PEOs for the Institution-UG

PEO1. The graduates will apply appropriate theory and scientific knowledge to participate in activities that support humanity and economic development nationally and globally, developing as leaders in their fields of expertise.

PEO2. The graduates pursue lifelong learning and continuous improvement of the knowledge and skills with the highest professional and ethical standards.

PEOs for the UG Departments

Mathematics:

PEO3:The graduates will demonstrate the ability to utilize effectively the variety of teaching techniques and class room strategies and develop confidence to appear for competitive examinations and occupy higher levels of academic and administrative fields.

B.Sc. Mathematics (PO)

PO No.	Upon completion of the B.Sc. Degree Programme, the graduateswill be able to:
PO - 1	equip students with hands on training through various courses to enhance entrepreneurshipskills.
PO - 2	impart communicative skills and ethical values.
PO - 3	face challenging competitive examinations that offer rewarding careers in science and education.
PO - 4	apply the acquired scientific knowledge to face day to day needs and reflect upon green initiatives to build a sustainable environment.

B.Sc. Mathematics (PSO)

PSO No.	Upon completion of the B.Sc. Degree Programme, the graduateswill be able to:	PO addressed
PSO - 1	acquire a strong foundation in various branches of mathematics to formulate real life problems into mathematical models	PO 4
PSO - 2	apply the mathematical knowledge and skills to develop problem solvingskills cultivating logical thinking and face competitive examinations with confidence.	PO 3, 4
PSO - 3	develop entrepreneurial skills based on ethical values, become empowered and self dependent in society.	PO 1,2
PSO - 4	enhance numerical ability and address problems in interdisciplinary areas which would help in project and field works.	PO 1
PSO - 5	pursue scientific research and develop new findings with global impact using latest technologies.	PO 4

Semester : I **Major Core I**
Name of the Course : **Differential Calculus and Trigonometry**
Subject code : **MC2011**

No. of hours per week	Credits	Total No. of hours	Marks
6	5	90	100

Objectives:
1. To impart knowledge on applications of Differential Calculus and important concepts of Trigonometry.
2. To enhance problem solving skills.

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO - 1	Recall the idea of derivative, rules of differentiation and understand the concept of p-r equation.	PSO - 1	R
CO - 2	Learn the concepts of curvature, circle of curvature, evolute and apply the concepts to solve problems.	PSO - 2	U, Ap
CO - 3	Recognize the rules of identifying asymptotes and employ the same to different curves.	PSO - 3	Ap, U
CO - 4	Acquire the knowledge about hyperbolic functions and compare it with circular functions, trigonometric functions, inverse trigonometric functions and their properties.	PSO - 1	U, E
CO - 5	Categorize the methods of finding the sum of trigonometric series.	PSO - 8	An

Total contact hours: 90 (Including lectures, assignments and tests)

Unit	Section	Topics	Lecture hours	Learning outcomes	Pedagogy	Assessment/ evaluation
I	**Curvature**					
	1.	Introduction and definition of pedal equation	2	Recall the idea of derivative, rules of differentiation and understand the concept of p-r equation	Lecture	Test
	2.	Problems related to p-r equations	6	Apply the concept of p-r equation in problems	Lecture with illustrations	Group Discussion
	3.	Introduction, definition and theorems based on of curvature	3	To understand the definition of curvature and learn the theorems	Lecture	Test
	4.	Radius of curvature in different forms	2	To understand the definitions of closed sets and limit points with examples and theorems	Lecture	Test
	5.	Problems related to Radius of curvature	2	To identify Hausdorff spaces and practice various theorems	Lecture with illustrations	Group discussion
II	**Centre of curvature, Evolute**					

	1.	Definition and problems based on centre of curvature of the curve	5	To understand the definition of centre of curvature of the curve	Lecture	Test
	2.	Definition and problems related to evolute of the curve	5	To understand the definition of evolute of the curve and practice problems	Lecture	Q&A
	3.	Definition and problems on circle of curvature	5	To practice various problems related to circle of curvature	Lecture	Formative Assessment Test
III	**Asymptotes**					
	1.	Definition and methods of finding asymptotes for the curve y=f(x) and f(x,y)=0	3	To understand the methods of finding asymptotes	Lecture	Quiz
	2.	Working rule to find the inclined asymptotes	2	Recognize the rules of identifying asymptotes	Lecture with illustration	Test
	3.	Problems on linear asymptotes and intersection of curves	5	To apply the rules to different curves	Lecture with group discussion	Brain stoming
	4.	Problems based on inclined asymptotes	5	To apply the rules to different curves	Lecture	Assignment
IV	**Hyperbolic functions, Logarithm of Complex numbers**					
	1.	Introduction and definition of Hyperbolic functions	2	Acquire the knowledge about hyperbolic functions	Lecture with illustration	Quiz
	2.	Problems based on hyperbolic functions	4	To compare with circular functions,	Lecture	Q&A
	3.	Definitions and Problems based on inverse hyperbolic functions	4	Acquire the knowledge about inverse hyperbolic functions	Lecture	Slip Test
	4.	Separate into real and imaginary parts of hyperbolic and inverse hyperbolic functions	5	To distinguish various hyperbolic functions, trigonometric functions , inverse trigonometric functions	Lecture	Formative Assessment Test
V	**Summation of Trigonometric Series**					
	1.	Introduction and Illustrations based on method of difference	4	To analyze the methods of finding the sum of trigonometric series	Lecture with illustration	Quiz
	2.	Theorem and problems on sum of	7	To categorize problems on sum of sines and	Lecture	Test

		sines and cosines of n angles in A.P		cosines of n angles in A.P		
	3.	Introduction of C+iS method	1	To know C+iS method	Lecture	Slip Test
	4.	Problems related to C+iS method	3	To apply C+iS method to find the sum of trigonometric series	Lecture	Assignment

Course Instructor: Dr.K.Jeya Daisy **HoD: Dr. V. M. Arul Flower Mary**
Course Instructor: Ms. V. Princy Kala **HoD(SF): Mrs. J. Anne Mary Leema**

Semester : I **Allied I**
Name of the Course : Algebra and Calculus (for Physics and Chemistry)
Subject code : MA2011

No. of hours per week	Credits	Total No. of hours	Marks
6	5	90	100

Objectives:

1. To impart knowledge in concepts related to Algebra.

2. To solve problems in Physical Science.

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO - 1	Recall the fundamentals of algebraic equations, matrices and rules of integration	PSO - 1	R
CO - 2	Practice the formation of equations and compute symmetric functions of roots in terms of coefficients	PSO - 2	Ap
CO - 3	Revise the properties of eigen values of the matrices	PSO - 3	E
CO - 4	Learn Beta, Gamma functions and evaluate integrals using them	PSO - 4	E, U
CO - 5	Practice the expansion of Fourier series and utilize the same for higher studies	PSO - 5	Ap

Total contact hours: 90 (Including lectures, assignments and tests)

Unit	Section	Topics	Lecture hours	Learning outcome	Pedagogy	Assessment/ Evaluation
I	**Theory of equations**					
	1.	Basic definition about Polynomial and its roots. Fundamental Theorem of Algebra and related theorems without proof	3	To recall the fundamentals of algebraic equations, matrices and rules of integration	Lecture	Short Test
	2.	Formation of equations of lowest degree with	3	Practice the formation of	Lecture and group	Test

		rational coefficients and solving equations when one root and two roots given.		equations and to solve equations when one root and two roots given.	discussion	
	3.	Formation of equation of the lowest degree with rational coefficients whose roots are given	3	Practice the formation of equations and compute symmetric functions of roots in terms of coefficients whose roots are given	Lecture	Test
	4.	Proving that the given equation has no imaginary roots and Relation between roots and coefficients	2	To Prove that the given equation has no imaginary roots and understand the relation between roots and coefficients	Lecture	Test
	5.	Solving equations if their roots are in G.P, A.P	2	To Solve equations if their roots are in G.P, A.P.	Lecture	Test
	6.	Solving equations and finding equal roots two pairs of equal roots, roots which are in some ratio.	2	To Solve equations and finding equal roots, two pairs of equal roots, roots which are in some ratio.	Lecture	Test
II	**Transformation of equations**					
	1	Formation of equation whose roots are k times the roots of f(x) = 0.	3	To understand the transformation of equations and formation of equation whose roots are k times the roots of f(x) = 0.	Lecture and discussion	Test
	2	Form the equation whose roots are negative of the roots of the given equation and whose roots are diminished by h	3	To identify the equation whose roots are negative of the roots of the given equation and whose roots are diminished by h	Lecture	Formative Assessment
	3	Solve the equation whose roots are equal in magnitude but opposite in sign to the roots of f(x) =0 and to increase the roots of f(x) = 0 by h	3	To identify the equation whose roots are equal in magnitude but opposite in sign to the roots of f(x) =0 and to increase the roots of f(x) = 0 by h	Lecture	Test

	4	Solving the given equation and find the real root using Newton's method.	3	To calculate the given equation and find the real root using Newton's method.	Lecture	Test
	5	Finding positive and negative roots of the equation using Newton's method.	3	To identify positive and negative roots of the equation using Newton's method.	Lecture and discussion	Test
III	**Matrices**					
	1	Basic concepts of matrix addition, matrix multiplication and rank of a matrix and definitions	3	To understand the basic concepts in matrices	Lecture	Test
	2	Test the consistency of the system of given homogenous equations and solving if it is consistent.	2	To solve homogenous equations if it is consistent.	Lecture and discussion	Test
	3	Cayley Hamilton theorem and Solving problems based on Cayley Hamilton theorem	2	To understand Cayley Hamilton theorem solve problems based on it	Lecture	Test
	4	Defining matrix polynomial, Characteristic matrix, Characteristic polynomial and Characteristic equation	2	To identify Characteristic matrix, Characteristic polynomial and Characteristic equation	Lecture	Test
	5	Evaluating the sum and product of the eigen values of the matrix without actually finding the eigen values.	2	To evaluate the sum and product of the eigen values of the matrix without actually finding the eigen values	Lecture	Test
	6	Evaluating Characteristic roots, eigen values and eigen vectors of the matrix.	2	To evaluate Characteristic roots, eigen values and eigen vectors of the matrix.	Lecture	Test
	7	Evaluating the sum and product of the eigen values of the matrix without finding the roots of the characteristic equation.	1	To evaluate Characteristic roots, eigen values and eigen vectors of the matrix.	Lecture	Formative Assessment
	8	Evaluating the	1	To evaluate	Lecture	Test

		characteristic vectors corresponding to each characteristic root of the given matrix.		Characteristic roots, eigen values and eigen vectors of the matrix.		
IV	**Beta and Gamma functions**					
	1	Introduction to Beta, Gamma functions, its properties	4	To learn Beta, Gamma functions and its properties.	Lecture and discussion	Test
	2	Evaluation of integrals using Beta Functions	2	To evaluate integrals using Beta Functions	Lecture	Test
	3	Proving duplication formula.	3	To prove duplication formula.	Lecture	Test
	4	Problems based on Beta and Gamma functions.	3	To solve problems based on Beta and Gamma functions.	Lecture	Test
	5	Proving some results on Beta and Gamma functions.	3	To prove some results on Beta and Gamma functions.	Lecture	Test
V	**Fourier Series Expansion**					
	1	Fourier Series Expansion and Fourier coefficients	2	To understand Fourier Series Expansion and Fourier coefficients	Lecture	Test
	2	Explanation of Sine Series and Cosine Series and results based on them	2	To identify Sine Series and Cosine Series and results based on them	Lecture	Test
	3	Evaluate the Fourier Sine series and Fourier Cosine series for the given function.	3	To evaluate the Fourier Sine series and Fourier Cosine series for the given function.	Lecture	Test
	4	Evaluate the Half range Fourier Sine Series and Fourier Cosine Series for the given function.	3	To evaluate the Half range Fourier Sine Series and Fourier Cosine Series for the given function.	Lecture	Test
	5	Evaluate the Fourier series for the given function and deduce certain results.	3	To evaluate the Fourier series for the given function and deduce certain results.	Lecture	Test
	6	Evaluate the Fourier series for the given function in the intervals $(-\pi,\pi)$ and $(0,\pi)$	2	To evaluate the Fourier series for the given function in the intervals $(-\pi,\pi)$ and $(0,\pi)$	Lecture	Formative Assessment

Course Instructor: Dr.K.Jeya Daisy& Dr. Jancy Vini **HoD: Dr. V. M. Arul Flower Mary**
HoD(SF): Mrs. J. Anne Mary Leema

Semester : I
Name of the Course : Quantitative Aptitude – I(NME)
Course Code : MNM201

No. of hours per week	Credits	Total No. of hours	Marks
4	2	60	100

Objectives: 1. To develop the quantitative aptitude of the students.
2.To solve problems required for various competitive examinations.

CO	Upon completion of this course the students will be able to :	PSO addressed	CL
CO - 1	apply BODMAS rule for simplification and determine missing numbers in a sequence	PSO - 1	R
CO - 2	express numbers in the base of a fraction of 100.	PSO - 2	U
CO - 3	employ the problems related to the division of profit and loss of a business.	PSO - 4	Ap
CO - 4	measure the relative magnitude of two quantities in an effective way.	PSO - 2	C
CO - 5	construct and develop mathematical solutions to simple real life problems.	PSO - 1	Ap
CO - 6	learn ratio and proportion and practice duplication and triplication of ratios	PSO - 4	U, Ap

Unit I

Simplification - BODMAS rule - Modulus of a real number - Virnaculum - Some real life problems, Missing numbers in the expression.

