### 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	Upon completion of the B.Sc. Degree Programme, the
No.	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

Unit	Section	Topics	Lecture	Learning outcomes	Pedagogy	Assessment/
			hours			evaluation
I	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	(	Centre of curvature, E	volute			

		T		T	1 _	
	1.	Definition and	5	To understand the	Lecture	Test
		problems based on		definition of centre of		
		centre of curvature		curvature of the curve		
		of the curve				
	2.	Definition and	5	To understand the	Lecture	Q&A
		problems related to		definition of evolute of		
		evolute of the curve		the curve and practice		
				problems		
	3.	Definition and	5	To practice various	Lecture	Formative
		problems on circle		problems related to		Assessment
		of curvature		circle of curvature		Test
III	A	symptotes				
	1.	Definition and	3	To understand the	Lecture	Quiz
		methods of finding		methods of finding		
		asymptotes for the		asymptotes		
		curve $y=f(x)$ and				
		f(x,y)=0				
	2.	Working rule to	2	Recognize the rules of	Lecture	Test
		find the inclined	_	identifying asymptotes	with	
		asymptotes			illustration	
	3.	Problems on linear	5	To apply the rules to	Lecture	Brain
	J.	asymptotes and	5	different curves	with group	stoming
		intersection of		different curves	discussion	Stommig
		curves			discussion	
	4.	Problems based on	5	To apply the rules to	Lecture	Assignment
	٦.	inclined asymptotes	3	different curves	Lecture	7 issignment
IV	Hynerho	olic functions, Logarit	hm of Con			
	1.	Introduction and	2	Acquire the knowledge	Lecture	Quiz
	1.	definition of	2	about hyperbolic	with	Quiz
		Hyperbolic		functions	illustration	
		functions		Tunctions	inustration	
	2.	Problems based on	4	To compare with	Lecture	Q&A
	۷.	hyperbolic	<del>'1</del>	circular functions,	Lecture	Q&A
		Hyperdone		Circulal fullcuolis,		
		• •		,		
	3	functions	1	·	Lecture	Slin Test
	3.	functions Definitions and	4	Acquire the knowledge	Lecture	Slip Test
	3.	functions Definitions and Problems based on	4	Acquire the knowledge about inverse	Lecture	Slip Test
	3.	functions  Definitions and Problems based on inverse hyperbolic	4	Acquire the knowledge	Lecture	Slip Test
		functions  Definitions and Problems based on inverse hyperbolic functions		Acquire the knowledge about inverse hyperbolic functions		-
	3.	functions  Definitions and Problems based on inverse hyperbolic functions  Separate into real	5	Acquire the knowledge about inverse hyperbolic functions  To distinguish various	Lecture	Formative
		functions  Definitions and Problems based on inverse hyperbolic functions  Separate into real and imaginary parts		Acquire the knowledge about inverse hyperbolic functions  To distinguish various hyperbolic functions,		Formative Assessment
		functions  Definitions and Problems based on inverse hyperbolic functions  Separate into real and imaginary parts of hyperbolic and		Acquire the knowledge about inverse hyperbolic functions  To distinguish various hyperbolic functions, trigonometric functions,		Formative
		functions  Definitions and Problems based on inverse hyperbolic functions  Separate into real and imaginary parts of hyperbolic and inverse hyperbolic		Acquire the knowledge about inverse hyperbolic functions  To distinguish various hyperbolic functions, trigonometric functions , inverse trigonometric		Formative Assessment
• • • • • • • • • • • • • • • • • • •	4.	functions  Definitions and Problems based on inverse hyperbolic functions  Separate into real and imaginary parts of hyperbolic and inverse hyperbolic functions	5	Acquire the knowledge about inverse hyperbolic functions  To distinguish various hyperbolic functions, trigonometric functions , inverse trigonometric functions		Formative Assessment
V	4. S	functions  Definitions and Problems based on inverse hyperbolic functions  Separate into real and imaginary parts of hyperbolic and inverse hyperbolic functions  ummation of Trigono	5 ometric Ser	Acquire the knowledge about inverse hyperbolic functions  To distinguish various hyperbolic functions, trigonometric functions , inverse trigonometric functions  ies	Lecture	Formative Assessment Test
V	4.	functions  Definitions and Problems based on inverse hyperbolic functions  Separate into real and imaginary parts of hyperbolic and inverse hyperbolic functions  ummation of Trigono Introduction and	5	Acquire the knowledge about inverse hyperbolic functions  To distinguish various hyperbolic functions, trigonometric functions , inverse trigonometric functions  ies  To analyze the methods	Lecture	Formative Assessment
V	4. S	functions  Definitions and Problems based on inverse hyperbolic functions  Separate into real and imaginary parts of hyperbolic and inverse hyperbolic functions  ummation of Trigono Introduction and Illustrations based	5 ometric Ser	Acquire the knowledge about inverse hyperbolic functions  To distinguish various hyperbolic functions, trigonometric functions, inverse trigonometric functions  ies  To analyze the methods of finding the sum of	Lecture  Lecture with	Formative Assessment Test
V	4. S	functions  Definitions and Problems based on inverse hyperbolic functions  Separate into real and imaginary parts of hyperbolic and inverse hyperbolic functions  ummation of Trigono Introduction and Illustrations based on method of	5 ometric Ser	Acquire the knowledge about inverse hyperbolic functions  To distinguish various hyperbolic functions, trigonometric functions , inverse trigonometric functions  ies  To analyze the methods	Lecture	Formative Assessment Test
V	4. S 1.	functions  Definitions and Problems based on inverse hyperbolic functions  Separate into real and imaginary parts of hyperbolic and inverse hyperbolic functions  ummation of Trigono  Introduction and Illustrations based on method of difference	5 ometric Ser 4	Acquire the knowledge about inverse hyperbolic functions  To distinguish various hyperbolic functions, trigonometric functions, inverse trigonometric functions  ies  To analyze the methods of finding the sum of trigonometric series	Lecture  Lecture  with illustration	Formative Assessment Test
V	4. S	functions  Definitions and Problems based on inverse hyperbolic functions  Separate into real and imaginary parts of hyperbolic and inverse hyperbolic functions  ummation of Trigono Introduction and Illustrations based on method of	5 ometric Ser	Acquire the knowledge about inverse hyperbolic functions  To distinguish various hyperbolic functions, trigonometric functions, inverse trigonometric functions  ies  To analyze the methods of finding the sum of	Lecture  Lecture with	Formative Assessment 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	Ap
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	Ap

