SIR P. T. SARVAJANIK COLLEGE OF SCIENCE (Autonomous)
SURAT-395001
(Affiliated with Veer Narmad South Gujarat University, Surat)

SYLLABUS

FOR

SEM I & II

Program: M. Sc.

Course: Mathematics

From

Academic year

2026-27

Content

M. Sc. (Sem-I & II) Mathematics

Sr. No	Semester	Course	Course Number	Course Code	Course Name
1	I	Core Course-I	CC-I	MHMSC-S1P1-4CR26	Advanced Abstract Algebra
2		Core Course-II	CC-II	MHMSC-S1P2-4CR26	Advanced Real Analysis
3		Core Course-III	CC-III	MHMSC-S1P3-4CR26	Advanced Number Theory
4		Skill Enhancement Course-I	SEC-I	MHMSC-S1SEC1-2CR26	Principles of Data Science
			SEC-II	MHMSC-S1SEC2-2CR26	Math with Python [only practical]
			SEC-III	MHMSC-S1SEC3-2CR26	SWAYAM/MOOC etc.
5		Indian Knowledge System	IKS	MHMSC-S1IKS1-2CR26	Introduction to Ancient Mathematics and Astronomy
6		Practical	CCP-I	MHMSC-S1PR1-2CR26	Lab Course-I
			CCP-II	MHMSC-S1PR2-2CR26	Lab Course-II
			CCP-III	MHMSC-S1PR3-2CR26	Lab Course-III
1	II	Core Course – IV	CC-IV	MHMSC-S2P4-4CR26	Complex Analysis
2		Core Course – V	CC-V	MHMSC-S2P5-4CR26	Ordinary Differential Equations
3		Core Course – VI	CC-VI	MHMSC-S2P6-4CR26	Analytic Number Theory
4		Vocational Course-I	VC-I	MHMSC-S2VOC1-2CR26	Applications of Python in Mathematics
5		Practical	CCP-IV	MHMSC-S2PR4-2CR26	Lab Course-IV
			CCP-V	MHMSC-S2PR5-2CR26	Lab Course-V
			CCP-VI	MHMSC-S2PR6-2CR26	Lab Course-VI
			VCP-I	MHMSC-S2VOCPR1-2CR26	Vocational Lab Course-I

Semester- II

Core Course- IV (CC-IV)

COURSE NAME: COMPLEX ANALYSIS

COURSE CODE: MHMSC-S2P4-4CR26 [CREDITS – 04]

Course learning outcome		
At the end of this course, Students will be able to 1. Understand series expansion. 2. Classify singularities and evaluate residues, poles, and zeros of complex functions. 3. Apply contour integration techniques to evaluate integrals, including improper integrals and trigonometric integrals. 4. Analyze conformal mappings and transformations.		
Module 1	**Series Expansion**	**[15L]**
Learning Objective 1. To understand power series and their convergence. 2. To study Taylor and Laurent series and operations on power series.		
Learning Outcomes: At the end of this module the learner will be able to 1. Analyse and determine convergence of power series and apply series expansions of complex functions. 2. Apply Taylor and Laurent series and perform operations on power series to solve problems in complex analysis.		
1.1	Introduction to Sequence and Series of Complex numbers	**[2L]**
1.2	Series Expansions: Power Series, Uniform convergence of power series	**[5L]**
1.3	Taylor series, Zeros of Analytic functions, Laurent Series	**[5L]**
1.4	Integration and Differentiation of Power Series, Multiplication and division of Power Series	**[3L]**
Module 2	**Singularities and Residues**	**[15L]**
Learning Objective 1. To understand classification of singularities, poles, zeros, and residues. 2. To study meromorphic functions and behaviour of functions at infinity. 3. To learn partial fraction expansion and identification of regular and singular points.		
Learning Outcomes: At the end of this module the learner will be able to 1. Classify singularities and compute residues, poles, and zeros of complex functions. 2. Analyse meromorphic functions and behaviour at infinity. 3. Apply partial fraction expansion to identify regular and singular points.		
2.1	Classification of Singularities, Residues, Poles and Zeros	**[6L]**
2.2	Behaviour of Functions at Infinity, Meromorphic Functions, the open mapping theorem	**[5L]**
2.3	Partial fraction expansions, Regular points and singularities	**[4L]**
Module 3	**Sums and Definite Integrals**	**[15L]**
Learning Objective 1. To understand contour integration techniques. 2. To study methods for estimation of sums and evaluation of definite and improper integrals.		

