



B.Voc. Mathematics and Artificial

PROGRAMME SPECIFIC OUTCOME

PSO1. Attain a good foundation in Mathematics and Artificial Intelligence in the undergraduate level enabling them to take up higher studies in both Mathematics and Artificial Intelligence

PSO2. Introduce to powerful tools for tackling a wide range of topics in Mathematics and Artificial Intelligence.

PSO3. Familiarize with additional relevant mathematical & AI techniques subjects to complement the core.

PSO4. Understand a range of topics in almost all areas of Mathematics and Artificial Intelligence

PSO5. Attain Vocational and profession skill in AI system design and IOT programming along with mathematical and statistical problem Solving Skill

COURSE OUTCOME

SJSDC1ST01 : DESCRIPTIVE STATISTICS & INTRODUCTION TO R

SJSDC1ST01.1	Understanding of basics of R programming.
SJSDC1ST01.2	Summarize the data in a diagrammatic and graphic way.
SJSDC1ST01.3	Obtain descriptive statistics and make interpretations.
SJSDC1ST01.4	Describe the concepts of correlation and regression and identify an appropriate relationship between two variables.

SJSDC2ST08(P) : DISCRIPTIVE STATISTICS LAB

SJSDC2ST08 (P).1	Apply the basics of R package
SJSDC2ST08 (P).2	Apply Statistical tools for analysis of data in real time using R
SJSDC2ST08 (P).3	Fit curves for a give data using R

SJSDC3ST11 : PROBABILITY STATISTICAL METHODS

SJSDC3ST11.1	Summarize various probability approaches and compute probabilities.
SJSDC3ST11.2	Understand the applications of theoretical distributions and sampling distributions.
SJSDC3ST11.3	Identify a suitable test of significance to test a given hypothesis.
SJSDC3ST11.4	Apply the concept of time series.

SJSDC4ST20(P) : TESTING AND ANALYSIS USING R (Lab)

SJSDC4ST20 (P).1	Apply testing procedure in real life problems
SJSDC4ST20 (P).2	Develop scientific and experimental skills of the students with application based studies.
SJSDC4ST20 (P).3	Correlate the theoretical principles with application based studies.

SJSDC1MT02 : CALCULUS OF SINGLE VARIABLE 1

SJSDC1MT02.1	Understand to the fundamental ideas of limit, continuity and differentiability and also to some basic theorems of differential calculus
SJSDC1MT02.2	Apply differential calculus for sketching of curves and in the solution of some optimization problems of interest in real life
SJSDC1MT02.3	Evaluate the definite integral
SJSDC1MT02.4	Solve the area, Volume, surface area problem, find out the arc length of a plane curve

SJSDC2MT05 : CALCULUS OF SINGLE VARIABLE 2

SJSDC2MT05.1	Understand natural algorithm, exponential function, hyperbolic function and its properties
SJSDC2MT05.2	Solve improper integrals and find their convergence

SJSDC2MT05.3	Understand Series convergence and find the convergence using different tests
SJSDC2MT05.4	Find power series convergence, region of convergence, differentiation and integration
SJSDC2MT05.5	Understand the concept of parameterization and find arc length, curvature, area of surface of revolution using it

SJSDC3MT09 : CALCULUS OF MULTIVARIABLE

SJSDC3MT09.1	Understand several contexts of appearance of multivariable functions and their representation using graph and contour diagrams.
SJSDC3MT09.2	Formulate and work on the idea of limit and continuity for functions of several variables.
SJSDC3MT09.3	Understand the notion of partial derivative, their computation, interpretation and chain rule for calculating partial derivatives.
SJSDC3MT09.4	Get the idea of directional derivative, its evaluation, interpretation, and relationship with partial derivatives.
SJSDC3MT09.5	Understand the concept of gradient, a few of its properties, application and interpretation.
SJSDC3MT09.6	Understand the use of partial derivatives in getting information of tangent plane and normal line.
SJSDC3MT09.7	Calculate the maximum and minimum values of a multivariable function using second derivative test and Lagrange multiplier method.
SJSDC3MT09.8	Find a few real life applications of Lagrange multiplier method in optimization problems.
SJSDC3MT09.9	Extend the notion of integral of a function of single variable to integral of functions of two and three variables.
SJSDC3MT09.10	Address the practical problem of evaluation of double and triple integral using Fubini's theorem and change of variable formula.
SJSDC3MT09.11	Realise the advantage of choosing other coordinate systems such as polar, spherical, cylindrical etc. in the evaluation of double and triple integrals.
SJSDC3MT09.12	Apply double and triple integral in the problem of finding out surface area, mass of lamina, volume, centre of mass and so on.
SJSDC3MT09.13	Understand the notion of a vector field, the idea of curl and divergence of a vector field, their evaluation and interpretation.
SJSDC3MT09.14	Understand the idea of line integral and surface integral and their evaluations.
SJSDC3MT09.15	Learn three major results viz. Green's theorem, Gauss's theorem and Stokes' theorem of multivariable calculus and their use in several areas and directions.

