



**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 APPLICATIONS
UG DEGREE PROGRAMME IN COMPUTER APPLICATIONS**

PROGRAMME EDUCATIONAL OBJECTIVES

The Graduates will

PEO1.	pursue with confidence for higher studies in the form of MCA, MBA, etc, and excel in computer oriented skills to make successful career as professionals thereby acquiring greater competency.
PEO2.	possess professional skills to solve real time applications with excellent computing ability.
PEO3.	adapt to a rapidly upgrading technical environment with entrepreneurial pursuit.
PEO4.	exhibit the skills and abilities effectively as a team member and/or leader by adhering to ethical standards in the profession

PROGRAMME SPECIFIC OUTCOMES

By the Completion of B.C.A programme, the learners will be able to

PSO1.	explore technical knowledge in diverse areas of Computer Applications and cultivate skills for successful career, entrepreneurship and higher studies.
PSO2.	design and develop reliable software applications for social and industry needs.
PSO3.	apply standard software engineering practices and strategies in software project development to deliver a product with quality for business success.
PSO4.	identify the business and corporate issues through proper plan and decision making, thereby promoting oral and written communication efficiently using supportive technologies.
PSO5.	manage project work effectively as an individual member or as a leader in project team satisfying the customer needs based on time and cost schedule.
PSO6.	imbibe ethical, moral and social responsibilities of a professional leading to highly cultured and civilized personality.
PSO7.	exploit new technologies and update their skills with an attitude towards independent and lifelong learning.

COURSE OUTCOME

Major Course	
Course Code: GLCA11	Course Title: Programming with C
On successful completion of the course, the learners should be able to	
CO1.	explain the tokens, I/O operations, statements, files and unions in C.
CO2.	discuss character array, string, user defined functions and pointers.
CO3.	create simple programs using branching and looping statements.
CO4.	apply the concept of looping statements and structure.
CO5.	develop simple programs using arrays and functions.

Allied Course	
Course Code: GLCA1A	Course Title: Digital Circuits
On successful completion of the course, the learners should be able to	
CO1.	explain number system, logic gates, flip flops and registers.
CO2.	solve problems in number system and simplify Boolean algebraic expressions using Karnaugh map and Boolean laws.
CO3.	describe the working of arithmetic and combinational circuits.
CO4.	outline the working of flip-flops, counters and Registers.
CO5.	illustrate the components of computer and its architecture.

Major Course	
Course Code: GLCA1L	Course Title: C Programming Lab
On successful completion of the course, the learners should be able to	
CO1.	apply the basic concepts of C-Programming.
CO2.	build programs using conditional and iterative statements.
CO3.	develop programs using arrays and strings.
CO4.	construct program using functions.
CO5.	create programs using files, pointers, structures and unions.

Major Course	
Course Code: GLCA21	Course Title: Object Oriented Programming with C++
On successful completion of the course, the learners should be able to	
CO1.	express the OOP concepts, tokens, expressions, control structures, classes, objects, constructors, destructors and console I/O operations.
CO2.	explain the functions, operator overloading, inheritance, type conversion and templates.
CO3.	apply the concept of arrays and function overloading.
CO4.	create programs using function and constructor.
CO5.	design programs using operator overloading and inheritance.

Allied Course	
Course Code: GLCA2A	Course Title: Computer Oriented Numerical Methods
On successful completion of the course, the learners should be able to	
CO1.	illustrate various numerical methods for solving mathematical problems.
CO2.	solve the algebraic, transcendental and simultaneous equations using various numerical methods.
CO3.	estimate approximate solution to problems using numerical differentiation and integration.
CO4.	use relevant numerical techniques for Interpolation of data.
CO5.	formulate approximate solution to ordinary differential equations.

Major Course	
Course Code: GLCA2L	Course Title: C++ Programming Lab
On successful completion of the course, the learners should be able to	
CO1.	create program using simple classes and access modifier.
CO2.	design programs using function overloading and friend function.
CO3.	implement the various levels of inheritance and sorting methods.
CO4.	construct programs with inline function and virtual base class.
CO5.	develop programs using operator overloading and inheritance.

Major Course	
Course Code: GLCA31	Course Title: Data Structures and Algorithms
On successful completion of the course, the learners should be able to	
CO1.	explain the features of various data structures and algorithmic techniques.
CO2.	discuss the ADTs and applications of different data structures.
CO3.	examine different sorting, searching and traversal techniques.
CO4.	illustrate the general methods and problems of various algorithms.
CO5.	solve problems on linear and nonlinear data structures and greedy methods.

Major Course	
Course Code: GLCA32	Course Title: Programming in Java
On successful completion of the course, the learners should be able to	
CO1.	describe the Java features, structure, tokens, arrays, strings, class, inheritance and Applet.
CO2.	construct simple programs using operators, branching and looping statements.
CO3.	implement the concepts of arrays, strings, classes and inheritance.
CO4.	explain the concepts of interfaces, packages, threads, exceptions and files.
CO5.	create simple applications using interfaces, packages, Applet and Graphics.