Learning Outcomes: At the end of this module the learner will be able to 1. Apply contour integration methods to evaluate definite integrals and improper integrals. 2. Use complex analysis techniques to estimate sums and solve trigonometric integrals.		
3.1	Estimation of sums, Definite Integrals involving Sines and Cosines, Improper integrals	**[8L]**
3.2	Integration along indented Contours, Other types of Contours.	**[7L]**
Module 4	**Conformal Mappings**	**[15L]**
Learning Objective 1. To understand the Conformality Theorem and properties of conformal mappings. 2. To study bilinear transformations and special transformations including exponential and trigonometric mappings.		
Learning Outcomes: At the end of this module the learner will be able to 1. Analyse and apply conformal mappings to transform complex regions. 2. Apply bilinear, exponential, and trigonometric transformations in solving complex analysis problems.		
4.1	Conformality Theorem, Bilinear Transformation, Special Bilinear Transformations	**[8L]**
4.2	Exponential Transformation, Trigonometric Transformation.	**[7L]**

References:

1. H. S. Kasana: Complex Variables – Theory and Applications, 2nd Edition (2006), PHI, N. Delhi.
2. James Ward Brown & Ruel V. Churchill: complex Variables and Applications, McGraw-Hill, 8th Edition.
3. J. N. Sharma: Functions of a Complex Variable, Krishna Prakashan, 2014.
4. S. Ponnuswamy: Foundation of Complex Analysis, Narosa Publishing House, 1997.
5. S. Lang: Complex Analysis, Addition Wesley, 4th Edition, 1997.
6. H. A. Priestly: Introduction to Complex Analysis, Clarendon Press, 1990
7. J. B. Conway: Functions of one Complex Variable, Springer-Verlag, 1980

Mapping of COs and PSOs

Course Learning Outcomes	Programme Outcomes							
	1	2	3	4	5	6	7	8
Understand series expansion.	X	X	X					
Classify singularities and evaluate residues, poles, and zeros of complex functions.	X	X	X	X		X	X	
Apply contour integration techniques to evaluate integrals, including improper integrals and trigonometric integrals.	X		X	X		X	X	
Analyze conformal mappings and transformations.	X	X	X		X		X	X

M.Sc. (Mathematics) Semester-II

COURSE NAME: LAB COURSE-IV

COURSE CODE: MHMSC-S2PR4-2CR26 [CREDITS- 02]

Course Learning Outcome
After the successful completion of the Course, the learner will be able to: 1. Develop the ability to analyse complex numbers and functions using algebraic, trigonometric, and exponential forms, and evaluate limits, continuity, and differentiability in the complex plane. 2. Apply analytic function theory including Cauchy-Riemann equations, complex integration, Cauchy theorems, and series expansions to solve complex analysis problems.

PRACTICAL: MHMSC-S2PR4-2CR26 (Lab Course - IV)	
Practical-1	Examples based on Triangle Inequality, Polar and Exponential forms.
Practical-2	Finding roots in complex plane.
Practical-3	Exercise on Limits, Continuity, Differentiability.
Practical-4	Examples based on Cauchy-Riemann Equations, Analytic functions, Harmonic functions.
Practical-5	Examples on Exponential function, Trigonometric functions, Hyperbolic functions, Multivalued function.
Practical-6	Examples on Logarithmic function, Complex Exponents, Inverse Trigonometric and Hyperbolic functions.
Practical-7	Examples based on Cauchy-Goursat Theorem, Extension of Cauchy-Goursat Theorem, Cauchy Integral formula.
Practical-8	Examples on Series Expansions.

Core Course- V (CC-V)

COURSE NAME: Ordinary Differential Equations

COURSE CODE: MHMSC-S2P5-4CR26 [CREDITS – 04]

