KARUPPANNAN MARIAPPAN COLLEGE

(AUTONOMOUS)

(Co-Educational Institution, Affiliated to Bharathiar University, Coimbatore and Recognized u/s 2(f) & 12(B) of UGC act 1956 and Accredited by NAAC with "B" Grade)

Chettiarpalayam, Kangayam Road, Muthur -638 105.

Tirupur District, Tamilnadu

DEPARTMENT OF MATHEMATICS

M.Sc., (MATHEMATICS)

SYLLABUS

CONTROLLER OF EXAMINATIONS
Muthur - 638105
Karuppannan Mariappan College (Autonomous)

கருப்பணன் மாரியப்பன் கல்லூரி
முத்தூர் – 638 105.
ஒழுக்கம் கடமை வாய்மை

(Students admitted during the academic year 2024-2025 and onwards)

(Under CBCS with Outcome Based Education (OBE) Pattern)

DEPARTMENT OF MATHEMATICS

Vision

To strengthen the mental calculations, approximations, predictions, estimation of results and Mathematical problems to meet the challenge open to them.

Mission

1. To achieve innovation in teaching, learning and research to realize goals of higher education.
2. To improve the perspective of students on mathematics as per modern requirements.
3. To empower the learners in achieving their professional goals related to mathematics through invited talks and workshops.

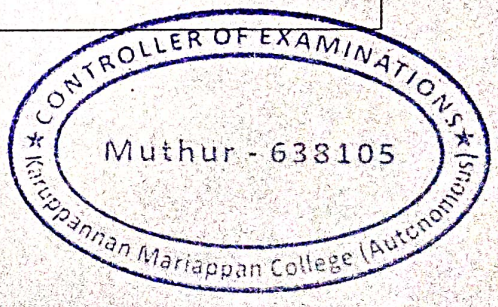
Eligibility for admission:

Should have studied B.Sc., Mathematics/ Mathematics with C.A./ Applied Mathematics.

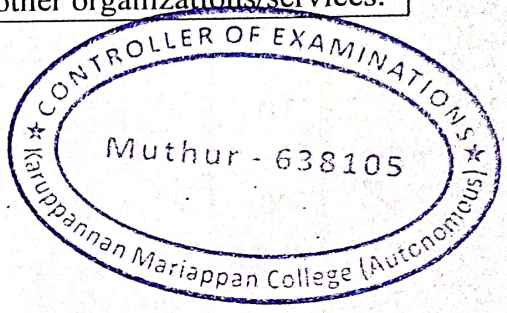
Regulation:

Regulation 2024-25 framed for the conduct of postgraduate programme is applicable.

Programme Outcomes (POs)	
On successful completion of the **M. Sc. Mathematics** programme, the students will be able to	
PO1	Demonstrate in-depth knowledge of Mathematics, both in theory and application.
PO2	Attain the ability to identify, formulate and solve challenging problems in Mathematics.
PO3	Know the various specialized areas of advanced mathematics and its applications.
PO4	Analyze complex problems in Mathematics and propose solutions using research-based knowledge.
PO5	Obtain the accurate solutions for the community oriented problems via various mathematical models.
PO6	Work individually or as a team member or leader in uniform and multidisciplinary settings.
PO7	Crack lectureship and fellowship exams affirmed by UGC like CSIR-NET and SET.
PO8	Apply the Mathematical concepts, in all the fields of learning including higher research, and recognize the need and prepare for lifelong learning.
PO9	Know the use of computers both as an aid and as a tool to study problems in Mathematics.
PO10	Inculcate the knowledge of formulation and apply the mathematical concepts which are suitable for real life applications.



Programme Specific Outcomes (PSOs)	
After the successful completion of **M.Sc. Mathematics** programme, the students are expected to	
PSO1	Communicate concepts of Mathematics and its applications.
PSO2	Acquire analytical and logical thinking through various mathematical tools and techniques.
PSO3	Investigate real life problems and learn to solve them through formulating mathematical models.
PSO4	Attain in-depth knowledge to pursue higher studies and ability to conduct research. Work as mathematical professional.
PSO5	Achieve targets of successfully clearing various examinations/interviews for placements in teaching, banks, industries and various other organizations/services.



M.Sc., Mathematics Degree Course

(For the students admitted during the academic year 2024-2025 and onwards)

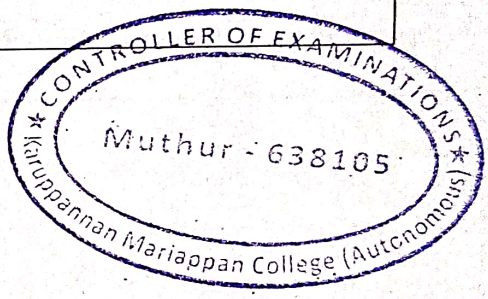
CIA- Continuous Internal Assessment Marks, ESE- End Semester Examination Marks							
S. No	Course Code	Course	Duration Hours	Maximum Marks		Total Marks	Credits
				CIA	ESE		
		SEMESTER-I					
1	24P1MAC1	Linear algebra	6	25	75	100	4
2	24P1MAC2	Real analysis	7	25	75	100	4
3	24P1MAC3	Ordinary Differential Equations	7	25	75	100	4
4	24P1MAC4	Numerical Analysis	6	25	75	100	4
5	24P1MAE1/ 01/ 02	Elective – I :	4	25	75	100	4
		Total	**30**	**125**	**375**	**500**	**20**
		SEMESTER-II					
1	24P2MAC5	Abstract Algebra	6	25	75	100	4
2	24P2MAC6	Complex Analysis	7	25	75	100	4
3	24P2MAC7	Partial Differential Equations	7	25	75	100	4
4	24P2MAC8	Graph Theory	6	25	75	100	4
5	24P2MAE2/ 01/ 02	Elective – II :	4	25	75	100	4
		Total	**30**	**125**	**375**	**500**	**20**