	1 otal contact nours: 90 (including lectures, assignments and tests)						
Unit	Section	Topics	Lecture hours	Learning outcome	Pedagogy	Assessment/ Evaluation	
I	Theory o	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		equations and to	discussion	
		solving equations when		solve equations		
		one root and two roots		when one root and		
		given.		two roots given.		
	3.	Formation of equation	3	Practice the	Lecture	Test
		of the lowest degree		formation of		
		with rational		equations and		
		coefficients whose roots		compute symmetric		
		are given		functions of roots in		
				terms of coefficients		
				whose roots are		
	4.	Desvine that the given	2	given To Prove that the	Lecture	Test
	4.	Proving that the given equation has no	2	given equation has	Lecture	Test
		imaginary roots and		no imaginary roots		
		Relation between roots		and understand the		
		and coefficients		relation between		
				roots and		
				coefficients		
	5.	Solving equations if	2	To Solve equations	Lecture	Test
		their roots are in G.P,		if their roots are in		
		A.P		G.P, A.P.		
	6.	Solving equations and	2	To Solve equations	Lecture	Test
		finding equal roots two		and finding equal		
		pairs of equal roots,		roots, two pairs of		
		roots which are in some		equal roots, roots		
		ratio.		which are in some ratio.		
II	Transfo	rmation of equations		Tauo.		
	1	Formation of equation	3	To understand the	Lecture and	Test
		whose roots are k times		transformation of	discussion	
		the roots of $f(x) = 0$ .		equations and		
				formation of		
				equation whose roots		
				are k times the roots		
	2	D 4		of $f(x) = 0$ .	T .	
	2	Form the equation	3	To identify the	Lecture	Formative
		whose roots are		equation whose roots		Assessment
		negative of the roots of		are negative of the		
		the given equation and whose roots are		roots of the given equation and whose		
		diminished by h		roots are diminished		
		diffillioned by it		by h		
	3	Solve the equation	3	To identify the	Lecture	Test
		whose roots are equal in		equation whose roots		
		magnitude but opposite		are equal in		
		in sign to the roots of		magnitude but		
		f(x) = 0 and to increase		opposite in sign to		
		the roots of $f(x) = 0$ by h		the roots of $f(x) = 0$		
				and to increase the		
				roots of $f(x) = 0$ by h		

				T	T _	T_
	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.  Matrices	3	To identify positive and negative roots of the equation using Newton's method.	Lecture and discussion	Test
III	I.	viatrices				
	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

