appropriate marketing strategies for the development of digital marketing
CLO3[K4]	analyze the different types of insights and tools that digital media offers and challenges faced by digital marketing
CLO4[K5]	evaluate the effectiveness of digital marketing strategies
CLO5[K6]	create goal-oriented advertisements and marketing plan for business applications

Core Course	
Course Code: 23GSC41	**Course Title:** JAVA PROGRAMMING
On successful completion of the course, the learners should be able to	
CLO1[K2]	describe the various features, programming constructs and concepts of Java
CLO2[K3]	apply object-oriented programming concepts to solve problems
CLO3[K4]	analyze the various object-oriented principles and concepts of Java through examples
CLO4[K5]	criticize the mechanism and influence of unique Java features in developing programs
CLO5[K6]	create applets and GUI based applications with AWT and Swing components

Core Course	
Course Code: 23GSC4L	**Course Title:** JAVA PROGRAMMING LAB
On successful completion of the course, the learners should be able to	
CLO1[K2]	express in own words about the concepts and logic used in java programs
CLO2[K3]	write java programs for scientific and general applications
CLO3[K4]	debug the java programs and correct the syntax and logical errors
CLO4[K5]	check output for special cases and validate the input and output with appropriate messages
CLO5[K6]	make modifications in the program logic to improve the efficiency of java programs

Generic Elective Course	
Course Code: 23GSEG41	**Course Title:** NUMERICAL METHODS
On successful completion of the course, the learners should be able to	
CLO1[K2]	define errors in numerical computation and describe the methods to solve problems using numerical methods
CLO2[K3]	use method of least squares to find the curve of best fit to a given set of data and interpolate the unknown values of the function
CLO3[K4]	compare the efficiency of methods in solving algebraic, transcendental equations and system of simultaneous linear equations
CLO4[K5]	evaluate the approximate numerical value of differentials, integrals and interpret how the values differ from actual integration
CLO5[K6]	formulate approximate solutions to ordinary differential equations

Core Course	
Course Code: 23GSC51	**Course Title:** SOFTWARE ENGINEERING
On successful completion of the course, the learners should be able to	
CLO1[K2]	explain the basic concepts of software engineering.
CLO2[K3]	use software requirement specification techniques, design techniques and notations
CLO3[K4]	distinguish and compare different project sizes, organization structures, coupling, cohesion, design notations, verification and validation techniques.
CLO4[K5]	evaluate the programmer months and development time using cost estimation techniques source code metrics, stepwise refinement
CLO5[K6]	construct state oriented notations, design notations and techniques

Core Course	
Course Code: 23GSC52	**Course Title:** .NET PROGRAMMING
On successful completion of the course, the learners should be able to	
CLO1[K2]	explain the basic concepts of .NET Framework, Visual Studio IDE and ASP.NET with C#
CLO2[K3]	develop web applications using standard controls
CLO3[K4]	analyze the usage of ADO.NET in web applications
CLO4[K5]	choose the appropriate validation and navigation controls while developing web applications
CLO5[K6]	design and develop web pages using ASP.NET controls for specific applications

Core Course	
Course Code: 23GSC5L	**Course Title:** .NET PROGRAMMING LAB
On successful completion of the course, the learners should be able to	
CLO1[K2]	express in own words about the concepts and logic used in ASP.NET Web Applications
CLO2[K3]	design and develop web pages for real time applications
CLO3[K4]	debug the web application programs and correct the syntax and logical errors
CLO4[K5]	check output for special cases and validate the input and output with appropriate messages
CLO5[K6]	make modifications in the program logic to improve the efficiency of web programs

Core Course	
Course Code: 23GSC5P	**Course Title:** PROJECT WITH VIVA-VOCE
On successful completion of the course, the learners should be able to	
CLO1[K2]	identify a problem in their area of interest and demonstrate the applicability of computerizing it
CLO2[K3]	participate in a group project to illustrate the dynamics of a diverse work environment
CLO3[K3]	demonstrate basic level of competency in programming and logic skills
CLO4[K4]	apply the skills acquired through the program to business scenarios
CLO5[K6]	present conclusions effectively orally and in writing