Course learning outcome		
At the end of this course, Students will be able to 1. Find the general solution of the first order linear homogeneous equations. 2. Understand the utility of the theory of power series which is studied in Real Analysis course through solving various second order differential equations. 3. Get introduced to the Hypergeometric functions which arises in connection with solutions of the second order ordinary differential equations with regular singular points. 4. Solve the problems arises in Mathematical physics using properties of special functions. 5. Understand the importance of studying well-posedness of the problem namely existence, uniqueness and continuous dependence of first order differential equations through Picard's theorem. 6. Solve ordinary differential equations by numerical methods.		
Module 1	**Second Order Linear Equations and Power Series Solutions**	**[15L]**
Learning Objective 1. Students will learn about the general solution of first order and second order linear equations.		
Learning Outcomes: At the end of this module the learner will be able to 1. Find the general solution of the first order linear homogeneous equations. 2. Understand the utility of the theory of power series which is studied in Real Analysis course through solving various second order differential equations.		
1.1	Second Order Linear Equations: The General Solution of the Homogeneous Equation, The Use of a Known Solution to find Another, The Homogeneous Equation with Constant Coefficients, The method of Undetermined Coefficients, The method of variation of parameters.	**[9L]**
1.2	Power Series solutions: A review of power series, Series solutions of first order equations, Second Order Linear Equations: Ordinary points.	**[6L]**
Module 2	**Regular Singular Points**	**[15L]**
Learning Objective 1. To learn about Gauss's hypergeometric equation and Legendre Polynomials & Bessel functions		
Learning Outcomes: At the end of this module the learner will be able to 1. Get introduced to the Hypergeometric functions which arises in connection with solutions of the second order ordinary differential equations with regular singular points.		
2.1	Regular Singular Points, Gauss's hypergeometric equation, The Point at infinity, Two convergence proofs.	**[6L]**
2.2	Legendre Polynomials, Properties of Legendre Polynomials, Legendre series, Least squares approximation, Bessel functions and The Gamma function, The definition of the function $Jp(x)$.	**[9L]**

Module 3	Linear Systems of First Order Equations	[15L]
Learning Objective 1. To get the knowledge of the concepts from linear algebra and analysis in the study of system of first order equations.		
Learning Outcomes: At the end of this module the learner will be able to 1. Understand the importance of studying well-posedness of the problem namely existence, uniqueness and continuous dependence of first order differential equations through Picard's theorem		
3.1	Linear systems, Homogeneous Linear Systems with Constant Coefficients, Distinct real roots, Distinct complex roots, Equal real roots.	**[9L]**
3.2	The Existence and Uniqueness of Solutions: The Method of Solutions of Successive Approximations and Picard's Theorem.	**[6L]**
Module 4	**Numerical Methods**	**[15L]**
Learning Objective 1. To get the knowledge of the solution of ordinary differential equations by numerical methods.		
Learning Outcomes: At the end of this module the learner will be able to 1. Solve ordinary differential equations by numerical methods.		
4.1	Introduction, The Method of Euler, An Improvement to Euler, Higher Order Methods, Simpson's 1/3 rule, Simpson's 3/8 rule, Runge-Kutta method.	**[15L]**

References:

1. G. F. Simmons, Differential Equations with Applications and Historical Notes, 3/e, CRC Press, 2017.
2. Murray D. A., Introductory course in Differential Equations, Longmas, Green & Co., 1/e, 1897, Reprinted 1929, Revised: Khosla Publishing House, 2021.
3. W.T. Reid, Ordinary Differential Equations, 99/e, John Wiley & Sons, New York, 1971.
4. E.A. Coddington and N. Levinson, Theory of Ordinary Differential Equations, McGraw Hill Publishing Company, New York, 1955.
5. Shepley L. Ross, Differential Equations, 3/e, John Wiley & Sons, 2007.

Mapping of COs and PSOs

Course Learning Outcomes	Programme Outcomes							
	1	2	3	4	5	6	7	8
At the end of this course, Students will be able to Find the general solution of the first order linear homogeneous equations	X	X	X			X	X	X
Understand the utility of the theory of power series which is studied in Real Analysis course through solving various second order differential equations.	X	X	X			X	X	X
Get introduced to the Hypergeometric functions which arises in connection with solutions of the second order ordinary differential equations with regular singular points.	X	X	X			X	X	
Solve the problems arises in Mathematical physics using properties of special functions.	X	X	X			X	X	X
Understand the importance of studying well-posedness of the problem namely existence, uniqueness and continuous dependence of first order differential equations through Picard's theorem.	X	X	X					
Solve ordinary differential equations by numerical methods.	X	X				X		

M.Sc. (Mathematics) Semester-II

COURSE NAME: LAB COURSE-V

COURSE CODE: MHMSC-S2PR5-2CR26 [CREDITS- 02]

Course Learning Outcome

After the successful completion of the Course, the learner will be able to:

1. Apply analytical methods to solve differential equations, including homogeneous equations, power series solutions, special functions (Legendre polynomials, Bessel functions, and Gauss hypergeometric equations), and systems of first-order linear equations.
2. Implement numerical and approximate techniques such as Picard's method, successive approximations, and numerical methods to obtain solutions of differential equations and analyze their accuracy.