<u> </u>		ahamataristis		Chamataristis		
		characteristic vectors		Characteristic roots,		
		corresponding to each characteristic root of the		eigen values and		
		given matrix.		eigen vectors of the matrix.		
IV	I	Beta and Gamma functions	S	maurx.		
	1	Introduction to Beta,	4	To learn Beta,	Lecture and	Test
		Gamma functions, its		Gamma functions	discussion	
		properties		and its properties.		
	2	Evaluation of integrals	2	To evaluate integrals	Lecture	Test
		using Beta Functions		using Beta Functions		
	3	Proving duplication	3	To prove	Lecture	Test
		formula.		duplication formula.		
	4	Problems based on	3	To solve problems	Lecture	Test
		Beta and Gamma		based on Beta and		
		functions.		Gamma functions.		
	5	Proving some results on	3	To prove some	Lecture	Test
		Beta and Gamma		results on Beta and		
		functions.		Gamma functions.		
V	I	Fourier Series Expansion				
	1	Fourier Series	2	To understand	Lecture	Test
		Expansion and Fourier		Fourier Series		
		coefficients		Expansion and		
				Fourier coefficients		
	2	Explanation of Sine	2	To identify Sine	Lecture	Test
		Series and Cosine		Series and Cosine		
		Series and results based		Series and results		
		on them		based on them		
	3	Evaluate the Fourier	3	To evaluate the	Lecture	Test
		Sine series and Fourier		Fourier Sine series		
		Cosine series for the		and Fourier Cosine		
		given function.		series for the given		
	4	77.10		function.	<b>T</b>	<b>T</b>
	4	Evaluate the Half range	3	To evaluate the Half	Lecture	Test
		Fourier Sine Series and		range Fourier Sine		
		Fourier Cosine Series		Series and Fourier		
		for the given function.		Cosine Series for		
	5	Evaluate the Fourier	3	the given function.  To evaluate the	Lecture	Tost
	3		3	Fourier series for the	Lecture	Test
		series for the given function and deduce		given function and		
		certain results.		deduce certain		
		certain results.		results.		
	6	Evaluate the Fourier	2	To evaluate the	Lecture	Formative
	J	series for the given	<b>-</b>	Fourier series for the	Lecture	Assessment
		function in the intervals		given function in the		1 Assessment
		$(-\pi,\pi)$ and $(0,\pi)$		intervals $(-\pi, \pi)$ and		
		and (o,")				
				$(0,\pi)$		

# 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.

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	Ap
CO - 4	measure the relative magnitude of two quantities in an effective way.	PSO - 2	С
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.

Unit	Section	Topics	Lecture hours	Learning outcomes	Pedagogy	Assessment/ valuation
I	BODN	AS 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	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
III	Profit a	nd 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 an	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	2	To learn about triplicate	Lecture	Online
		subtriplicate ratio		and subtriplicate ratio	through	Assignment
					googlemeet	
V	Partner	ship				
	1.	Ratio of Division of	2	To understand the basic	Lecture	Online
		Gains		concepts of partnersip	through	Assignment
					googlemeet	
	2.	Working and	2	To acquire skills to solve	Lecture	Online test
		Sleeping partners		problems involving	through	
				Working and Sleeping	googlemeet	
				partners		
		CI · P ·			-	
	3.	Chain Rule	2	To study about chain	Lecture	Formative
				rule and to solve the	through	Assessment
				problems related to	googlemeet	online Test
				chain rule		

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

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.

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

Unit	Sect	tion	Topics	Lectu	Learning outcome	Pedagogy	Assessment
				re			/Evaluation
				hours			
Ι	Lin	ear Diff	erential equations	3			
	1	Introdu	uction of Linear	5	Distinguish linear,	Lecture	Evaluation
		Differe	ential equations		nonlinear, ordinary	with	through:
		with co	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
		comple	ementary		equations with		
		function	on, Finding the		constant and		
		particu	ılar integral for		variable		Short test on
		eax			coefficients		homogeneous
	2	Findin	g the particular	3	Solve linear	Lecture	linear equations