Allied Course	
Course Code: GLCA3A	Course Title: Visual Programming
On successful completion of the course, the learners should be able to	
CO1.	describe the fundamentals, working environment, statements and arrays in visual basic.
CO2.	explicate the working of various controls, menus, procedures and SQL database.
CO3.	make use of various controls.
CO4.	construct programs using decision making statements and arrays.
CO5.	implement procedures, menus, dialog boxes and built in data controls.

Major Course	
Course Code: GLCA3L	Course Title: Java Programming Lab
On successful completion of the course, the learners should be able to	
CO1.	create simple Java programs using arrays and different types of statements.
CO2.	design programs using inheritance and polymorphism.
CO3.	construct Multithread and Exception programs.
CO4.	build Packages and Interfaces.
CO5.	construct programs using files, Applet and Graphics.

Allied Course	
Course Code: GLCA3AL	Course Title: Visual Programming Lab
On successful completion of the course, the learners should be able to	
CO1.	develop simple window applications.
CO2.	design animation using Timer.
CO3.	construct dialogs and menus.
CO4.	create SDI and MDI applications.
CO5.	integrate database and window applications.

Major Course	
Course Code: GLCA41	Course Title: Database Management Systems
On successful completion of the course, the learners should be able to	
CO1.	describe the basic concepts of Database Management Systems, database architecture, E-R model and SQL.
CO2.	outline the various Normal forms and E-R Model techniques.
CO3.	create and Alter tables and views using SQL.
CO4.	develop queries using joins and aggregate functions.
CO5.	interpret the backup and recovery mechanism in database.

Allied Course	
Course Code: GLCA4A	Course Title: Operating Systems
On successful completion of the course, the learners should be able to	
CO1.	discuss the system structures, process management and memory management in operating system.
CO2.	analyze the scheduling algorithms and page replacement algorithms.
CO3.	outline the synchronization problems and deadlock prevention, avoidance, detection and recovery techniques.
CO4.	describe the memory management strategies.
CO5.	illustrate the virtual memory management and disk scheduling.

Major Course	
Course Code: GLCA4L	Course Title: DBMS LAB
On successful completion of the course, the learners should be able to	
CO1.	create tables and enforce integrity constraints.
CO2.	build queries based on aggregate and built-in functions.
CO3.	develop PL/SQL programs using iteration controls and cursors.
CO4.	construct PL/SQL programs using functions.
CO5.	implement various triggers in PL/SQL programs.

Allied Course	
Course Code: GLCA4AL	Course Title: DTP LAB
On successful completion of the course, the learners should be able to	
CO1.	implement various tools in photoshop.
CO2.	develop business cards, pamphlets using photoshop.
CO3.	create theme oriented animated story with effects using photoshop.
CO4.	design articles, advertisements, vouchers using pagemaker.
CO5.	manipulate objects and figures in coreldraw.

Major Course	
Course Code: GLCA51	Course Title: Software Engineering
On successful completion of the course, the learners should be able to	
CO1.	describe the basic concepts, factors and phases of software development.
CO2.	explicate the planning models, requirement, cost estimation and design concepts of software.
CO3.	analyze software design, validation and maintenance techniques.
CO4.	apply the concepts and features of modern programming language and estimate the cost of software.
CO5.	compare various planning models, cost estimation and design techniques.

Major Elective Course	
Course Code: GLCA5E1	Course Title: Web Technology
On successful completion of the course, the learners should be able to	
CO1.	describe the basics of web programming using basic HTML5 and PHP.
CO2.	implement CSS3, Forms, JavaScript and JQuery in web pages.
CO3.	develop programs using PHP flow-controls, built-in library, arrays & string functions in PHP.
CO4.	design web pages using various elements of HTML5 and PHP.
CO5.	illustrate PHP security issues, session and communication with the database.

Major Elective Course	
Course Code: GLCA5E2	Course Title: Computer Security
On successful completion of the course, the learners should be able to	
CO1.	discuss various security attacks, classical encryption techniques and public key cryptographic System.
CO2.	outline the various encryption standards to ensure security.
CO3.	summarize different message authentication codes and cryptosystems.
CO4.	explain the key management and distribution of keys.
CO5.	describe the user authentication mechanism and network access control and cloud security.

Major Elective Course	
Course Code: GLCA5E3	Course Title: Computer Graphics
On successful completion of the course, the learners should be able to	
CO1.	classify the various Graphics Systems.
CO2.	discuss the different output primitive algorithms.
CO3.	summarize the attributes of Output primitives.
CO4.	describe the two dimensional Geometric Transformations and viewing.
CO5.	outline the basic 3D concepts and interactive input methods.

Major Elective Course	
Course Code: GLCA5E4	Course Title: Cloud Computing
On successful completion of the course, the learners should be able to	
CO1.	describe the fundamental concepts, technology and mechanisms of Cloud.
CO2.	discuss the architecture, services, models and the technologies of cloud.
CO3.	outline the Cloud infrastructure, Management mechanisms and identify the security threats in cloud computing.
CO4.	compare the different Cloud Architectures, services, technology and models.
CO5.	explicate the services rendered by the cloud providers and the use of applications in business and media.