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		SEMESTER-III					
1	24P3MAC9	Topology	7	25	75	100	4
2	24P3MAC10	Mathematical Methods	6	25	75	100	4
3	24P3MAC11	Mechanics	6	25	75	100	4
4	24P3MAC12	Optimization Techniques	6	25	75	100	4
5	24P3MAE3/ 01/ 02	Elective – III:	5	25	75	100	4
		Total	**30**	**125**	**375**	**500**	**20**
		SEMESTER-IV					
1	24P4MAC13	Functional Analysis	6	25	75	100	5
2	24P4MAC14	Mathematical Statistics	6	25	75	100	5
3	24P4MAC15	Fluid Dynamics	6	25	75	100	5
4	24P4MAC16	Computer Programming in C++	3	25	75	100	3
5	24P4MAP1	Computer Programming in C++ (Practical)	2	40	60	100	2
6	24P4MAE4/ 01/ 02	Elective – IV :	4	25	75	100	4
7	24P4MAPV1	Project Viva voce	3	50	100	150	6
		Total	**30**	**215**	**535**	**750**	**30**
		Grand Total	**120**	**590**	**1660**	**2250**	**90**

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List of Elective Paper		
Elective -I	01	Number Theory
	02	Differential Geometry
Elective -II	01	Neural Networks
	02	Fuzzy Logic and Fuzzy Sets
Elective -III	01	Calculus of Variations and Integral Equations
	02	Cryptography
Elective -IV	01	Control Theory
	02	LaTex



SEMESTER –I

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
I	24P1MAC1	CORE –I	6	4	25	75	100
Course Title		LINEAR ALGEBRA					

S.NO.	COURSE OBJECTIVES
1	To work with matrices and learn to solve systems of linear equations.
2	To recognize the concepts of the terms span, linear independence and dependence, basis and dimension and apply the concepts of various vector spaces and subspace.
3	To compute Eigen vectors and Eigen values.
4	To familiarizes with the notions of linear algebra
5	To develop the knowledge of the simultaneous triangulation and simultaneous diagonalization

COURSE OUTCOMES(COs):

On the successful completion of the course, students will be able to

CO Number	Course Outcomes	Knowledge Level
CO1	Identify and construct linear transformations of a matrix.	K1, K3
CO2	Utilize the concepts of linear transformations and dual spaces.	K4
CO3	Find the characteristic equation , Eigen values and corresponding Eigen Vectors of a given matrix	K2
CO4	Evaluate the characteristic vectors and simultaneous Triangularisation and Denationalization	K4,K5
CO5	Demonstrate competence with the basic ideas of linear algebra including matrix operations, basis, invertibility, polynomials and minimal polynomials.	K4, K6

K1–Remember; **K2**–Understanding; **K3**–Apply; **K4**–Analyze; **K5**-Evaluate; **K6**-Create

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SYLLABUS		
Unit	**Content**	**No.of Hours**
I	**Linear transformations** Linear transformations – Isomorphism of vector spaces – Representations of linear transformations by matrices – Linear functionals. **(Chapter 3 : Sections 3.1-3.5)**	18
II	**Algebra of polynomials** The algebra of polynomials –Polynomial ideals - The prime factorization of a polynomial. **(Chapter 4 : Sections 4.1, 4.2, 4.4, 4.5)**	18
III	**Determinants** Determinant functions - Permutations and the uniqueness of determinants – Classical adjoint of a (square) matrix – Inverse of an invertible matrix using determinants. **(Chapter 5 : Sections 5.1 to 5.4)**	18
IV	**Diagonalization** Characteristic values – Annihilating polynomials - Invariant subspaces – Simultaneous triangulations – Simultaneous diagonalization- Invariant subspaces. **(Chapter 6 : Sections 6.1 to 6.4)**	18
V	**Diagonalization(cont)** Simultaneous triangulation and simultaneous Diagonalization - Direct-sum decompositions - Invariant Direct sums – Primary Decomposition theorem. **(Chapter 6 : Sections 6.5 to 6.8)**	18
	TOTAL	**90**

S.NO.	TEXT BOOK:
1	Kenneth M Hoffman and Ray Kunze, **Linear Algebra**, Prentice-Hall of India Pvt. Ltd, New Delhi, 2nd Edition, 2013.