1		٠,	1.0		1:00 1:1	'd DDE	
		_	ol for cos ax, sin		differential	with PPT	
			ding the		equations with	Illustratio	
			llar integral for		constant and	n	
		$e^{ax}f(x)$			variable		
				2	coefficients	-	
	3		g the particular	3	Distinguish linear,	Lecture	
		_	ol for $x^n f(x)$ ,		nonlinear, ordinary	with	Formative
			action of		and partial	illustration	Assessment- I
			geneous linear		differential		
		_	ons, Conversion		equations, Solve		
			mogeneous		linear differential		
		linear o	equations into		equations with		
		linear	differential		constant and		
			ons with constant		variable		
		coeffic	eients		coefficients		
	4	Solvin	g homogeneous	3	Solve linear	Lecture	
		linear e	equations using		differential	with	
		the log	arithmic		equations with	illustration	
		substit	ution, Solving		constant and		
			eneous linear		variable		
		equation	ons using the new		coefficients		
		operate	_				
II	Lap	olace Tr	ansform	•		•	
	1		Definition of	3	Explain the basic	Lecture	Short test on
			Laplace		properties of	with PPT	Computation of
			_		1 1	Illustratio	_
			Transform,		Laplace Transform		Laplace Transform of
			Transform, Properties of		1 1	Illustratio	Laplace
			Transform,		Laplace Transform and inverse Laplace	Illustratio	Laplace Transform of
			Transform, Properties of Laplace Transform,		Laplace Transform and inverse Laplace	Illustratio	Laplace Transform of standard
			Transform, Properties of Laplace Transform, Computation of		Laplace Transform and inverse Laplace	Illustratio	Laplace Transform of standard
			Transform, Properties of Laplace Transform, Computation of Laplace		Laplace Transform and inverse Laplace	Illustratio	Laplace Transform of standard
			Transform, Properties of Laplace Transform, Computation of Laplace Transform of		Laplace Transform and inverse Laplace	Illustratio	Laplace Transform of standard
			Transform, Properties of Laplace Transform, Computation of Laplace Transform of standard		Laplace Transform and inverse Laplace	Illustratio	Laplace Transform of standard
	2		Transform, Properties of Laplace Transform, Computation of Laplace Transform of standard functions	5	Laplace Transform and inverse Laplace Transform	Illustratio n	Laplace Transform of standard
	2		Transform, Properties of Laplace Transform, Computation of Laplace Transform of standard functions Problems on	5	Laplace Transform and inverse Laplace Transform  Explain the basic	Illustratio n  Lecture	Laplace Transform of standard
	2		Transform, Properties of Laplace Transform, Computation of Laplace Transform of standard functions Problems on Laplace	5	Laplace Transform and inverse Laplace Transform  Explain the basic properties of	Illustratio n  Lecture with	Laplace Transform of standard functions
	2		Transform, Properties of Laplace Transform, Computation of Laplace Transform of standard functions Problems on Laplace Transform,	5	Laplace Transform and inverse Laplace Transform  Explain the basic properties of Laplace Transform	Illustratio n  Lecture	Laplace Transform of standard functions  Assignment on
	2		Transform, Properties of Laplace Transform, Computation of Laplace Transform of standard functions Problems on Laplace Transform, Definition of	5	Laplace Transform and inverse Laplace Transform  Explain the basic properties of Laplace Transform and inverse Laplace	Illustratio n  Lecture with	Laplace Transform of standard functions  Assignment on the related
	2		Transform, Properties of Laplace Transform, Computation of Laplace Transform of standard functions Problems on Laplace Transform, Definition of Inverse Laplace	5	Laplace Transform and inverse Laplace Transform  Explain the basic properties of Laplace Transform	Illustratio n  Lecture with	Laplace Transform of standard functions  Assignment on
	2		Transform, Properties of Laplace Transform, Computation of Laplace Transform of standard functions Problems on Laplace Transform, Definition of Inverse Laplace Transform,	5	Laplace Transform and inverse Laplace Transform  Explain the basic properties of Laplace Transform and inverse Laplace	Illustratio n  Lecture with	Laplace Transform of standard functions  Assignment on the related
	2		Transform, Properties of Laplace Transform, Computation of Laplace Transform of standard functions Problems on Laplace Transform, Definition of Inverse Laplace Transform, Properties of	5	Laplace Transform and inverse Laplace Transform  Explain the basic properties of Laplace Transform and inverse Laplace	Illustratio n  Lecture with	Laplace Transform of standard functions  Assignment on the related
	2		Transform, Properties of Laplace Transform, Computation of Laplace Transform of standard functions Problems on Laplace Transform, Definition of Inverse Laplace Transform,	5	Laplace Transform and inverse Laplace Transform  Explain the basic properties of Laplace Transform and inverse Laplace	Illustratio n  Lecture with	Laplace Transform of standard functions  Assignment on the related
	2		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	3	Laplace Transform and inverse Laplace Transform  Explain the basic properties of Laplace Transform and inverse Laplace	Illustratio n  Lecture with	Laplace Transform of standard functions  Assignment on the related
			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		Laplace Transform and inverse Laplace Transform  Explain the basic properties of Laplace Transform and inverse Laplace Transform	Illustratio n  Lecture with illustration	Laplace Transform of standard functions  Assignment on the related

	4	specific functions, Problems on Inverse Laplace Transform Solving Linear Differential equations using	4	and inverse Laplace Transform  Use the Laplace transform in finding the solution of	Lecture with illustration	Formative Assessment –II
III	Partial Diff	Laplace Transform, Solving simultaneous equations using Laplace Transform Gerential equations		linear differential equations		
111	1	Introduction of	4	Learn methods of	Lecture	Short test on
		Partial differential equations, Formation of Partial differential equations by eliminating the unknown constants, Formation of Partial differential equations by eliminating the arbitrary functions		forming and solving partial differential equations	with illustration	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,	3	Learn methods of forming and solving partial differential equations	Lecture with PPT Illustratio n	Quiz
		General solution of Lagrange's equation				Formative Assessment-III
	3	Solving	4	Learn methods of	Lecture	