Unit II

Percentage - Concepts of Percentage – Results on Population - Results on Depreciation.

Unit III

Profit and Loss – Cost price – Selling Price – Profit or Gain – Loss – gain percentage - loss percentage.

Unit IV

Ratio and proportion – Fourth, third and mean proportionals – comparison of ratios, compound ratio – duplicate and subduplicate ratio- triplicate and subtriplicate ratio – variation.

Unit V

Partnership – Ratio of Division of Gains - Working and Sleeping partners – Chain Rule - Direct proportion – Indirect proportion.

Total contact hours: 60 (Including lectures, assignments and tests)

Unit	Section	Topics	Lecture hours	Learning outcomes	Pedagogy	Assessment/ valuation
I	**BODMAS rule**					

	1.	Simplification of numbers, BODMAS rule, Examples based on BODMAS rule	2	To apply BODMAS rule for simplification	Lecture through googlemeet	Online Quiz
	2.	Modulus of a real number, Examples related to Modulus of a real number	2	To solve problems based on modulus of a real number	Lecture through googlemeet	Online test
	3.	Virnaculam (Bar), Illustrations based on Virnaculam, Missing numbers in the given expression	2	To learn about Virnaculam and to determine missing numbers in a sequence	Lecture through googlemeet	Online Assignment
II	**Percentage**					
	1.	Concepts of Percentage	2	To understand the basic concepts of percentage	Lecture through googlemeet	Online Assignment
	2.	Results on Population	2	To acquire detailed knowledge on results on population	Lecture through googlemeet	Online test
	3.	Results on Depreciation.	2	To solve the problems on depreciation.	Lecture through googlemeet	Formative Assessment online Test
III	**Profit and Loss**					
	1.	Cost price and Selling Price	2	To understand the concepts of cost price and selling price	Lecture through googlemeet	Online Quiz
	2.	Profit or Loss	2	To solve problems on profit or loss	Lecture through googlemeet	Online test
	3.	Gain percentage - loss percentage.	2	To learn techniques to solve problems involving gain percentage	Lecture through googlemeet	Online Assignment
IV	**Ratio and proportion**					
	1.	Fourth, third and mean proportionals	2	To understand about Fourth, third and mean proportionals	Lecture through googlemeet	Online Quiz and group discussion
	2.	comparison of ratios, compound ratio , duplicate and	2	To solve problems on ratios and compare them	Lecture through googlemeet	Online test

		subduplicate ratio				
	3.	triplicate and subtriplicate ratio	2	To learn about triplicate and subtriplicate ratio	Lecture through googlemeet	Online Assignment
V	**Partnership**					
	1.	Ratio of Division of Gains	2	To understand the basic concepts of partnersip	Lecture through googlemeet	Online Assignment
	2.	Working and Sleeping partners	2	To acquire skills to solve problems involving Working and Sleeping partners	Lecture through googlemeet	Online test
	3.	Chain Rule	2	To study about chain rule and to solve the problems related to chain rule	Lecture through googlemeet	Formative Assessment online Test

Course Instructor: Ms.T.Sheeba Helen **HoD: Dr. V. M. Arul Flower Mary**
Course Instructor: Dr.J.C.Evelin **HoD(SF): Mrs. J. Anne Mary Leema**

Semester : II Major Core II
Name of the Course : Classical Algebra and Integral Calculus
Course Code : MC2021

No. of hours per week	Credits	Total No. of hours	Marks
6	5	90	100

Objectives:
1. To give a sound knowledge in Classical Algebra.
2. To solve problems in applications of Integral Calculus.

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO - 1	recall the fundamentals of algebraic equations and rules of integration.	PSO - 1	R
CO - 2	apply fundamental theorem of algebra in framing and solving equations	PSO - 5	U
CO - 3	choose appropriate method for transformation of equations	PSO - 2	Ap
CO - 4	develop the skill of evaluation of double and triple integrals over different regions	PSO - 3	Ap
CO - 5	identify Beta, Gamma functions and utilize them for the evaluation of definite integrals	PSO - 5	Ap,E
CO - 6	develop the Fourier Series expansion in any interval and apply the same for solving technical and physical problems	PSO - 4	Ap, An

Total contact hours: 90 (Including lectures, assignments and tests)

Unit	Section	Topics	Lecture hours	Learning outcomes	Pedagogy	Assessment/ evaluation
I	**Theory of equations**					
	1	Preliminaries about equations and reminder theorem Fundamental theorem of Algebra Problems based on reminder theorem Problems based on Fundamental theorem of Algebra	4	Explain the primary concepts of Fundamental theorem of Algebra Problems based on reminder theorem	Lecture with Illustration	Evaluation through appreciative inquiry
	2	In an equation with real coefficients, imaginary roots occur in pairs In an equation with rational coefficients,	3	To distinguish between imaginary roots occur in pairs and irrational roots occur in pairs	Lecture	Evaluation through quizzes and discussions.

		irrational roots occur in pairs Relations between roots and coefficients of equations				
	3	Forming the equation whose roots are functions of roots of the given equation Forming the equation whose roots are in A.P Forming the equation whose roots are in G.P. Forming the equation whose roots are in H.P	4	To understand theFormation of the equation whose roots are in A.P,GP,HP	Lecture with Illustration	Slip Test
	4	Symmetric functions of the roots Sum of r^{th} powers of the roots Newton's theorem on the sum of the powers of the roots. Problems based on Newton's theorem	4	To understandNewton's theorem on the sum of the powers of the roots	Discussion with Illustration	Quiz and Test
II	**Transformation of Equations**					
	1	Transform an equation into another whose roots are the roots of the given equation with signs changed Transform an equation into another whose roots are m times the roots of the given equation Reciprocal equations Standard form of reciprocal equations	4	To identify the Reciprocal equations Standard form of reciprocal equations	Lecture with Eamples	Evaluation through discussions.
	2	Any reciprocal equation can be reduced to a Standard reciprocal equation Solving different types of reciprocal equations Increasing or	4	To solve different types of reciprocal equations	Lecture	Evaluation through appreciative inquiry

		decreasing the roots of a given equation by a given quantity				
	3	Removal of terms Descarte's rule of signs Descarte's rule of signs for negative roots Problems related to Descarte's rule of signs	4	To calculate problems related to Descarte's rule of signs	Lecturewith Illustration	Formative Assessment Test
	4	Rolle's theorem. Problems related to Rolle's theorem.	3	To calculate problems related toRolle's theorem	Group Discussion	Slip Test
III	**Double integrals**					
	1	Introduction about integration and Double integrals Evaluation of double integrals with constant limits in cartesian co-ordinates Evaluation of double integrals with constant limits in polar co-ordinates	3	Explain the primary concepts of Double integrals	Lecture with Illustration	Evaluation through discussions.
	2	Evaluation of double integrals with variable limits in cartesian co-ordinates Evaluation of double integrals with variable limits in polar co-ordinates Evaluation of double integrals over a specified region bounded by straight lines	4	Calculate the integrals over a specified region bounded by straight lines	Lecture with Illustration	Evaluation through appreciative inquiry
	3	Evaluation of double integrals over a specified region bounded by different curves Working rule for changing the order of integration Problems on changing	4	To apply the double integrals over a specified region bounded by different curves	Lecture	Formative Assessment Test

		the order of integration				
	4	Introduction about triple integrals Evaluation of double integrals with constant limits Evaluation of double integrals with variable limits	4	Evaluate the double integrals and triple integrals	Lecture and group discussion	Slip Test
IV	**Beta and Gamma functions**					
	1	Definition and existence of Beta and Gamma functions Properties of Gamma function Properties of Beta function Relation between Beta and Gamma functions	4	Explain the primary concepts of Beta and Gamma functions	Lecture with Illustration	Evaluation through discussions.
	2	Computation of Beta and Gamma functions Evaluation of integrals using properties of Gamma function Equivalent definitions of Beta function	4	To understand the theorems and problems based on Beta and Gamma functions	Lecture and group discussion	Evaluation through Assignment
	3	Evaluation of integrals using properties of Beta function Finding the value of standard definite integrals in terms of Beta and Gamma functions	4	To know aboutproperties of Beta function	Lecture with Illustration	Formative Assessment Test
	4	Duplication formula Deductions using Duplication formula	2	To understand Duplication formula	Lecture with Illustration	Slip Test
V	**Fourier series**					
	1	Definition and basic properties of odd and even functions Introduction of Fourier series expansion Computation of Fourier coefficients	4	Explain the basic properties of odd and even functions	Lecture	Evaluation through discussions.
	2	Development of	4	To understand Fourier	Lecture	Formative

		Fourier series over an interval of length 2π Deduction of sum of series from Fourier series expansion Introduction of half range Fourier series expansion		series expansion and half range Fourier series expansion	with Illustration	Assessment test
	3	Development of half range sine series over an interval of length π Development of half range cosine series over an interval of length π Deduction of sum of series from half range Fourier series expansion	3	To calculate Problems based on half range sine,cosine series over an interval of length π	Lecture with Illustration	Slip Test
	4	Development of Fourier series over an arbitrary interval Development of half range sine series over an arbitrary interval Development of half range cosine series over an arbitrary interval	4	To differentiatehalf range sine series over an arbitrary interval And half range cosine series over an arbitrary interval	Lecture with Illustration	Home Assignment

Course Instructor: Dr.L.Jesmalar **HoD:Dr. V. M. Arul Flower Mary**

Course Instructor: Ms. V. Princy Kala **HoD(SF): Mrs. J. Anne Mary Leema**

& Ms. V.G. Michael Florance

Semester : II **Allied II**
Name of the Course: Vector Calculus and Differential Equations(for Physics and Chemistry)
Subject code :MA2021

No. of hours per week	Credits	Total No. of hours	Marks
6	5	90	100

Objectives:
1. To introduce the concept of vector operators.
2. To impart the mathematical knowledge essential for solving problems in Physical Science.

CO	Upon completion of this course the students will be able to :	PSO addressed	CL
CO - 1	explain the physical meaning and properties of curl and divergence	PSO - 1	U
CO - 2	practice the computation of line integrals, surface integrals	PSO - 2	Ap
CO - 3	use computational tools to solve problems and applications of partial differential equations of first order.	PSO - 2	Ap
CO - 4	find the complementary function and particular integral of a differential equation by using appropriate methods.	PSO - 5	U
CO - 5	use Laplace transform and their inverse to solve differential equations.	PSO - 3	Ap

Total contact hours: 90 (Including lectures, assignments and tests)

Unit	Section	Topics	Lecture hours	Learning outcomes	Pedagogy	Assessment/ evaluation
I	**Vector Differentiation**					
	1	Revision of dot and cross product of vectors, Definition and theorems on differentiation of Vectors	4	To recall the operations on vectors and understand its functions	Lecture with Illustration	Brainstorming
	2	Gradient of a scalar function and its properties, Problems based on Gradient	3	To study gradient in detail and apply its properties to solve problems	Lecture. Group discussion	Appreciative inquiry
	3	Equation of tangent plane and normal line for a single surface, Equation of	4	To understand the tangent plane and normal line and its various functions	Lecture, Small groups	Test

		tangent line and normal plane for the intersection of two surfaces, Angle between two surfaces				
	4	Divergence of vectors and its properties, Curl of vectors and its properties, Solenoidal and irrotational vectors	4	To study in detail divergence, curl, solenoidal and irrotational vectors	Lecture, Jigsaw	Quiz
II	**Vector Integration**					
	1	Definition of line integrals and work done by a force, Parametric equation of curves	3	To practice the computation of line integrals	Lecture, problem	Slip test
	2	Evaluation of line integrals over curves in a plane, Evaluation of line integrals over curves in a surface	5	To evaluate line integrals over different surface	Inquiry based	Assignment
	3	Computation of work done by a force, Projection of a surface over a plane	3	To compute work done and understand projection	Lecture, inductive method	Formative Assessment Test
	4	Definition of surface integrals, Evaluation of surface integrals over a plane	4	To practice the computation of surface integrals	Group Discussion	Seminar
III	**Linear Differential equations**					
	1	Introduction of Linear Differential equations with constant coefficients, Formation of auxillary equation and finding the complementary function	4	To study the basics of linear differential equations and to find the complementary function by using an appropriate method	Lecture, Debate	Multiple choice questions

