

Srikrishna College, Bagula
 Department of Computer Science
 Course Outcome
 B.SC. (HONOURS): Computer Science

COURSE CODE	COURSE NAME	COURSE OUTCOME
SEMESTER 1		
UG-H-CC-L-101	Computer Fundamentals and Programming using C	<p>After completing this course satisfactorily, a student will be able to:</p> <ol style="list-style-type: none"> 1. Confidently operate Desktop Computers to carry out computational tasks. 2. Understand working of Hardware and Software and the importance of operating systems. 3. Understand programming languages, number systems, peripheral devices, networking, multimedia and internet concepts. 4. Read, understand and trace the execution of programs written in C language. 5. Write the C code for a given problem. 6. Perform input and output operations using programs in C. 7. Write programs that perform operations on arrays.
UG-H-CC-P-101	Programming using C	<p>After completing this course satisfactorily, a student will be able to:</p> <ol style="list-style-type: none"> 1. Read, understand and trace the execution of programs written in C language. 2. Write the C code for a given problem. 3. Perform input and output operations using programs in C. 4. Write programs that perform operations on arrays. 5. Write user defined functions to perform a task.
UG-H-CC-L-102	Digital System Design	<p>After completing this course satisfactorily, a student will be able to:</p> <ol style="list-style-type: none"> 1. To know about the basic building blocks of computer system. 2. Boolean algebra and Boolean function representation. 3. Develop combinational and sequential circuits for functional and storage blocks. 4. Understand the design of different arithmetic and logical circuits. 5. Learn about different logic families.

UG-H-CC-P-102	Digital System Design Lab	<ol style="list-style-type: none"> 1. Knowledge and use of hardware description language for system modeling and simulation. 2. Describe and explain the operation of fundamental digital gates. 3. Minimize the Boolean expression using Boolean algebra and design it using logic gates. 4. Analyze the operation of medium complexity standard combinational circuits like the encoder, decoder. 5. Analyze the operation of medium complexity standard combinational circuits like the multiplexer, demultiplexers. 6. Analyze the operation of medium complexity standard combinational circuits like the code converters. 7. Design complex digital systems at several level of abstractions; behavioral and structural, synthesis and rapid system prototyping. 8. Design complex digital system such as ALU. 9. Analyze the operation of a flip-flop and examine relevant timing diagrams. 10. Analyze the operation of counters and shift registers.
SEMESTER 2		
UG-H-CC-L-203	Programming in C++	<p>After completing this course satisfactorily, a student will be able to:</p> <ol style="list-style-type: none"> 1. Learn the concepts of data, abstraction and encapsulation 2. Be able to write programs using classes and objects, packages. 3. Understand conceptually principles of Inheritance and Polymorphism and their use and program level implementation. 4. Learn exception and basic event handling mechanisms in a program 5. To learn typical object-oriented constructs of specific object oriented programming language
UG-H-CC-P-203	Programming in C++ Lab	<p>After completing this course satisfactorily, a student will be able to:</p> <ul style="list-style-type: none"> • The basic programming and OOPs concepts • Creating C++ programs • Tokens, expressions and control structures in C++ • Arranging same data systematically with arrays • Classes and objects in C++ • Constructors and destructors in C++ • Files management and templates in C++ • Handling exceptions to control errors

UG-H-CC-L-204	Computer System Architecture	<p>After completing this course satisfactorily, a student will be able to:</p> <ul style="list-style-type: none">• To make students understand the basic structure, operation and characteristics of digital computer.• To familiarize the students with arithmetic and logic unit as well as the concept of the concept of pipelining.• To familiarize the students with hierarchical memory system including cache memories and virtual memory.• To make students know the different ways of communicating with I/O devices and standard I/O interfaces.
UG-H-CC-T-204	Computer System Architecture Tutorial	<p>After completing this course satisfactorily, a student will be able to: Clear all the doubt.</p>

SEMESTER 3

UG-H-CC-L-305	Data Structures	<p>After completing this course satisfactorily, a student will be able to:</p> <ol style="list-style-type: none">1. Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithms2. Describe common applications for arrays, records, linked structures, stacks, queues, trees, and graphs3. Write programs that use arrays, records, linked structures, stacks, queues, trees, and graphs4. Demonstrate different methods for traversing trees5. Compare alternative implementations of data structures with respect to performance6. Describe the concept of recursion, give examples of its use7. Discuss the computational efficiency of the principal algorithms for sorting and searching
UG-H-CC-P-305	Data Structures Lab	<p>After completing this course satisfactorily, a student will be able to:</p> <ol style="list-style-type: none">1. Implement different sorting and searching algorithms.2. Implement the stack, Queue and their applications3. Implement various types of linked lists and their applications4. Perform basic operations on trees and graphs and determine minimum spanning tree.
UG-H-CC-L-306	Design and Analysis of Algorithms	<p>After completing this course satisfactorily, a student will be able to:</p> <ul style="list-style-type: none">• Argue the correctness of algorithms using inductive proofs and Analyze worst-case running times of algorithms using asymptotic analysis.• Explain important algorithmic design paradigms (divide-and-conquer, greedy method, dynamic-programming and Backtracking) and apply when an algorithmic design situation calls for it.• Explain the major graph algorithms and Employ graphs to model engineering problems, when appropriate• Compare between different data structures and pick an appropriate data structure for a design situation.• Describe the classes P, NP, and NP Complete and be able to prove that a certain problem is NP-Complete