PRACTICAL : MHMSC-S2PR5-2CR26 (Lab Course - V)

Practical-1 Examples based on the general solution of the homogeneous equation.

Practical-2 Examples based on power series solution.

Practical-3 Examples based on Gauss's hypergeometric equation.

Practical-4 Examples based on Legendre Polynomials and Bessel function.

Practical-5 Examples based on Linear Systems of First Order Equations.

Practical-6 Examples based on The Method of Solutions of Successive Approximations and Picard's method.

Practical-7 Examples: Numerical Methods-1.

Practical-8 Examples: Numerical Methods-2.

Core Course- VI (CC-VI)

COURSE NAME: ANALYTIC NUMBER THEORY

COURSE CODE: MHMSC-S2P6-4CR26 [CREDITS – 04]

Course learning outcome		
At the end of this course, Students will be able to 1. Know about Arithmetic functions, Dirichlet multiplication and elementary theorems on Prime numbers. 2. Learn about Chebyshev's functions, divisor functions $d(n)$, Mangöldt function, Abel's identity 3. Analyze the number theoretic problems		
Module 1	**Arithmetical functions and Dirichlet multiplication**	**[15L]**
Learning Objective 1. To learn about various functions in Number theory.		
Learning Outcomes: At the end of this module the learner will be able to 1. Understand the Möbius function, Mangöldt function and its properties.		
1.1	Basic introduction of the Möbius function $\mu(n)$ and the Euler totient function $\phi(n)$, relation connecting μ and ϕ, the Dirichlet product of two arithmetical functions (a.f.) and group structure w.r.t. this product, the Mangöldt function $\Lambda(n)$, Multiplicative arithmetical functions, the inverse of a completely multiplicative arithmetical functions.	**[15L]**
Module 2	**Dirichlet multiplication and averages of Arithmetical functions**	**[15L]**
Learning Objective 1. To gain the knowledge of Arithmetic functions.		
Learning Outcomes: At the end of this module the learner will be able to 1. Understand Arithmetic functions, Dirichlet multiplication and elementary theorems on Prime numbers		
2.1	Liouville's function $\lambda(n)$, the divisor functions $d(n)$and $\sigma\alpha(n)$, the generalized convolutions, the big oh notation, Euler's summation formula, some elementary asymptotic formulas, the average order of divisor functions $d(n)$and $\sigma\alpha(n)$, the average order of functions $\phi(n)$, $\mu(n)$, $\Lambda(n)$.	**[15L]**
Module 3	**Averages of Arithmetical Functions and Chebyshev's functions**	**[15L]**
Learning Objective 1. To make students aware about various types of the functions in number theory.		
Learning Outcomes: At the end of this module the learner will be able to 1. Understand lattice points and functions and relation between two functions in number theory.		
3.1	Euler's summation formula, Distribution of lattice points visible from the origin, the partial sums of a Dirichlet product, applications to $\mu(n)$ and $\Lambda(n)$, Chebyshev's functions $\psi(x)$ and $\vartheta(x)$, relation between $\psi(x)$, $\pi(x)$and $\vartheta(x)$, Abel's identity.	**[15L]**

Module 4	Elementary theorems on the distribution of prime numbers	[15L]
Learning Objective 1. To learn about elementary theorems on distributions of prime numbers.		
Learning Outcomes: At the end of this module the learner will be able to 1. Understand prime number theorems and partial sums of the functions.		
4.1	Some equivalent forms of prime number theorem, lower and upper bounds for $\pi(n)$ and pn, Shapiro's Tauberian theorem and its applications, an asymptotic formula for the partial sums $\sum_{p\leq x}(1/p)$, the partial sums of function $\mu(n)$.	**[15L]**

References:

1. Tom M. Apostol: Introduction to Analytic Number Theory, Narosa Pub. House, New Delhi, 1998.
2. Mc Carthy P. J.: Introduction to Arithmetical function, Springer-Verlag, New York, 1986.
3. K. Chandrashekharan: Introduction to Analytic Number Theory, Springer-Verlag, New York, 1968.
4. Hua L. K.: Introduction to Number Theory, Springer-Verlag, New York, 1982.