S.NO.	REFERENCE BOOKS:
1	M. Artin, "**Algebra**", Prentice Hall of India Pvt. Ltd., 2005.
2	S.H. Friedberg, A.J. Insel and L.E Spence, "**Linear Algebra**", Pritice- Hall of India Pvt. Ltd., 4th Edition, 2010.
3	I.N. Herstein, "**Topics in Algebra**", Wiley Eastern Ltd, New Delhi, 2nd Edition, 2013.
4	S.Arumugam & A.Thangapandi Isaac"Modern Algebra" Scitech Publications,1st Edition, July 2015
5	A.R.Vasishtha "Modern Algebra" Krishna Prakashan Media P. Ltd.-Meerut, 1st Edition, 2014

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S.NO.	E-REFERENCES:
1	https://www.khanacademy.org/math/linear-algebra
2	https://www.classcentral.com/course/swayam-basic-linear-algebra-13003
3	https://ocw.mit.edu/courses/mathematics/18-06-linear-algebra-spring-2010/

Mapping Course Outcomes with Programme Outcomes:

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	L	S	M	M	S	L	S	M
CO2	L	S	L	S	S	L	S	L	S	S
CO3	M	S	M	L	S	M	S	M	L	S
CO4	L	M	L	S	S	L	M	L	S	S
CO5	S	S	M	M	M	S	S	M	M	M

S-Strong; M-Medium; L-Low

D. Sasi

Verified By

[D. SASIREKHA]

Approved By

[S. DEVI]

DEPARTMENT OF MATHEMATICS
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Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
I	24P1MAC2	CORE –II	7	4	25	75	100
Course Title		REAL ANALYSIS					

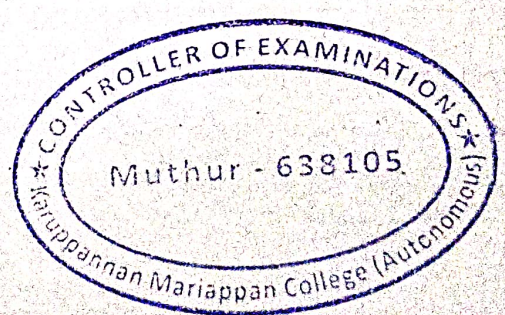
S.NO.	COURSE OBJECTIVES
1	To classify the notion of Riemann- Stieltjes integrals and the conditions for their existence.
2	To acquire knowledge of basic topological properties in the field of real numbers and to expose the concept of convergence, continuity of sequence and series of functions
3	To equip adequate understanding of differentiability of real functions and related theorems
4	To construct simple mathematical proofs and possess the ability to verify them.
5	To apply abstract ideas and rigorous methods in mathematical analysis to practical problems in various fields

COURSE OUTCOMES (COs):

On the successful completion of the course, students will be able to

CO Number	Course Outcomes	Knowledge Level
CO1	Acquire knowledge on the theory of Riemann-Stieltjes integrals.	K1
CO2	Understanding limits and their uses in sequences, series, differentiation and integration.	K2
CO3	Apply the Mean Value Theorem and the Fundamental Theorem of Calculus to problems in the context of real analysis and interconnected to various fields in science, in general.	K3
CO4	Evaluate the Riemann innerability of a bounded function and prove theorems related to linear transformations.	K5
CO5	Describe the ideas of the total variation and functions of bounded variation.	K4, K6

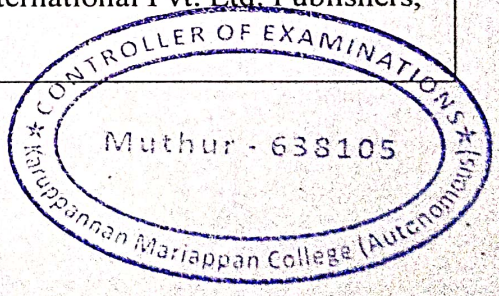
K1–Remember; **K2**–Understanding; **K3**–Apply; **K4**–Analyze; **K5**-Evaluate; **K6**-Create



SYLLABUS		
Unit	**Content**	**No.of Hours**
I	**The Riemann – Stieltjes Integral :** Definition and Existence of the Integral – Properties of the Integral – Integration and Differentiation – Integration of vector valued functions – Rectifiable Curves. **(Chapter 6)**	**21**
II	**Sequences and Series of Functions :** Discussion of main Problem – Uniform convergence – Uniform convergence and Continuity – Uniform convergence and Integration. **(Chapter 7 – Sections 7.1-7.16)**	**21**
III	**Sequences and Series of Functions (Continuation) :** Uniform convergence and Differentiation – Equi - continuous families of functions – The Stone Weierstrass's theorem. **(Chapter 7 – Sections 7.17-7.33)**	**21**
IV	**Some special functions :** Power series – The Exponential and Logarithmic functions – The trigonometric functions – The algebraic Completeness of the complex field –Fourier series – The gamma function. (Chapter 8)	**21**
V	**Functions of several variable :** The implicit function theorem – The rank theorem –Determinants – Derivative of Higher order – Differentiation of integral. **(Chapter 9 – Sections 9.26 – 9.43)**	**21**
	TOTAL	**105**

S.NO.	TEXT BOOK:
1	Walter Rudin, "**Principles of mathematical Analysis**", McGraw Hill Education (India) pvt. Ltd., New Delhi, Third edition, Reprint – 2016.