UG-H-CC-P-306	Design and Analysis of Algorithms Lab	<p>After completing this course satisfactorily, a student will be able to:</p> <ol style="list-style-type: none"> 1.The principle objective of this course is to build solid foundation in algorithms and their applications. 2.Implement various divide and conquer techniques examples. 3.Implement various Greedy techniques examples. 4.mplement various Dynamic Programming techniques examples. 5.Provide a practical exposure of all algorithms. 6.Understand the importance of algorithm and its complexities.
UG-H-CC-L-307	Discrete Structures	<p>After completing this course satisfactorily, a student will be able to:</p> <ul style="list-style-type: none"> • Understand the notion of mathematical thinking, mathematical proofs, and algorithmic thinking, and be able to apply them in problem solving. • Understand the basics of combinatorics, and be able to apply the methods from these subjects in problem solving. • Be able to use effectively algebraic techniques to analyses basic discrete structures andalgorithms. • Understand some basic properties of graphs and related discrete structures, and be able to relate these to practical examples.
UG-H-CC-T-307	Discrete Structures Tutorial	<p>After completing this course satisfactorily, a student will be able to:</p> <p>Clear all the doubt.</p>
UG-H-SEC-P-301	UNIX/LINUX Programming	<p>After completing this course satisfactorily, a student will be able to:</p> <ul style="list-style-type: none"> • Run various UNIX commands on a standard UNIX/LINUX Operating system (We will be using Ubuntu flavor of the Linux operating system). • Run C / C++ programs on UNIX. • Do shell programming on UNIX OS. • Understand and handle UNIX system calls.

SEMESTER 4

UG-H-CC-L-408	Operating System	<p>After completing this course satisfactorily, a student will be able to:</p> <ul style="list-style-type: none">• Describe the important computer system resources and the role of operating system in their management policies and algorithms.• Understand various functions, structures and history of operating systems and should be able to specify objectives of modern operating systems and describe how operating systems have evolved over time.• Understanding of design issues associated with operating systems.• Understand various process management concepts including scheduling, synchronization, and deadlocks.• Have a basic knowledge about multithreading.• Understand concepts of memory management including virtual memory.• Understand issues related to file system interface and implementation, disk management.• Understand and identify potential threats to operating systems and the security features design to guard against them
UG-H-CC-T-408	Operating System Tutorial	<p>After completing this course satisfactorily, a student will be able to: Clear all the doubt.</p>
UG-H-CC-L-409	Computer Networks	<p>After completing this course satisfactorily, a student will be able to:</p> <ul style="list-style-type: none">• Understand the structure of Data Communications System and its components.• Be familiarize with different network terminologies.• Familiarize with contemporary issues in network technologies.• Know the layered model approach explained in OSI and TCP/IP network models• Identify different types of network devices and their functions within a network.• Learn basic routing mechanisms, IP addressing scheme and internetworking concepts.• Familiarize with IP and TCP Internet protocols.• Understand major concepts involved in design of WAN, LAN and wireless networks.• Learn basics of network configuration and maintenance.

UG-H-CC-T-409	Computer Networks Tutorial	After completing this course satisfactorily, a student will be able to: Clear all the doubt.
UG-H-CC--410	Database Management Systems	After completing this course satisfactorily, a student will be able to: 1.Gain knowledge of database systems and database management systems software. 2.Model data in applications using conceptual modelling tools such as ERDiagrams and design data base schemas based on the model. 3.Formulate, using SQL, solutions to a broad range of query and data update problems. 4.Demonstrate an understanding of normalization theory and apply such knowledge to thenormalization of a database. 5.Familiarity with database storage structures and access techniques
UG-H-CC-P-410	Data Management Systems Lab	After completing this course satisfactorily, a student will be able to: <ul style="list-style-type: none"> • Transform an information model into a relational database schema and to use a data definition language and/or utility to implement the schema using a DBMS. • Use an SQL interface of a multi-user relational DBMS package to create, secure, populate, maintain, and query a database. • Formulate query, using SQL, solutions to a broad range of query and data update problems. • Use a desktop database package to create, populate, maintain, and query a database. • Demonstrate a rudimentary understanding of programmatic interfaces to a database and be able to use the basic functions of one such interface. • Analyze an information storage problem and derive an information model expressed in the form
UG-H-SEC-P-402	Programming with MATLAB	After completing this course satisfactorily, a student will be able to: <ul style="list-style-type: none"> • Understand Basics of MATLAB coding. • Write the program for a given problem in MATLAB coding. • Simulate various graphics in MATLAB simulation tool.

