St. Mira's College for Girls, Pune
[Autonomous- affiliated to the Savitribai Phule University]
Course Outcomes
For Undergraduate Programme
Name of Programme: B.Sc Computer Science
w.e.f. 2023
COMPUTER SCIENCE

Course: FYBSC(CS)-CS-Major-BSMAJCS123120-Introduction to C Programming

Semester: I

At the end of this course, the learner will be able to:	
CO1.	Analyse a computational problem and develop an algorithm/ flow chart to find to find its solution
CO2.	Understand the basic building blocks of C programming using arithmetic common logical, relational or Bitwise operators
CO3.	Develop readable C programs with branching and looping statements
CO4.	Illustrate a given competition problem into a number of modules and develop a reliable multifunction C program by using recursion

Course: FYBSC(CS)-CS-Major-BSMAJCS123121-Database Management System

Semester: II

At the end of this course, the learner will be able to:	
CO1.	Understand the fundamental concept of data storage
CO2.	Use diagramming tools such as E-R model and create models in software development
CO3.	Evaluate and apply database management operations to use database systems
CO4.	Analyse the raw data and design data dependencies, constraints, views, triggers and functions in databases

Course: FYBSC(CS)-CS-Major-BSMAJCS123122-Computer Science Practical-C Programming and PostgreSQL

Semester: I

At the end of this course, the learner will be able to:	
CO1.	Understand the program development life cycle
CO2.	Solve simple computational problems using modular design and basic features of C language
CO3.	Solve real world computational problems
CO4.	Evaluate operations on relational database management systems
CO5.	Understand basic query processing operations. Design ER model for given requirements and convert the same into database tables
CO6.	Understand constraints, views, triggers and functions in databases

Course: FYBSC(CS)-CS-Major-BSMAJCS223120-Advanced C Programming Techniques

Semester: II

At the end of this course, the learner will be able to:	
CO1.	Write readable C programs with arrays, string for storing the data to be processed
CO2.	Define and use of pointers with simple applications
CO3.	Describe and differentiate between structure and unions to write simple programs
CO4.	Understand the concept of file and C processor derivatives

Course: FYBSC(CS)-CS-Major-BSMAJCS223121-Introduction to Python Programming

Semester: II

At the end of this course, the learner will be able to:	
CO1.	Understand the syntax and semantics of Python programming language
CO2.	Interpret the use of programming constructs such as lists, tuples, sets, strings in Python program
CO3.	Outline a basic Python program structure to facilitate code reuse with the help of functions

CO4.	Illustrate the process of structuring of the data using files and dictionaries

Course: FYBSC(CS)-CS-Major-BSMAJCS223122-Computer Science Practical-Advanced C and Python Programming

Semester: II

At the end of this course, the learner will be able to:	
CO1.	Construct the code organization with complex data types, structures and preprocessor derivatives
CO2.	Recognize the advanced concepts of programming using the 'C' and files manipulation
CO3.	Understand the basic constructs of Python programming such as data types, control statements etc and data structures like list, functions, tuples, dictionaries and sets
CO4.	Use modules, packages and files in python programs

ELECTRONICS

Course: FYB.SC(CS) ELECTRONICS-Minor-BSMINELE22302-Computer Instrumentation

Semester: II

At the end of this course, the learner will be able to:	
CO1.	Recall the basic knowledge of semiconductor devices and they're working and use of signal conditioning circuits in a system
CO2.	Explain the working principle of sensors and transducers and their classification, identify and apply the knowledge of sensors in smart instrumentation system
CO3.	Classify different types of ADC and DAC, apply the knowledge of conversion of digital to analogue and vice versa
CO4.	Apply the knowledge above to understand an instrumentation system

Course: FYB.SC(CS) ELECTRONICS-OE-OE2-12309-Fundamentals of Computer System

Semester: I

At the end of this course, the learner will be able to:	
CO1.	Recall the basic knowledge of components of computer hardware and software
CO2.	Identify and interpret the function of different networking devices
CO3.	Differentiate between types of codes and number systems and convert one code to another
CO4.	Identify gates and examine their function in digital circuits. Solve the Boolean equation

Course: FYB.SC(CS) ELECTRONICS-OE-OE2-22309-Fundamentals of Computer Organization

