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:

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

СО	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	Learning outcomes	Pedagogy	Assessment/
			hours			evaluation
Ι	Curvatu	re				
	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	0	Centre of curvature, E	volute			

	1.	Definition and	5	To understand the	Lecture	Test
		problems based on centre of curvature of the curve		definition of centre of curvature of the curve		
	2.	Definition and problems related to	5	To understand the definition of evolute of	Lecture	Q&A
		evolute of the curve		the curve and practice problems		
	3.	Definition and problems on circle	5	To practice various problems related to	Lecture	Formative Assessment
		of curvature		circle of curvature		Test
III	A	symptotes				
	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	Hyperbo	olic functions, Logarit	hm of Con	plex 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		ummation of Trigono			1 _	
	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 Course Instructor: Ms. V. Princy Kala

HoD: Dr. V. M. Arul Flower Mary 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.

СО	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	Ар
CO - 3	Revise the properties of eigen values of the matrices	PSO - 3	Е
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	Ар

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

Unit	Section	Topics	Lecture hours	Learning outcome	Pedagogy	Assessment/ Evaluation
Ι	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

	3.	rational coefficients and solving equations when one root and two roots given. Formation of equation of the lowest degree with rational coefficients whose roots are given	3	equations and to solve equations when one root and two roots given. Practice the formation of equations and compute symmetric functions of roots in terms of coefficients whose roots are given	discussion	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	Transfo	rmation 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 thereal 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	Ν	Aatrices				
	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	E	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		Sourier 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

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

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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.

СО	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	Ар
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	Ар
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 (Includin	g lectures, assignments and tests)

10	Total contact nours: ob (including rectures, assignments and tests)									
Unit	Section	Topics	Lecture hours	Learning outcomes	Pedagogy	Assessment/ valuation				
I	BODN	/IAS rule								

		1			Γ	I		
	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		
I	Percent	age						
	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		
II	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		
V	Ratio ar	nd 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 Course Instructor: Dr.J.C.Evelin HoD: Dr. V. M. Arul Flower Mary HoD(SF): Mrs. J. Anne Mary Leema

Name of the course: Differential Equations and Vector CalculusCourse 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.

СО	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	Sect	tion	Topics	Lectu	Learning outcome	Pedagogy	Assessment
				re			/Evaluation
				hours			
Ι	Line	ear Diff	erential equations	5			
	1	Introd	uction of Linear	5	Distinguish linear,	Lecture	Evaluation
		Differ	ential equations		nonlinear, ordinary	with	through:
	with constant		onstant		and partial	illustration	Short test on
		coeffic	cients, Formation		differential		finding the
		of aux	illary equation		equations, Solve		particular
		and fir	nding the		linear differential		integral
		compl	ementary		equations with		
		functio	on, Finding the		constant and		
	particular integral for		lar integral for		variable		Short test on
		e ^{ax}			coefficients		homogeneous
	2	Findin	g the particular	3	Solve linear	Lecture	linear equations