SEMESTER 5

UG-H-CC-L-511	Theory of Computation	<p>After completing this course satisfactorily, a student will be able to:</p> <ol style="list-style-type: none"> 1.Design Finite Automata machines for given problems; 2.Analyze a given Finite Automata machine and find out its Language; 3.Design Pushdown Automata machine for given CF language(s); 4.Generate the strings/sentences of a given context-free languages using its grammar; 5.Design Turing machines for given any computational problem.
UG-H-CC-T-511	Theory of Computation Tutorial	<p>After completing this course satisfactorily, a student will be able to:</p> <ul style="list-style-type: none"> • Clear various doubt
UG-H-CC-L-512	Internet Technologies	<p>After completing this course satisfactorily, a student will be able to:</p> <ul style="list-style-type: none"> • Understand the basic knowledge of Java programing language • Familiarize the students with Data types, operators, functions, control structures in Java script. • Gain the knowledge how to connect a database through JDBC • Gain the overview of Java Server Page(JSP) • Understand the knowledge of Java Beans.
UG-H-CC-L-512	Internet Technologies Lab	<p>After completing this course satisfactorily, a student will be able to:</p> <ul style="list-style-type: none"> • Develop web based application using suitable client side and server side web technologies.
UG-H-DSE-L-501	Microprocessor/ Digital Image Processing	<p>After completing this course satisfactorily, a student will be able to:</p> <p>Microprocessor</p> <ol style="list-style-type: none"> 1. Recall and apply a basic concept of digital fundamentals to Microprocessor based personal computer system. 2. Identify a detailed s/w & h/w structure of the Microprocessor. 3. Illustrate how the different peripherals are interfaced with Microprocessor. 4. Distinguish and analyze the properties of Microprocessors & Microcontrollers. 5. Analyze the data transfer information through serial & parallel ports. <p>Digital Image Processing</p> <ol style="list-style-type: none"> 1.Familiarize the students with the image fundamentals and mathematical transforms necessaryfor image processing. 2.Make the students understand the image enhancement techniques. 3.Make the students understand the image restoration and reconstruction procedures. 4.Familiarize the students with the image segmentation procedures.

UG-H-DSE-L-501	Microprocessor/ Digital Image Processing Lab	<p>After completing this course satisfactorily, a student will be able to:</p> <p>Microprocessor:</p> <ul style="list-style-type: none"> • Demonstrate ability to handle arithmetic operations using assembly language programming. • Demonstrate ability to handle logical operations using assembly language programming. • Demonstrate ability to handle string instructions using assembly language programming. • Demonstrate ability to handle sorting operations and using assembly language programming. <p>Digital Image Processing:</p> <ul style="list-style-type: none"> • Write program to read and display digital image using MATLAB or SCILAB. • Write and execute image processing programs using point processing method. • Write and execute programs for image arithmetic operations. • Write and execute programs for image logical operations. • Write a program for histogram calculation and equalization. • Write and execute program for geometric transformation of image. • Understand various image noise models and to write programs for image restoration. • Write and execute programs to remove noise using spatial filters. • Write and execute programs for image frequency domain filtering.
UG-H-DSE-L-502	Numerical Methods/ Machine Learning	<p>After completing this course satisfactorily, a student will be able to:</p> <p>Numerical Methods</p> <ul style="list-style-type: none"> • Understand numerical techniques to find the roots of non-linear equations and solution of system of linear equations. • Understand the difference operators and the use of interpolation. • Understand numerical differentiation and integration and numerical solutions of ordinary and partial differential equations. <p>Machine Learning</p> <ul style="list-style-type: none"> • Have a good understanding of the fundamental issues and challenges of machine learning: data, model selection, model complexity. • Have an understanding of the strengths and weaknesses of many popular machine learning approaches. • Appreciate the underlying mathematical relationships within and across Machine Learning algorithms and the paradigms of supervised and un-supervised learning. • Be able to design and implement various machine learning algorithms in a range of real-world applications.