Mapping of COs and PSOs

Course Learning Outcomes	Programme Outcomes							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Know about Arithmetic functions, Dirichlet multiplication and elementary theorems on Prime numbers.	**X**	**X**	**X**				**X**	
Learn about Chebyshev's functions, divisor functions $d(n)$, Mangöldt function, Abel's identity	**X**	**X**	**X**		**X**		**X**	
Analyse the number theoretic problems	**X**	**X**	**X**		**X**	**X**	**X**	

M.Sc. (Mathematics) Semester-II

COURSE NAME: LAB COURSE-VI

COURSE CODE: MHMSC-S2PR6-2CR26 [CREDITS- 02]

Course Learning Outcome
After the successful completion of the Course, the learner will be able to: 1. Develop the ability to analyse and apply arithmetic functions, Dirichlet convolution, and average order concepts, along with understanding lattice point distribution and fundamental results in prime number theory. 2. Apply advanced analytic techniques including Chebyshev functions, Prime Number Theorem, Abel's identity, and Tauberian theorems to solve number-theoretic problems.

PRACTICAL : MHMSC-S2PR6-2CR26 (Lab Course - VI)	
Practical-1	Exercise on Möbius function (n), Euler totient function (n).
Practical-2	Exercise on Mangöldt function $\Lambda(n)$, Multiplicative a.f..
Practical-3	Exercise on Liouville's function (n), the divisor functions $(n)$and $\sigma\alpha(n)$.
Practical-4	Exercise on the average order of divisor functions $(n)$and $\sigma\alpha(n)$, the average order of functions $\phi(n)$, $\mu(n)$, $\Lambda(n)$.
Practical-5	Examples on Distribution of lattice points visible from the origin, the partial sums of a Dirichlet product.
Practical-6	Examples on Chebyshev's functions (x) and (x), relation between $\psi(x)$, $\pi(x)$and $\vartheta(x)$, Abel's identity.
Practical-7	Examples based on Equivalent forms of prime number theorem, lower and upper bounds for (n) and pn.
Practical-8	Examples on Shapiro's Tauberian theorem.

Vocational Course

COURSE NAME: Applications of Python in Mathematics

COURSE CODE: MHMSC-S2VC1-2CR26 [CREDITS – 02]

Course learning outcome		
At the end of this course, Students will be able to 1. Apply file handling and exception handling techniques in Python for efficient data processing. 2. Perform basic and advanced mathematical computations using Python libraries such as NumPy and SymPy. 3. Analyze algebraic expressions, sequences, and functions including roots, inequalities, and maxima/minima using computational tools. 4. Apply calculus concepts such as limits, derivatives, integrals, and differential equations using Python. 5. Perform vector and matrix operations including solving systems of linear equations and finding eigenvalues and eigenvectors. 6. Analyze and visualize data using statistical measures and graphical representations.		
Module 1	**Applications of Python in Computational Algebra**	**[15L]**
Learning Objective 1. To understand file handling and exception handling in Python, including working with text/binary files and error management. 2. Learn to perform basic and advanced mathematical operations using Python libraries such as math, random, SymPy, and NumPy.		
Learning Outcomes: At the end of this module the learner will be able to 1. Apply file handling techniques and implement exception handling for robust Python programs. 2. Solve mathematical problems such as equations, matrices, polynomials, sequences, and inequalities using Python tools.		
1.1	File Handling, Exception Handling: Opening, reading, and writing text and binary files, File modes and file objects, Exception handling using try, except, else, and finally, handling specific exceptions.	**[6L]**
1.2	Basic mathematical operations using Python, working with math libraries (e.g., math, random), Solving for x; Expanding terms; Creating and accessing Matrices using Sympy and Numpy; Prime factorization; Solving inequalities; Summation and Products; Algebra of polynomials; Finding roots of polynomials; Complex numbers; Logarithm properties; Arithmetic sequences; Geometric sequences; Maxima and minima of functions; Even and odd functions.	**[9L]**
Module 2	**Applications of Python in Calculus, Trigonometry, Linear Algebra and Statistics**	**[15L]**
Learning Objective 1. To understand plotting techniques and trigonometric functions, including angle conversions and graphical visualization. 2. To learn calculus concepts such as limits, derivatives, integrals, and differential equations		