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			ll for cos ax, sin		differential	with PPT	
			ding the		equations with	Illustratio	
			lar integral for		constant and	n	
		$e^{ax}f(x)$			variable		
				-	coefficients		
	3		g the particular	3	Distinguish linear,	Lecture	
			l for $x^n f(x)$,		nonlinear, ordinary	with	Formative
			uction of		and partial	illustration	Assessment- I
		-	geneous linear		differential		
		-	ons, Conversion		equations, Solve		
			mogeneous		linear differential		
		linear	equations into		equations with		
		linear	differential		constant and		
		equation	ons with constant		variable		
		coeffic	vients		coefficients		
	4	Solvin	g homogeneous	3	Solve linear	Lecture	
		linear o	equations using		differential	with	
		the log	arithmic		equations with	illustration	
		substit	ution, Solving		constant and		
			eneous linear		variable		
			ons using the new		coefficients		
		operate	-				
II	Lap	olace Tr	ansform		•	·	
	1		Definition of	3	Explain the basic	Lecture	Short test on
	1		Definition of	3	Explain the basic	Lecture	Short lest on
	1			3	Explain the basic properties of	with PPT	
	1		Laplace	5	properties of		Computation of
	1		Laplace Transform,	5	properties of Laplace Transform	with PPT	
	1		Laplace Transform, Properties of	5	properties of	with PPT Illustratio	Computation of Laplace
	1		Laplace Transform, Properties of Laplace	3	properties of Laplace Transform and inverse Laplace	with PPT Illustratio	Computation of Laplace Transform of
	1		Laplace Transform, Properties of Laplace Transform,	5	properties of Laplace Transform and inverse Laplace	with PPT Illustratio	Computation of Laplace Transform of standard
	1		Laplace Transform, Properties of Laplace Transform, Computation of	3	properties of Laplace Transform and inverse Laplace	with PPT Illustratio	Computation of Laplace Transform of standard
	1		Laplace Transform, Properties of Laplace Transform, Computation of Laplace	3	properties of Laplace Transform and inverse Laplace	with PPT Illustratio	Computation of Laplace Transform of standard
	1		Laplace Transform, Properties of Laplace Transform, Computation of	3	properties of Laplace Transform and inverse Laplace	with PPT Illustratio	Computation of Laplace Transform of standard
	1		Laplace Transform, Properties of Laplace Transform, Computation of Laplace Transform of	3	properties of Laplace Transform and inverse Laplace	with PPT Illustratio	Computation of Laplace Transform of standard
			Laplace Transform, Properties of Laplace Transform, Computation of Laplace Transform of standard functions	5	properties of Laplace Transform and inverse Laplace Transform	with PPT Illustratio n	Computation of Laplace Transform of standard
	2		Laplace Transform, Properties of Laplace Transform, Computation of Laplace Transform of standard functions		properties of Laplace Transform and inverse Laplace Transform Explain the basic	with PPT Illustratio n Lecture	Computation of Laplace Transform of standard
			Laplace Transform, Properties of Laplace Transform, Computation of Laplace Transform of standard functions Problems on Laplace		properties of Laplace Transform and inverse Laplace Transform Explain the basic properties of	with PPT Illustratio n Lecture with	Computation of Laplace Transform of standard functions
			Laplace Transform, Properties of Laplace Transform, Computation of Laplace Transform of standard functions Problems on Laplace Transform,		properties of Laplace Transform and inverse Laplace Transform Explain the basic properties of Laplace Transform	with PPT Illustratio n Lecture	Computation of Laplace Transform of standard functions Assignment on
			Laplace Transform, Properties of Laplace Transform, Computation of Laplace Transform of standard functions Problems on Laplace Transform, Definition of		properties of Laplace Transform and inverse Laplace Transform Explain the basic properties of Laplace Transform and inverse Laplace	with PPT Illustratio n Lecture with	Computation of Laplace Transform of standard functions Assignment on the related
			Laplace Transform, Properties of Laplace Transform, Computation of Laplace Transform of standard functions Problems on Laplace Transform, Definition of Inverse Laplace		properties of Laplace Transform and inverse Laplace Transform Explain the basic properties of Laplace Transform	with PPT Illustratio n Lecture with	Computation of Laplace Transform of standard functions Assignment on
			Laplace Transform, Properties of Laplace Transform, Computation of Laplace Transform of standard functions Problems on Laplace Transform, Definition of Inverse Laplace Transform,		properties of Laplace Transform and inverse Laplace Transform Explain the basic properties of Laplace Transform and inverse Laplace	with PPT Illustratio n Lecture with	Computation of Laplace Transform of standard functions Assignment on the related
			Laplace Transform, Properties of Laplace Transform, Computation of Laplace Transform of standard functions Problems on Laplace Transform, Definition of Inverse Laplace Transform, Properties of		properties of Laplace Transform and inverse Laplace Transform Explain the basic properties of Laplace Transform and inverse Laplace	with PPT Illustratio n Lecture with	Computation of Laplace Transform of standard functions Assignment on the related
			Laplace Transform, Properties of Laplace Transform, Computation of Laplace Transform of standard functions Problems on Laplace Transform, Definition of Inverse Laplace Transform,		properties of Laplace Transform and inverse Laplace Transform Explain the basic properties of Laplace Transform and inverse Laplace	with PPT Illustratio n Lecture with	Computation of Laplace Transform of standard functions Assignment on the related
	2		Laplace Transform, Properties of Laplace Transform, Computation of Laplace Transform of standard functions Problems on Laplace Transform, Definition of Inverse Laplace Transform, Properties of Inverse Laplace Transform	5	properties of Laplace Transform and inverse Laplace Transform Explain the basic properties of Laplace Transform and inverse Laplace Transform	with PPT Illustratio n Lecture with illustration	Computation of Laplace Transform of standard functions Assignment on the related
			Laplace Transform, Properties of Laplace Transform, Computation of Laplace Transform of standard functions Problems on Laplace Transform, Definition of Inverse Laplace Transform, Properties of Inverse Laplace Transform,		properties of Laplace Transform and inverse Laplace Transform Explain the basic properties of Laplace Transform and inverse Laplace Transform	with PPT Illustratio n Lecture with illustration	Computation of Laplace Transform of standard functions Assignment on the related
	2		Laplace Transform, Properties of Laplace Transform, Computation of Laplace Transform of standard functions Problems on Laplace Transform, Definition of Inverse Laplace Transform, Properties of Inverse Laplace Transform	5	properties of Laplace Transform and inverse Laplace Transform Explain the basic properties of Laplace Transform and inverse Laplace Transform	with PPT Illustratio n Lecture with illustration	Computation of Laplace Transform of standard functions Assignment on the related

