ESTD. IN 1965

St.Mary'S College

Sulthan Bathery,Wayanad, Kerala-673592
Phone: +91 4936 220246, 225246
Email: stmaryssby@gmail.com

Learning Outcomes 2018-19

ST.MARY'S COLLEGE
Wayanad Dist.
Kerala
SULTHAN BATHERY-673 592

PRINCIPAL
ST. MARY'S COLLEGE
SULTHAN BATHERY
WAYANAD-673 592

B.Sc. MATHEMATICS

PROGRAMME SPECIFIC OUTCOMES

1 - Skill in problem solving, creativity, numeracy and self-management.
2 - Confidence in accepting professional challenges, act with integrity, set themselves high standards.
3 - Ability to work independently and along a team with professional integrity.
4 - Acquire skills of logical and analytical reasoning.
5 - Develop a critical attitude towards knowledge.
6 - Equipped to seek knowledge and to continue learning throughout their lives.
7 - Generate intellectual curiosity, effective learning and research abilities.
8 - Proficiency in curricular, co-curricular and extracurricular activities that deepen and broaden knowledge.
9 - Bloom skills of analysis, application, synthesis, evaluation and criticality
10 - Develop self-awareness, empathy, cultural awareness and mutual respect
11 - Talent to work in a wide range of cultural settings and inculcate respect for themselves and others and will be courteous.
12 - Knowledge in ethical behaviour, sustainability and personal contribution.
13 - Awareness in the environmental, social and cultural value system.

COURSE OUTCOMES

SEMESTER I

MAT1B01-FOUNDATIONS OF MATHEMATICS

1 - Explain the Propositional Calculus in Mathematical Logic.
2 - Describe Set theory, Relations & Functions.
3 - Explain Indexed collection of sets and operations on indexed collection of sets.

SEMESTER II

MAT2B02- CALCULUS

1 - Find the extreme value of a function.
2 - Understanding Mean Value Theorem.
3 - Conceive the concept of asymptotes and obtain their equations.
4 - Learn about partial derivatives and its applications.
5 - Find the area under a given curve, length of an arc of a curve when the equations are given in parametric and polar form.
6 - Find the area and volume by applying the techniques of double and triple integrals.
7 - Find the moment, centers of mass and work done.

SEMESTER III

MAT3B03- CALCULUS& ANALYTIC GEOMETRY

1- Learn about transcendental equations.
2- Conceive the concept of infinite series and power series.
3- Define Conic Sections and Classify Conic Sections by eccentricity.
4- Interpret parametric equations & Polar coordinates of Conic Sections.
5- Explain Graphing in Polar coordinates.

SEMESTER IV

MAT4B04- THEORY OF EQUATIONS, MATRICES AND VECTOR CALCULUS

1 - Interpret equations of lines and planes in space Explain integration in vector fields.
2 - Analyse the fundamental theorem of algebra.
3 - Solve equations of nth degree.
4 - Find the equations whose nature of roots are given.
5 - Solve third degree equations using Cardan's method.
6 - Find roots of fourth degree equations using Ferrari method.
7 - Interpret the relation between roots and coefficients.
8 - Apply Descarte's rule of signs to find the number of real and imaginary roots of a given equation.
9 - Execute various numerical analysis methods to obtain roots of an equation.
10 - Understand the concepts of Matrix, Cayley- Hamilton theorem, Gauss Jordan Elimination etc.

SEMESTER V

MAT5B05- VECTOR CALCULUS

1- Understanding functions of several variables, limits and continuity.
2- Describe multi variable functions and partial derivatives.
3- Understanding triple integrals.
4- Understanding integration in vector fields.

MAT5B06- ABSTRACT ALGEBRA

1- Understanding the concept of binary operation.
2- Applications of cosets and theorem of Lagrange.
3- An introduction to Rings, Fields and Integral Domains.

MAT5B07-BASIC MATHEMATICAL ANALYSIS

1- Explain Real number system and some of its basic properties.
2- Define the basic concepts needed for real analysis.
3- Explain Bolzano Weierstrass theorem for sets.
4- Describe Real sequences, its Convergence Some theorems.
5- Explain limit points of a sequence.
6- Understanding the fundamentals of complex numbers

MAT5B08- DIFFERENTIAL EQUATIONS

1- Obtain an integrating factor which may reduce a given differential equation into an exact one and eventually provide its solution.
2- Obtain the solution of first and second order differential equation.
3- Describe the partial differential equation and distinguish the integrals of first order linear partial differential equation into complete, general and singular integrals.
4- Uses of Laplace transforms and Fourier series in the solution of differential equations.
5- Solve separation of variables, Wave equation and Heat equation.

SEMESTER VI

MAT6B09- REAL ANALYSIS

1- Explain continuous functions and some of its properties.
2- Define Riemann Integration.
3- Explain pointwise and uniform convergence of functions.
4- Describe Improper Integrals.
5- Explain Beta and Gamma functions.