using computational tools. 3. To study vector and matrix operations along with basic statistical measures and data visualization.		
Learning Outcomes: At the end of this module the learner will be able to 1. Apply plotting and computational tools to visualize trigonometric functions and mathematical concepts. 2. Solve problems involving calculus, differential equations, vectors, and matrices using appropriate methods. 3. Analyze data using statistical measures and graphical representation techniques.		
2.1	Plotting random phase angles; converting angles and radians; plotting curves of trigonometric functions; Calculus – computing limits of a function, derivatives of functions, plotting tangent lines, finding critical points; partial derivatives; Indefinite integrals; definite integrals; the area between curves; First-order and second-order ordinary differential equations.	**[8L]**
2.2	Row and column vectors; algebra of vectors – dot product, adding, scalar multiplication; Matrix multiplication; Matrix inverse; solving system of linear equations; Eigenvalues and Eigenvectors. Graphical presentation of data; Measure of central tendency – Mean, Median and Mode, Variance, and standard deviation.	**[7L]**

References:

1. Timothy A Budd, "Exploring Python", Tata McGraw Hill, New Delhi. Michel Dawson, "Python Programming for Absolute Beginners", Third Edition, Course Technology Cengage Learning Publications, 2013.
2. Allen B. Downey, Think Python: How to Think Like a Computer Scientist, second edition, O'Reilly Media, Inc, 2015.
3. Bill Lubanovic, Introducing Python, O'Reilly Media, Inc. 2nd Edition, November 2019.
4. Amit Saha, Doing Math with Python Use Programming to Explore Algebra, Statistics, Calculus, and More, No Starch Press, 2015.
5. Robert Johansson, Numerical Python: Scientific Computing and Data Science Applications with NumPy, SciPy, and matplotlib, Apress,2018.
6. David A. Ham, Object-oriented Programming in Python for Mathematicians Paperback, 2023.
7. H. P. Langtangen, A Primer on Scientific Programming with Python, 2/e., Springer, 2016.
8. E Balagurusamy, Introduction to Computing & Problem-Solving using Python, 1st ed., McGraw Hill Education (India) Private Limited, New Delhi.

Mapping of COs and PSOs

Course Learning Outcomes	Programme Outcomes							
	1	2	3	4	5	6	7	8
Apply file handling and exception handling techniques in Python for efficient data processing.	X	X	X			X	X	X
Perform basic and advanced mathematical computations using Python libraries such as NumPy and SymPy.	X	X	X	X	X	X		
Analyze algebraic expressions, sequences, and functions including roots, inequalities, and maxima/minima using computational tools.	X	X	X	X		X		
Apply calculus concepts such as limits, derivatives, integrals, and differential equations using Python.	X	X	X	X		X		
Perform vector and matrix operations including solving systems of linear equations and finding eigenvalues and eigenvectors.	X	X	X	X	X	X	X	
Analyze and visualize data using statistical measures and graphical representations.	X	X	X	X	X	X	X	X

M.Sc. (Mathematics) Semester-II

COURSE NAME: LAB COURSE- VII

COURSE CODE: MHMSC-S2VCPR1-2CR26 [CREDITS- 02]

Course Learning Outcome
After the successful completion of the Course, the learner will be able to: 1. Develop the ability to implement Python programs for mathematical computations, including calculus, algebra, and statistics using libraries such as NumPy, SciPy, SymPy, and Matplotlib. 2. Apply programming concepts to solve problems involving file handling, exception handling, numerical methods, and data visualization. 3. Analyse and model real-world problems such as population growth, differential equations, and matrix operations using computational techniques.

Practical Vocational Paper: MHMSC-S2VCPR1-2CR26 (Lab Course - VII)	
1	Program to open a text file, write some data into it, and then read and display the contents of the file.
2	Program to demonstrate exception handling using try, except, else, and finally blocks for division of two numbers.
3	Program to compute the derivative of a given function using symbolic mathematics with SymPy.
4	Program to calculate the definite integral of a function using numerical integration methods from SciPy.
5	Program of Taylor series to approximate transcendental functions like sine, cosine, exponential and logarithm.
6	Program to perform operations on complex numbers and find modulus of a complex number.
7	Program to plot a sine wave and cosine wave using Matplotlib.
8	Program to find the area between two curves.
9	Program to calculate the roots of a quadratic equation using the math library.
10	Program to evaluate indefinite integrals of a function.
11	Program to perform vector operations such as dot product and vector addition.
12	Program to solve a first-order differential equation using Python.
13	Program for Model population growth using the logistic equation.
14	Program for matrix transposition, determinant calculation, and matrix inversion.
15	Program to compute eigenvalues and eigenvectors of a matrix.
16	Program to calculate mean, median, and standard deviation of a given dataset.