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		specific		and inverse Laplace		
		functions,		Transform		
		Problems on				
		Inverse Laplace				
		Transform				
	4	Solving Linear	4	Use the Laplace	Lecture	Formative
		Differential		transform in finding	with	Assessment –II
		equations using		the solution of	illustration	
		Laplace		linear differential	mustration	
		Transform,		equations		
		Solving		equations		
		-				
		simultaneous				
		equations using				
		Laplace				
		Transform				
III		erential equation		ſ	1	
	1	Introduction of	4	Learn methods of	Lecture	Short test on
		Partial		forming and	with	formation of
		differential		solving partial	illustration	Partial
		equations,		differential		differential
		Formation of		equations		equations by
		Partial		1		eliminating the
		differential				unknown
		equations by				constants, and
		eliminating the				arbitrary
		unknown				function.
		constants,				runetion.
		Formation of				
		Partial				
		differential				
		equations by				
		eliminating the				
		arbitrary				
		functions	2	T	.	
	2	Methods of	3	Learn methods of	Lecture	<u>.</u>
		solving Partial		forming and	with PPT	Quiz
		differential		solving partial	Illustratio	
		equations,		differential	n	
		Standard form		equations		
		of Lagrange's				
		equation,				
		General				Earna ations
		solution of				Formative
		Lagrange's				Assessment-III
		equation				
	3	Solving	4	Learn methods of	Lecture	
L	1	0	1		L	

		Lagrange's equation by method of grouping,		forming and solving partial differential equations	with illustration	
		Solving Lagrange's equation by method of multipliers				
	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		fferentiation			-	
	2 (]]]]]]]]]]]]]]]]]]	Revision of dot and cross product of vectors, Definition and heorems 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
	(c a I I t t t t	Problems based on Gradient, Equation of tangent plane and normal line for a single surface, Equation of angent line and normal plane for he intersection of two surfaces	4	Learn differentiation and integration of vector valued functions	Lecture with illustration	Formative Assessment-I
	3 4 t	Angle between wo 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 I	ntegration				
	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
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	theorem Formative Assessment-III

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

Major Core IV

Semester	: III
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.

СО	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	Ар
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)

	Total contact notifs: 72 (including feetal cs, assignments and tests)					
Unit	Section	Topics	Lectu	Learning outcomes	Pedagogy	Assessment/
			re			evaluation
			hours			
Ι	Prelin	ninaries		·	•	·
	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			I	I
	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	Sequenc	es				
	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	Subsequ	iences			·	·
	1	Subsequences- Definition Theorems based onSubsequences Subsequences-	2	Explain the primary concepts of Subsequences	Lecture with PPT Illustration	Evaluation through discussions.
		Examples				

	5	Problems based on Integral Test.	2	To solve the Problems based on Integral Test.	Lecture with	Quiz and 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
	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
	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
• •	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.
V	4 Series of	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
	3	Cauchy sequences- Definition Cauchy sequences- examples	3	To apply the principles of Cauchy sequences	Lecture	Formative Assessment Test
		Peak points-Examples Limit points Limit points-Examples		peak point of sequences	with Illustration	through appreciative inquiry

Course Instructor: Dr. Angel Jebitha Course Instructor: Dr.S.Kavitha HoD:Dr. V. M. Arul Flower Mary 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.