	2	Finding the particular integral for $e^{ax,}$ Finding the particular integral for cos ax, sin ax	4	To find the particular integral of a differential equation by using an appropriate method	Lecture with Illustration	Test
	3	Finding the particular integral for $e^{ax}f(x)$, Finding the particular integral for $x^nf(x)$	3	To find the particular integral of a differential equation by using an appropriate method	Lab	Slip test
	4	Introduction of homogeneous linear equations, Conversion of homogeneous linear equations into linear differential equations with constant coefficients	4	To study few methods to convert the homogeneous linear equations into differential equations	Group Discussion	Formative Assessment Test
IV	**Partial Differential equations**					
	1	Introduction of Partial differential equations, Formation of Partial differential equations by eliminating the unknown constants,	3	To understand the basics and the formation of partial differential equations	Lecture with Illustration	Quiz
	2	Formation of Partial differential equations by eliminating the arbitrary functions, Methods of solving Partial differential equations	3	To study the methods of formation and the solution of partial differential equations	Lecture and small groups	Test
	3	Standard form of Lagrange's equation, General solution of Lagrange's equation	3	To study about Lagrange's equation and the methods to find its solutions	Discussion	Test
	4	Solving Lagrange's equation by method	3	To use computational tool to solve problems	Lecture and	Brain storming

		of grouping		and applications of partial differential equation of first order	Discussion	
	5	Solving Lagrange's equation by method of multipliers	3	To use computational tool to solve problems and applications of partial differential equation of first order	Lecture with Illustration	Test
V	**Laplace Transform**					
	1	Definition of Laplace Transform, Properties of Laplace Transform	3	To know the basics and the properties of Laplace Transform	Lecture and Debate	Test
	2	Computation of Laplace Transform of standard functions, Problems on Laplace Transform	3	To solve problems on Laplace Transform	Lecture with Illustration	Formative Assessment test
	3	Definition of Inverse Laplace Transform, Properties of Inverse Laplace Transform	3	To know the basics and the properties of Inverse Laplace Transform	Lecture and Lab	Short test
	4	Computation of Inverse Laplace Transform of specific functions, Problems on Inverse Laplace Transform	3	To use the Inverse Laplace Transform to solve the differential equation	Lecture and small groups	Assignment
	5	Solving Linear Differential equations using Laplace Transform	3	To use Laplace transform to solve the differential equation	Lecture with Illustration	Quiz and Test

Course Instructor: Dr. K. Jeya Daisy **HoD:Dr. V. M. Arul Flower Mary**

HoD(SF): Mrs. J. Anne Mary Leema

Semester **II**
Name of the Course **: Quantitative Aptitude - II (NME)**
Course Code **: MNM202**

No. of hours per week	Credits	Total No. of hours	Marks
4	2	60	100

Objectives: 1.To develop the quantitative aptitude of the students
2.To solve problems needed for various competitive examinations.

Course Outcome

CO	Upon completion of this course the students will be ableto:	PSO addressed	CL
CO - 1	frame equations and solve problems involving ratios and fractions.	PSO - 2	Ap
CO - 2	calculate the area and compare the objects on the basis of their size and area.	PSO - 1	Ap
CO - 3	change the form of the number using logarithm and make tedious and confusing calculations simple.	PSO - 4	An
CO - 4	have sufficient knowledge about the basis of calculation.	PSO - 2	U, Ap
CO - 5	study the concept related to time, speed and distance.	PSO - 4	Ap

Total contact hours: 30 (Including lectures, assignments and tests)

Unit	Section	Topics	Lecture hours	Learning outcomes	Pedagogy	Assessment/ evaluation
I	**Problems on Numbers**					
	1.	Problems on Numbers	3	To understand the basic concepts of numbers	Lecture thro google meet	Online Test
	2.	Framing and solving equations involving unknown numbers	3	To frame and solve equations	Lecture thro google meet	Online quiz, Assignment
II	**Problems on Trains**					
	1.	Problems on Trains	2	To study basic concepts	Lecture thro google meet	Online Test, Assignment
	2.	Time taken by a train to cover	2	To solve problems on time taken by a train to	Lecture thro google meet	Online Quiz

		$l$metres, l + $b$metres		cover l metres, l + $b$metres		
	3.	Relation between a train and stationary/moving body	2	To solve problems related to train and stationary/moving body	Lecture thro google meet	Formative Assessment online Test
III	**Compound Interest**					
	1.	Compound Interest	3	To recall the formulae of Compound interest	Lecture thro google meet	Online Test, Assignment
	2.	Interest compounded annually, half yearly and quarterly, different rates for different years	3	To employ the problems related interest compounded annually, half yearly and quarterly, different rates for different years	Lecture thro google meet	Formative Assessment online Test
IV	**Logarithms**					
	1.	Logarithms	2	To study the rules of Logarithms	Lecture thro google meet	Online Test
	2.	Properties of Logarithms	2	To solve problems by applyingthepropertiesof logarithms	Lecture thro google meet	Online Assignment
	3.	Common Logarithms	2	To solve problems of Common Logarithms	Lecture thro google meet and Group discussion	Online Quiz
V	**Area**					
	1.	Area - Results on Triangles- Pythagoras theorem, median, centroid	3	To learn the formulae and results	Lecture thro google meet	Online Quiz, Test
	2.	Area of a triangle and rectangle	3	To find Area of the given field	Lecture thro google meet	Formative Assessment online Test

Course Instructor: Dr. M.R. Angel Jebitha, Ms.J.C.Mahizha **HoD: Dr. V. M. Arul Flower Mary**
Course Instructor: Dr.C.Jenila **HoD(SF): Mrs. J. Anne Mary Leema**

Semester : III Major Core III
Name of the course : Differential Equations and Vector Calculus
Course Code : MC2031

No. of hours per week	Credits	Total No. of hours	Marks
6	4	90	100

Objectives:

1. To gain deeper knowledge in differential equations, differentiation and integration of vector functions.

2. To apply the concepts in higher mathematics and physical sciences.

CO	Upon completion of this course the students will be able to :	PSO addressed	CL
CO - 1	distinguish linear, nonlinear, ordinary and partial differential equations	PSO - 4	An
CO - 2	solve linear differential equations with constant and variable coefficients	PSO - 5	U
CO - 3	explain the basic properties of Laplace Transforms and Inverse Laplace Transforms.	PSO - 1	U
CO - 4	use the Laplace transform to find the solution of linear differential equations	PSO - 2	Ap
CO - 5	learn methods of forming and solving partial differential equations	PSO - 3	U
CO - 6	learn differentiation and integration of vector valued functions	PSO - 4	U

Total contact hours: 90 (Including lectures, assignments and tests)

Unit	Section	Topics	Lecture hours	Learning outcome	Pedagogy	Assessment /Evaluation
I	**Linear Differential equations**					
	1	Introduction of Linear Differential equations with constant coefficients, Formation of auxillary equation and finding the complementary function, Finding the particular integral for e^{ax}	5	Distinguish linear , nonlinear, ordinary and partial differential equations, Solve linear differential equations with constant and variable coefficients	Lecture with illustration	Evaluation through: Short test on finding the particular integral Short test on homogeneous linear equations
	2	Finding the particular	3	Solve linear	Lecture	

		integral for cos ax, sin ax, Finding the particular integral for $e^{ax}f(x)$		differential equations with constant and variable coefficients	with PPT Illustration	
	3	Finding the particular integral for $x^nf(x)$, Introduction of homogeneous linear equations, Conversion of homogeneous linear equations into linear differential equations with constant coefficients	3	Distinguish linear , nonlinear, ordinary and partial differential equations, Solve linear differential equations with constant and variable coefficients	Lecture with illustration	Formative Assessment- I
	4	Solving homogeneous linear equations using the logarithmic substitution , Solving homogeneous linear equations using the new operator	3	Solve linear differential equations with constant and variable coefficients	Lecture with illustration	
II	**Laplace Transform**					
	1	Definition of Laplace Transform, Properties of Laplace Transform, Computation of Laplace Transform of standard functions	3	Explain the basic properties of Laplace Transform and inverse Laplace Transform	Lecture with PPT Illustration	Short test on Computation of Laplace Transform of standard functions
	2	Problems on Laplace Transform, Definition of Inverse Laplace Transform, Properties of Inverse Laplace Transform	5	Explain the basic properties of Laplace Transform and inverse Laplace Transform	Lecture with illustration	Assignment on the related problem
	3	Computation of Inverse Laplace Transform of	3	Explain the basic properties of Laplace Transform	Lecture with illustration	

		specific functions, Problems on Inverse Laplace Transform		and inverse Laplace Transform		
	4	Solving Linear Differential equations using Laplace Transform, Solving simultaneous equations using Laplace Transform	4	Use the Laplace transform in finding the solution of linear differential equations	Lecture with illustration	Formative Assessment –II
III	**Partial Differential equations**					
	1	Introduction of Partial differential equations, Formation of Partial differential equations by eliminating the unknown constants, Formation of Partial differential equations by eliminating the arbitrary functions	4	Learn methods of forming and solving partial differential equations	Lecture with illustration	Short test on formation of Partial differential equations by eliminating the unknown constants, and arbitrary function.
	2	Methods of solving Partial differential equations, Standard form of Lagrange's equation, General solution of Lagrange's equation	3	Learn methods of forming and solving partial differential equations	Lecture with PPT Illustration	Quiz Formative Assessment-III
	3	Solving	4	Learn methods of	Lecture	

		Lagrange's equation by method of grouping, Solving Lagrange's equation by method of multipliers		forming and solving partial differential equations	with illustration	
	4	Solution of Lagrange's equation using grouping and suitable multipliers, Explanation of Charpit's method, Finding the solution of PDE using Charpit's method	4	Learn methods of forming and solving partial differential equations	Lecture Discussio n	
IV	**Vector Differentiation**					
	1	Revision of dot and cross product of vectors, Definition and theorems on differentiation of Vectors, Gradient of a scalar function and its properties	4	Learn differentiation and integration of vector valued functions	Lecture with PPT Illustratio n	Short test on gradient & differentiation of Vectors
	2	Problems based on Gradient, Equation of tangent plane and normal line for a single surface, Equation of tangent line and normal plane for the intersection of two surfaces	4	Learn differentiation and integration of vector valued functions	Lecture with illustration	Formative Assessment-I
	3	Angle between two surfaces, Divergence of	3	Learn differentiation and integration of	Lecture with illustration	

		vectors and its properties, Curl of vectors and its properties		vector valued functions		
	4	Solenoidal and irrotational vectors, Harmonic vectors and Laplace's equation, Problems based on divergence and curl	4	Learn differentiation and integration of vector valued functions	Lecture with illustration	Short test on Divergence, Curl , Solenoidal and irrotational vectors, Formative Assessment-II
V	**Vector Integration**					
	1	Definition of line integrals and work done by a force, Parametric equation of curves, Evaluation of line integrals over curves in a plane, Evaluation of line integrals over curves in a surface	4	Evaluate line and surface integrals using Green's theorem, Stoke's theorem and Gauss divergence theorem	Lecture with illustration	Short test on Evaluation of line integrals
	2	Computation of work done by a force, Projection of a surface over a plane, Definition of surface integrals, Evaluation of surface integrals over a plane	4	Evaluate line and surface integrals using Green's theorem, Stoke's theorem and Gauss divergence theorem, Apply the concepts to solve problems in physical sciences and engineering	Lecture with Discussio n	Formative Assessment-II
	3	Evaluation of surface integrals over a cube and parrelopiped, Evaluation of surface integrals	4	Evaluate line and surface integrals using Green's theorem, Stoke's theorem and Gauss divergence	Lecture with illustration	Short test on Green's theorem&Stoke's theorem

		over a sphere, cylinder and cone, Statement and verification of Green's theorem		theorem, Apply the concepts to solve problems in physical sciences and engineering		Short test on Gauss Divergence theorem Formative Assessment-III
	4	Statement and verification of Stoke's theorem, Statement and verification of Gauss Divergence theorem	4	Evaluate line and surface integrals using Green's theorem, Stoke's theorem and Gauss divergence theorem, Apply the concepts to solve problems in physical sciences and engineering	Lecture with illustration	

Course Instructor: Dr. K. Jeya Daisy **HoD: Dr. V. M. Arul Flower Mary**
Course Instructor: Dr.C.Jenila **HoD(SF): Mrs. J. Anne Mary Leema**

Semester : III **Major Core IV**
Name of the Course :Real Analysis I
Course Code : MC2032

No. of hours per week	Credits	Total No. of hours	Marks
5	4	75	100

Objectives:

1. To introduce the primary concepts of sequences and series of real numbers.

2. To develop problem solving skills.

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO- 1	explain the primary concepts of sequences and series of real numbers	PSO - 1	U
CO- 2	define convergence and divergence of sequences and series	PSO - 1	R
CO- 3	distinguish between convergence and divergence of sequences and series	PSO - 2	U
CO- 4	relate the behavior of monotonic and geometric sequences and series	PSO - 5	Ap
CO- 5	calculate the limit and peak point of sequences	PSO - 3	An
CO- 6	analyze the importance of Cauchy's general principle of convergence of sequences and series	PSO - 4	An

Total contact hours: 75 (Including lectures, assignments and tests)