MAT6B10- COMPLEX ANALYSIS

1- Distinguish complex variables and complex functions.
2- Describe complex functions and identify them as transformations.
3- Interpret the limit of complex functions.
4- Interpret continuity at a point and continuity in a region of complex functions.
5- Understand differentiability of complex functions.
6- Recognize differentiability implies continuity but continuity need not imply differentiability.
7- Describe Cauchy-Riemann equations, and use them to distinguish between differentiable and non-differentiable functions.
8- Understand analytic functions and entire functions.
9- Describe harmonic functions and utilize the property to verify differentiability.
10- Know elementary functions and their properties.
11- Understand the theory and techniques of complex integration.

12- Recognize that contour integrals of complex functions are path dependent except in certain cases.
13- Interpret Cauchy-Goursat Theorem, Cauchy's Integral formula, Cauchy's inequality Theorem, Liouvilles theorem, Maximum-Modulus principle and apply these properties for integration.
14- Understand the theory and application of the power series expansion of analytic functions.
15- Derive power series expansion of analytic function using Taylor's theorem or Laurent'sTheorem.
16- Distinguish between singular points, non-singular points isolated singularities and nonisolated singularities.
17- Characterise singularities.
18- Evaluate residue of functions at isolated singular points.

MAT6B11- NUMERICAL METHODS

1- Solution of algebraic and transcendental equations
2- Explain Newton Raphson Method
3- Understanding Interpolation and Newton's formula
4- Explain the relation between Matrices and Linear systems of Equations
5- Numerical solutions of ordinary differential equations

MAT6B12- NUMBER THEORY &LINEAR ALGEBRA

1 - Describe Mathematical Induction and Binomial Theorem
2 - Introduce the division algorithm
3 - Compute the greatest common divisor
4 - Describe the Euclidean algorithm
5 - Explain the Diophantine equation ax + by = c
6 - Introduce The fundamental theorem of arithmetic &The sieve of Eratosthenes.
7 - Describe Basic properties of congruence
8 - Compute Binary and decimal representation of integers
9 - Introduce Chinese remainder theorem and Fermat's little theorem
10 - Describe pseudoprimes
11 – Explain Wilson's theorem
12 - Compute the sum and number of divisors, The greatest integer function
13 - Introduce Euler's phi-function, Euler's Theorem, Properties of the phi-function.
14 - Define vector space and basic properties
15 - Explain basis, rank, null space etc

MAT6B13(E01)- GRAPH THEORY

1- Describe the basic concepts of graph theory
2- Construct different types of graphs.
3- Evaluate the adjacency matrix and incidence matrix of a graph.

4- Identify trees, paths and cycles in graphs.
5- Differentiate between Hamiltonian and eulerian graphs.
6- Identify cut vertices of a graph if any.
7- Identify the bridges of a graph if any.
8- Define the vertex connectivity of a graph.

COMPLEMENTARY COURSE TO PHYSICS AND CHEMISTRY

SEMESTER I

MAT1C01-MATHEMATICS

On completion of this course, successful students will be able to:

1 - Compute the limit of functions.
2 - Compute the value of the derivative at a point algebraically using the (limit) definition.
3 - Determine the expression for the derivative of elementary functions from the limit definition.
4 - Identify the extreme values of a function and classify them as maxima, minima and saddle points using the first derivative test.
5 - Learning L'hopital's Rule.
6 - Describe the consequences of Rolle's theorem and Mean Value theorem for differentiable functions.
7 - Calculate integrals of functions.
8 - Interpret the definite integral as the limit of a Riemann sum.
9 - Determine area between curves, length of plane curves using integration.
10 - Calculate volumes by slicing and rotation.
11 - Compute areas of surfaces of revolution.

SEMESTER II

MAT2C02-MATHEMATICS

On completion of this course, successful students will be able to:

1 - Interpret double integrals and hyperbolic functions.
2 - Understand infinite series.
3 - Graphing with polar coordinates.
4 - Calculate partial derivatives of functions of several variables.

SEMESTER III

MAT3C03-MATHEMATICS

On completion of this course, successful students will be able to:

1 -Calculate the rank of a matrix.
2-Compute summation of infinite series.
3- Solve system of equations using Matrix method.
4- Determine the characteristic roots and characteristic vectors of a Matrix.
5 - Compute Line integrals, Surface integrals etc

SEMESTER IV

MAT4C04-MATHEMATICS

On completion of this course, successful students will be able to:

1- Obtain an integrating factor which may reduce a given differential equation into an exact one and eventually provide its solution.
2- Obtain the solution of first and second order differential equation.
3- Uses of Laplace transforms and Fourier series in the solution of differential equations.
4- Describe the partial differential equation and distinguish the integrals of first order linear partial differential equation into complete, general and singular integrals.
5- Solve separation of variables, Wave equation.
6- Numerical solutions of ordinary differential equations.
7- Finding Numerical Integration using Trapiziodal rule and Simpson's rule.