СО	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	Ар
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
Ι	Probabili	ty			L	
	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

[T					1
				variables, their		
				types and related		
				concepts		
	2	Example and	3	To recall the	Lecture	Test
		Theorems		definition of	with	
		based on		probability and	Illustration	
		Events,		to apply the		
		Problems		techniques to		
		based on		prove the		
		events and		properties of		
		sample space		probability and		
				related		
				distributions		
	3	Conditional	3	To recall the	Lecture	Quiz and Test
		probability,		definition of	with PPT	
		Problems		probability and	Illustration	
		based on		apply the		
		Conditional		techniques to		
		probability		prove the		
		procucinty		properties of		
				probability and		
				related		
				distributions		
	4	Properties –	3	To detect the	Lecture	Formative
		Independent		different	with	Assessment
		events,		probability	Illustration	Test
		Theorems		distributions	mastration	1050
		based on		which are		
		independent		widely used and		
		events,		to recall the		
		Problems				
				definition of		
				definition of probability and		
		based on		probability and		
		based on independent		probability and apply the		
		based on		probability and apply the techniques to		
		based on independent		probability and apply the techniques to prove the		
		based on independent		probability and apply the techniques to prove the properties of		
		based on independent		probability and apply the techniques to prove the properties of probability and		
		based on independent		probability and apply the techniques to prove the properties of probability and related		
	5	based on independent events.	2	probability and apply the techniques to prove the properties of probability and related distributions	Lecture	Test
	5	based on independent events. Baye's	2	probability and apply the techniques to prove the properties of probability and related distributions To understand	Lecture	Test
	5	based on independent events. Baye's theorem and	2	probability and apply the techniques to prove the properties of probability and related distributions To understand the definition of	with	Test
	5	based on independent events. Baye's theorem and Problems	2	probability and apply the techniques to prove the properties of probability and related distributions To understand the definition of random		Test
	5	based on independent events. Baye's theorem and Problems based on	2	probability and apply the techniques to prove the properties of probability and related distributions To understand the definition of random variables, their	with	Test
	5	based on independent events. Baye's theorem and Problems based on Baye's	2	probability and apply the techniques to prove the properties of probability and related distributions To understand the definition of random variables, their types and related	with	Test
II		based on independent events. Baye's theorem and Problems based on	2	probability and apply the techniques to prove the properties of probability and related distributions To understand the definition of random variables, their	with	Test

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

				Γ	,
			probability and		
			related		
			distributions		
2	Cumulant	3	To recall the	Group	Short Test
	generating		definition of	Discussion	
	function,		probability and		
	properties and		set functions and		
	Problems		to apply the		
	based on		techniques to		
	Cumulantgener		prove the		
	ating Function		properties of		
	uning i uniotion		probability and		
			related		
			distributions		
3	Characteristic	3	To recall the	Lecture	Test
5	function,	5	definition of		1051
	· ·			with	
	properties,		probability and	Illustration	
	Problemsbased		set functions, to		
	on		detect the		
	Characteristic		different		
	function and		probability		
	Poisson		distributions		
	distribution		which are		
			widely used		
			and to apply the		
			techniques to		
			prove the		
			properties of		
			probability and		
			related		
			distributions		
4	Theorems	3	To recall the	Group	Short Test
	based on		definition of	Discussion	
	Poisson		probability and		
	distribution,		set functions and		
	Problems		to apply the		
	based on		techniques to		
	Poisson		prove the		
	distribution,		properties of		
	Mode,Moment		1 1		
			probability and related		
	Generating				
	Functionof		distributions and		
	Poisson		to understand		
	distribution		the definition of		
			random		
			variables, their		