Semester: II

At the end of this course, the learner will be able to:	
CO1.	Construct the combinational and sequential logic circuit
CO2.	Classify different semiconductor memories, recognize the principle memory technologies from a hierarchical viewpoint with emphasis on cache memory
CO3.	Identify and explain different parts of CPU and I/O devices, and organize them according to their function
CO4.	Compare microprocessors and relate them to Pentium processors

Course: FYB.SC(CS) ELECTRONICS-SEC-BSSECCSE12302-Electronics Practical in Digital System

Semester: I

At the end of this course, the learner will be able to:	
CO1.	Identify and measure different components and solve binary arithmetic problems using Boolean algebra and K-maps
CO2.	Demonstrate combinational and sequential logic circuits, build and test circuits using simulation software
CO3.	Apply knowledge and perform electronics experiments as well as analyse and interpret data of electronics in computer science
CO4.	Work effectively and responsibly as a team member to perform experiments, report writing, using modern tools and techniques

Course: FYB.SC(CS) ELECTRONICS-SEC-BSSECCSE22302-Skill Based Practical in omputer Organization

Semester: II

At the end of this course, the learner will be able to:	
CO1.	Identify and test gates, computer hardware and network devices
CO2.	Construct the combinational and sequential logic circuits, build and test circuits using simulation software
CO3.	Classify different semiconductor memories, recognize the principal memory technology from hierarchical viewpoint with emphasis on cache memory
CO4.	Work effectively and responsibly as a team member to perform experiments, report writing, using modern tools and techniques

Course: FYB.SC(CS) ELECTRONICS-VSC-BSVSCCSE12302-Digital System

Semester: I

At the end of this course, the learner will be able to:	
CO1.	Classify and represent numbers to solve binary arithmetic problems
CO2.	Demonstrate logic gates and identify that used to build circuits using Boolean algebra
CO3.	Apply logic gates to build combinational circuits
CO4.	Utilize logic gates to construct sequential circuits

Course: FYB.SC(CS) ELECTRONICS-VSC-BSVSCCSE22302-Electronics Practical in Computer Instrumentation

Semester: II

At the end of this course, the learner will be able to:	
CO1.	Calculate the frequency and amplitude of the sine and square wave
CO2.	Describe the characteristics of semiconductor devices
CO3.	Demonstrate the working of OP-AMP, ADC and DAC and analyze and interpret the data for relating electronics to computer science

CO4.	Work effectively and responsibly as a team member to perform experiments, report writing, use modern tools and techniques

MATHEMATICS

Course: FYBSC(CS)-MATHEMATICS-IKS-BSIKS12301-Ancient Indian Mathematics

Semester: I

At the end of this course, the learner will be able to:	
CO1.	Learn about various history and contributions of Indian mathematician
CO2.	Learn various Sulbasutra and Acharya Pingala, meruprastara properties
CO3.	Learn about square root and cube root techniques and techniques in arithmetic given and different number system and its history with decimal place value system
CO4.	Learn about solving Diophantine equation and Pell's equation and various developments in arithmetic, geometry, algebra and trigonometry

Course: FYBSC(CS)-MATHEMATICS-Minor-BSMINMAT22301-Linear Algebra

Semester: II

At the end of this course, the learner will be able to:	
CO1.	Define vector spaces and related properties
CO2.	Describe linear transformation and related terms
CO3.	Identify matrix is diagonalizable or not
CO4.	Find orthogonal and orthonormal vectors

Course: FYBSC(CS)-MATHEMATICS-OE-OE2-12308-Discrete Mathematics

Semester: I

At the end of this course, the learner will be able to:	
CO1.	Define and understand the basics of logic. Write an instrument using logical notation and determine validity of the argument
CO2.	Determine properties of relations, identify equivalence and partial order relations and represent them diagrammatically
CO3.	Apply among various counting principles and apply them appropriately
CO4.	Understand the basic concepts of graph theory and its types

Course: FYBSC(CS)-MATHEMATICS-OE-OE2-22308-Graph Theory

Semester: II

At the end of this course, the learner will be able to:	
CO1.	Know about the new branch of mathematics- graph theory and its applications
CO2.	Define trees and demonstrate different traversal methods of trees
CO3.	Classify different types of digraphs and identify the areas of their applications
CO4.	Describe and apply some important and useful algorithms for graphs