Unit	Section	Topics	Lecture hours	Learning outcomes	Pedagogy	Assessment/ evaluation
I	**Preliminaries**					
	1	Preliminaries – Mathematical Induction	3	Explain the primary concepts of the Mathematical Induction.	Lecture with Illustration	Evaluation through appreciative inquiry
	2	Finite and Infinite Sets.	3	To distinguish between finite and infinite set.	Lecture with PPT	Evaluation through quizzes and discussions.
	3	Theorems based on the Real Numbers and the algebraic and order	3	To understand the theorems based onthe Real Numbers and the	Lecture with Illustration	Slip Test

		properties of R.		algebraic and order properties of R.		
	4	Absolute value and the real line.	3	To understandAbsolute value and the real line.	Discussion with Illustration	Quiz and Test
II	**The real numbers**					
	1	The Real Numbers-The completeness property of R.	3	To know aboutThe completeness property of R.	Lecture with PPT	Evaluation through discussions.
	2	Applications of the supremum property.	3	To know aboutApplications of the supremum property.	Lecture	Evaluation through appreciative inquiry
	3	Intervals.	3	To identify Intervals.	Lecture	Formative Assessment Test
III	**Sequences**					
	1	Sequences- Definitions Range of Sequences, Limit of a Sequence, Bounded Sequence.	3	Explain the primary concepts of sequences and series of real numbers	Lecture with Illustration	Evaluation through appreciative inquiry
	2	Theorems based on bounded Sequence, Problems based on bounded Sequence, Monotonic Sequence.	3	To distinguish between bounded and monotonic sequences	Lecture with PPT	Evaluation through quizzes and discussions.
	3	Theorems based on Monotonic Sequence Convergent Sequence Theorems based on Convergent Sequence	3	To understand the theorems based onConvergent Sequence and Divergent Sequence	Lecture with Illustration	Slip Test
	4	Behavior of monotonic sequence.	3	To understandBehavior of monotonic sequence.	Discussion with Illustration	Quiz and Test
IV	**Subsequences**					
	1	Subsequences-Definition Theorems based onSubsequences Subsequences-Examples	2	Explain the primary concepts of Subsequences	Lecture with PPT Illustration	Evaluation through discussions.
	2	Peak points	3	Calculate the limit and	Lecture	Evaluation

		Peak points-Examples Limit points Limit points-Examples		peak point of sequences	with Illustration	through appreciative inquiry
	3	Cauchy sequences-Definition Cauchy sequences-examples	3	To apply the principles of Cauchy sequences	Lecture	Formative Assessment Test
	4	Theorems based on The upper and lower limits of a sequence.	3	To identify the upper and lower limits of a sequence.	Group Discussion	Slip Test
V	**Series of positive terms**					
	1	Series-Definition& Examples Series, Infinite series-Examples	3	Explain the primary concepts of series of real numbers	Lecture with PPT Illustration	Evaluation through discussions.
	2	Theorems and problems based on Comparison Test.	3	To understand the Theorems and problems based on Comparison Test.	Lecture and group discussion	Evaluation through Assignment
	3	Problems based on Kummer's Test, D'Alembert's Ratio Test, De Morgan and Bertrand's Test and Gauss Test.	3	To solve the Problems based on Kummer's Test, D'Alembert's Ratio Test, De Morgan and Bertrand's Test and Gauss Test.	Lecture with Illustration	Formative Assessment Test
	4	Problems based on Root Test and Condensation Test.	3	To solve the Problems based on Root Test and Condensation Test.	Lecture with Illustration	Slip Test
	5	Problems based on Integral Test.	2	To solve the Problems based on Integral Test.	Lecture with Illustration	Quiz and Test

Course Instructor: Dr. Angel Jebitha **HoD:Dr. V. M. Arul Flower Mary**
Course Instructor: Dr.S.Kavitha **HoD(SF): Mrs. J. Anne Mary Leema**

SEMESTER **III**

Name of the Course **: Probability Theory and Distributions (Allied)**

Course Code **: MA2031**

No. of hours per week	Credit	Total No. of hours	Marks
5	5	75	100

Objectives: 1. To impart knowledge on the basic concepts of Probability theory and Probability distributions.

2. To apply the theory in real life situations.

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO - 1	recall the definition of probability and set functions	PSO - 1	R
CO - 2	differentiate between probability and conditional probability and compute according to the requirement	PSO - 4	An
CO - 3	understand the definition of random variables, their types and related concepts	PSO - 1	U
CO - 4	detect the different probability distributions which are widely used	PSO - 4	An
CO - 5	apply the techniques to prove the properties of probability and related distributions	PSO - 5	Ap
CO - 6	choose the suitable probability distribution corresponding to a given data	PSO - 5	E

Total contact hours: 75 (Including lectures, assignments and tests)

Unit	Sections	Topics	Lecture hours	Learning Outcome	Pedagogy	Assessment/ Evaluation
I	**Probability**					
	1	Probability, Experiment, sample space	2	To recall the definition of probability and set functions and understand the definition of random	Lecture with Illustration	Short Test

				variables, their types and related concepts		
	2	Example and Theorems based on Events, Problems based on events and sample space	3	To recall the definition of probability and to apply the techniques to prove the properties of probability and related distributions	Lecture with Illustration	Test
	3	Conditional probability, Problems based on Conditional probability	3	To recall the definition of probability and apply the techniques to prove the properties of probability and related distributions	Lecture with PPT Illustration	Quiz and Test
	4	Properties – Independent events, Theorems based on independent events, Problems based on independent events.	3	To detect the different probability distributions which are widely used and to recall the definition of probability and apply the techniques to prove the properties of probability and related distributions	Lecture with Illustration	Formative Assessment Test
	5	Baye's theorem and Problems based on Baye's theorem	2	To understand the definition of random variables, their types and related concepts	Lecture with Illustration	Test
II	**Random variables**					

	1	Random variables, Distribution function, Discrete, continuous-random variable	3	To recall the definition of probability and set functions, to differentiate between probability and conditional probability and compute according to the requirement, and to understand the definition of random variables, their types and related concepts	Group Discussion	Quiz and Test
	2	Problems based on discrete random variable	2	To recall the definition of probability and set functions	Lecture with Illustration	Test
	3	Problems based on continuous-random variable	2	To detect the different probability distributions which are widely used	Lecture with Illustration	Test
	4	Mathematical expectation	2	Test the validity of a given data	Group Discussion	Quiz and Test
III	**Moment Generating Function**					
	1	Moment Generating Function, Related examples, Problems based on Moment Generating Function, Properties of Moment Generating Function	3	Recall the definition of probability and set functions, understand the definition of random variables, their types and related concepts and to apply the techniques to prove the properties of	Lecture with PPT Illustration	Quiz and Test

				probability and related distributions		
	2	Cumulant generating function, properties and Problems based on Cumulantgenerating Function	3	To recall the definition of probability and set functions and to apply the techniques to prove the properties of probability and related distributions	Group Discussion	Short Test
	3	Characteristic function, properties, Problemsbased on Characteristic function and Poisson distribution	3	To recall the definition of probability and set functions, to detect the different probability distributions which are widely used and to apply the techniques to prove the properties of probability and related distributions	Lecture with Illustration	Test
	4	Theorems based on Poisson distribution, Problems based on Poisson distribution, Mode,Moment Generating Functionof Poisson distribution	3	To recall the definition of probability and set functions and to apply the techniques to prove the properties of probability and related distributions and to understand the definition of random variables, their	Group Discussion	Short Test

				types and related concepts		
	5	Theorems based on Mode,Moment Generating Function of Poisson distribution, fitting of Poisson distribution and problems based on this	3	To apply the techniques to prove the properties of probability and related distributions and to detect the different probability distributions which are widely used	Lecture with Illustration	Test
IV	**Binomial Distribution**					
	1	Introduction-Definition, Moments of binomial Distribution	3	To recall the definition of probability and set functions and to understand the definition of random variables, their types and related concepts	Group Discussion	Short Test
	2	Central moments, Theorems based on Central moments	3	To understand the definition of random variables, their types and related concepts and recall the definition of probability and set functions and to	Lecture with Illustration	Test
	3	Mode of binomial distribution, Problems based on Mode of binomial distribution	3	To recall the definition of probability and set functions and to apply the techniques to prove the properties of	Group Discussion	Short Test

				probability and related distributions		
	4	Fitting of binomial distribution, examples, Problems based on fitting of binomial distribution	3	To detect the different probability distributions which are widely used and to apply the techniques to prove the properties of probability and related distributions	Lecture with Illustration	Test
V	**Normal Distribution**					
	1	Definition, Moment Generating Functionabout origin of normal distribution, Mean and variance	3	To recall the definition of probability and set functions and to apply the techniques to prove the properties of probability and related distributions	Lecture with Illustration	Test
	2	Standard normal variate, mode, Median, Moment Generating Functionabout mean of normal distribution, Theorems basedon mean of normal distribution	3	To recall the definition of probability and set functions and to understand the definition of random variables, their types and related concepts	Lecture with Illustration	Quiz and Test
	3	Problems basedon meanof normal distribution, Area property	3	To recall the definition of probability and set functions and to understand	Lecture with Illustration	Formative Assessment Test

		of normal distribution, Problems basedon area of normal distribution		the definition of random variables, their types and related concepts and to apply the techniques to prove the properties of probability and related distributions		
	4	Quartile deviation for the normal distribution, fitting of normal distribution, Problems basedon Fitting of normal distribution	3	To recall the definition of probability and to detect the different probability distributions which are widely used and to apply the techniques to prove the properties of probability and related distributions	Lecture with Illustration	Test

Course Instructor: Sr. S. AntinMary **HoD: Dr. V. M. Arul Flower Mary**
Course Instructor: Ms. V. Princy Kala **HoD(SF): Mrs. J. Anne Mary Leema**

Semester : **IV** **Major Core V**
Name of the Course : **Groups and Rings**
Subject code : **MC2041**

No. of hours per week	Credit	Total No. of hours	Marks
6	5	90	100

Objectives: 1.To introduce the concepts of Group theory and Ring theory
3. To gain more knowledge essential for higher studies in Abstract Algebra4.

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO – 1	recall the definitions of groups ,rings, functions and also examples of groups and rings	PSO - 1	R
CO – 2	explain the properties of groups, rings and different types of groups and rings	PSO - 1	U
CO – 3	develop proofs of results on Permutation groups ,Cyclic groups, Quotient group, Subgroups, subrings , quotient rings	PSO - 5	C
CO – 4	examine the properties of Ideals-Maximal and Prime ideals-Cosets-order of an element	PSO - 5	E
CO – 5	test the homomorphic and isomorphic properties of groups and rings	PSO - 4	An
CO – 6	develop the concepts of ordered integral domains and Unique Factorisation Domains	PSO - 5	E

Total contact hours: 90 (Including lectures, seminar and tests)

Unit	Section	Topics	Lecture hours	Learning outcomes	Pedagogy	Assessment/ evaluation
I	**Groups.**					
	1.	Definition and examples on Groups	4	To understand the definition of groups	Lecture with Illustration	Evaluation through test
	2.	Definition and examples on Permutation Groups	3	To understand the definition permutation groups	Lecture	Q&A
	3.	Definition of cycle and theorem based on cycles	3	To understand the definition of cycle and theorem based on cycles	Lecture with Illustration	Open Book Assignment
	4.	Theorems on even and odd permutations	2	To understand and apply this theorem in various problems	Lecture with Illustration	Quiz

	5.	Definition examples, theorems and problems of sub groups	3	To understand the definition and theorems of sub groups	Lecture with Illustration	Group Discussion
	6.	Theorems on cyclic groups and problems based on cyclic groups	2	To learn the concepts of cyclic groups	Lecture with Illustration	Q&A
II	**Order of an element and Normal Sub Groups**					
	1.	Definition and Theorems on order of an Element	2	To understand the definition and theorems on order of an Element	Lecture with Illustration	Test
	2.	Problems on order of an element	2	To apply the concept of order of an element in problems	Lecture	Open book assignment
	3.	Definition of Cosets and problems on cosets	3	To understand the definition of cosets and problems on cosets	Lecture	Q&A
	4.	Lagrange's Theorem, Euler's Theorem, Fermats theorem	3	To learn Lagrange's Theorem, Euler's Theorem, Fermats theorem	Lecture	Formative Assessment Test
	5.	Normal subgroups - Definition and Examples	2	To know the definition of Normal subgroups	Group Discussion	Q&A
	6.	Problems and theorems on Normal Subgroups	2	To apply the Normal subgroups concept in problems	Lecture with Illustration	Slip Test
III	**Isomorphism**					
	1.	Definition, theorems and Examples of Isomorphism	4	To understand the definition and theorems based on Isomorphism	Lecture with Illustration	Quiz
	2.	Cayley's Theorem and Theorem on Automorphism and generators	3	To learn the Cayley'stheorem and understand the concept of Automorphism and generators	Lecture	SipTest
	3.	Definition of Homomorphism and Examples	2	To learn the definition of Homomorphism and Examples	Lecture	Test
	4.	Fundamental Theorem of Homomorphism	3	To study the Fundamental Theorem of Homomorphism	Lecture	Q&A
	5.	Problems on Kernel	3	To apply Kernel concept in problems	Group Discussion	Brain Storming

IV	**Rings**					
	1.	Definition, Elementary properties and examples of Rings	3	To learn the definition of rings	Lecture with Illustration	Quiz
	2.	Problems based on Isomorphism of Rings	3	To get the idea of Isomorphism of Rings	Lecture and group discussion	Test
	3.	Types of Rings and Theorems	2	To identify the Types of Rings	Lecture with Illustration	Test
	4.	Examples of Skewfieldsamd Theorems based on Skewfields	2	To apply Skewfields idea in problems	Lecture with Illustration	Formative Assessment Test
	5.	Definition and Theorems on integral Domains	1	To know about integral Domains	Lecture with Illustration	Assignment
	6.	Characteristic of a Ring	1	To interpret the Characteristic of a Ring	Lecture with Illustration	Quiz and Test
V	**Sub Rings**					
	1.	Definition and Examples of Sub Rings	2	To get the knowledge of subrings	Lecture with Illustration	Test
	2.	Problems and Theorems on Sub Rings	1	To develop the proof technique and solve problems.	Lecture with Illustration	Q&A
	3.	Definition, Theorems and Examples on ideals	3	To utilize the concept of ideals in examples	Lecture with Illustration	Open Book Assignment
	4.	Ordered integral Domains	3	To understand the Ordered integral Domains	Lecture with Illustration	Assignment
	5.	Maximal and Prime Ideals	2	To know about Maximal and Prime Ideals	Lecture with Illustration	Quiz and Test
	6.	Homomorphism of Rings	2	To learn the definition of Homomorphism of Rings	Lecture with Illustration	Assignment
	7.	Unique factorisation Domain	2	To understand and analyze about Unique factorisation Domain	Lecture with Illustration	Quiz and Test