Major Elective Course	
Course Code: GLCA5E5	Course Title: Introduction to Data Mining
On successful completion of the course, the learners should be able to	
CO1.	explain the various types of data, patterns and attributes.
CO2.	outline the frequent itemset mining, Classification and Clustering techniques.
CO3.	describe the processing concepts and analysis techniques of big data.
CO4.	construct programs using commands of R programming language.
CO5.	manipulate Data Objects in R.

Major Elective Course	
Course Code: GLCA5E6	Course Title: Embedded Systems
On successful completion of the course, the learners should be able to	
CO1.	explain the architecture and programming concepts of embedded-systems.
CO2.	outline the communication devices and Network protocols.
CO3.	recall the concepts of Interrupts Service Routine mechanism.
CO4.	compare the real-time operating system process.
CO5.	illustrate the various embedded systems in RTOS.

Major Course	
Course Code: GLCA5L1	Course Title: Web Technology Lab
On successful completion of the course, the learners should be able to	
CO1.	design and implement dynamic websites with good aesthetic sense of designing.
CO2.	create web pages using cascading style sheets.
CO3.	develop a responsive web site using JavaScript.
CO4.	rewrite string handling operations using PHP.
CO5.	construct database programs using PHP script.

Major Course	
Course Code: GLCA5L2	Course Title: Animation Technology Lab
On successful completion of the course, the learners should be able to	
CO1.	develop animation using tweening and masking in Flash.
CO2.	apply 2D techniques of Flash for creating advertisements.
CO3.	make use of various effects using Adobe Premier Pro.
CO4.	construct artistic and creative work using 3D Max.
CO5.	build 3D models and designs using Maya.

Major Course	
Course Code: GLCA61	Course Title: Computer Networks
On successful completion of the course, the learners should be able to	
CO1.	describe the uses, hardware, software and the reference models of network.
CO2.	examine the transmission media, switching and design issues of data link and transport layer.
CO3.	explicate the Ethernet cabling mechanism, domain name system and electronic mail architecture.
CO4.	outline the protocols of data link, network, transport and application layers.
CO5.	solve the network oriented problems in data rate, error detection, error correction, routing and congestion controls.

Major Course	
Course Code: GLCA62	Course Title: Dot NET Programming
On successful completion of the course, the learners should be able to	
CO1.	explain the benefits of .NET framework, OOPs concepts and the various standard, navigation and validation controls.
CO2.	describe pointers, delegates, exception handling and the working of database.
CO3.	develop console applications using namespace, class and objects, delegates and pointers.
CO4.	construct web based applications using Standard and Validation controls.
CO5.	make use of master pages, Navigation controls and implement database.

Major Elective Course	
Course Code: GLCA6E1	Course Title: Operations Research
On successful completion of the course, the learners should be able to	
CO1.	formulate the decision making problems into mathematical models.
CO2.	describe the various methods and terminologies in solving decision making problems.
CO3.	solve linear programming problems using optimization techniques.
CO4.	determine optimal allocation of resources in Transportation and Assignment problems.
CO5.	test for optimal outcome in Game Theory for strategic decision making.

Major Elective Course	
Course Code: GLCA6E2	Course Title: Statistical Methods
On successful completion of the course, the learners should be able to	
CO1.	explain the basic terms and concepts in Statistics.
CO2.	describe the types of statistical situation to which different distributions can be applied.
CO3.	analyze statistical data using measures of central tendency, dispersion and location.
CO4.	calculate and interpret the correlation and regression between two variables.
CO5.	compute probability for uncertain problems.

Major Elective Course	
Course Code: GLCA6E3	Course Title: Graph Theory
On successful completion of the course, the learners should be able to	
CO1.	explain the basic concepts and algorithms in Graph Theory.
CO2.	understand some applications of graph theory to practical problems and other branches of Mathematics
CO3.	identify the minimal spanning tree of a graph.
CO4.	determine the matrix representation of graphs.
CO5.	design real world problems using Graph Theory.

Major Course	
Course Code: GLCA6L	Course Title: Dot NET Programming Lab
On successful completion of the course, the learners should be able to	
CO1.	develop C# 5.0 programs using OOPs concept and various controls.
CO2.	implement pointers and delegates concepts.
CO3.	design web based ASP.NET applications.
CO4.	construct programs using data base and validation controls.
CO5.	create and configure Master Pages.

Major Course	
Course Code: GLCA6P	Course Title: Project Work
On successful completion of the course, the learners should be able to	
CO1.	design computerized solutions to real life problems using appropriate methods.
CO2.	integrate the algorithms with the problems to find the solutions.
CO3.	construct structured programming techniques for business to meet the global demand.
CO4.	develop computer based object-oriented programming paradigms.
CO5.	apply the knowledge, skills, experience and ethical values to become lifelong learners.

Non Major Course	
Course Code: GLCA3N	Course Title: Animation Software
On successful completion of the course, the learners should be able to	
CO1.	describe the working environment and different tools of flash.
CO2.	implement various tools in flash.
CO3.	explain color panel and timeline panel.
CO4.	build new symbols and explore the types of Symbols in Flash.
CO5.	make use of tweening, 3D rotation, 3D translation in animations.