1		Lagrange's		forming and	with	<u> </u>
		Lagrange's equation by		forming and solving partial	illustration	
		_			mustration	
		method of		differential		
		grouping,		equations		
		Solving				
		Lagrange's				
		equation by				
		method of				
		multipliers				
	4	Solution of	4	Learn methods of	Lecture	
		Lagrange's		forming and	Discussio	
		equation using		solving partial	n	
		grouping and		differential		
		suitable		equations		
		multipliers,		1		
		Explanation of				
		Charpit's				
		method,				
		Finding the				
		solution of				
		PDE using				
		Charpit's				
		method				
IV		Differentiation		T		
	1	Revision of dot	4	Learn	Lecture	
		and cross product		differentiation and	with PPT	Short test on
		of vectors,		into anotion of	T11 4 4	
		· ·		integration of	Illustratio	gradient &
1		Definition and		vector valued	n Illustratio	differentiation of
		Definition and theorems on				
		Definition and		vector valued		differentiation of
		Definition and theorems on differentiation of Vectors, Gradient		vector valued		differentiation of
		Definition and theorems on differentiation of Vectors, Gradient of a scalar function		vector valued		differentiation of
		Definition and theorems on differentiation of Vectors, Gradient		vector valued		differentiation of
	2	Definition and theorems on differentiation of Vectors, Gradient of a scalar function	4	vector valued		differentiation of
	2	Definition and theorems on differentiation of Vectors, Gradient of a scalar function and its properties	4	vector valued functions	n	differentiation of
	2	Definition and theorems on differentiation of Vectors, Gradient of a scalar function and its properties  Problems based on	4	vector valued functions  Learn	n Lecture	differentiation of
	2	Definition and theorems on differentiation of Vectors, Gradient of a scalar function and its properties  Problems based on Gradient, Equation	4	vector valued functions  Learn differentiation and	n Lecture with	differentiation of
	2	Definition and theorems on differentiation of Vectors, Gradient of a scalar function and its properties  Problems based on Gradient, Equation of tangent plane	4	vector valued functions  Learn differentiation and integration of	n Lecture with	differentiation of Vectors
	2	Definition and theorems on differentiation of Vectors, Gradient of a scalar function and its properties  Problems based on Gradient, Equation of tangent plane and normal line for	4	Learn differentiation and integration of vector valued	n Lecture with	differentiation of Vectors  Formative
	2	Definition and theorems on differentiation of Vectors, Gradient of a scalar function and its properties  Problems based on Gradient, Equation of tangent plane and normal line for a single surface, Equation of	4	Learn differentiation and integration of vector valued	n Lecture with	differentiation of Vectors
	2	Definition and theorems on differentiation of Vectors, Gradient of a scalar function and its properties  Problems based on Gradient, Equation of tangent plane and normal line for a single surface, Equation of tangent line and	4	Learn differentiation and integration of vector valued	n Lecture with	differentiation of Vectors  Formative
	2	Definition and theorems on differentiation of Vectors, Gradient of a scalar function and its properties  Problems based on Gradient, Equation of tangent plane and normal line for a single surface, Equation of	4	Learn differentiation and integration of vector valued	n Lecture with	differentiation of Vectors  Formative
	2	Definition and theorems on differentiation of Vectors, Gradient of a scalar function and its properties  Problems based on Gradient, Equation of tangent plane and normal line for a single surface, Equation of tangent line and normal plane for	4	Learn differentiation and integration of vector valued	n Lecture with	differentiation of Vectors  Formative
	3	Definition and theorems on differentiation of Vectors, Gradient of a scalar function and its properties  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	3	Learn differentiation and integration of vector valued	n Lecture with	differentiation of Vectors  Formative
		Definition and theorems on differentiation of Vectors, Gradient of a scalar function and its properties  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		Learn differentiation and integration of vector valued functions	Lecture with illustration	differentiation of Vectors  Formative
		Definition and theorems on differentiation of Vectors, Gradient of a scalar function and its properties  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  Angle between		Learn differentiation and integration of vector valued functions	Lecture with illustration	differentiation of Vectors  Formative

	4	vectors and its properties, Curl of vectors and its properties  Solenoidal and irrotational vectors, Harmonic vectors and Laplace's equation, Problems based on divergence and curl	4	vector valued functions  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			<u> </u>	
	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

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.

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	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

Unit	Section	Topics	Lectu	Learning outcomes	Pedagogy	Assessment/
			re			evaluation
			hours			
I	Prelin	ninaries				
	2	Preliminaries – Mathematical Induction  Finite and Infinite Sets.	3	Explain the primary concepts of the Mathematical Induction.  To distinguish	Lecture with Illustration Lecture	Evaluation through appreciative inquiry Evaluation
				between finite and infinite set.	with PPT	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		<b>'</b>	l	1
	1	The Real Numbers-The completeness propertyof 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	ces			_	
	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		<u> </u>		•
	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	f 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
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	Ap
CO - 6	choose the suitable probability distribution corresponding to a given data	PSO - 5	Е

Unit	Sections	Topics	Lecture	Learning	Pedagogy	Assessment/
			hours	Outcome		Evaluation
I	Probabili	ty				
	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