Course Instructor(Aided): Dr.L.Jesmalar **HOD :Dr. V. M. Arul Flower Mary**
Course Instructor(SF): Ms.V. Princy Kala Leema **HOD(SF) : Ms. J. Anne Mary**

Semester : IV **Major Core VI**
Name of the Course : Analytical Geometry - 3 Dimensions
Subject code : MC2042

No. of hours per week	Credits	Total No. of hours	Marks
5	5	75	100

Objectives:

1. To gain deeper knowledge in three dimensional Analytical Geometry.
2. To develop creative thinking, innovation and synthesis of information

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO – 1	recall the basic definitions and concepts of planes and lines	PSO - 1	R
CO – 2	demonstrate the Projection of the line joining two points, Cosines of the line joining two points and will be able to solve problems	PSO - 3	Ap
CO – 3	analyze the characteristics of a cone and the condition for a plane to touch the quadric cone	PSO - 2	An
CO – 4	draw three dimensional surfaces from the given information	PSO - 4	An
CO – 5	discuss the characteristics and properties of 3 - dimensional objects like sphere,cubeetc	PSO - 1	U
CO – 6	develop the skill in 3 - dimensional geometry to gain mastery in related courses	PSO - 6	C

Total contact hours: 75 (Including lectures, assignments and tests)

Unit	Section	Topics	Lecture hours	Learning outcomes	Pedagogy	Assessment/ evaluation
I	**Direction cosines of a line**					
	1.	Introduction and definition of distance between points and angle between two lines.	2	To understand the concept of distance between points and angle between two lines	Lecture	Test
	2.	Definition and problems related to Projection on a line, Direction cosines of a line	3	To understand the projection on a line and direction cosines of a line	Lecture with illustrations	Group Discussion
	3.	Definition of	3	To analyze the	Lecture	Test

		direction ratios and projection of the line joining two points.		equations of two skew lines in a simplified form		
	4.	Definition and Theorems related to direction cosines of the line joining the points	2	Acquire the knowledge about direction cosines of the line joining the points	Lecture	Test
	5.	Definition and problems based on conditions for perpendicularity and parallelism.	2	To practice various problems related to conditions for perpendicularity and parallelism.	Lecture with group discussion	Group discussion
II	**The Plane**					
	1.	Definition and problems based on Equation of a plane in different forms ,Intercept form , normal form	3	To understand the concepts Equation of a plane in different forms	Lecture	Test
	2.	Definition and problems related to Angle between the planes ,The ratio in which the plane divides the line joining the points	3	To understand the definition of the ratio in which the plane divides the line joining the points	Lecture	Q&A
	3.	Definition and problems on a plane through the line of intersection of two given planes	3	To practice various problems related to plane through the line of intersection of two given planes	Lecture	Formative Assessment Test
	4.	Problems based on length of perpendicular , Planes bisecting the angle between two planes.	3	Acquire the knowledge about the planes bisecting the angle between two planes.	Lecture with illustration s	Test
III	**The Straight Line**					
	1.	Definition and methods of finding	3	To understand the methods of finding	Lecture	Quiz

		equation of a line in different forms		equation of a line in different forms		
	2.	Problems based on the plane and the straight line	3	To compare the plane and the straight line	Lecture with illustration	Test
	3.	Definition and problems Angle between the lines, image of a line	3	To Know the concept of Angle between the lines	Lecture with group discussion	Brain storming
	4.	Problems based on Co-planarity of two lines	3	Acquire the knowledge about Co-planarity of two lines	Lecture with ppt	Assignment
IV	**The Sphere**					
	1.	Introduction and Illustrations based on equation of the sphere in its general form	3	To understand the sphere in its general form	Lecture	Quiz
	2.	Theorem and problems on determination of the centre and radius of a sphere	2	To determine thecentre and radius of a sphere	Lecture	Test
	3.	The length of the tangent from the point to the sphere	2	To know about the length of the tangent from the point to the sphere	Lecture with illustration	Slip Test
	4.	Problems related to Section of sphere by a plane	3	To practice various problems related to Section of sphere by a plane	Lecture	Assignment
	5.	Definition of Intersection of two spheres and tangent plane.	2	Acquire the knowledge about Intersection of two spheres and tangent plane.	Lecture with illustration	Formative Assessment Test
IV	**The Cone**					
	1.	Definitions and problems in the equation of a surface and Cone	2	To understand about equation of a surface	Lecture with illustration	Test
	2.	Problems related to the intersection of a straight line and a quadric cone andTangent plane	4	To practice various problems related to the tangent plane and normal	Lecture	Slip Test

		and normal				
	3.	Problems related to thecondition for a plane to touch the quadric cone and the angle between the lines in which a plane cuts the cone	3	Acquire the knowledge aboutthe condition for a plane to touch the quadric cone	Lecture	Assignment
	4.	Problems related to the condition that the cone has three mutually perpendicular generators.	3	To know aboutthe condition that the cone has three mutually perpendicular generators.	Lecture	Quiz

Course Instructor(Aided)::Dr.J.Befija Minnie **HOD:Dr. V. M. Arul Flower Mary**

Course Instructor(S.F):Dr. S. Kavitha **HOD(S.F) :Ms. J.Anne Mary Leema**

SEMESTER IV

Name of the Course :Applied Statistics (Allied)

Course Code : MA2041

No. of hours per week	Credit	Total No. of hours	Marks
5	5	75	100

Objectives: 1. To acquire the knowledge of correlation theory and testing hypothesis.

2. To solve research and application oriented problems.

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO – 1	identify and demonstrate appropriate sampling processes	PSO –2	Ap
CO – 2	recall the methods of classifying and analyzing data relative to single variable	PSO –4	R
CO - 3	describe the χ^2 distribution in statistics	PSO –3	U
CO - 4	distinguish between the practical purposes of a large and a small sample	PSO –1	An
CO - 5	understand that correlation coefficient is independent of the change of origin and scale	PSO –5	U

Total contact hours: 75 (Including lectures, assignments and tests)

Unit	Section	Topics	Lecture hours	Learning outcomes	Pedagogy	Assessment/ evaluation
I	**Correlation**					
	1	Definitions and examples of correlation, Properties of correlation coefficient, Problems based on correlation	5	To Recall the definitions of correlation, Properties of correlation coefficient	Lecture	Quiz
	2	Definition of Rank correlation and proving Spearman's formula, Calculating Rank	3	To analyzeRank correlation and to solve the problems.	Lecture	Assignment

		correlation coefficient for the given data				
	3	Definition and results based on regression, Problems on regression	2	To solve the problems on regression	Lecture	Test
	4	Equation of regression lines	1	Apply regression lines in real life problems	Lecture with group discussion	Test
	5	Angle between the regression lines.	1	To Learn the Angle between the regression lines.	Lecture	Assignment
II	**Test of significance**					
	1	Introduction on test of significance, Sampling and its types, Definition on Sampling distribution and examples, Standard error for some sampling distributions	3	To solve problems related to test of significance	Lecture with group discussion	Test
	2	Testing of hypothesis and errors in testing of hypothesis, critical values for different levels of significance, Procedure for testing of a statistical hypothesis	3	To testing of hypothesis	Lecture	Quiz
	3	Explanation and Problems of test of significance for single proportions	3	To solve problems related to single proportions	Lecture	Formative Assessment
	4	Probable limits , Test of significance for difference of proportions	2	To solve problems related to Probable limits	Lecture	Test
	5	Problems on test of significance for difference of proportions	1	To solve problems related to difference proportions	Lecture with group discussion	Test
III	**Test of significance for means**					
	1	Test of significance for single mean if the standard deviation is	4	To Learn some methods to solve the Problems based on	Lecture	Test

		known, Problems based on confidence limits for population mean, Problems based on test of significance of means.		confidence limits for population mean and Problems based on test of significance of means.		
	2	Problems based on test of significance for difference of sample means, Test of significance for single standard deviation	2	To Learn some methods to solve the problems of test of significance for difference of sample means and single standard deviation	Lecture	Test
	3	Test of significance for equality of standard deviations of a normal population.	2	To learn normal population	Lecture	Test
	4	Problems based on test of significance for standard deviation	2	To test the significance for standard deviation	Lecture	Test
	5	Problems based on test of significance for correlation coefficient	3	To test the significance for correlation coefficient	Lecture	Test
IV	**Test of significance for small samples**					
	1	Distinguish large and small samples, Test of significance based on t-distribution, Test for the difference between the mean of a sample and that of a population.	3	To test the significance based on t-distribution, and the difference between the mean of a sample and that of a population.	Lecture with group discussion	Quiz
	2	Test for the difference between the means of two samples, Confidence limits for population mean	2	To solve problems related Confidence limits	Lecture	Assignment
	3	Problems based on confidence limits for population mean,Test of significance based on F-test	2	To learn the test of significance based on F-test	Lecture	Assignment
	4	Problems on test of significance based on F-test.	2	To solve problems on test of significance based on F-test.	Lecture	Formative Assessment

	5	Test of significance of an observed sample correlation, Problems on test of significance of an observed sample correlation.	2	To solve problems related to observed sample correlation.	Lecture	Assignment
V	**Test based on χ^2-distribution**					
	1	Introduction on test based on χ^2-distribution ,χ^2 −test for population variance	3	To Solve the problems related to χ^2 −test for population variance	Lecture	Quiz
	2	χ^2 −test to test the goodness of fit	2	To test the goodness of fit for χ^2 −test.	Lecture	Test
	3	Result on χ^2 −test to test the goodness of fit.	2	To learn the Result on χ^2 −test to test the goodness of fit.	Lecture	Formative Assessment
	4	Fit a Poisson distribution for the given data and to test the goodness of fit.	3	Toanalyze a Poisson distribution.	Lecture	Test
	5	Theorem based on the test for independence of attributes, Yate's Correction.	2	To solve the Problems based on independence of attributes.	Lecture	Assignment

Course Instructor (Aided): S. Antin Mary **HOD(Aided):Dr. V. M. Arul Flower**

MaryCourse Instructor(S.F): Dr. C. Jenila **HOD(S.F) :Ms. J.Anne Mary Leema**

Semester V
Major Core VII- Linear Algebra
Course Code: MC2051

No. of hours per week	Credits	Total No. of hours	Marks
6	5	90	100

Objectives:
1. To introduce the algebraic system of Vector Spaces, inner product spaces.
2. To use the related study in various physical applications.

Course Outcomes

CO	upon completion of this course, the students will be able to:	PSO addressed	CL
CO-1	recall and define Groups, Fields, and their properties	PSO - 1	R

CO-2	cite examples of vector spaces, subspaces, and linear transformations	PSO - 1	U
CO-3	determine the concepts of linear independence, linear dependence, basis, and the dimension of vector spaces	PSO - 1	U
CO-4	correlate rank and nullity, Linear transformation, and matrix of a Linear transformation	PSO - 2	Ap
CO-5	examine whether a given space is an inner product space and the orthonormality of sets	PSO - 3	Ap

Total contact hours: 90 (Including lectures, assignments, quizzes, and tests)

Unit	Section	Topics	Lecture hours	Learning outcome	Pedagogy	Assessment/ Evaluation
I	**Vector spaces**					
	1.	Vector spaces - Definition	4	To understand Vector spaces and their Definition	Lecture Illustration	Evaluation through slip test
	2.	Vector spaces - Examples	4	To giveexamples of vector spaces on different fields.	Lecture Illustration	quiz, test
	3.	Subspaces	5	To prove many theorems related to subspaces and derive some examples.	Lecture Illustration	Evaluation through slip test
	4.	Linear transformation.	5	To determine linear transformations and study their properties and types.	Lecture Illustration	Class test
II	**The span of a Set**					
	1	Span of a Set	3	To understand about Span of a Set	Lecture Illustration	Home Assignment
	2	Linear Independence	4	To identify the Linear Independence and dependence of a set	Lecture Illustration	Evaluation through slip test
	3	Basis and Dimension	3	To calculate the Basis and Dimension of a given set	Lecture Illustration	Formative Assessment
	4	Rank and Nullity	4	To find the rank and nullity of a given set	Lecture Illustration	Online Quiz, Test
	5	Matrixof a Linear Transformation	4	To calculate the Matrixof a Linear Transformation	Lecture Illustration	Home Assignment
III	**Cayley-Hamilton Theorem**					