SJSDC3MT10 : DIFFERENTIAL EQUATION

SJSDC3MT10.1	Identify a number of areas where the modelling process results in a differential equation.
SJSDC3MT10.2	Learn what an ODE is, what it means by its solution, how to classify DEs, what it means by an IVP and so on.
SJSDC3MT10.3	Learn to solve ODEs that are in linear, separable and in exact forms and also to analyse the solution.

SJSDC3MT10.4	Realise the basic differences between linear and non linear DEs and also basic results that guarantees a solution in each case.
SJSDC3MT10.5	Learn a method to approximate the solution successively of a first order IVP.
SJSDC3MT10.6	Understand the theory and method of solving a second order linear homogeneous and nonhomogeneous equation with constant coefficients.
SJSDC3MT10.7	Find out a series solution for homogeneous equations with variable coefficients near ordinary points.
SJSDC3MT10.8	Solve differential equation using Laplace method which is especially suitable to deal with problems arising in engineering field.
SJSDC3MT10.9	Solve partial differential equations using the method of separation of variables

SJSDC4MT14 : NUMBER THEORY AND LINEAR ALGEBRA

SJSDC4MT14.1	Prove results involving divisibility, greatest common divisor, least common multiple and a few applications
SJSDC4MT14.2	Understand the theory and method of solutions of LDE.
SJSDC4MT14.3	Understand the theory of congruence and a few applications.
SJSDC4MT14.4	Apply basic ideas of matrix theory to solve related problems
SJSDC4MT14.5	Understand Real vector spaces, subspaces, linear independence, basis and dimension
SJSDC4MT14.6	Understand row space, column space, null space
SJSDC4MT14.7	Find Rank nullity Eigen value & Eigen vectors of Matrix spaces

SJSDC4MT15 : NUMERICAL ANALYSIS

SJSDC4MT15.1	Understand several methods such as bisection method, fixed point iteration method, regula falsi method etc. to find out the approximate numerical solutions of algebraic and transcendental equations with desired accuracy.
SJSDC4MT15.2	Understand the concept of interpolation and also learn some well known interpolation techniques.
SJSDC4MT15.3	Understand a few techniques for numerical differentiation and integration and also realize their merits and demerits.
SJSDC4MT15.4	Find out numerical approximations to solutions of initial value problems and also to understand the efficiency of various methods.

SJSDC5MT19 : ABSTRACT ALGEBRA

SJSDC5MT19.1	Understand concepts of permutations, groups, subgroups and solve problems related to it
SJSDC5MT19.2	Understand cyclic groups, permutation groups, cosets, commutative rings, Integral domains and learn basic theorems related to the concepts
SJSDC5MT19.3	Understand the concept of Isomorphisms, homomorphism and learn basic theorems related to the concepts

SJSDC5MT20 : REAL ANALYSIS

SJSDC5MT20.1	Understand Algebraic, Order and completeness properties of real line
SJSDC5MT20.2	Understand the concepts of Intervals, sequence and its limits, monotone sequences and learn the basic theorems related to it
SJSDC5MT20.3	Find convergence and divergence of sequence and learn theorems related to convergence
SJSDC5MT20.4	Understand the concept of Series and its convergence
SJSDC5MT20.5	Understand Basics of differentiation and Riemann Integration

SJSDC5MT21 : COMPLEX ANALYSIS

SJSDC5MT21.1	Understand the difference between differentiability and analyticity of a complex function, construct examples, Learn necessary and sufficient condition for checking analyticity.
SJSDC5MT21.2	Understand elementary analytic functions of complex analysis and their properties
SJSDC5MT21.3	Understand Complex integration and finding residue using integration
SJSDC5MT21.4	Understand more general type of series expansion analogous to power series expansion viz. Laurent's series expansion for functions having singularity.