S.NO.	REFERENCE BOOKS:
1	T.M. Apostol, "**Mathematical Analysis**", Narosa Publ. House, New Delhi, 2nd Edition, 2002.
2	H.L.Royden, "**Real Analysis**", Macmillian Publ.Co.Inc.4th Edition, 2011
3	V.Ganapathy Iyer, "**Mathematical Analysis**", Tata McGraw Hill, New Delhi, 1970.
4	R.G. Bartle"**Elements of Real Analysis**" John Wily and Sons, New york, 1976
5	S.C. Malik, "**Principles of Real Analylsis**", New Age International Pvt. Ltd. Publishers, New Delhi, Sixth Edition, Reprint 2022.



S.NO.	E-REFERENCES:
1	https://onlinecourses.nptel.ac.in/
2	https://ocw.mit.edu/courses/18-100a-real-analysis-fall-2020/pages/lecture-notes-and-readings/
3	https://www.math.purdue.edu/~torresm/introduction-real-analysis.html

Mapping Course Outcomes with Programme Outcomes:

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	S	M	S	M	S	S
CO2	M	S	S	M	M	S	M	M	L	M
CO3	M	M	S	S	M	S	S	M	S	M
CO4	S	M	M	S	M	S	M	S	M	M
CO5	M	S	S	S	S	M	L	S	S	S

S-Strong; M-Medium; L-Low

Verified By

[E.MARIAJHAMBAL]

Approved By

[S.DEVI]

DEPARTMENT OF MATHEMATICS
Karuppannan Mariappan College
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Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
I	24P1MAC3	CORE –III	7	4	25	75	100
Course Title		ORDINARY DIFFERENTIAL EQUATIONS					

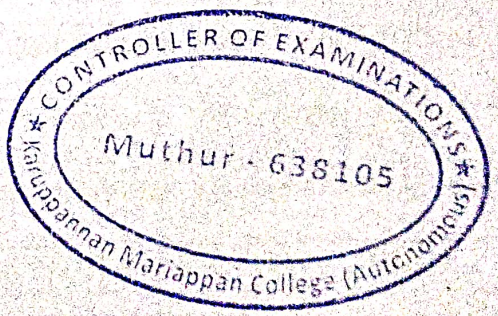
S.NO.	COURSE OBJECTIVES
1	To provide an awareness of the system to linear differential equations
2	To enable the students to use the methods to find the solutions of systems and Boundary Value Problems
3	To apply the results, learn to analyze the Regular singular points of second order Equations and discuss the stability of linear systems.
4	To equip the students to study in-depth concepts and applications of differential equations
5	To gain knowledge about differential equations arise for many problems in oscillations of mechanical and electrical systems.

COURSE OUTCOMES(COs)

On the successful completion of the course, students will be able to

CO Number	Course Outcomes	Knowledge Level
CO1	Obtain Systems of linear differential equations and identify the uniqueness of solutions	K1, K2
CO2	Determine the Existence and uniqueness of solutions	K2
CO3	Create the Sturm–Louville problem and the Green's function and Apply on Boundary Value Problems	K3, K6
CO4	Analyze the Euler functions and Bessel functions, regular singular points at Infinity	K4
CO5	Develop the Existence solutions of linear systems of first order systems	K5

K1–Remember; K2–Understanding; K3–Apply; K4–Analyze; K5-Evaluate; K6-Create



SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**Systems of linear differential equations** Systems of first order equations – Model for Arms competition between two nations – Existence and uniqueness theorem -Fundamental matrix – Non- homogeneous linear systems–Linear systems with constant coefficients–Linear Systems with periodic coefficients. **(Chapter 4 – Sections 4.2-4.8)**	22
II	**Existence and uniqueness of solutions** Preliminaries–Successive approximations–Picard'stheorem–Continuation And dependence on initial conditions–Existence and uniqueness of solutions of systems – Fixed point method. **(Chapter 5 – Sections 5.2-5.4, 5.6,5.8,5.9)**	21
III	**Boundary value problems** Sturm–Liouville problem–Green's function–Applications of Boundary Value Problems– Picard'stheorem. **(Chapter 7 – Sections 7.2-7.5)**	21
IV	**Linear Equations with regular singular points** The Euler Equation-second order equations with regular single points-Exceptional cases-The Bessel equation-The Bessel equation contd **(Chapter 4 – Sections 4.2,4.3,4.6-4.8)**	21
V	**Existence and Uniqueness of Solutions to first order Equations** Equations with variable separated-Exact Equations-The method of successive aproximations-The Lipschitz Condition-Convergence of the successive approximations **(Chapter 5 – Sections 5.2-5.6)**	20
	TOTAL	**105**

S.NO.	TEXT BOOKS:
1	S.G. Deo , V. Lakshmikantham and V. Raghavendra, "**Text book of Ordinary Differential Equations**",Tata Mc Graw - Hill Publishing Company Limited, New Delhi., 3rd Edition 2015, Re-Print 2024 **Unit I,II,III**
2	Coddington E.A, Levinson. N, "**Theory of Ordinary Differential Equations**", Tata McGraw -Hill Publishing Company Limited, New Delhi, 1st Edition, 2004. **Unit IV,V**