				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

4Fitting of binomial distribution, examples, Problems based on fitting of tistribution examples, Problems binomial distribution tistribution probability used and fitting of to apply the probability and related distributionsTestVNormal Distribution distributionTo recall the distributionsLecture with IllustrationVNormal Distribution distributionTo recall the probability and related distributionsLecture with IllustrationVNormal DistributionTo recall the definition of probability and set functions and origin of normal distributionsTo recall the definition of probability and set functions and origin of normal distributionLecture with Illustration2Standard mode, Median, Moment Generating related distribution, distributionsTo recall the definition of probability and related distributionsLecture with Ullustration2Standard normal variate, mode, Median, Moment Generating trunctionabout distribution, trunceTo recall the definition of probability and related distribution distributionLecture with Milustration3Problems basedon mean of normal distributionTo recall the definition of mean of normal distributionLecture with mean of normal distribution theorems basedon mean of normal distributionLecture with mean of normal distribution theorems basedon mean of normal distributionTo recall the definition of mean of normal distribution <th></th> <th></th> <th>1</th> <th>1</th> <th>1 1 11 1</th> <th></th> <th>1</th>			1	1	1 1 11 1		1
Image: second					probability and		
4 Fitting of binomial distribution, examples, Problems based on fitting of binomial distribution 3 To detect the different probability which are widely used and fitting of binomial distribution Lecture with Illustration Test V Normal Distribution prove the properties of probability and related distributions Lecture with Illustration Test V Normal Distribution To recall the distributions Lecture with Illustration Test 1 Definition, Generating 3 To recall the techniques to probability and related Lecture with Illustration Test 2 Standard normal distribution, mode, Median, Moment definition of probability and related Lecture with Illustration Quiz and Test 2 Standard normal distribution, mean of normal distribution, types and related distribution functionabout mean of normal distribution 3 To recall the definition of random variables, their types and related concepts Lecture with Illustration 3 Problems basedon mean of normal distribution 3 To recall the definition of random variables, their types and related concepts Lecture with Illustration							
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			distribution,		set functions and		
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	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 Course Instructor: Ms. V. Princy Kala HoD: Dr. V. M. Arul Flower Mary HoD(SF): Mrs. J. Anne Mary Leema

Teaching Plan (2019-2020) Semester - V

Name of the Course: Linear AlgebraSubject Code: MC1751

Number of hours per	week Numbe	er of credits	Total number of hours	Marks
6		5	90	100

Objectives:

(i)To introduce the algebraic system of Vector Spaces and the related study of various physical applications.

(ii)To equip students with the ideas of vector space, basis, inner product spaces, linear transformations to pursue their higher studies.

СО	Upon completion of this course the students will be able	PSO	CL
	to:	addressed	
CO-1	Recall and define Groups, Fields and their properties	PSO -1	R
CO- 2	Cite examples of vector spaces ,subspaces and linear	PSO -1	U
	transformations		
CO- 3	Determine the concepts of linear independence, linear	PSO -1	U
	dependence, basis and dimension of vector spaces		
CO- 4	Correlate rank and nullity ,Linear transformation and matrix	PSO-2	Ар
	of a Linear transformation		
CO- 5	Examine whether a given space is an inner product space and	PSO-3	Ар
	the orthonormality of sets		

Unit	Module	Topics	Lecture hours	Learning outcomes	Pedagogy	Assessment/e valuation
Ι	Ector Spa	ices				
	1	Vector spaces - Definition and Examples	3	Understand the basic definitions and fundamental concepts of Vector spaces	Lecture with illustration	Slip Test
	2	Sub spaces -	4	Identify the difference between Vector spaces and subspaces	Lecture	Brain Storming
	3	Sub spaces –solved problems	4	Learn to solve the problems based on sub Spaces.	Lecture with Group Discussion	Assignment
	4	Linear	4	Understand the concept	Lecture with	Jigsaw

		Transformation		of Linear Transformation.	PPT	
II	Span of a	a set	·			
	1	Span of a Set	4	Understand the definitions and basic concepts of span of a set	Lecture	Slip Test
	2	Linear Independence	4	Identify the difference between Linear Independence and dependence.	Lecture with illustration	Assignment
	3	Basis	3	Understand the concept of Basis	Lecture with PPT	Formative Exam
	4	Dimension	4	Solve the problems based on Basis and dimension.	Lecture with video	Slip Test
III	Rank an	d Nullity				
	1	Rank and Nullity	3	Understand the concept of Rank and Nullity	Lecture	Quiz
	2	Matrix of a linear transformation	3	Determine the concepts of Matrix of a linear transformation	Lecture with illustration	Test
	3	Characteristic Equation	3	Solve the problems based on Characteristic Equation	Lecture with PPT	Slip Test
	4	Cayley –Hamilton theorem	3	Learn the theory of Cayley –Hamilton theorem	Blended Learning	Assignment
	5	Eigen Values and eigen vectors.	3	Solve the problems based on eigen Values and eigen vectors.	Lecture	Formative Exam
IV	Inner Pr	oduct Spaces				
	1	Inner Product Spaces-Definition and Examples	5	Understand the definition and examples of Inner Product Spaces	Lecture with illustration	Quiz
	2	Orthogonality	5	To practice various problems on Orthogonality	Lecture , Blended Learning	Brain Storming
	3	Orthogonal Complement	5	Learn to find the Orthogonal Complement	Lecture	Assignment
V	Bilinear	form				
	1	Bilinear forms	5	Understand the	Lecture	Quiz