Discipline Specific Course	
Course Code: GLCA4DSL	Course Title: Command Line Interface Lab
On successful completion of the course, the learners should be able to	
CO1.	make use of dos commands.
CO2.	implement file and directory commands.
CO3.	build batch programs using decision making statements.
CO4.	construct shell programs to create, list the contents and sort the files.
CO5.	create shell programs using basic statements, commands and operators.

Non Major Course	
Course Code: GLCA4N	Course Title: Web Designing
On successful completion of the course, the learners should be able to	
CO1.	describe tables, links, frames, CSS and character formatting.
CO2.	illustrate the use of markup tags and formatting in web pages.
CO3.	create tables using various attributes.
CO4.	design web pages using frames and links.
CO5.	develop and make use of cascading style sheets in web pages.

Job Oriented Course	
Course Code: GLJO62	Course Title: Android Application Development
On successful completion of the course, the learners should be able to	
CO1.	describe Android features, architecture, activities, menus and UI design.
CO2.	create activity and layouts for Android App.
CO3.	design menus in the UI layout.
CO4.	make use of files and databases.
CO5.	express the advanced concepts of android.

Job Oriented Course	
Course Code: GLJO62L	Course Title: Android Application Development Lab
On successful completion of the course, the learners should be able to	
CO1.	design user Interfaces and Layouts in Android App.
CO2.	develop simple Android applications.
CO3.	build app using menus.
CO4.	implement database concepts in Android.
CO5.	create web pages using web view control.

Add on Course	
Course Code: GLCAEC1L	Course Title: Office Automation Lab
On successful completion of the course, the learners should be able to	
CO1.	create and format the word document.
CO2.	construct word document to perform mail merge operation.
CO3.	generate series, charts and perform sort and filter using MS-Excel.
CO4.	build tables using MS-Word and MS-Access.
CO5.	design presentation using MS-PowerPoint and MS-Word.

Add on Course	
Course Code: GLCAEC2L	Course Title: Image Design using Photoshop Lab
On successful completion of the course, the learners should be able to	
CO1.	implement various tools in Photoshop
CO2.	apply layers for designs.
CO3.	develop still and animating effects.
CO4.	create presentations using Photoshop.
CO5.	design different types of cards.

Add on Course	
Course Code: GLCAEC3	Course Title: Introduction to Python Programming
On successful completion of the course, the learners should be able to	
CO1.	express the basic and object-oriented concepts of Python.
CO2.	define statements, functions, files, exceptions, class and objects.
CO3.	implement the decision making statements and simple file concepts in scripts.
CO4.	develop scripts using built-in and user-defined functions.
CO5.	construct scripts using exceptions, strings and lists.

Add On Course	
Course Code: GLCAEC3L	Course Title: Python Programming Lab
On successful completion of the course, the learners should be able to	
CO1.	design scripts using conditional and looping statements.
CO2.	develop python programs using arrays and lists.
CO3.	build scripts using functions, recursive functions and lambda functions.
CO4.	construct scripts using tuples and dictionaries.
CO5.	create simple file-oriented scripts.

Add on Course	
Course Code: GLCAEC4L	Course Title: Mobile Application Development Lab
On successful completion of the course, the learners should be able to	
CO1.	make use of mobile application framework.
CO2.	design applications using GUI components, font and colors.
CO3.	build mobile applications using graphical primitives.
CO4.	create mobile apps to implement multithreading concept.
CO5.	implement database in mobile apps.

Add on Course	
Course Code: GLCAEC5L	Course Title: Open Source Programming Lab
On successful completion of the course, the learners should be able to	
CO1.	design undemanding scripts using python, perl and ruby.
CO2.	develop python programs using arrays, strings and lists.
CO3.	create simple file programs using python.
CO4.	implement functions and decision making statements using python, perl and ruby languages.
CO5.	build ruby scripts using decision making statements and arrays.

Add on Course	
Course Code: GLCAEC6L	Course Title: Statistical Analysis using Mat Lab
On successful completion of the course, the learners should be able to	
CO1.	create simple Matlab files.
CO2.	design Matlab files to perform matrix and vector operations.
CO3.	construct Matlab files using structures and functions.
CO4.	develop Matlab files to solve linear differential equations.
CO5.	build programs using simulink.



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**DEPARTMENT OF COMPUTER APPLICATIONS
PG DEGREE PROGRAMME IN COMPUTER APPLICATIONS**

PROGRAMME EDUCATIONAL OBJECTIVES

The Graduates will

PEO1.	emerge as successful professionals ready for Industry, Government sectors and Consultancy firms.
PEO2.	comprehend, analyze, design and construct computing solutions for the real-time problems and relate them with research.
PEO3.	act with creative, innovative and entrepreneurial potentials using latest technology and trends.
PEO4.	develop as socially responsible and value driven citizens committed to sustainable development through Computing skills and lifelong learning.