S.NO.	REFERENCE BOOKS:
1	George F. Simmons, "**Differential Equations with Application and Historical Notes**", Tata McGraw - Hill, New Delhi -1974.
2	Nandhakumaran, A.K. Datti, P.S.Raju, K.George, "**Ordinary Differential Equations Principles and Applications**", Cambridge University press,1st Edition, 2017 .
3	Sanchez D.A. "**Ordinary Differential Equations and Stability Theory**" W.H.Freeman and Co, 1st Edition, 1968.
4	M. D. Raisinghania "**Advanced Differential Equations**" S:Chand & Company Ltd, 1st Edition, Reprint 2005.
5	Carmen Charles Chicone, "**Ordinary Differential Equations with Applications**" Springer; 2nd Edition, 2006

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S.NO.	E-REFERENCES:
1	https://mathworld.wolfram.com/OrdinaryDifferentialEquation.html
2	http://www.math.psu.edu/tseng/class/math25/Notes 2nd%20 order%20ODE%20pt1. pdf
3	http://www.khanacademy.org/math/differential-equations/first-order-differential-equations
4	http://nptel.ac.in/courses/111105038/

Mapping Course Outcomes with Programme Outcomes:

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L	L	M	M	M	S	S	M	S	S
CO2	L	M	M	M	S	S	M	M	L	S
CO3	L	M	M	S	S	M	S	M	S	M
CO4	M	S	L	S	S	S	S	S	M	M
CO5	M	S	S	M	L	M	M	S	S	S

S-Strong; M-Medium; L-Low

D. Sasi

Verified By

[D. SASIREKHA]

Approved By

[S. DEVI]

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Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
I	24P1MAC4	CORE –IV	6	4	25	75	100

Course Title	NUMERICAL ANALYSIS

S.NO.	COURSE OBJECTIVES
1	To recall the numerical methods to solve the algebraic/transcendental equations and the system of linear equations and to discuss the convergence.
2	To solve the linear equations, non-linear equations and interpolating the values using numerical methods
3	To obtain the solution of Boundary Value Problems and Characteristic Value Problems using Numerical Methods.
4	To find the Solution of Ordinary Differential Equations and Partial Differential Equations using Numerical methods.
5	To classify partial differential equations and determine the numerical solutions using finite difference algorithms

COURSE OUTCOMES (COs):

On the successful completion of the course, students will be able to

CO Number	Course Outcomes	Knowledge Level
CO1	Remember various numerical methods for finding the solution of algebraic and transcendental equations.	K1
CO2	Demonstrate various numerical algorithms for solving simultaneous linear algebraic equations.	K2
CO3	Apply various numerical methods to solve differential equations.	K3
CO4	Analyze the Boundary Value Problems and Characteristic Value Problems.	K4, K6
CO5	Evaluate the Characteristic values using power method	K5

K1–Remember; K2–Understanding; K3–Apply; K4–Analyze; K5-Evaluate; K6-Create

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SYLLABUS

Unit	Content	No. of Hours
I	**Solution of algebraic and transcendental equations:** Interval halving method - Linear interpolation method (Method of false position) – Newton's method - Fixed point iteration - Bairstow's method to extract quadratic factors - Sufficient condition for convergence of Newton's method and fixed-point iteration - Order of convergence of Newton's method. **(Chapter1-Section:1.2-1.4,1.6-1.8)**	18
II	**Numerical Differentiation:** Derivatives from difference tables – Higher order derivatives: Newton's forward, Newton's backward, Bessel's, Stirling's and Divided difference formula for derivatives. **Numerical Integration:** Trapezoidal - Simpson's rules - Romberg integration. **(Chapter5-Section: 5.2-5.8)**	18
III	**Solution of Ordinary Differential Equations :** Taylor series method – Euler and Modified Euler methods - Runge –Kutta methods – Multi-step methods – Milne's method – Adam's method. **(Chapter6-Section: 6.2-6.7)**	18
IV	**BoundaryValueProblemsandCharacteristicValueProblems:** Solution through a set of equations – Derivative boundary conditions – Characteristic value problems –The power method. **(Chapter 7- Section: 7.3-7.5)**	18
V	Iterative methods for Laplace equation – The Poission equation – Derivative Boundary conditions–Solving the equation for time–dependent heat flow (i) The Explicit method (ii)The Crank Nicolson method–Solving the wave equation by finite differences. **(Chapter 8- Section : 8.1-8.6)**	18
	TOTAL	90

S.NO.	TEXT BOOK:
1	C.F.Gerald and P.O.Wheatley, "**Applied Numerical Analysis**", Pearson Education Asia, 6th Edition, 2002. (For **Units I-V**)

S.NO.	REFERENCE BOOKS:
1	S.C.Chapra and P.C.Raymond, "**Numerical Methods for Engineers**", Tata Mc Graw Hill, New Delhi, 2000.
2	R.L.Burden and J.Douglas Faries, "**Numerical Analysis**", Brooks/Cole, 9th Edition, 2011.
3	S.S.Sastry, "**Introductory methods of Numerical Analysis**", Prentice-Hall of India, New Delhi, 1998.
4	P.Kandasamy etal. "**Numerical Methods**" , S.Chand & Co., Ltd., New Delhi, 2003
5	M.K. Jain, S.R.K.Iyengar, R.K. Jain,"**Numerical Methods for Scientific and Engineering**" Computation New Age International, 6th Edition, 2012.