2   Example and Theorems   Sassed on Events,   Problems   Problems   Dased on Conditional probability   Date of the properties of probability and related   Date of the properties of probability and   Date of th			1	I	111 41	T	1
2 Example and Theorems based on Events, Problems based on events and probability, Problems based on Conditional probability  4 Properties — Independent events, Theorems based on independent events, Problems based on based on based on probability and probability and related different with probability independent events, Problems based on probability and probability and probability and related different with probability distributions which are widely used and to recall the definition of probability and probability an					· · · · · · · · · · · · · · · · · · ·		
2   Example and Theorems based on Events, Problems based on events and sample space   Problems based on events etchniques to probability and related distributions   Problems based on events of probability and apply the techniques to prove the properties of probability and related distributions   Properties of probability distributions   Properties of probability and related distributions   Properties of probability distributions   Properties of probability and related distributions   Properties of probability and   Properties of probability							
Theorems based on Events, Problems based on events and sample space probability and related distributions  3 Conditional probability, Problems based on events and probability and related distributions  3 Conditional probability, Problems based on events and probability and related distributions  4 Properties — 3 To detect the properties of probability and related distributions  4 Properties — 3 To detect the different events, Theorems based on independent events, Problems based on independent events, Problems based on independent events, Problems based on based on probability and recall the definition of probability and related distributions  4 Properties — 3 To detect the different with probability and related distributions which are widely used and events, Problems definition of probability and recall the definition of probability and related widely used and the events, Problems based on probability and definition of probability and recall the definition of probability and probability and related with probability and related distributions with probability and		2	F 1 1	2		т ,	T4
based on Events, Problems based on events and sample space  3 Conditional probability and probability  4 Properties – Independent events, Theorems based on independent events, Problems based on based on independent events, Problems based on probability and related distributions independent events, Problems based on probability and probability and independent events, Problems based on probability and its recall the definition of probability and its recall the definition of probability and its related to recall the definition of probability and its related to apply the techniques to prove the properties of probability and related distributions  Lecture with PPT Illustration  Quiz and Test  With PPT Illustration  Illustration  Assessment  Test		2		3			Test
Events, Problems based on events and sample space  3							
Problems based on events and sample space  3						Illustration	
based on events and sample space probability and related distributions  3			· ·				
events and sample space    Properties of probability and related distributions					-		
sample space probability and related distributions  3					-		
related distributions  3 Conditional probability, Problems based on Conditional probability  4 Properties – Independent events, Theorems based on independent events, Problems based on independent events, Problems based on based on independs based on independs based on base							
distributions  Conditional probability, Problems based on Conditional probability  Properties – Independent events, Theorems based on independent events, Problems based on independent events, Problems based on independent events, Problems based on based on based on independs based on based			sample space				
To recall the definition of probability, Problems based on Conditional probability  4 Properties – Independent events, Theorems based on independent events, Problems based on independent events, Problems based on based on based on independs the probability and to recall the definition of probability and the recall the recall the definition of probability and the recall the recall the definition							
probability, Problems based on Conditional probability  4 Properties — Independent events, Theorems based on independent events, Problems based on independent events, Problems based on based o		3	Conditional	3		Lecture	Quiz and Test
Problems based on Conditional probability  Properties – 3 To detect the different events, Theorems based on independent events, Problems Problems Problems Probability and apply the techniques to prove the properties of probability and related distributions  4 Properties – 3 To detect the different with Assessment Illustration Illustration  Formative with Assessment Illustration Test  Theorems distributions which are widely used and events, Problems definition of probability and			probability,		definition of	with PPT	
Conditional probability			- ·		probability and	Illustration	
probability  prove the properties of probability and related distributions  4 Properties — 3 To detect the Independent events, probability Theorems based on independent events, probability of independent events, to recall the Problems based on based on probability and			based on		apply the		
properties of probability and related distributions  4 Properties — 3 To detect the Independent events, Theorems based on independent events, Problems based on based on probability and proba					-		
probability and related distributions  4 Properties – 3 To detect the Independent events, probability Theorems based on independent events, probability with are independent events, problems based on probability and probabi			probability		-		
related distributions  4 Properties – 3 To detect the Independent events, Theorems based on independent events, Problems based on based on based on probability and related distributions with probability distributions which are widely used and to recall the definition of probability and							
distributions  4 Properties – 3 To detect the different with Assessment Probability distributions based on independent events, Problems based on based on based on probability and							
4 Properties – Independent events, Theorems based on independent events, Problems based on based on based on probability and Properties – 3 To detect the different with Assessment Illustration Test  To detect the different with Assessment Illustration Test  Test  To detect the different with Assessment Illustration Test  Test							
Independent events, probability distributions based on independent events, Problems based on based on probability and different probability distributions which are widely used and to recall the definition of probability and		1	Droportios	2		Lastura	Formativa
events, Theorems based on independent events, Problems based on probability distributions which are widely used and to recall the definition of based on probability and		4	_	3			
Theorems based on independent events, Problems based on probability and  distributions which are widely used and to recall the definition of probability and			-				
based on independent widely used and events, to recall the Problems definition of based on probability and			· ·			mastration	Test
events, Problems based on  to recall the definition of probability and							
events, Problems based on  to recall the definition of probability and			independent		widely used and		
based on probability and			-		<u> </u>		
			Problems		definition of		
independent apply the			based on		probability and		
			independent		apply the		
events. techniques to			events.				
prove the					-		
properties of							
probability and related							
distributions							
5 Baye's 2 To understand Lecture Test		5	Rave's	2		Lecture	Test
theorem and the definition of with		,		_			1031
Problems random Illustration							
based on variables, their							
Baye's types and related							
theorem concepts			•				
II Random variables	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	Group Discussion	Quiz and Test
				types and related concepts		
	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 Func	tion	1 8		
	1	Moment Generating Function, Related examples, Problems based on Moment Generating Function, Properties of Moment Generating Function 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