PROGRAMME SPECIFIC OUTCOMES

By the Completion of M.C.A programme, the learners will be able to

PSO1.	apply knowledge and promote technological advances and crack competitive examinations.
PSO2.	implement and evaluate a computer-based system, process or component to meet the stakeholder needs and become globally competent.
PSO3.	use current technologies, skills and models in the computing discipline to enhance research.
PSO4.	excel in leadership and managerial skills by adopting professional ethics through communicative technical information in both verbal and written format.

PSO5.	demonstrate team work with the ability of leadership, analytical reasoning for solving real time critical problems and strong human values for responsible professional.
PSO6.	build cross cultural, societal, professional, legal and ethical issues prevailing in industry.
PSO7.	obtain the confidence for self and continuous life-long learning as a computing professional to have a successful career.

COURSE OUTCOME

Core Course	
Course Code: HLCA11	Course Title: Computer Organization
On successful completion of the course, the learners should be able to	
CO1.	describe fundamental components of a digital computer and its operations.
CO2.	solve the problems in various number systems and Boolean algebra.
CO3.	outline the working of logic circuits and ALU.
CO4.	exemplify the purpose of Memory, Input Output devices and Control unit.
CO5.	elucidate addressing techniques and pipelining concepts in computer system.

Core Course	
Course Code: HLCA12	Course Title: Discrete Structures
On successful completion of the course, the learners should be able to	
CO1.	list out the basic principles of discrete mathematical structures.
CO2.	describe computer programs in a formal mathematical manner.
CO3.	apply mathematical logic to solve problems.
CO4.	evaluate the system of linear equations by the use of matrices.
CO5.	design and manipulate the different concepts in Theory of Automata.

Core Course	
Course Code: HLCA13	Course Title: Data Structures and Algorithms
On successful completion of the course, the learners should be able to	
CO1.	describe the linear and nonlinear data structures.
CO2.	illustrate the concepts of linked Lists, Trees and Graphs.
CO3.	list various sorting techniques for solving a problem.
CO4.	select appropriate algorithmic concept to solve real time problems.
CO5.	differentiate the dynamic programming and greedy methods.

Core Course	
Course Code: HLCA14	Course Title: Object Oriented Programming with C++
On successful completion of the course, the learners should be able to	
CO1.	explain the Class, Objects and Polymorphism.
CO2.	create object oriented programs using Pointers and Function Overloading.
CO3.	apply the concept of Inheritance and run time Polymorphism.
CO4.	elaborate templates and Exception Handling mechanism.
CO5.	describe the basics of I/O Streams.

Core Course	
Course Code: HLCA1L1	Course Title: Data Structures and Algorithms Lab
On successful completion of the course, the learners should be able to	
CO1.	construct programs for implementing linear and non linear data structures.
CO2.	make use of different data structure operations.
CO3.	build searching techniques.
CO4.	create programs for various sorting algorithms.
CO5.	develop programs for binary tree applications.

Core Course	
Course Code: HLCA1L2	Course Title: C++ Programming Lab
On successful completion of the course, the learners should be able to	
CO1.	make use of Arrays.
CO2.	create Inline Function and Friend Functions.
CO3.	design programs using Function and Operator Overloading.
CO4.	construct programs using Inheritance.
CO5.	implement File concepts and Exception Handling mechanism.

Core Course	
Course Code: HLCA21	Course Title: Operating Systems
On successful completion of the course, the learners should be able to	
CO1.	express the basic concepts and structures of Operating System.
CO2.	outline the various operations and scheduling algorithms of processes.
CO3.	illustrate various Synchronization problems and deadlock prevention, detection and recovery techniques.
CO4.	discuss the Memory Management techniques.
CO5.	describe the File systems and I/O systems.

Core Course	
Course Code: HLCA22	Course Title: Java Programming
On successful completion of the course, the learners should be able to	
CO1.	express the features, data types, statements, class and objects.
CO2.	create user-defined packages, interfaces and exceptions.
CO3.	implement the concept of multi-thread, I/O streams and strings.
CO4.	design applications using AWT controls.
CO5.	outline the theory of swing controls, networking and servlets.

Core Course	
Course Code: HLCA23	Course Title: Database Management System
On successful completion of the course, the learners should be able to	
CO1.	explain the DBMS concepts, database architecture, relational and ER models.
CO2.	create database design using the Entity Relationship model.
CO3.	formulate simple and complex query statements using Structured Query Language.
CO4.	describe the formal relational query languages, transaction management and concurrency control.
CO5.	discuss the recovery system and normalization techniques.

Core Course	
Course Code: HLCA24	Course Title: Microprocessors and Interfacing
On successful completion of the course, the learners should be able to	
CO1.	describe the architecture and organization of 8085,8086 and 80386 microprocessor.
CO2.	distinguish the addressing modes of 8085,8086 and 80386 microprocessor.
CO3.	use different types of instruction sets and interrupts.
CO4.	interpret pins, signals and bus transfer techniques of different microprocessors.
CO5.	illustrate the peripheral interfacing.