UG-H-DSE-P-502	Numerical Methods/ Machine Learning Lab	<p>After completing this course satisfactorily, a student will be able to:</p> <p>Numerical Methods</p> <ul style="list-style-type: none"> • Find roots of the equation by bisection method. • Find the roots of the equation by secant/Regula–Falsi method. • Find the roots of the equation by Newton’s method. • Find the solution of a system of nonlinear equation using Newton’s method. • Find the solution of tri-diagonal system using Gauss Thomas method. • Find the solution of system of equations using Jacobi/Gauss-Seidel method. • Find the cubic spline interpolating function. • Evaluate the approximate value of finite integrals using Gaussian/Romberg integration. • Solve the boundary value problem using finite difference method. <p>Machine Learning</p> <ul style="list-style-type: none"> • Perform elementary mathematical operations in Octave/MATLAB like addition, multiplication, division and exponentiation. • Perform elementary logical operations in Octave/MATLAB (like OR, AND, Checking for Equality, NOT, XOR). • Create, initialize and display simple variables and simple strings and use simple formatting for variable. • 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. • Use command to compute the size of a 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. • Perform basic operations on matrices (like addition, subtraction, multiplication) and display specific rows or columns of the matrix. • Perform other matrix operations like converting matrix data to absolute values, taking the negative of matrix values, adding /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.

		<ul style="list-style-type: none">• 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.• Generate different subplots from a given plot and colour plot data.• Use conditional statements and different type of loops based on simple example/s.• Perform vectorized implementation of simple matrix operation like finding the transpose of a matrix, adding, subtracting or multiplying two matrices.
--	--	---

SEMESTER 6

UG-H-CC-L-613	Software Engineering	<p>After completing this course satisfactorily, a student will be able to:</p> <ul style="list-style-type: none">• Learn basic knowledge and understanding of the analysis and design of complex systems.• Apply software engineering principles and techniques.• Produce efficient, reliable, robust and cost-effective software solutions.• Work as an effective member or leader of software engineering teams.• Manage time, processes and resources effectively by prioritizing competing demands to achieve personal and team goals Identify and analyzes the common threats in each domain.
UG-H-CC-T-613	Software Engineering Tutorial	<p>After completing this course satisfactorily, a student will be able to: Clear all the doubt.</p>
UG-H-CC-L-614	Computer Graphics	<p>After completing this course satisfactorily, a student will be able to:</p> <ul style="list-style-type: none">• Acquire familiarity with the concepts and relevant mathematics of computer graphics.• Ability to implement various algorithms to scan, convert the basic geometrical primitives, transformations, area filling, clipping.• Describe the importance of viewing and projections.• Ability to design basic graphics application programs.• Familiarize with fundamentals of animation and Virtual reality technologies• Be able to design applications that display graphic images to given specifications.• To understand a typical graphics pipeline.
UG-H-CC-P-614	Computer Graphics Lab	<p>After completing this course satisfactorily, a student will be able to:</p> <ul style="list-style-type: none">• implement Bresenham's line drawing algorithm.• implement mid-point circle drawing algorithm• clip a line using Cohen and Sutherland line clipping algorithm• clip a polygon using Sutherland Hodgeman algorithm.• apply various 2D transformations on a 2D object (use homogenous coordinates).• apply various 3D transformations on a 3D object and then apply parallel and perspective projection on it.• to draw Hermite/Bezier curve.

UG-H-DSE-L-603	System Programming/Introduction to Data Science	<p>After completing this course satisfactorily, a student will be able to:</p> <p>System Programming</p> <ul style="list-style-type: none"> • Understand the overview of compilation, Phases of a compiler. • Get the basic knowledge of Assemblers & Loaders, Linkers • Get the idea about Lexical Analysis, Parsing. • Familiarize with Intermediate representations, Storage organization, Code Generation. <p>Introduction to Data Science</p> <ul style="list-style-type: none"> • Understand the overview of Data Scientist's Tool Box. • Understand the overview of R Programming Basics. • Basic knowledge of getting and cleaning Data. • Analyses Exploratory Data . • Get the concept of Reproducible Research.
UG-H-DSE-P-603	System Programming/Introduction to Data Science Lab	<p>After completing this course satisfactorily, a student will be able to:</p> <p>System Programming</p> <ul style="list-style-type: none"> • implement an assembler for a hypothetical language. • get familiar with lex: Can write a program to recognize numbers, identifiers. • get familiar with yacc: Can write a desk calculator. <p>Introduction to Data Science</p> <ul style="list-style-type: none"> • Write basic program. • Implement linear search, binary search. • Implement matrices addition, subtraction and Multiplication.
UG-H-DSE-PRO-	Project Work/Dissertation	<p>After completing this course satisfactorily, a student will be able to:</p> <ul style="list-style-type: none"> • gain in-depth knowledge and use adequate methods in the major subject/field of study. • create, analyze and critically evaluate different technical/research solutions. • clearly present and discuss the conclusions as well as the knowledge and arguments that form the basis for these findings. • identify the issues that must be addressed within the framework of the specific dissertation in order to take into consideration