			definition of Bilinear forms	with illustration	
2	Quadratic forms	5	Distinguish between Bilinear forms and Quadratic forms	Lecture	Assignment
3	Reduction of a quadratic form to the Diagonal form	5	To practice various Problems based on Reduction of a quadratic form to the Diagonal form	Lecture	Formative Exam

Course Instructor (Aided): Dr. L. Jesmalar Course Instructor (S.F): Ms. R.N. Rajalekshmi HoD(Aided): Dr. V.M. Arul Flower Mary HoD(Aided): Ms. J. Anne Mary Leema

Name of the Course: Real AnalysisSubject code: MC1752

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, compactness and uniform convergence.
- 2. To use these concepts in higher studies.

СО	Upon completion of this course the students will be able to :	PSO addressed	CL
CO-1	Understands 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	Ар
CO- 3	Distinguish between continuous functions and uniform continuous functions	PSO-9	An
CO -4	Use the basic concepts in the development of real analysis results	PSO-1	С
CO- 5	Understand the concepts of countable and uncountable sets, metric space, connectedness, compactness of metric spaces	PSO-7	U

CO- 6	Develop the ability to reflect on problems that are quite	PSO-8	Ар
	significant in the field of real analysis		

Unit	Module	Topics	Lecture hours	Learning outcomes	Pedagogy	Assessment/ evaluation
Ι	1	Introduction to real analysis. Definitions, examples and theorems on Countable and Uncountable Sets.	4	To determine countable and uncountable sets	Lecture with PPT	Quiz
	2	Metric spaces definitions, problems and theorems	5	To explain about metric spaces	Lecture, Group discussion	Test
	3	Bounded sets definitions and problems	2	To find out a set is bounded or unbounded	Lecture	Quiz
	4	Open ball, open sets definitions, examples, problems and theorems	3	To solve problems on open sets	Lecture with PPT	Assignment
	5	Equivalent metrics, Subspace	3	To analyse about equivalent metrics	Lecture	Test
II	1	Interior of a set definitions, examples, problems and theorems	3	To analyse about interior of a set	Lecture with group discussion	Assignment
	2	Closed sets, closure definitions, examples, problems and	4	To determine the closed sets and closure of the subsets	Lecture	Formative Assessment

		theorems				
	3	Limit point definitions, examples, problems and theorems, Dense sets definitions, examples, and theorems	3	To find the limit point	Lecture	Assignment
	4	Complete metric space definitions, examples, problems and theorems	5	To analyse about complete metric space	Lecture with group discussion	Test
	5	Cantor's intersection theorem, Baire's Category theorem	3	To explain the theorems	Lecture	Test
ш	1	Continuity of functions definitions, examples, problems and theorems	4	To determine the continuity of a function	Lecture	Assignment
	2	Composition of continuous functions problems	3	To analyse about composition of continuous functions problems	Lecture	Assignment
	3	Homeomorphism examples	3	To learn to prove homeomorphism	Lecture with group discussion	Test
	4	Uniform continuity definitions, examples, problems and theorems	2	To determine the uniformly continuous functions	Lecture	Assignment
	5	Discontinuous functions definitions, examples, problems and theorems	5	To test the discontinuity of a function	Lecture with PPT	Test
IV	1	Connectedness	3	To learn to prove the	Lecture	Quiz

		definitions, examples, problems and theorems		connectedness of the subsets	with group discussion	
	2	Connected subsets of R problems and theorems	3	To determine the connected subsets	Lecture	Formative Assessment
	3	Connectedness and continuity problems and theorems	3	To compare connectedness and continuity	Lecture with group discussion	Assignment
	4	Intermediate value theorem	1	To learn Intermediate value theorem	Lecture	Test
V	1	Compactness definitions, examples, and theorems	3	To explain the concept compactness	Lecture	Test
	2	Compact subsets of R theorems	2	To learn to prove the theorems	Lecture	Test
-	3	Equivalent characterisations for compactness problems and theorems	5	To learn to prove the theorems	Lecture	Formative Assessment
	4	Compactness and continuity	3	To compare compactness and continuity	Lecture	Test