Discipline Specific Elective Course	
Course Code: 23GSDE51	**Course Title:** OPERATING SYSTEMS
On successful completion of the course, the learners should be able to	
CLO1[K2]	explain the concepts of operating system, process, memory management and file system
CLO2[K3]	identify and handle the deadlocks in process synchronization and scheduling algorithms
CLO3[K4]	analyze the various CPU scheduling algorithms and memory management strategies
CLO4[K5]	interpret the allocation methods of File systems and virtual memory management
CLO5[K6]	formulate the solutions to schedule the CPU, disk, replace the page for real time applications

Discipline Specific Elective Course	
Course Code: 23GSDE52	**Course Title:** VIRTUAL REALITY
On successful completion of the course, the learners should be able to	
CLO1[K2]	explain the basics and components of Virtual Reality
CLO2[K3]	identify content, current state and near future in Virtual Reality
CLO3[K3]	analyze the ways to plan a Virtual Reality Project
CLO4[K4]	interpret the ways to create content for Virtual and Augmented Realit
CLO5[K6]	predict the future of Virtual Reality

Discipline Specific Elective Course	
Course Code: 23GSDE53	**Course Title:** PHP PROGRAMMING
On successful completion of the course, the learners should be able to	
CLO1[K2]	explain the basic concepts of PHP programming
CLO2[K3]	use arrays, operators, control structures and functions to develop PHP programs
CLO3[K4]	compare and analyze flow control, string functions and files in PHP applications
CLO4[K5]	justify and assess the importance of controls in web pages
CLO5[K6]	design and develop dynamic, database-driven web applications using PHP

Discipline Specific Elective Course	
Course Code: 23GSDE54	**Course Title:** MOBILE APPLICATION DEVELOPMENT
On successful completion of the course, the learners should be able to	
CLO1[K2]	describe the basics and components of mobile applications
CLO2[K3]	apply proper user interfaces and Java programming features to mobile application development
CLO3[K3]	analyze the problem and add necessary user interface components, graphics and multimedia components into the application
CLO4[K4]	evaluate the results by implementing the concept behind the problem with proper code
CLO5[K6]	design and develop mobile application using Android development platform

Internship	
Course Code: 23GSIN51	**Course Title:** INTERNSHIP
On successful completion of the course, the learners should be able to	
CLO1[K2]	relate the class room theory with work place practice
CLO2[K3]	apply the practices / procedures observed in real time working environment
CLO3[K3]	analyze the workflow and communication flow prevailing in the institution / industry
CLO4[K4]	assess interests and abilities in their field of study
CLO5[K6]	propose strategies, policies and guidelines for enhancing efficiency of industrial / institutional operations

Core Course	
Course Code: 23GSC61	**Course Title:** COMPUTER NETWORKS
On successful completion of the course, the learners should be able to	
CLO1[K2]	describe the basics of Computer Network architecture, OSI and TCP/IP reference models
CLO2[K3]	utilize checksum and cyclic redundancy check for error detection and MAC protocols for flow control, identify the class of network address
CLO3[K4]	compare the various transmission media, topologies, connecting devices and routing methods
CLO4[K5]	examine the various media access protocols transport layer protocols, IP Protocol and client server protocol
CLO5[K6]	design a network for data communication in an organization using LAN, WAN, FTP and Telnet

Core Course	
Course Code: 23GSC62	**Course Title:** DATA ANALYTICS USING R
On successful completion of the course, the learners should be able to	
CLO1[K2]	describe the various features of R and explain the basics of big data
CLO2[K3]	apply the features of R to solve simple data analytics problems
CLO3[K4]	examine the usage of vectors, lists, data frames, factors and tables
CLO4[K5]	choose the appropriate R packages for processing the datasets
CLO5[K6]	develop R programs to do data analytics on the datasets

Core Course	
Course Code: 23GSC6L	**Course Title:** DATA ANALYTICS USING R LAB
On successful completion of the course, the learners should be able to	
CLO1[K2]	express in own words about the concepts and logic used in R
CLO2[K3]	write R programs and construct NoSQL queries for data analytics
CLO3[K4]	debug the programs and correct the syntax and logical errors
CLO4[K5]	check output for special cases and validate the input and output with appropriate messages
CLO5[K6]	make modifications in the program logic to improve the efficiency of R programs