	1	Characteristic Equation	4	To understand basic concepts ofCharacteristic Equation	Lecture Illustration	Slip Test
	2	Cayley-Hamilton Theorem	5	To analyze the Cayley-Hamilton Theorem for matrix	Lecture Illustration	Online quiz
	3	Eigenvalues and Eigen vectors	5	To determine the Eigen values and Eigenvectors of the matrix	Lecture Illustration	Online Assignment
	4	Properties of Eigenvalues.	4	To study the Properties of Eigenvalues.	Lecture Illustration	SlipTest
IV	**Inner Product Spaces**					
	1	Inner Product Spaces - Definition	4	To understand the definition of inner product space	Lecture Illustration	Slip Test
	2	Inner Product Spaces - examples	4	To verify examples of Inner Product Spaces	Lecture Illustration	Home Assignment
	3	Orthogonality	5	To study theorthogonalitycondition and related theorems	Lecture Illustration	quiz
	4	Orthogonal complement	5	To study the Orthogonal complement and related theorems	Lecture Illustration	Formative Test, Online Quiz
V	**Bilinear forms**					
	1	Bilinear forms	3	To understand the Bilinear forms	Lecture Illustration	Class Test
	2	Quadratic forms	3	To understand the Quadratic forms	Lecture Illustration	Formative assessment
	3	Reduction of a quadratic form to the diagonal form	3	To derive the Reduction of a quadratic form to the diagonal form	Lecture Illustration	Online Quiz
	4	Partially ordered set-Lattices	3	To learn the Partially ordered set-Lattices	Lecture Illustration	Online Assignment
	5	Distributive Lattices-Modular Lattices-	3	To find the distributive Lattices-Modular Lattices	LectureIllustration	Class test

	6	Boolean Algebra.	3	To learn the Boolean Algebra	Lecture Illustration	Slip test

Course Instructor: Ms. J.C. Mahizha **HoD: Dr.T. Sheeba Helen**

Course Instructor: Ms.Anne Mary Leema **HoD(SF): Dr.S.Kavitha**

Semester : V **Major Core VIII**
Name of the Course :Real Analysis II
CourseCode : MC2052

No. of hours per week	Credit	Total No. of hours	Marks
6	5	90	100

Objectives: 1. To introduce Metric Spaces and the concepts of completeness, continuity, connectedness and compactness

2. To use these concepts in higher studies.

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO - 1	understand the concepts of completeness, continuity and discontinuity of metric spaces	PSO - 1	U
CO - 2	apply the metric space theorems to real life situations	PSO - 4	Ap
CO - 3	distinguish between continuous functions and uniform continuous functions	PSO - 5	An
CO - 4	use basic concepts in the development of real analysis results	PSO - 1	C
CO - 5	Understand the concepts of metric space, connectedness and compactness of metric spaces	PSO - 3	U
CO- 6	Develop the ability to reflect on problems that are quite significant in the field of analysis	PSO -2	Ap

Unit	Section	Topics	Lecture hours	Learning outcomes	Pedagogy	Assessment/ evaluation
I	1	Metric Space, definition and examples	3	Explain the primary concepts of Metric Space	Lecture with Illustration	Evaluation through appreciative inquiry

	2	Bounded sets, Open ball, Open sets	3	To understand the conceptsBounded sets, Open ball and Open sets	Lecture with PPT	Evaluation through quizzes and discussions.
	3	Subspace, Interior of a set, Closed sets	3	To understand about Subspace, Interior of a set and Closed sets	Lecture with Illustration	Slip Test
	4	Closure,Limit point, Dense sets.	3	To understandabout Closure, Limit point and Dense sets	Discussion with Illustration	Quiz and Test
II	1	Complete metric space	3	To know about complete Metric space	Lecture with PPT	Evaluation through discussions.
	2	Cantor's intersection theorem - Baire's Category theorem	3	To know about Cantor's intersection theorem andBaire's Category theorem	Lecture	Evaluation through appreciative inquiry
	3	Contraction mapping- Definition and examples- Contraction mapping theorem	3	To learn the concept Contraction mapping	Lecture	Formative Assessment Test
III	1	Continuity of functions	3	To explain the concept Continuity of functions	Lecture with Illustration	Evaluation through appreciative inquiry
	2	Composition of continuous functions, Equivalent conditions for continuity	4	To study the concepts Composition of continuous functions	Lecture with PPT	Evaluation through quizzes and discussions
	3	Homeomorphism, Uniform continuity	3	To understand the concepts Homeomorphism and Uniform continuity	Lecture with Illustration	Slip Test
	4	Discontinuous functions on R	3	To understand the concept Discontinuous functions	Discussion with Illustration	Quiz and Test
IV	1	Connectedness, Definition and examples	3	To study about Connectedness	Lecture with PPT Illustration	Evaluation through discussions
	2	Connected subsets of R	3	To learn the conceptConnected subsets	Lecture with Illustration	Evaluation through appreciative inquiry
	3	Connectedness and	3	To understandthe	Lecture	Formative

		continuity		relation between Connectedness and Continuity		Assessment Test
	4	Intermediate value theorem	2	To study about the Intermediate value theorem	Group Discussion	Slip Test
V	1	Compactness, Compact space	3	Explain the primary concepts of Compactness	Lecture with PPT Illustration	Evaluation through discussions.
	2	Compact subsets of R	3	To understand the concept Compact subsets of R.	Lecture and group discussion	Evaluation through Assignment
	3	Equivalent Characterization for Compactness	3	To study about Equivalent Characterization for Compactness	Lecture with Illustration	Formative Assessment Test
	4	Compactness and continuity	4	To understand the relation between Compactness and Continuity	Lecture with Illustration	Slip Test

Course Instructor: Dr. J.Befija Minnie **HoD:Dr. T.Sheeba Helen**
Course Instructor S.F: Ms. Monisha **HoD:Dr. S.Kavitha**

Name of the Course : Graph Theory

Subject code : MC2055

No. of hours per week	Credits	Total No. of hours	Marks
5	4	75	100

Objectives:

1. To introduce graphs and the concepts of connectedness, matchings, planarity and domination.
2. To apply these concepts in research.

Course Outcome

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO - 1	understand the basic definitions to write the proofs of simple theorems	PSO - 1	U
CO - 2	employ the definitions to write the proofs of simple theorems	PSO - 2	Ap
CO - 3	relate real life situations with mathematical graphs	PSO - 3	Ap

CO - 4	develop the ability to solve problems in graph theory	PSO - 4	An
CO - 5	analyze real life problems using graph theory both quantitatively and qualitatively	PSO - 4	An

Unit	Section	Topics	Lecture hours	Learning outcomes	Pedagogy	Assessment/evaluation
I	**Pictorial Representation – Isomorphism and degrees - cycles in a graph - connected graphs - cut vertices and cut edges**					
	1.	Trail and Path-Examples, Cycles in graphs – definitions and theorems, Theorems on limit points and examples, Theorems on connected graph	3	To apply the results in real life cycle	Lecture with Illustration	Evaluation through test
	2.	Theorems on cycles in graph, complement graphs – definition and theorems, Digraph	3	To distinguish the theorems and their application	Lecture with Illustration	Slip test
	3.	Definitions and Theorems on cut vertices and cut edges	3	To identify the cut vertices and edges	Lecture with Examples	Brain Storming and Test
	4.	Trivial and non-Trivial Graphs – definitions and theorems	3	To construct the graphs	Discussion with Illustration	Quiz and Test
II	**Eulerian graphs - Fleury's algorithm - Hamiltonian graphs - Weighted graphs - Chinese Post-man Problem -Travelling Sales-man Problem Bipartite graphs - Trees.**					
	1.	Eulerian Graphs-definitions and theorems, Theorems related to Eulerian trail using digraph	3	To identify the Closed walk.	Lecture with PPT	Test
	2.	Fleury's Algorithm to construct a closed Eulerian trail	2	To construct a Eulerian Trail	Lecture with illustration	Test
	3.	Hamiltonian Graphs – definitions and theorems,	2	To identify the difference in cycle and path	Lecture	Assessment Test

		Hamiltonian cycle and path				
	4.	Problem basedon weightedgraphs - Chinese Post-man Problem - Travelling Sales-man Problem Bipartite graphs	3	To construct a road map.	Group Discussion	Test
	5.	Bipartite graphs- Definition and Theorems, Theorems on trees.	2	To calculate a unique path.	Lecture with illustration	Test
III	**Planar graphs - Euler formula - Platonic solids - Dual of a plane graph - Characterization of planar graphs - Colourings - Vertex colouring - Edge colouring - An algorithm for vertex colouring.**					
	1.	Definition and examples related to planar graphs, Euler's formula for planar graphs and related corollary	3	To understand the concept in Eulerian and planar graph	Lecture with PPT Illustration	Quiz
	2.	Definition and theorems related to Platonic solids, Dual of a plane graph, Definition and theorem related to characterization of planar graph	3	To apply the ancient concerned with polyhedra.	Lecture with Illustration	Test
	3.	Definition and theorems on colouring, Theorem related to maximum colourings of a graph,triangle free graph in colouring	4	To identify alternating colours to the graphs	Lecture with examples	Assignment
	4.	Definition and theorems related to edge colouring, An algorithm for vertex colouring of a graph	2	To identify the colouring and solve the problems	Group Discussion	Formative Assessment Test
IV	**Directed Graphs - Connectivity in digraphs - Strong orientation of graphs – Euleriandigraphs -**					

	Tournament.					
	1.	Introduction, Definitions related to directed graph	3	To understand the concept about directed graph	Lecture with PPT Illustration	Brain Storming
	2.	Strongly connected graph – definition and theorems	3	To understand the concept of strong, unilateral, weakly connected graph.	Lecture and group discussion	Test
	3.	Definition and Theorems related to Strong orientation of graphs	2	To understandabout orientation graph.	Lecture with Illustration	Quiz and Test
	4.	Eulerian Digraph-definition and theorems, Tournaments	4	To understand the in degree and out degree to solve the problems.	Lecture with Illustration	Test
V	**Dominating Sets, Relationship between independent sets and dominating sets, Irredundant sets, Upper Bounds and Lower Bounds for the Domination Number .**					
	1.	Introduction and definition related to Dominating Sets with theorems,	2	To understand solve real life problems in dominating Sets	Lecture with PPT Illustration	Test
	2.	Definition and theorems relate to Independent Sets and Irredundant sets	3	To understand relate to independent and irredundant sets and problems related to it.	Lecture with Illustration	Assessment test
	3.	Definition Examples and theorems related to Bounds-Upper Bound	4	To understand the isolated vertices in graphs	Lecture with PPT Illustration	Slip test
	4.	Theorems related	3	To understand the concept	Lecture with PPT	Quiz

		to Lower Bounds		about Domination and connected graph.	Illustration	

Course Instructor (Aided): Sr. S. Antin Mary **HoD(Aided): Dr. T. Sheeba Helen**
Course Instructor (S.F): Dr. G. JovitVinishMelma **HoD(S.F) : Dr. S. Kavitha**

Semester V
Major Core IX- Computer Oriented Numerical Methods
Course Code: MC2053

No. of hours per week	Credits	Total No. of hours	Marks
6	**4**	90	100

Objectives:

1. To provide suitable and effective numerical methods, for computing approximate numerical values of certain raw data.

2. To lay foundation of programming techniques to solve mathematical problems.

Course Outcomes

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO - 1	understand the elementary programming language and its structure	PSO - 4	U
CO - 2	develop computer programmes for the solution of various numerical problems	PSO - 5	C
CO - 3	apply numerical methods to obtain approximate solutions to mathematical problems	PSO - 3	Ap
CO - 4	employ different methods of constructing a polynomial using various methods	PSO - 2	A
CO - 5	compare the rate of convergence of different numerical formula	PSO - 4	An
CO - 6	distinguish the advantages and disadvantages of various numerical methods	PSO - 4	An

Total contact hours: 90 (Including lectures, assignments and tests)

Unit	Section	Topics	Lecture hours	Learning outcomes	Pedagogy	Assessment/evaluation
I	Basis structure of C programs					
	1	Basis structure of C programs, C Tokens and Keywords	3	To understand the structure of a C program and identify C Tokens and Keywords	Lecture with Illustration	Evaluation through Brainstorming
	2	Identifiers, Constants, Variables and Data Types, Operations and Expressions		To identify Identifiers, Constants, Variables and Data Types, Operations and Expressions	Lecture with Illustration	Slip Test
	3	Arithmetic Operators, Relational Operators,	3	To understand the syntax of various operators and apply	Lecture with illustration	Evaluation through role play