Course Instructor (Aided): Dr.J. Befija Minnie Course Instructor (S.F): Ms. V. Mara Narghese HoD(Aided): Dr. V.M. Arul Flower Mary HoD(Aided): Ms. J. Anne Mary Leema

Name of the Course : Graph Theory

Course code : MC1753

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

Objectives:

1. To introduce graphs, directed graphs and the concepts of connectedness and labeling.

2. To apply these concepts in research.

СО	Course Outcomes Upon completion of this course the students	PSO addressed	CL
CO - 1	will be able to: understand the basic definitions to write the proofs of simple	PSO - 1	U
	theorems		C
CO - 2	employ the definitions to write the proofs of simple theorems	PSO - 2	Ар
CO - 3	relate real life situations with mathematical graphs	PSO - 3	Ар
CO - 4	develop the ability to solve problems in graph theory	PSO - 4	An
CO - 5	analyze real life problems using graph theory both	PSO - 4	An
	quantitatively and qualitatively		

	Modul	Topics	Lecture	Learning outcomes	Pedagogy	Assessment/e
Unit	e		hours			valuation
Ι	Graphs	and Sub graphs				
	1	Graphs and Sub graphs - Definition and Examples - Degrees,	4	Understand the basic definitions and fundamental concepts of	Lecture with illustration	Brainstorming
		Sub graphs, Isomorphism		graph theory		
	2	Ramsey Numbers - Independent sets and coverings - Intersection graphs and line graphs	4	Identify the difference between Independent sets and coverings and understand the concept of Intersection graphs and line graphs	Lecture with PPT	Slip Test
	3	Matrices - Operations on graphs	4	Learn to form adjacency and incidence matrices of a graph and learn different types of operations on graphs	Lecture with Group Discussion	Assignment Method

	4	Degree Sequences - Graphic Sequences.	5	Understand the concept of Degree Sequences and Graphic Sequences.	Lecture with Video	Test
II	Connee	ctedness				
	1	Connectedness - Walks, Trails and Paths	5	Understand the definitions and distinguish among walks, trails and paths	Blended learning	Brainstorming
	2	Connectedness and Components	5	Understand the definitions of cut point and bridge of a graph and analyse the connectedness of a graph	Lecture with PPT	Jigsaw
	3	Blocks -Connectivity	5	Understand the concept of blocks and learn to find the connectivity of different graphs	Lecture with PPT	Formative Exam
	4	Eulerian Graphs - Hamiltonian Graphs(excluding theorem 5.10)	5	Understand the concept of Eulerian graphs and Hamiltonian graphs	Lecture with illustration	Test
III	Trees					
	1	Trees - Characterisation of trees - Centre of a tree	5	Understand the concept of trees	Lecture with PPT	Quiz
	2	Matchings - Matchings in bipartite graphs.	5	Understand the concept of Matchings and to practice various Theorems	Blended learning	Test
IV	Planar	ity	I	1		
	1	Definition and properties	5	Cite examples of planar and non-planar graphs	Lecture with illustration	Quiz
	2	Colourability - Chromatic number and chromatic index	5	Learn to find the chromatic number of different graphs	Blended learning	Formative Exam
	3	The Five Colour Theorem - Chromatic polynomials	5	To practice various Theorems and learn to write the chromatic polynomial of different graphs	Lecture	Presentations
V	Directe	d Graphs				
	1	Directed Graphs - Definition and Basic Properties	4	Understand the definition of digraphs	Lecture with illustration	Quiz

2	Paths and Connections	4	Distinguish between	Lecture	Test
	- Eulerian Trail		strongly connected and	with PPT	
			weakly connected		
			digraphs and understand		
			the concept of Eulerian		
			trails		
3	Digraphs and Matrices	5	To practice various	Lecture	Formative
	- Tournaments		Theorems and understand	with group	Exam
			the concept of	discussion	
			Tournaments		

Course Instructor (Aided): Sr. S. Antin Mary

HoD(Aided): Dr. V.M. Arul Flower Mary

Course Instructor (S.F): Ms. J. Anne Mary Leema

HoD(Aided): Ms. J. Anne Mary Leema

Name of the Course: Numerical Methods

Course Code : MC1755

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

Objectives: 1. To study Numerical differentiation and Numerical integration using different formulae.