SJSDC1AI03 : INTRODUCTION TO ARTIFICIAL INTELLIGENCE

SJSDC1AI03.1	Compare AI with human intelligence and traditional information processing and discuss its strengths and limitations as well as its application to complex and human-centred problems.
SJSDC1AI03.2	Understand the core concepts and algorithms of advanced AI, including informed searching, CSP, logic, uncertain knowledge and reasoning, dynamic Bayesian networks, graphical models, decision making, multi agent, inductive learning, statistical learning, reinforcement learning, deep learning, natural language processing, robotics, and so on.
SJSDC1AI03.3	Apply the basic principles, models, and algorithms of AI to recognize, model, and solve problems in the analysis and design of information systems.
SJSDC1AI03.4	Analyze the structures and algorithms of a selection of techniques related to searching, reasoning, machine learning, and language processing.
SJSDC1AI03.5	Design AI functions and components involved in intelligent systems such as computer games, expert systems, semantic web, information retrieval, machine translation, mobile robots, decision support systems, and intelligent tutoring systems.

SJSDC1AI04 : PYTHON PROGRAMMING

SJSDC1AI04.1	Familiar about the basic constructs of programming such as data, operations, conditions, loops, functions etc.
SJSDC1AI04.2	Understand how to read/write to files, handle exception using python.
SJSDC1AI04.3	Build package Python modules for reusability.
SJSDC1AI04.4	Design and understand object-oriented concepts with Python classes.
SJSDC1AI04.5	Understand the concept of pattern matching.
SJSDC1AI04.6	Design GUI applications along with database connectivity to move the data to/from the application

SJSDC2AI07 –DATA STRUCTURES AND ALGORITHMS

SJSDC2AI07.1	Survey algorithmic strategies give presentations using open source documentation tools like Latex and soft skill methodologies.
SJSDC2AI07.2	Write mathematical modeling of algorithms for problem solving.
SJSDC2AI07.3	Develop SRS in the UG projects;
SJSDC2AI07.4	Solve problems for multi-core or distributed or concurrent/Parallel/Embedded environments.

SJSDC3AI14 : INTRODUCTION TO MACHINE LEARNING

SJSDC3AI14.1	Design a learning model appropriate to the application
SJSDC3AI14.2	Design a Neural Network for an application of your choice.
SJSDC3AI14.3	Implement Probabilistic Discriminative and Generative algorithms for an application of your choice and analyze the results
SJSDC3AI14.4	Use a tool to implement typical Clustering algorithms for different types of applications.

SJSDC4AI19 : ARTIFICIAL NEURAL NETWORK

SJSDC4AI19.1	Mathematically model a neuron Understand
SJSDC4AI19.2	Model a linear regressor/classifier using a perceptron model Apply
SJSDC4AI19.3	Solve non-linear problems using multi-layer neural network Apply
SJSDC4AI19.4	Implement better training algorithms for neural network

SJSDC1AI23 : DEEP LEARNING

SJSDC1AI23.1 Understand the role of Deep learning in Machine Learning Applications

SJSDC1AI23.2 Design and implement Deep Learning Applications.

SJSDC1AI23.3 Critically Analyse Different Deep Learning Models in Image Related.

SJSDC1AI23.4 Design and implement Convolutional Neural Networks.

SJSDC1AI24 : IOT PROGRAMMING

SJSDC1AI24.1 Enable learners to understand System On Chip Architectures.

SJSDC1AI24.2 Introduction and preparing Raspberry Pi with hardware and installation.

SJSDC1AI24.3 Learn physical interfaces and electronics of Raspberry Pi and program them using practical's

SJSDC1AI24.4 Learn how to make consumer grade IoT safe and secure with proper use of protocols