Course: FYBSC(CS)-MATHEMATICS-SEC-BSSECCSM12301-Mathematics Practical Using C Language

Semester: I

At the end of this course, the learner will be able to:	
CO1.	Construct a solid foundation in the field of programming handling various mathematical problems from vector geometry using C programming
CO2.	Critically analyse a given problem, understand and solve the problem using C
CO3.	Find and explain the concepts of GDM, LCM and reminder using Fermat's theorem and apply those in C programming
CO4.	Understand the use of various concepts such as arryas in C programming for mathematical problems

Course: FYBSC(CS)-MATHEMATICS-SEC-BSSECCSM22301-Mathematics Practical using Maxima

Semester: II

At the end of this course, the learner will be able to:	
CO1.	Demonstrate the skills of programming handling the mathematical concepts using new mathematical open source software MAXIMA
CO2.	Solve problems based on linear algebra using MAXIMA commands
CO3.	Applying commands in MAXIMA solve problems from Graph Theory
CO4.	Enhance visualization skills

Course: FYBSC(CS)-MATHEMATICS-VSC-BSVSCCSM12301-Number Theory and Matrix Algebra

Semester: I

At the end of this course, the learner will be able to:	
CO1.	Classify different types of relations and apply the concepts of divisibility in number theory and its properties
CO2.	Understand prime numbers, congruence relations and define real life problems using recurrence relation
CO3.	Explore the equivalence between vector equations and matrix equations
CO4.	Learn computations with matrix, apply different methods such as row echelon and LU decomposition to solve linear algebraic systems

Course: FYBSC(CS)-MATHEMATICS-VSC-BSVSCCSM22301-Mathematics Practical using Scilab and Maxima

Semester: II

At the end of this course, the learner will be able to:	
CO1.	Explore commands on matrices, plotting functions and writing small programs using functions in Scilab
CO2.	Learn commands on matrices , drawing graph and operations on graph in Maxima
CO3.	Plot various kinds of graphs and explore its properties in Maxima
CO4.	Loan solving system of linear equations, matrix diagonalization, defining vectors and related properties in Scilab

STATISTICS

Course: FYBSC(CS) STATISTICS-OE-OE1-12306-Descriptive Statistics

Semester: I

At the end of this course, the learner will be able to:	
CO1.	Organize, manage and present data. Analyze statistical data graphically using frequency distributions and cumulative frequency distributions
CO2.	Understand and apply concepts of measures of central tendency and dispersion in problem solving
CO3.	Remember, understand, apply, evaluate and interpret data using measures of skewness and kurtosis
CO4.	Present and interpret the data for correlation, using scatter plot. Understand, evaluate and interpret the data for correlation using Karl Pearson's formula

Course: FYBSC(CS) STATISTICS-OE-OE1-22306-Introduction to Probability Theory

Semester: II

At the end of this course, the learner will be able to:	
CO1.	Apply methods of counting principles, permutation and combination to real life situations. Apply concepts of experiments, sample space, events required in calculation of probabilities
CO2.	Use the basic probability rules including additive and multiplicative laws, independent and mutually exclusive events in problem solving
CO3.	Understand and apply concepts of conditional probabilities and independence of random variables
CO4.	Understand and apply discrete probability distributions to various real life problems

Course: FYBSC(CS) STATISTICS-VEC-BSVECBDA2301-Basic of Data Analytics

Semester: II

At the end of this course, the learner will be able to:	
CO1.	Apply methods of counting principles, permutation and combination to real life situations. Apply concepts of experiments, sample space, events required in calculation of probabilities
CO2.	Use the basic probability rules including additive and multiplicative laws, independent and mutually exclusive events in problem solving
CO3.	Understand and apply concepts of conditional probabilities and independence of random variables
CO4.	Understand and apply discrete probability distributions to various real life problems

Course: FYBSC(CS) STATISTICS-VEC-BSVECPDS2301-Practical on Descriptive Statistics

Semester: I

At the end of this course, the learner will be able to:	
CO1.	Tablet and make frequency distribution of the given data using various graphical and diagrammatic techniques
CO2.	To compute various measures of central tendency, dispersion
CO3.	To calculate and interpret measures of skewness and kurtosis
CO4.	Analyse the relationship between two variables using scatter plot. Compute and interpret coefficient of correlation