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S.NO.	E-REFERENCES:
1	https://ocw.mit.edu/courses/18-330-introduction-to-numerical-analysis-spring-2012/pages/lecture-notes/
2	https://www.vedantu.com/maths/numerical-analysis

Mapping Course Outcomes with Programme Outcomes :

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	M	S	S
CO2	S	M	M	S	S	S	M	M	L	S
CO3	S	M	S	S	M	M	S	M	S	M
CO4	M	S	S	S	S	S	S	S	M	M
CO5	S	S	S	S	S	M	M	S	S	S

S-Strong; M-Medium; L-Low

E. Marr
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Muthur - 638105
Karuppannan Mariappan College (Autonomous)

DEPARTMENT OF MATHEMATICS
Karuppannan Mariappan College
Chettiyar Palayam, Muthur
TIRUPUR - 638 105.

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
I	24P1MAE1/01	ELECTIVE – I	4	4	25	75	100
Course Title		NUMBER THEORY					

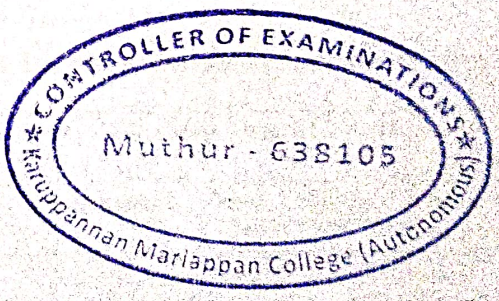
S.NO.	COURSE OBJECTIVES
1	To establish the fundamental ideas and elementary notions of Number Theory
2	To show how certain number theorems can be applied within Cryptography
3	To analyze the concepts of Number Theory functions.
4	To learn the concepts of congruences and quadratic reciprocity
5	To explore the concepts of arithmetic functions and Recurrence functions

COURSE OUTCOMES (COs)

On the successful completion of the course, students will be able to

CO Number	Course Outcomes	Knowledge Level
CO1	Understand the concepts of divisibility and primes.	K1
CO2	Understand the concepts of congruence & solving problems.	K1,K2
CO3	Analyze and solve problems using power residues & Quadratic residues.	K4
CO4	Apply quadratic reciprocity Law to solve problems..	K3,K5
CO5	Analyze the concepts of Number Theory functions.	K4, K6

K1–Remember; **K2**–Understanding; **K3**–Apply; **K4**–Analyze; **K5**-Evaluate; **K6**-Create



SYLLABUS

Unit	Content	No. of Hours
I	**Divisibility:** Introduction, Divisibility, Primes. **(Chapter 1- Section: 1.1-1.3)**	18
II	**Congruences:** Solutions of congruences, Congruences of Degree1, The functions (n) Congruences of Higher Degree, Prime power Moduli, Prime Modulus. **(Chapter 2- Section: 2.1-2.3 ,2.6-2.7)**	18
III	Congruences of Degree2, prime Modulus, Power Residues, Number Theory from an Algebraic view point, Multiplicative Groups, Rings and Fields, Quadratic Residues. **(Chapter 2- Section: 2.8-2.11 , Chapter 3- Section: 3.1)**	18
IV	**Quadratic Reciprocity:** Quadratic Reciprocity–The Jacobi symbol–Greatest Integer function. **(Chapter 3- Section: 3.2-3.3 , Chapter 4-Section : 4.1)**	18
V	**Some functions of Number Theory:** Arithmetic functions –The Moebius Inversion formula–Recurrence functions. **(Chapter 4- Section: 4.2-4.4)**	18
	TOTAL	90

S.NO.	TEXT BOOK:
1	Ivan Nivan, Herbert S. Zuckermam, Hugh L.Montgomery, **"An Introduction to the theory of Numbers"**, John Wiley & Sonsinc., UK, 5rd Edition, 1991. **Unit I-V**

S.NO.	REFERENCE BOOKS:
1	T.M. Apostol , **"Introduction to Analytic number Theory"**, Springer Verlag, 1976.
2	George E. Andrews, **"Number Theory"**, Hindustan publishing, New Delhi, 1989.
3	Kennath H. Rosen, **"Elementary Number Theory and Its Application"**, Addison Wesley Publishing Company,1968,
4	K. Ireland and M. Rosen, **"A classical introduction to modern number theory"**, Springer-Verlag, New York, 2nd Edition.,1990.
5	Gelfond, A. O.,**"Transcendental and Algebraic numbers"**, New York, Dover Publication, 1960.

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S.NO	E-REFERENCES :
1	https://www.britannica.com/science/number-theory
2	https://www.geeksforgeeks.org/number-theory/

Mapping Course Outcomes with Programme Outcomes:

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	S	S	M	S	S
CO2	M	S	M	S	M	S	M	M	L	S
CO3	M	S	S	M	S	S	S	M	S	M
CO4	S	M	M	S	S	S	S	S	M	M
CO5	S	M	S	M	S	M	M	S	S	S

S- Strong; M-Medium; L–Low

Verified By

[E. MARAIMATHAMBAL]

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[S. DEVI]

CONTROLLER OF EXAMINATIONS
Muthur - 638105
Karuppannan Mariappan College (Autonomous)

DEPARTMENT OF MATHEMATICS
Karuppannan Mariappan College
Chettiyar Palayam, Muthur
TIRUPUR - 638 105.