2	Cumulant generating function, properties and Problems based on Cumulantgener ating Function	3	probability and related distributions  To recall the definition of probability and set functions and to apply the techniques to prove the properties of probability and related	Group Discussion	Short Test
3	Characteristic function, properties, Problemsbased on Characteristic function and Poisson distribution	3	distributions  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

	T		1	1 1 1	I	
				types and related		
	_	T1	3	concepts	T4	Total
	5	Theorems	3	To apply the	Lecture	Test
		based on		techniques to	with	
		Mode, Moment		prove the	Illustration	
		Generating		properties of		
		Function of		probability and		
		Poisson		related		
		distribution,		distributions and		
		fitting of		to detect the		
		Poisson		different		
		distribution		probability		
		and problems		distributions		
		based on this		which are		
				widely used		
IV		Distribution	1 4	I m		
	1	Introduction-	3	To recall the	Group	Short Test
		Definition,		definition of	Discussion	
		Moments of		probability and		
		binomial		set functions		
		Distribution		and to		
				understand the		
				definition of		
				random		
				variables, their		
				types and related		
				concepts		
	2	Central	3	To understand	Lecture	Test
		moments,		the definition of	with	
		Theorems		random	Illustration	
		based on		variables, their		
		Central		types and related		
		moments		concepts and		
				recall the		
				definition of		
				probability and		
				set functions		
				and to		
	3	Mode of	3	To recall the	Group	Short Test
		binomial		definition of	Discussion	
		distribution,		probability and		
		Problems		set functions and		
		based on Mode		to apply the		
		of binomial		techniques to		
		distribution		prove the		
				properties of		

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

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

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

Semester : V Name of the Course :Real Analysis II CourseCode : MC2052

No. of hours per week	Credit	Total No. of hours	Mar ks
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.

СО	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	С
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

	1	1		1	ı	1
	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
Course Instructor S.F: Ms. Monisha
HoD:Dr. T.Sheeba Helen
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	PSO	CL
	will be able to:	addressed	
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	Pictoria	al Representation –	Isomorphisi	n and degrees - cy	cles in a graph	- connected graphs - cut
		and cut edges	I	1	T	
	1.	Trail and Path-	3	To apply the	Lecture with	Evaluation through test
		Examples, Cycles		results in real	Illustration	
		in graphs –		life cycle		
		definitions and				
		theorems, Theorems on				
		limit points and				
		examples,				
		Theorems on				
		connected graph				
	2.	Theorems on	3	To distinguish	Lecture with	Slip test
		cycles in graph,		the theorems	Illustration	
		complement		and their		
		graphs –		application		
		definition and				
		theorems,				
		Digraph				
	3.	Definitions and	3	To identify the	Lecture with	Brain Storming and Test
		Theorems on cut		cut vertices and	Examples	
		vertices and cut		edges		
	4.	edges Trivial and non-	3	To construct the	Discussion	Quiz and Test
	4.	Trivial Graphs –	3	To construct the	with	Quiz and Test
		definitions and		graphs	Illustration	
		theorems			mustration	
II	Eulerian		lgorithm -	⊥ Hamiltonian gran	hs - Weighted	graphs - Chinese Post-man
		Travelling Sales-ma				g- wp-10 021111000 1 000 1110111
	1.	Eulerian Graphs-	3	To identify the	Lecture with	Test
		definitions and		Closed walk.	PPT	
		theorems,				
		Theorems related				
		to Eulerian trail				
		using digraph				
	2.	Fleury's	2	To construct a	Lecture with	Test
		Algorithm to		Eulerian Trail	illustration	
		construct a closed				
	3.	Eulerian trail	2	To identify the	Laatura	Assessment Test
	3.	Hamiltonian Graphs	2	To identify the difference in	Lecture	Assessment Test
		Graphs – definitions and		cycle and path		
		theorems,		Cycle and paul		
		meorems,				