Elective Course	
Course Code: HLCA2E	Course Title: Multimedia Systems
On successful completion of the course, the learners should be able to	
CO1.	describe the basic concepts of Multimedia.
CO2.	summarize the characteristics of digital audio & video.
CO3.	critique the Photoshop workspace.
CO4.	manipulate different Photoshop color modes.
CO5.	organize images and process files using Bridge in Photoshop

Core Course	
Course Code: HLCA2L1	Course Title: Java Programming Lab
On successful completion of the course, the learners should be able to	
CO1.	develop programs using array, string, class and inheritance.
CO2.	create user-defined packages, interfaces and exceptions.
CO3.	implement the concept of multi-thread.
CO4.	design applications using Applet and AWT and swing controls.
CO5.	construct network applications.

Core Course	
Course Code: HLCA2L2	Course Title: DBMS Lab
On successful completion of the course, the learners should be able to	
CO1.	create the components of database and manipulate the data in the database.
CO2.	develop PL/SQL using cursors.
CO3.	build PL/SQL programs using functions, procedures and packages.
CO4.	create PL/SQL blocks, exception and triggers.
CO5.	develop applications using forms.

Core Course	
Course Code: HLCA31	Course Title: Resource Management Techniques
On successful completion of the course, the learners should be able to	
CO1.	summarize various algorithms, rules and terms to solve decision making problems.
CO2.	solve problems using Probability and Markov Analysis.
CO3.	use various methods to solve Transportation and Assignment Problems.
CO4.	analyze various models in Inventory Theory and Queuing Theory.
CO5.	build networks to plan, schedule and control Project activities.

Core Course	
Course Code: HLCA32	Course Title: Unix and Network Programming
On successful completion of the course, the learners should be able to	
CO1.	describe the types of files, file functions, process functions.
CO2.	explain coprocesses, signal and thread concepts.
CO3.	examine Inter process communication using signals, pipes, FIFO, Message queues, semaphores, shared memory and network sockets.
CO4.	design programs using Inter Process Communications.
CO5.	implement network communication using TCP and UDP sockets.

Core Course	
Course Code: HLCA33	Course Title: Dot NET Programming
On successful completion of the course, the learners should be able to	
CO1.	describe the components of .NET framework, Namespaces, Pointers, Delegates, features of ASP.Net and AJAX.
CO2.	explain about Windows Presentation Foundation and Windows Workflow Foundation.
CO3.	create a connection to a database and design Smart Device Applications.
CO4.	summarize the properties, methods and events of Standard controls and Navigation Controls.
CO5.	make use of ASP.Net3.5 validation and database controls.

Core Course	
Course Code: HLCA34	Course Title: Principles of Compiler Design
On successful completion of the course, the learners should be able to	
CO1.	describe the structure and phases of compiler.
CO2.	explain the tokens, finite automata, context free grammars and parsing techniques.
CO3.	illustrate the generation of intermediate and optimized object code.
CO4.	construct parse tree, transition diagram, NFA & DFA.
CO5.	make use of parsing techniques and regular expressions.

Core Course	
Course Code: HLCA3L1	Course Title: Unix and Network Programming Lab
On successful completion of the course, the learners should be able to	
CO1.	implement basic UNIX Commands.
CO2.	make use of System Calls.
CO3.	create program using signals.
CO4.	construct programs for Inter process communication using Pipes, FIFO, Message Queue and semaphore.
CO5.	develop networking programs using TCP and UDP.

Core Course	
Course Code: HLCA3L2	Course Title: Dot NET Programming Lab
On successful completion of the course, the learners should be able to	
CO1.	develop simple applications using VB.Net.
CO2.	create Simple Windowing Applications in C#.Net.
CO3.	combine Windows Applications with Database using ADO.Net.
CO4.	construct Web based Programs.
CO5.	build Master Pages.

Core Course	
Course Code: HLCA41	Course Title: Software Engineering
On successful completion of the course, the learners should be able to	
CO1.	discuss software, process, process models, requirements, design, quality, review and testing techniques.
CO2.	describe the elements and approaches of SQA, estimation of software projects and risk management.
CO3.	analyze the Software Testing Strategies for conventional and web oriented applications
CO4.	examine the process models, review techniques and the metrics in the process and project domains.
CO5.	explore project scheduling, maintenance and reengineering.

Core Course	
Course Code: HLCA42	Course Title: Middleware Technologies
On successful completion of the course, the learners should be able to	
CO1.	describe Client/Server computing, building blocks and CORBA overview.
CO2.	discuss OMG IDL to Java mapping and ORB run time system.
CO3.	illustrate the components, interfaces and dynamic linking of COM, HRESULTs, GUID, Class Factory.
CO4.	create simple Java ORB applications.
CO5.	build simple COM applications.

Core Course	
Course Code: HLCA43	Course Title: XML And Web Services
On successful completion of the course, the learners should be able to	
CO1.	explain the basics of XML, DTD, Schemas, CSS, XSL and Web services.
CO2.	create well formed XML documents using CSS, DTD and schemas.
CO3.	analyze XML Query and schema.
CO4.	discuss XLinks, XPointer and XHTML.
CO5.	develop web applications using XHTML and Web Services using SOAP and WSDL.