		Logical Operators, Assignment Operators, Increment and Decrement Operators		in programmes		
	4	Conditional Operators, Bitwise Operators and Special Operators	3	To understand the syntax of various operators and apply in programmes	Lecture with Illustration	Open book test
	5	Managing Input and Output Operations Formatted Input and Formatted Output	3	To understand the Input and Output Operations	Flipped class	Quiz and Test
II	Decision making and Branching					
	1	Decision making and Branching and Decision making with IF statement	3	To differentiatedecision making and branching	Blended class	Evaluation through Assignment
	2	Simple IF statement The IF…. Else statements and Nesting of IF... Else statements.	3	To understand Simple IF statement The IF…. Else statements and Nesting of IF... Else statements.	Lecture with Illustration	Evaluation through appreciative inquiry
	3	The GOTO statement, Decision making and Looping	3	To express GOTO statement in programmes	Lecture with Small programms	Slip test
	4	The WHILE Statement and The DO Statement	3	To express WHILE Statement and DO Statement in programmes	Lecture with Small programms	Formative Assessment Test
	5	The FOR Statement.	3	To express GOTO statement in programmes	Lecture with Small programms	Formative Assessment Test
III	Solutions of algebraic and transcendental equations					
	1	Solutions of algebraic and transcendental equations. Iteration method and Newton Raphson method	3	To understand the solutions of algebraic and transcendental equations and to solve problems for the same	Lecture with Illustration	Evaluation through open seminar
	2	programs in C for Newton Raphson method	3	To construct the programs in C for Newton Raphson method	Laboratoy method	Evaluation through the output of the program
	3	Interpolation - Newton's Interpolation formulae	3	To understand interpolation and to solve problems using Newton's Interpolation formulae	Lecture with Illustration	Slip Test
	4	programs in C for Newton's Forward Interpolation andBackward Interpolation fomula	3	To construct programs in C for Newton's Forward Interpolation and Backward Interpolation fomula	Laboratoy method	Evaluation through the output of the program
	5	Lagrange's	3	To solve problems using	Lecture with	Evaluation

		Interpolation formula		Lagrange's Interpolation formula	Illustration	through open seminar
IV	Numerical differentiation and integration					
	1	Numerical differentiation, derivatives using Newton's forward difference	3	To understand Numerical differentiation and to solve problems using Newton's forward difference	Lecture with PPT Illustration	Evaluation through discussions.
	2	Newton's backward difference formula	3	To obtain approximate solutions for problems using Newton's backward difference formula	Flipped Class	Evaluation through appreciative inquiry
	3	Numerical integration, Newton cote's quadrature formula	3	To understand Numerical integration and to develop Newton cote's quadrature formula	Lecture with Illustration	Formative Assessment Test
	4	Trapezoidal rule	3	To obtain approximate solutions for problems using Trapezoidal rule	Problem Solving	Slip Test
	5	Programs in C for Trapezoidal rule	3	To develop programsin C for Trapezoidal rule	Laboratoy method	Evaluation through the output of the program
V	Numerical integration					
	1	Simpson's $(1/3)^{rd}$ rule	3	To find approximate solutions for problems using Simpson's $(1/3)^{rd}$ rule	Problem Solving	Evaluation through exercise problem solving
	2	Programs in C for Simpson's one - third rule	3	To develop programsin C for Simpson's one - third rule	Laboratoy method	Evaluation through the output of the program
	3	Simpson's $(3/8)^{th}$ rule	3	To find approximate solutions for problems using Simpson's $(3/8)^{th}$ rule	Flipped class	Formative Assessment Test
	4	Numerical solution of differential equation	3	To understandnumericalsolution of differential equation	Blended class	Slip Test
	5	Taylor's series method and Picard's method.	3	To differentiate Taylor's series method and Picard's method and solve problems	Problem Solving	Formative Assessment Test

Course Instructor: Dr. S.Sujitha **HoD:Dr. T.Sheeba Helen**
Course Instructor: Ms. Princykala **HoD(SF): Dr.S.Kavitha**

Semester VI

Major Core X- Complex Analysis
Course Code: MC2061

No. of hours per week	Credits	Total No. of hours	Marks
6	5	90	100

Objectives: 1. To introduce the basic concepts of differentiation and integration of Complex functions.

2. To apply the related concepts in higher studies.

Course Outcome

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO - 1	understand the geometric representation of mappings	PSO - 1	U
CO - 2	use differentiation rules to compute derivatives and express complex- differentiable functions as power series	PSO - 4	E
CO - 3	compute line integrals by using Cauchy's integral theorem and formula	PSO - 3	E
CO - 4	identify the isolated singularities of a function and determine whether they are removable, poles or essential	PSO – 1	U
CO - 5	evaluate definite integrals by using residues theorem	PSO – 5	C

Unit	Module	Topics	Lecture hours	Learningoutcomes	Pedagogy	Assessment/ evaluation
I	1	Differentiability – definitions and theorems	3	To analyse the basic properties of differentiability	Lecture	Assignment
	2	Cauchy Riemann equations – theorems and examples, Alternate forms of C.R equations – theorems and	7	To get necessary & sufficient condition for differentiability	Lecture	Formative Assessment

		problems				
	3	Analytic functions– definition and problems	5	To discuss some properties of an analytic function	Lecture	Test
	4	Harmonic functions – definitions, theorems and problems	7	To find an analytic functions	Lecture with group discussion	Assignment
II	1	Bilinear transformations – elementary transformation and cross ratio	7	To determine the image of given region under bilinear transformation	Lecture with PPT	Quiz
	2	Fixed Points of Bilinear Transformation	2	To obtain fixed points under varies bilinear transformation	Problem solving	Assignment
	3	Mapping by Elementary Functions-$w = z^2, w = z^n, w = e^z, w = \sin z, w = \cos z,\ w = \cosh z$	3	To explain the properties of elementary functions	Lecture with PPT	Slip Test
III	1	Definite integral – definitions, theorems and examples	4	To evaluate definite integral	Lecture	Assignment
	2	Cauchy's theorem – definition and theorems	5	To prove Cauchy's theorems	Lecture	Test
	3	Cauchy's integral formula – theorems and problems	5	To evaluate integrals	Lecture with group discussion	Test

IV	1	Taylor's series- Taylor's theorem and problems	5	To expand the given function as Taylor's series	Lecture	Assignment
	2	Laurent's Series – Laurent's theorem and problems	5	To expand the given function as Laurent's series	Lecture	Formative Assessment
	3	Zeros of analytic functions – definition and problems	3	To determine the zeros of an analytic functions	Lecture with group discussion	Assignment
	4	Singularities – definitions and examples	1	To find the singularity of a given function	Lecture with group discussion	Slip Test
V	1	Residues – definition, lemmas and problems	5	To find the residue of a given function	Lecture	Test
	2	Cauchy's residue theorem – theorems and examples	3	To applyCauchy's residue theorem by evaluating the integrals.	Discussion	Test
	3	Evaluation of definite integrals – method and problems	5	To evaluate the definite integrals by using the given method.	Lecture	Formative Assessment

Course Instructor (Aided): Dr. M. K. Angel Jebitha **HoD(Aided): Dr. T. Sheeba Helen**
Course Instructor (S.F): Ms. V. Princy Kala **HoD(S.F): Dr. S. Kavitha**

Name of the Course : Mechanics
Subject code : MC2062

No. of hours per week	Credits	Total No. of hours	Marks
6	5	90	100

Objectives:

3. To visualize the application of Mathematics in Physical Sciences.
4. To develop the capacity to predict the effects of force and motion.

Course Outcome

CO	Upon completion of this course the students will be able to:	PSO addressed	CL

CO - 1	calculate the reactions necessary to ensure static equilibrium	PSO - 2	U
CO - 2	apply the principles of static equilibrium to particles and rigid bodies	PSO - 4	Ap
CO - 3	understand the ways of distributing loads	PSO - 5	C
CO - 4	identify internal forces and moments of a rigid body	PSO - 3	Ap
CO - 5	apply the basic principles of projectiles into real world problems	PSO - 2	Ap
CO - 6	classify the laws of friction	PSO - 4	An

Unit	Section	Topics	Lecture hours	Learning outcomes	Pedagogy	Assessment/evaluation
I	**Forces acting at a point, Parallel forces and moments**					
	5.	Forces Acting at a Point: Resultant and Components - Sample cases of finding the resultant -Analytical expression for the resultant of two forces acting at a point – Triangle forces – Perperndicular Triangular forces – Converse of the Trigangle of Forces- The Polygon of Forces, Lami's Theorem, Problems based on Lami's Theorem	4	To apply the principles of static equilibrium to particles and rigid bodies.	Lecture with PPT Illustration	Evaluation through test
	6.	Resultant of two like parallel forces, two unlike and unequal parallel forces, Resultant of number of parallel forces, equilibrium of three coplanar parallel forces	3	To distinguish the like and unlike parallel forces and determine their resultant and apply those principles to particles and rigid bodies.	Lecture with Illustration	Evaluation through test
	7.	Moment of a force, Geometrical representation,Varignon's theorem of moments	4	To understand the theorems of moments.	Lecture with Illustration	Test
	8.	Generalised theorem of moments, Problems based onVarignon's	4	To Calculate the algebraic sum of the moments of the forces	Discussion with Illustration	Quiz and Test

		theorem of moments, Generalised theorem of moments		of a rigid body.		
II	**Couples, Coplanar Forces**					
	6.	Couples – Equilibrium of two couples – Representation of a couple by a vector – Resultant of coplanar couples – Resultant of couple and a force – Problems based on Couples, Introduction and reduction of any number of coplanar forces,Analytical proof.	4	To identify couples and coplanar forces and find their resultant.	Lecture with PPT	Test
	7.	Conditions for forces to reduce a single force or couple, Change of the base point & Equation to the line of action of the resultant	3	To construct a couple or a single force from the given coplanar forces.	Lecture	Test
	8.	Problems based on reduction of number of coplanar forces	2	To identify the coplanar forces and find their resultant.	Lecture	Formative Assessment Test
	9.	Problems based on forces to reduce a single force or couple	3	To construct a couple or a single force from the given coplanar forces and solve problems.	Group Discussion	Test
	10.	Problems based on Equation to the line of action of the resultant	3	To calculate the algebraic sum of the moments of the forces of a rigid body.	Group Discussion	Test
III	**Friction**					
	5.	Introduction, Statical, Dynamical, Limiting friction and Laws of friction, Coefficient of friction, Angle of friction, Cone of friction	4	To classify the laws of friction and analyze the problems involving frictional forces.	Lecture with PPT Illustration	Quiz
	6.	Equilibrium of a particle on a rough inclined plane, Equilibrium of a body on a rough inclined plane under a force parallel to the plane, Equilibrium of a body on a rough inclined plane under any force.	3	To understand the principles of friction to particles and rigid bodies.	Lecture with Illustration	Test

	7.	Problems based on Coefficient of friction, angle of friction	4	To apply the principles of friction to particles and rigid bodies.	Lecture	Test
	8.	Problems based on Equilibrium of a particle on a rough inclined plane and equilibrium of a body on a rough inclined plane under a force parallel to the plane	4	To identify the principles and solve problems.	Group Discussion	Formative Assessment Test
IV	**Projectiles**					
	5.	Introduction, Definitions, fundamental principles, Path of a projectile, Characteristics of the motion of a projectile	3	To understand the motion of projectile in various directions.	Lecture with PPT Illustration	Quiz
	6.	Path of a projectile at a certain height above the ground, Problems based on Path of a projectile, Problems based on Characteristics of the motion of a projectile	4	To understand the path of a projectile in various directions and apply the principles into real world problems.	Lecture and group discussion	Test
	7.	Maximum horizontal range, Two possible directions of projection, Problems based on maximum horizontal range and Two possible directions of projection	4	To understand the range and various directions of projectile and apply the principles into real world problems.	Lecture with Illustration	Test
	8.	Velocity of the projectile, Velocity of the projectile falling freely from the directrix, Problems based on Velocity of the projectile	4	To understand the velocity of a projectile and apply the principles into real world problems.	Lecture with Illustration	Test
V	**Motion under the action of central forces**					
	5.	Motion under the action of central forces – Introduction– Velocity and Acceleration in Polar Coordinates	4	To understand velocity and acceleration in polar coordinates and solve real life problems.	Lecture with PPT Illustration	Test
	6.	Equation of Motion in Polar Coordinates – Note on the equiangular spiral	4	To understand Motion in Polar Coordinates and practice problems related to it.	Lecture with Illustration	Formative Assessment test

		– Motion under a central force.				
	7.	Differential Equation of central orbits – Perpendicular from the pole on the tangent – Pedal equation of the central orbit – Pedal equation of some of the well-known curves –	4	To calculate Pedal equation of some of the well-known curves.	Lecture with Illustration	Assignment
	8.	Velocities in a central orbit – Two – fold problems in central orbits.	3	To understand the two types of problems that arise in connection with central orbits.	Lecture with PPT Illustration	Assignment&Quiz

Course Instructor (Aided): Dr. V. Sujin Flower **HoD(Aided): Dr. T. Sheeba Helen**
Course Instructor (S.F): Dr. S. Kavitha **HoD(S.F): Dr. S. Kavitha**

Semester VI
Major Core XII- Number Theory
Course Code: MC2063

No. of hours per week	Credits	Total No. of hours	Marks
5	4	75	100

Objectives: 1. To introduce the fundamental principles and concepts in Number Theory.
2. To apply these principles in other branches of Mathematics.