SEMESTER - II

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
II	24P2MAC5	CORE V	6	4	25	75	100
Course Title		ABSTRACT ALGEBRA					

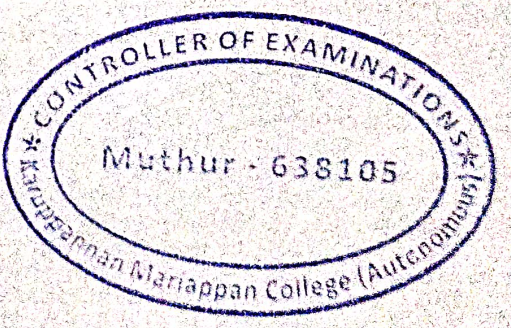
S.NO.	COURSE OBJECTIVES
1	To provide deep knowledge about various algebraic structures.
2	To familiarize with the notions of linear algebra.
3	To study the fundamental results on groups, rings and fields.
4	To develop knowledge on the structures of Hermitian, unitary and normal transformations.
5	To present the relationships between abstract algebraic structures with familiar numbers systems

COURSE OUTCOMES(COs):

On the successful completion of the course, students will be able to

CO Number	Course Outcomes	Knowledge Level
CO1	Recall basic counting principle, define class equations to solve problems, explain Sylow's theorems and apply the theorem to find number of Sylow subgroups.	K1
CO2	Discuss the various aspects of Euclidean Ring.	K3
CO3	Analyze field extensions and to illustrate the roots of polynomials and concept of division algorithm.	K4
CO4	Define Jordan, canonical form, Jordan blocks, define rational canonical form, define companion matrix of polynomial, find the elementary devices of transformation, apply the concepts to find characteristic polynomial of linear transformation.	K2, K5
CO5	Formulate the structures of Hermitian, unitary and normal transformations.	K6

K1–Remember; K2–Understanding; K3–Apply; K4–Analyze; K5-Evaluate; K6-Create

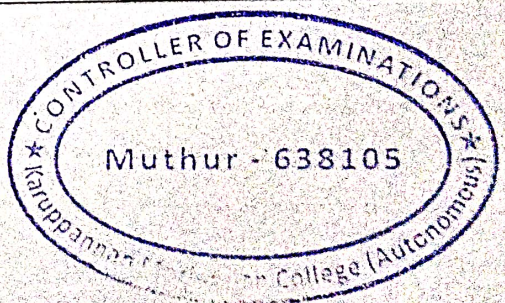


SYLLABUS

Unit	Content	No.of Hours
I	**Group Theory:** Another counting principle -Class equation - Cauchy's theorem - Sylow's theorem– Second part of Sylow's theorem –Third part of Sylow's theorem- Direct product. **(Chapter 2 : Sections :2.11 to 2.13)**	**18**
II	**Ring Theory:** Euclidean rings – Principle ideal ring – Unique factorization theorem - A particular Euclidean ring - Fermat's theorem - Polynomial rings – Division algorithm. **(Chapter 3 : Sections :3.7 to 3.9)**	**18**
III	**Fields:** Extension field – Finite extension – Algebraic extension –Roots of polynomials – Remainder theorem – More about roots – Simple extension. **(Chapter 5 : Sections :5.1, 5.3 & 5.5)**	**18**
IV	**Linear Transformations:** Canonical forms –Triangular form - Nilpotent transformations - Jordan form. **(Chapter 6 :Sections :6.4 to 6.6)**	**18**
V	**Linear Transformations:** Trace and transpose - Hermitian, unitary, normal transformations. **(Chapter 6 :Sections :6.8 & 6.10)**	**18**
	TOTAL	**90**

S.NO.	TEXT BOOK:
1	I.N. Herstein "**Topics in Algebra",** Wiley Eastern Limited, New Delhi, 2nd Edition, 1975. **Unit I-V**

S.NO.	REFERENCE BOOKS:
1	M.Artin, "**Algebra**", Prentice Hall of India, 1991
2	Serge Lang, "**Algebra**", Addison- Wesley, Mass, 3rd Edition,1993.
3	V.K.Khanna and S.K. Bhambri, "**A Course in Abstract Algebra**", Vikas Publishing House Pvt Ltd,1993
4	John. B. Fraleigh, "**A First Course in Abstract Algebra**", Addison-Wesley, New Delhi, 7th Edition, 2003.
5	D.S. Dummit & R.M. Foot," **Abstract Algebra**", John Wiley, New York, 1999



S.NO	E-REFERENCES :
1	https://web.iisermohali.ac.in/moodle/pluginfile.php/9999/mod_resource/content/2/cxip.pdf
2	https://people.maths.ox.ac.uk/flynn/genus2/sheets0405/grfnotes1011.pdf.
3	https://www.khanacademy.org/math/linear-algebra/matrix-transformations/linear transformations/ visualizing -linear-transformations

Mapping Course Outcomes with Programme Outcomes:

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	S	S	S	M	S	S
CO2	S	M	S	M	S	S	M	M	L	S
CO3	M	S	M	S	M	S	S	M	S	M
CO4	M	S	S	S	S	S	M	S	M	M
CO5	M	S	S	S	S	M	M	S	S	S

S-Strong; M-Medium; L-Low

D. Sasi

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[D. SASIREKHA]

Approved By

[S. DEVI]

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Muthur - 638105
Karuppannan Mariappan College (Autonomous)

DEPARTMENT OF MATHEMATICS
Karuppannan Mariappan College
Chettiyar Palayam, Muthur
TIRUPUR - 638 105.