Core Course	
Course Code: HLCA44	Course Title: Computer Networks
On successful completion of the course, the learners should be able to	
CO1.	describe the networks terminologies, the reference models, connecting devices and Wireless WANs
CO2.	discuss the transmission media, switching and design issues of data link and transport layer.
CO3.	solve problems in multiplexing, error detection & correction and routing algorithms
CO4.	outline the protocols of data link, network, transport and application layers.
CO5.	analyze routing algorithms, framing, flow controls and domain name system.

Core Course	
Course Code: HLCA4L1	Course Title: Middleware Technology Lab
On successful completion of the course, the learners should be able to	
CO1.	develop applications using RMI in Java.
CO2.	design the components in CORBA.
CO3.	create IDL file in Java.
CO4.	build simple COM applications.
CO5.	construct COM Components.

Core Course	
Course Code: HLCA4L2	Course Title: Xml and Web Services Lab
On successful completion of the course, the learners should be able to	
CO1.	create a well-formed XML documents using CSS and DTD.
CO2.	develop XML documents using DSO.
CO3.	construct XML schema.
CO4.	implement DOM in XML documents.
CO5.	build web services.

Core Course	
Course Code: HLCA51	Course Title: Android Application Development
On successful completion of the course, the learners should be able to	
CO1.	describe the working of Android Software Development Tools.
CO2.	discuss the creation of basic Widgets, selection widgets, Dialog boxes, Interactive Menus and ActionBars.
CO3.	examine the utilization of resources, media, Google maps and SMS.
CO4.	operate with selection widgets, menus, dialog boxes and databases.
CO5.	create Android applications using different widgets and simple services.

Core Course	
Course Code: HLCA52	Course Title: Data Mining and Warehousing
On successful completion of the course, the learners should be able to	
CO1.	describe the kinds of data, patterns, data cube computation and data mining techniques.
CO2.	apply OLAP operations in data cube and perform preprocessing methods.
CO3.	find the frequent itemsets and formulate rules using algorithms.
CO4.	explain classification, clustering and Outlier detection algorithms.
CO5.	compare various data mining Techniques.

Core Course	
Course Code: HLCA53	Course Title: Security in Computing
On successful completion of the course, the learners should be able to	
CO1.	explain the concepts of computer security, algorithms of cryptography, program security and protection mechanism
CO2.	analyze the encryption algorithms, firewalls to ensure security.
CO3.	discuss the database and data mining security.
CO4.	outline the threats in network and network security controls.
CO5.	describe user authentication mechanism, intrusion detection systems and IP security.

Core Course	
Course Code: HLCA5L1	Course Title: Android Application Development Lab
On successful completion of the course, the learners should be able to	
CO1.	develop simple Android Applications using Basic Widgets.
CO2.	create applications using scrollview and selection Widgets.
CO3.	design applications using Menus and Action bars.
CO4.	formulate the applications to connect with the SQLite Database.
CO5.	build advanced Android Programs for publishing.

Core Course	
Course Code: HLCA5L2	Course Title: Software Development Lab
On successful completion of the course, the learners should be able to	
CO1.	create programs using Advanced Java Concepts.
CO2.	develop programs using Server side scripts.
CO3.	apply Data Mining and Image Processing techniques.
CO4.	construct UML diagrams.
CO5.	design programs using Networking concepts and OS algorithms.

Core Course	
Course Code: HLCA6P	Course Title: Project Work and Viva voce
On successful completion of the course, the learners should be able to	
CO1.	assess the literature and develop solutions for real-time problem statement.
CO2.	make use of hardware and/or software techniques for business to meet the global competency.
CO3.	test and analyze the modules of planned project.
CO4.	develop technical report and deliver presentation.
CO5.	apply professional and managerial skills to achieve project goal.

Core Elective Course	
Course Code: HLCA1E1	Course Title: Graphics & Multimedia
On successful completion of the course, the learners should be able to	
CO1.	outline the various computer Graphics systems.
CO2.	generate various shapes using output primitive.
CO3.	discuss two dimensional and three dimensional transformations.
CO4.	apply Clipping operations in windows view port and classify Visible-Surface Detection Methods.
CO5.	illustrate the working of Multimedia elements.

Core Elective Course	
Course Code: HLCA1E2	Course Title: Management Information System
On successful completion of the course, the learners should be able to	
CO1.	explain the management information systems in business.
CO2.	outline the role of the ethical, social, and security issues of information systems.
CO3.	analyze and design a system.
CO4.	discuss the development process & strategic design of MIS.
CO5.	apply MIS in various manufacturing Sector.

Core Elective Course	
Course Code: HLCA1E3	Course Title: M-Commerce
On successful completion of the course, the learners should be able to	
CO1.	explain the concept of Mobile commerce and its applications.
CO2.	list the types of M-commerce services.
CO3.	recall various mobile communication systems.
CO4.	examine the different security features.
CO5.	make use of Mobile Business intelligence.

Core Elective Course	
Course Code: HLCA3E1	Course Title: 3DAnimation Techniques
On successful completion of the course, the learners should be able to	
CO1.	describe the fundamentals of objects, effects, Modifier and splines in 3ds Max.
CO2.	illustrate the creation, transformation, lighting and texturing of objects in Maya.
CO3.	demonstrate the workings of character studio, particle systems and space wraps in 3ds Max.
CO4.	examine the creation, modification and rendering of Polygon and NURBS modeling in Maya.
CO5.	apply transformation, lighting, texturing and animation effects in Maya.