	T	T ==	Г	T	T	1
		Hamiltonian cycle				
		and path				
	4.	Problem basedon	3	To construct a	Group	Test
		weightedgraphs -		road map.	Discussion	
		Chinese Post-man				
		Problem -				
		Travelling Sales-				
		man Problem				
		Bipartite graphs				
	5.	Bipartite graphs-	2	To calculate a	Lecture with	Test
		Definition and		unique path.	illustration	
		Theorems,				
		Theorems on				
		trees.				
III	_	aphs - Euler formul				
		•	aphs - Colo	urings - Vertex co	olouring - Edge	colouring - An algorithm for
	vertex col	ouring.				
		T		Τ	Τ	
	1.	Definition and	3	To understand	Lecture with	Quiz
		examples related		the concept in	PPT	
		to planar graphs,		Eulerian and	Illustration	
		Euler's formula		planar graph		
		for planar graphs				
		and related				
	2	corollary		m 1 1	-	TD .
	2.	Definition and	3	To apply the	Lecture with	Test
		theorems related		ancient	Illustration	
		to Platonic solids,		concerned with		
		Dual of a plane		polyhedra.		
		graph, Definition				
		and theorem				
		related to				
		characterization				
	3.	of planar graph  Definition and	4	To identify	Lecture with	Assignment
	3.	theorems on	4	To identify alternating		Assignment
		colouring,		colours to the	examples	
		Theorem related		graphs		
		to maximum		graphs		
		colourings of a				
		graph,triangle				
		free graph in				
		colouring				
	4.	Definition and	2	To identify the	Group	Formative Assessment Test
	٦.	theorems related		colouring and	Discussion	1 official ve Assessment Test
		to edge colouring,		solve the	Discussion	
		An algorithm for		problems		
		vertex colouring		Problems		
		of a graph				
IV	Directed		vity in digr	raphs - Strong o	rientation of o	raphs – Euleriandigraphs -
- 1	Directu	Capito Connecti	, it j in digi	apin buong 0	i i i i i i i i i i i i i i i i i i i	rapin Laicimiaigiapin -

	Tournam	ent.				
	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		ing Sets, Relationsh unds and Lower Bo				sets, Irredundant sets,
	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	Illustration	
	Domination and		
	connected		
	graph.		

Course Instructor (Aided): Sr. S. Antin Mary
Course Instructor (S.F): Dr. G. JovitVinishMelma
HoD(Aided): Dr. T. Sheeba Helen
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 certain raw data.

numerical values of

**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	С
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

Uni t	Sectio n	Topics	Lect ure hour s	Learning outcomes	Pedagogy	Assessment/eval uation
I	Basis	s 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,		in programmes		
		Assignment Operators,				
		Increment and				
		Decrement Operators				
	4	Conditional Operators,	3	To understand the syntax of	Lecture with	Open book test
		Bitwise Operators and		various operators and apply	Illustration	
		Special Operators		in programmes		
	5	Managing Input and	3	To understand the Input	Flipped class	Quiz and Test
		Output Operations		and Output Operations		
		Formatted Input and				
		Formatted Output				
II	Decisio	n making and Branching				
	1	Decision making and	3	To differentiatedecision	Blended	Evaluation
		Branching and Decision		making and branching	class	through
		making with IF				Assignment
		statement				
	2			m 1 / 10' 1 m	т	D. L.
	2	Simple IF statement	3	To understand Simple IF	Lecture with	Evaluation
		The IF Else		statement The IF Else	Illustration	through
		statements and Nesting		statements and Nesting of		appreciative
		of IF Else statements.		IF Else statements.		inquiry
	3	The GOTO statement,	3	To express GOTO statement	Lecture with	Slip test
		Decision making and		in programmes	Small	
		Looping			programms	
	4	The WHILE Statement	3	To express WHILE	Lecture with	Formative
		and The DO Statement		Statement and DO	Small	Assessment Test
				Statement in programmes	programms	
	5	The FOR Statement.	3	To express GOTO statement	Lecture with	Formative
				in programmes	Small	Assessment Test
	~				programms	
III		ns of algebraic and transcen			Γ	T
	1	Solutions of algebraic	3	To understand the solutions	Lecture with	Evaluation
		and transcendental		of algebraic and	Illustration	through open
		equations. Iteration		transcendental equations		seminar
		method and Newton		and to solve problems for		
		Raphson method		the same		
	2	programs in C for	3	To construct the programs	Laboratoy	Evaluation
		Newton Raphson		in C for Newton Raphson	method	through the
		method		method		output of the
						program
	3	Interpolation -	3	To understand interpolation	Lecture with	Slip Test
		Newton's Interpolation		and to solve problems using	Illustration	
		formulae		Newton's Interpolation		
				formulae		
	4	programs in C for	3	To construct programs in C	Laboratoy	Evaluation
		Newton's Forward		for Newton's Forward	method	through the
		Interpolation		Interpolation and Backward		output of the
				•	1	-
		andBackward		Interpolation fomula		program
		andBackward Interpolation fomula Lagrange's		Interpolation fomula		program

		Interpolation formula		Lagrange's Interpolation formula	Illustration	through open seminar
IV	Numer	ical differentiation and integ	ration			
	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	Evalu ation throu gh discus sions.
	2	Newton's backward difference formula	3	To obtain approximate solutions for problems using Newton's backward difference formula	Flipped Class	Evalu ation throug h apprec iative 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 Assessmen t 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 progra m
$\overline{\mathbf{V}}$	Numer	ical integration				111
	1	Simpson's (1/3) <sup>rd</sup> 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	Evalua tion throug h the output of the program
	3	Simpson's (3/8) <sup>th</sup> rule	3	To find approximate solutions for problems using Simpson's (3/8) <sup>th</sup> rule	Flipped class	Formative Assessmen t Test
	4	Numerical solution of differential equation	3	To understandnumerical solution 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	Problem Solving	Formative Assessmen
			method and solve problems	_	t Test

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