2. To develop various methods for solving applied scientific problems.

Course Outcome

СО	Upon completion of this course the students will be able to:	PSO addressed	CL
CO - 1	understand the basic definitions and meaning of interpolation	PSO - 1	U
CO - 2	select appropriate numerical methods and apply the same to various types of problems	PSO - 1	U
CO - 3	apply numerical methods to obtain approximate solutions to mathematical problems	PSO - 3	Ар
CO - 4	employ different methods of constructing a polynomial using various methods	PSO - 2	А
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

Unit	Module	Topics	Lecture	Learning Outcome	Pedagogy	Assessment/		
			hours			Evaluation		
Ι	Solutions of algebraic and transcendental equations							
	1	Iteration	3	To understand the non-linear	Lecture	Evaluation		
		method and problems		algebraic equations - Iteration method	with Illustration	through test		
	2	More problems on Iteration method	2	To understand solving techniques of Iteration method	Lecture with Illustration	Quiz and Test		
	3	Newton Raphson method and problems	3	To understand the non-linear algebraic equations - Newton Raphson method	Lecture with Illustration	Quiz through Quizizz		
	4	More problems on Newton Raphson method	2	To solve problems using Newton Raphson method	Lecture with Illustration	Test		
	5	Finite difference	3	To understand Finite difference	Lecture with PPT Illustration	Quiz and Test		
	6	Difference operators	2	To understand Difference operators	Lecture with Illustration	Formative Assessment Test		
II	Interpola	ation						
	1	Newton's Interpolation formulae	4	To understand Interpolation	Lecture with PPT Illustration	Test		
	2	Lagrange's Interpolation	4	To understand Lagrange Interpolation	Lecture with	Quiz and Test		

		formula			Illustration	
	3	Divided difference	3	To understand Divided difference	Lecture with Illustration	Evaluation through test
	4	Newton's divided difference formula	4	To solve the problems using Newton's divided difference formula	Lecture with PPT Illustration	Formative Assessment Test
III	Numerio	al differentiation	<u> </u>	<u> </u>		<u> </u>
	1	Derivatives using Newton's forward difference formula	4	To recall the basic concepts of Numerical differentiation	Lecture with Illustration	Evaluation through test
	2	Numerical differentiation using interpolation formulae for equal interval and problems	3	To solve the problems using Newton's forward difference formula	Lecture with PPT Illustration	Quiz through Quizizz
	3	Derivatives using Newton's backward difference formula.	4	To learn the derivation of Newton's backward difference formula	Lecture with Illustration	Quiz and Test
	4	More problems on Newton's backward	4	To solve the problems using Newton's backward	Lecture with PPT	Formative Assessment

		difference formula		difference formula	Illustration	Test	
IV	Numerical integration						
	1	Newton cote's - quadrature formula	4	To understand Newton cote's - quadrature formula	Lecture with Illustration	Test	
	2	Numerical integration by Trapezoidal rule	3	To learn the derivation of Trapezoidal rule and to solve the problems usingTrapezoidal rule	Lecture with PPT Illustration	Quiz through Quizizz	
	3	Numerical integration by Simpson's (1/3) rd rule	2	To learn the derivation of Simpson's $(1/3)^{rd}$ rule and to solve the problems using Simpson's $(1/3)^{rd}$ rule	Lecture with Illustration	Formative Assessment Test	
	4	Numerical integration by Simpson's (3/8) th rule	4	To learn the derivation of Simpson's (3/8) th rule and to solve the problems using Simpson's (3/8) th rule	Lecture with Illustration	Test	
V	Numerical solution of differential equation						
	1	Sole the differential equation using Taylor's series method	4	To understand Taylor's series method	Lecture with Illustration	Test	
	2	More problems on Taylor's series method	4	To solve the differential equation using Taylor's series method	Lecture with PPT Illustration	Quiz and Test	
	3	Sole the differential	4	To understand Picard'smethod	Lecture with	Quiz through	

	equation using Picard's method.			Illustration	Quizizz
4	More problems on Picard'smethod	3	To solve the differential equation using Picard's method	Lecture with Illustration	Test

Course Instructor (Aided): Ms. A. Jancy Vini

HoD(Aided): Dr. V.M. Arul Flower Mary

Course Instructor (S.F): Ms. D. Berla Jeyanthy

HoD(Aided): Ms. J. Anne Mary Leema