Core Elective Course	
Course Code: HLCA3E2	Course Title: Distributed Systems
On successful completion of the course, the learners should be able to	
CO1.	explain the distributed systems, networking and security techniques.
CO2.	summarize the distributed file system concepts.
CO3.	examine the transaction management and concurrency control.
CO4.	discuss the distributed deadlock and fault tolerant services.
CO5.	outline the characteristics and web services of distributed multimedia systems.

Core Elective Course	
Course Code: HLCA3E3	Course Title: Advanced Databases
On successful completion of the course, the learners should be able to	
CO1.	explain the Database Architecture and Advanced Transaction Processing.
CO2.	outline the Parallel databases and Object based databases.
CO3.	discuss the distributed databases.
CO4.	summarize XML, spatial and temporal data.
CO5.	describe the Advanced Application development.

Core Elective Course	
Course Code: HLCA4E1	Course Title: Digital Image Processing
On successful completion of the course, the learners should be able to	
CO1.	describe the fundamentals of digital image and transformation process.
CO2.	explicate filtering in frequency domain, image restoration and reconstruction methods.
CO3.	outline histogram processing, point, line and edge detection techniques.
CO4.	differentiate image segmentation, process of digital image, compression and filtering methodologies.
CO5.	analyze the segmentation, filtering and compression techniques.

Core Elective Course	
Course Code: HLCA4E2	Course Title: Soft Computing
On successful completion of the course, the learners should be able to	
CO1.	recall Fuzzy Logic concepts, neural networks and its applications.
CO2.	differentiate supervised and unsupervised learning.
CO3.	discuss Neuro-Fuzzy logic models.
CO4.	explain Neuro-Fuzzy Control systems.
CO5.	relate Fuzzy Sets and Genetic Algorithms in Game Playing and Color Recipe Prediction.

Core Elective Course	
Course Code: HLCA4E3	Course Title: Cloud Computing
On successful completion of the course, the learners should be able to	
CO1.	describe the architecture, services and models of cloud.
CO2.	discuss virtualization technologies.
CO3.	examine cloud web services and security mechanism.
CO4.	explain the Service Oriented Architecture.
CO5.	elaborate the Cloud Mail Services and streaming.

Core Elective Course	
Course Code: HLCA5E1	Course Title: UGC Net Preparatory Course – Computer Science
On successful completion of the course, the learners should be able to	
CO1.	recall the basic concepts in core areas of Computer Science and applications.
CO2.	identify the errors and programming logic used in the given code.
CO3.	examine the underlying processes in different domains on Computer Science and Applications.
CO4.	analyze the various concepts and techniques to find solutions to problems.
CO5.	justify and evaluate the applicability of computational techniques in mathematical foundations and theory of computation

Core Elective Course	
Course Code: HLCA5E2	Course Title: Artificial Intelligent Systems
On successful completion of the course, the learners should be able to	
CO1.	describe the Problem space, knowledge representations and Game playing.
CO2.	interpret knowledge using Predicate Logic and rules.
CO3.	summarize the statistical reasoning and learning.
CO4.	outline the connectionist models and Fuzzy logic Systems.
CO5.	discuss the genetic algorithms and natural language.

Core Elective Course	
Course Code: HLCA5E3	Course Title: Object Oriented Analysis & Design
On successful completion of the course, the learners should be able to	
CO1.	outline the features of object oriented analysis and design.
CO2.	illustrate the class, state and interaction models.
CO3.	support the domain analysis and application analysis for a system.
CO4.	construct system design and class design.
CO5.	explain the UML framework.

Core Elective Course	
Course Code: HLCA5E4	Course Title: Web Application Development
On successful completion of the course, the learners should be able to	
CO1.	explain HTML elements, user interactive form elements, multimedia elements.
CO2.	develop static and dynamic web pages using form element.
CO3.	describe the overview of Java script and AJAX, integration of PHP and AJAX and the fundamentals in working with jQuery.
CO4.	apply CSS and scripting to the HTML documents.
CO5.	construct web pages using AJAX, PHP and jQuery.

Core Elective Course	
Course Code: HLCA5E5	Course Title: Mobile Computing
On successful completion of the course, the learners should be able to	
CO1.	explain Mobile Computing Architecture.
CO2.	illustrate the technologies, services and architecture of GSM and SMS.
CO3.	summarize the Applications based on GPRS, WAP, CDMA, 3G and LAN.
CO4.	outline the various multimedia Compression Techniques.
CO5.	describe Security Issues in Mobile computing.

Core Elective Course	
Course Code: HLCA5E6	Course Title: Big Data Analytics
On successful completion of the course, the learners should be able to	
CO1.	explain the concepts, mining process of big data and multi-label big data mining.
CO2.	describe the context and text categorization and modelling.
CO3.	outline the distributed high dimensional data clustering for Big Data.
CO4.	express the Hadoop technology.
CO5.	make use of the big data databases and programming.