Discipline Specific Elective Course	
Course Code: 23GSDE61	**Course Title:** COMPUTER GRAPHICS
On successful completion of the course, the learners should be able to	
CLO1[K2]	describe the applications and basic concepts of Computer Graphics
CLO2[K3]	apply various geometric transformations and tests to two-dimensional objects
CLO3[K4]	analyze the various scan conversion algorithms to rasterize two-dimensional objects through examples
CLO4[K5]	evaluate the performance of algorithms for two dimensional output primitives and choose appropriate techniques and parameters used to enhance the quality of pictures
CLO5[K6]	develop algorithms for two dimensional output primitives and viewing in C

Discipline Specific Elective Course	
Course Code: 23GSDE62	**Course Title:** ARTIFICIAL INTELLIGENCE
On successful completion of the course, the learners should be able to	
CLO1[K2]	explain basics of artificial intelligence and expert system, search techniques
CLO2[K3]	identify problems where artificial intelligence techniques are applicable
CLO3[K3]	analyze the applications of neural networks, and Distributed representation of connectionist model
CLO4[K4]	evaluate search techniques, knowledge representing rules, fuzzy logic systems and genetic algorithm
CLO5[K6]	propose solutions to problems using genetic algorithm

Discipline Specific Elective Course	
Course Code: 23GSDE63	**Course Title:** IOT AND ITS APPLICATIONS
On successful completion of the course, the learners should be able to	
CLO1[K2]	describe the basics, design principles of IoT, M2M and components of IoT
CLO2[K3]	identify the appropriate protocol used in IoT for communication
CLO3[K4]	analyze data acquiring and storage process in IoT system
CLO4[K5]	justify the need for sensor technology in IoT System
CLO5[K6]	develop a design for IoT based smart city and smart home

Discipline Specific Elective Course	
Course Code: 23GSDE64	**Course Title:** CLOUD COMPUTING FUNDAMENTALS
On successful completion of the course, the learners should be able to	
CLO1[K2]	explain the concepts and technologies involved in Cloud Computing
CLO2[K3]	apply various cloud services and their implementation in Amazon, Microsoft and Google cloud computing platforms
CLO3[K3]	analyze the security issues in cloud services
CLO4[K4]	evaluate the application performance metrics in benchmarking and cloud security
CLO5[K6]	develop cloud services for various domains

Non Major Elective	
Course Code: 23GSNE12	**Course Title:** ADVANCED EXCEL
On successful completion of the course, the learners should be able to	
CLO1[K2]	describe the basics of excel
CLO2[K3]	apply Excel tools and formulas to transform and structure your data
CLO3[K4]	analyze a spreadsheet charts, tools and macros in excel
CLO4[K5]	evaluate data using sorting, filtering and pivot tables
CLO5[K6]	create pivot table, charts, and data validation in Excel

Non Major Elective	
Course Code: 23GSNE22	**Course Title:** STORY BOARDING AND ANIMATICS
On successful completion of the course, the learners should be able to	
CLO1[K2]	describe the basics of Storyboard Workspace and its components
CLO2[K3]	develop simple Storyboard Animations
CLO3[K4]	analyze how to create, working with layers and workspace for the storyboard
CLO4[K5]	choose visual methods of expressing character attitudes and acting that are related to storytelling
CLO5[K6]	create a layer and workspace for storyboarding

Skill Enhancement Course - Job Oriented Course	
Course Code: 23GJO48	**Course Title:** CALL CENTER MANAGEMENT
On successful completion of the course, the learners should be able to	
CLO1[K2]	Summarize the classification, functioning and working environment of call centers
CLO2[K3]	identify customers, services and offer solutions
CLO3[K4]	analyze various recruitment and training process
CLO4[K5]	interpret the complaints in tricky situation
CLO5[K6]	develop a scenario for CRM using telephonic communication

Skill Enhancement Course - Job Oriented Course	
Course Code: 23GJO48L	**Course Title:** CALL CENTER MANAGEMENT LAB
On successful completion of the course, the learners should be able to	
CLO1[K2]	summarize the role, functions and basic operations of call centers
CLO2[K3]	apply communication skills to face group discussions and mock interviews
CLO3[K4]	probe the problem situations to select appropriate remedies
CLO4[K5]	evaluate the training needs required for self and the team
CLO5[K6]	develop proposals for managing call centers