Course Outcome

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO - 1	express the concepts and results of divisibility of integers effectively	PSO - 1	U
CO - 2	construct mathematical proofs of theorems and find counter examples for false statements	PSO - 2	Ap

CO - 3	collect and use numerical data to form conjectures about the integers	PSO - 5	Ap
CO - 4	understand the logic and methods behind the major proofs in Number Theory	PSO - 4	An
CO - 5	solve challenging problems related to Chinese remainder theorem effectively	PSO - 3	E
CO - 6	build up the basic theory of the integers from a list of axioms	PSO - 1	U

Total contact hours: 75 (Including lectures, assignments and tests)

ni	Section	Topics	Lectu re hours	Learning outcomes	Pedagogy	Assessment/ev aluation
I	Divisibility Theory in the Integers					
	1	Preliminaries – Numbers, integers, Divisors and Divisibility Theory in the Integers	3	To understand the primary concepts of Numbers, integers, Divisors and their origin and Divisibility Theory in the Integers	Lecture with Illustration	Evaluation through appreciative inquiry
	2	The Division Algorithm theorem and its applications	3	To identify the divisors, quotient and the way of expressions	Lecture with illustration	Evaluation through quizzes and discussions.
	3	The greatest common divisor and least common multiple	3	To understand GCD and LCM of numbers and the relation between them	Lecture with Illustration	Slip Test
	4	Euclid's lemma and Euclidean Algorithm.	3	To express Euclid's lemma and Euclidean Algorithm and solve problems	Problem solving	Quiz and Test
	Diophantine Equation					
	1	The Diophantine Equation $ax + by = c$	3	To know about linear equations with two or more unknowns	Lecture with illustration	Evaluation through discussions.
	2	Primes and their Distribution.	3	To understand about Primes and their Distribution.	Problem solving	Evaluation through appreciative inquiry
	3	The fundamental theorem of arithmetic	3	To express every number as a product of primes	Lecture	Formative Assessment Test
	4	The Sieve of Eratosthenes	3	To understand the Sieve of Eratosthenes	Group Discussion	Formative Assessment Test
I	**Theory of Congruences**					
	1	Theory of Congruences	3	To explain the primary concepts of congruences	Lecture with Illustration	Evaluation through appreciative inquiry
	2	Basic properties of	3	To understand the basic properties of congruence	Flipped Class	Evaluation through quizzes

		congruence				and discussions.
	3	Linear congruences and the Chinese remainder theorem.	3	To construct Chinese remainder theorem	Lecture with Illustration	Slip Test
	4	Problems based on Chinese remainder theorem.	3	To solve problems related to Chinese remainder theorem	Discussion with Illustration	Quiz and Test
V	**Pseudoprimes**					
	1	Fermat's Little theorem and Pseudoprimes	2	To construct Fermat's Little Theorem and pseudoprimes	Lecture with PPT Illustration	Evaluation through discussions.
	2	Absolute pseudoprimes	3	To identify absolute pseudo primes	Flipped Class	Evaluation through appreciative inquiry
	3	Wilsons theorem	3	To construct Wilson's Theorem	Lecture with Illustration	Formative Assessment Test
	4	Quadratic Congruence.	3	To understand quadratic congruence.	Group Discussion	Slip Test
	Number Theoretic Functions					
	1	Number Theoretic Functions	3	To understand the primary concepts of Number Theoretic Functions	Lecture with Illustration	Evaluation through discussions.
	2	The sum and number of divisors	3	To find the sum of divisors and number of divisors	Lecture and group discussion	Evaluation through Assignment
	3	The Mobius Inversion formula.	3	To construct Mobius Inversion formula	Flipped class	Formative Assessment Test
	4	The greatest integer function.	3	To construct the greatest integer function	Lecture with Illustration	Slip Test

Course Instructor: Dr. S.Sujitha **HoD:Dr. T.Sheeba Helen**
Course Instructor: Ms. Y.A. Shiny **HoD(SF): Dr.S.Kavitha**

Semester - VI

Name of the Course: Major Core XIII- Linear Programming
Subject code: MC 2064

No. of hours per week	Credit	Total No. of hours	Marks
5	5	75	100

Objectives: 1. Tosolve reallife problems with the use of LPP problems.

2.To learn optimization techniques.

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Course Outcome

CO	Upon completion of this course the students will be able to:	PSOs addressed	CL
CO - 1	understand the origin and development of Operations Research	PSO - 1	U
CO - 2	explain what is an LPP	PSO - 1	U
CO - 3	define how to formulate an LPP with linear constraints	PSO - 1	R
CO - 4	maximize the profit, minimize the cost, minimize the time in transportation problem, Travelling salesman problem, Assignment problem	PSO - 3	Ap
CO - 5	identify a problem in your locality, formulate it as an LPP and solve	PSO - 4	C

Unit I	Section	Topics	Lecture hours	Learning Outcomes	Pedagogy	Assessment/evaluation
	1	Formulation of LPP, Mathematical Formulation of LPP, Solution of LPP	3	To write the standard form of LPP and to find solutions	Lecture with examples	Lecture and discussions
	2	Graphical method	4	To solve LPP in graphical method	Lecture	Lecture with illustrations
	3	Algorithm for Simplex method	1	To learn about Algorithm for Simplex method	Lecture with Illustration	Lecture
	4	Simplex method problems	3	To solve LPP by simplex method		Evaluation
	5	Algorithm for Big-M Method, Big-M Method problems	4	To solve LPP by Big-M method	Discussion with Illustration	Lecture and discussions
Unit II	1	Two phase method - Phase I : Solving auxiliary LPP using Simplex method	4	To solve LPP by Two Phase method	Lecture with PPT	Lecture
	2	Phase II : finding optimal basic feasible solution	3	To find basic feasible solution by Two Phase method- Phase II	Lecture with PPT	Evaluation through Test
	3	Duality in L.P.P, Primal, Formation of dual L.P.P, Matrix form of primal and its dual, Fundamental theorem of duality	3	To learn about duality in LPP	Lecture	Lecture with illustrations
	4	Dual Simplex Algorithm, Dual simplex problems	3	To solve LPP by dual simplex method	Group Discussion	Lecture and problem solving
	5	Degeneracyand cyclinginL.P.P.	2	To learn about Degeneracyand cyclinginL.P.P.	Lecture	Evaluation through discussions
Unit III	1	Mathematical formulation of Transportation Problems, Dual of a Transportation Problem	2	To know about Transportation problems	Lecture with Illustration	Lecture
	2	Solution of a Transportation Problem, North-West corner rule	2	To solve Transportation Problems by North-West corner rule	Lecture	Formative Assessment Test
	3	Row minima method, Column minima method, Least Cost Method	3	To solve Transportation Problems by Row minima method,	Group Discussion	Slip Test

				Column minima method, Least cost method		
	4	Vogel'sApproximation Method	3	To solve Transportation Problems by Vogel Approximation Method	Lecture with PPT Illustration	Evaluation through discussions
	5	Degeneracy inTransportation Problems	3	To learn about Degeneracyin TP	Lecture and group discussion	Evaluation through Assignment
Unit IV	1	Assignment Problems, Mathematicalformulation, Solution to Assignment Problems	2	To learn the applications ofAssignment Problems and to Solve the Assignment Problems	Lecture with Illustration	Lecture
	2	Hungarian Algorithm for solving Assignment Problem	3	To Solve Assignment Problems by Hungarian method	Lecture	Home Assignment
	3	Travelling Salesman Problem	2	To Solve the Travelling Salesman Problems	Lecture with PPT Illustration	Evaluation through discussions
Unit V	1	Introduction to SequencingofJobs	2	To learn about Introduction to SequencingofJobs	Lecture with Illustration	Lecture with illustrations
	2	Processingnjobsintwomachines	2	To know about Processingnjobsintwomachines	Lecture with Illustration	Slip Test
	3	Processingnjobsinmmachines	3	To know about Processingnjobsinmmachines	Lecture	Home Assignment
	4	Processingtwo jobsinmmachines	3	To know about Processingtwo jobsinmmachines	Lecture	Home Assignment

Course Instructor: Dr.J.Befija Minnie (Aided) **HOD: Dr. T. Sheeba Helen**
Course Instructor: Dr.C. Jenila (S.F) **HOD: Dr. S.Kavitha**

Elective II: (a) Astronomy
Course Code: MC2065

No. of hours per week	Credits	Total No. of hours	Marks
6	4	90	100

Objectives: 1. To introduce space science and to familiarize the important features of the planets, the sun, the moon, and the stellar universe.

2. To predict lunar and solar eclipses and study seasonal changes.

Course Outcome

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO – 1	define the spherical trigonometry of the celestial sphere	PSO - 1	U
CO – 2	discuss Kepler's laws	PSO - 1	U
CO – 3	calculate the motion of two particles relative to the common mass Centre	PSO - 2	Ap
CO – 4	interpret latitude and longitude and apply this to find the latitude and longitude of a particular place	PSO - 4	E
CO – 5	distinguish between Geometric Parallax and Horizontal Parallax	PSO - 4	An

Total contact hours: 90 (Including lectures, assignments,quiz, and tests)

Unit	Section	Topics	Lecture hours	Learning outcome	Pedagogy	Assessment/ Evaluation
I	**Celestial sphere**					
	7.	Spherical trigonometry (only the four formulae) - Celestial sphere	4	To understand the four formulae and related termsabout Celestial sphere.	Lecture Illustration	Evaluation through slip test
	8.	Four systems of coordinates	3	To represent the different systems of co-ordinates in the same figure and conversion of co-ordinates and to find the relation between right ascension and longitude of the Sun.	Lecture Illustration	quiz, test
	9.	Diurnal motion - Sidereal Time	3	To trace the changes in the coordinates of the sun in the course of year. To find the longitude of the Sun	Lecture Illustration	Evaluation through slip test

				on any day and Latitude of a place.		
	10.	Hour angle and Azimuth at rising	3	To understand the R.A and Declination of a body, Hour angle of a body at rising and setting and duration of day time Azimuth of a star	Lecture Illustration	Class test
	11.	Morning and Evening stars	3	To identify Morning stars, Evening stars	Lecture Illustration	Assignment
	12.	Circumpolar stars	2	To understand the Circumpolar stars and to find the condition that a star is circumpolar	Lecture Illustration	HomeAssign ment
II	**The Earth**					
	1	The Earth - Zones of the earth	3	To understand about different zones of the Earth	Lecture Illustration	Home Assignment
	2	Perpetual Day and Perpetual night	4	To calculate the durations of day and night during the year at different stations	Lecture Illustration	Evaluation through slip test
	3	Terrestrial latitude and longitude	3	To identify the Terrestrial latitude and longitude	LectureIllustr ation	Formative Assessment
	4	Dip of Horizon	4	To construct problems based on dip of Horizon	Lecture Illustration	Online Quiz, Test
	5	Twilight, Duration of Twilight, Twilight throughout the night, Shortest Twilight.	4	To calculate the duration of Shortest Twilight	LectureIllustr ation	Home Assignment
III	**Geocentric parallax**					
	1	Geocentric parallax - Parallax - Effects of Geocentric parallax	3	To understand basic concepts ofParallaxand Geocentric parallax	Lecture Illustration	SlipTest
	2	Changes in R.A and Declination of a body due to Geocentric Parallax	4	To analyze the Changes in R.A and Declination of a body due to Geocentric Parallax	Lecture Illustration	Online quiz
	3	Angular diameter – Equatorial horizontal	4	To determine the Angular diameter and	Lecture Illustration	Online Assignment

		Parallax		Equatorial horizontal Parallax		
	4	Heliocentric Parallax – Effect of Heliocentric Parallax	3	To analysethe Heliocentric Parallax and Effect of Heliocentric Parallax	Lecture Illustration	SlipTest
	5	To find the effect of Parallax on the Longitude and Latitude of a Star - Parsec	4	To find the solution of the effect of Parallax on the Longitude and Latitude of a Star and Parsec	Lecture Illustration	Online Assignment
IV	**Kepler's laws**					
	1	Kepler's laws - Eccentricity of Earth's orbit –	3	To understand the Kepler's laws and the Eccentricity of Earth's orbit	LectureIllustration	SlipTest
	2	Verification of Kepler's Laws (1) and (2) - Newton's deductions from Kepler's laws	3	To verify Kepler's Laws and understand Newton's deductions from Kepler's laws	Lecture Illustration	Home Assignment
	3	To derive Kepler's Third Law from Newton's law of Gravitation –To find the mass of a planet	4	To understand theKepler's third law which is derived from Newton's law of gravitation	Lecture Illustration	quiz
	4	To fix the position of a planet in its elliptic orbit – Geocentric and Heliocentric latitudes and longitudes	4	To study the position of a planet in its elliptic orbit, Geocentric and Heliocentric latitudes and longitudes	Lecture Illustration	Formative Test, Online Quiz
	5	To prove that the Heliocentric longitude of the Earth and Geocentric longitude of the Sun differ by 180^o	4	To determine the solutions of Heliocentric longitude of the Earth and Geocentric longitude of the Sun differ by 180^o	Lecture Illustration	Slip Test
V	**Two Body Problem**					
	1	Two Body Problem - Introduction – Newton's Fundamental equation of Motion	4	To understand the Two Body Problem and Newton's Fundamental equation of Motion	Lecture Illustration	ClassTest
	2	Motion of one particle	3	To calculate the	LectureIllustr	Formative

		relative to another		Motion of one particle relative to another	ation	assessment
	3	The motion of the common center of mass	3	To understand the motion of the common center of mass	LectureIllustration	Online Quiz
	4	The motion of two particles relative to the common mass center	4	To learn the motion of two particles relative to the common mass center	LectureIllustration	Online Assignment
	5	The motion of a planet with respect to the Sun	4	To find the motion of a planet with respect to the Sun	Lecture thro google meet	Class test

Course Instructor: Ms. J.C.Mahizha **HOD:Dr.T. Sheeba Helen**
Course Instructor: Ms. Monisha **HOD:Dr. S.Kavitha**