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
II	24P2MAC6	CORE VI	7	4	25	75	100
Course Title	COMPLEX ANALYSIS						

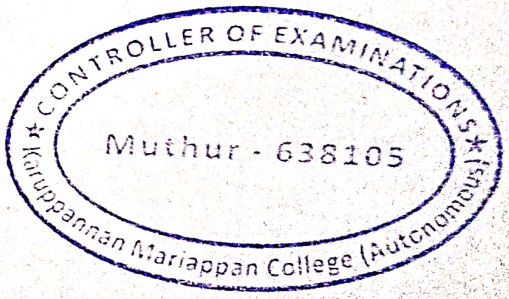
S.NO.	COURSE OBJECTIVES
1	To study Cauchy integral formula, local properties of analytic functions, general form of Cauchy's theorem
2	To explain the evaluation of definite integral and harmonic functions
3	To demonstrate the concept of the Cauchy's theorem and Residue theorem
4	To learn the concepts of complex integration and singularities.
5	To get knowledge about Partial fractions and Canonical products

COURSE OUTCOMES (COs)

On the successful completion of the course, students will be able to

CO Number	Course Outcomes	Knowledge Level
CO1	Analyze and evaluate local properties of analytical functions and definite integrals	K4, K5
CO2	Describe the concept of definite integral and harmonic functions	K3, K4
CO3	Demonstrate the concept of the general form of Cauchy's theorem	K4, K6
CO4	Develop Taylor and Laurent series .	K5
CO5	Explain the infinite products , canonical products and jensen's formula.	K1, K3

K1–Remember; K2–Understanding; K3–Apply; K4–Analyze; K5-Evaluate; K6-Create



SYLLABUS		
Unit	**Content**	**No.of Hours**
I	**Cauchy's Integral Formula:** The Index of a point with respect to a closed curve – The Integral formula – Higher derivatives. Local Properties of analytical Functions:Removable Singularities-Taylors's Theorem – Zeros and poles – The local Mapping – The Maximum Principle. **(Chapter 4 : Section 2:2.1 to 2.3, &Chapter 4 : Section 3:3.1 to 3.4)**	**18**
II	**The general form of Cauchy's Theorem :** Chains and cycles- Simple Continuity -Homology -The General statement of Cauchy's Theorem -Proof of Cauchy's theorem -Locally exact differentials-Multiply connected regions - Residue theorem - The argument principle. **(Chapter 4 : Section 4:4.1 to 4.7& Chapter 5 : Section 5:5.1 and 5.2)**	**18**
III	**Evaluation of Definite Integrals and Harmonic Functions:** Evaluation of definite integrals -Definition of Harmonic function and basic properties - Mean value property – Poisson formula **(Chapter 4 : Section 5 :5.3& Chapter 4 Sections 6: 6.1 to 6.3)**	**18**
IV	**Harmonic Functions and Power Series Expansions:** Schwarz theorem-The Reflection principle – Weierstrass theorem– Taylor's Series – Laurent series . **(Chapter 4 : Sections 6.4 and 6.5 &Chapter 5 : Sections 1.1 to 1.3)**	**18**
V	**Partial Fractions and Entire Functions:** Partial fractions - Infinite products – Canonical products – Gamma Function-Jensen's formula – Hadamard's Theorem **(Chapter 5 : Sections2.1 to 2.4 &Chapter5 : Sections 3.1 and 3.2)**	**18**
	TOTAL	**90**

S.NO.	**TEXT BOOK:**
1	Lars V.Ahlfors, "**Complex Analysis**", Mc Graw Hill Co., NewYork, 3rd Edition, 1979 **Unit I -V**

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S.NO.	REFERENCE BOOKS:
1	H.A.Presfly, "**Introduction to Complex Analysis**", Clarendon Press, oxford, 1990.
2	J.B. Conway, "**Functions of one complex variables**" Springer - Verlag, International student Naroser Publishing Co. Edition,1978
3	S. Ponnusamy, "**Foundations of Complex Analysis**", Narosa publishing house, 2002.
4	W. Rudin, "**Real and Complex Analysis**", McGraw Hill International Editions, 1987.
5	V.Karunakaran, "**Complex Analysis**" Alpha Science International Limited, 2nd edition, 2005

S.NO.	E - REFERENCES :
1	https://en.wikipedia.org/wiki/Complex_analysi
2	https://mccuan.math.gatech.edu/courses/6321/lars-ahlfors-complex-analysis-third-edition-mcgraw-hill-science_engineering_math-1979.pdf

Mapping Course Outcomes with Programme Outcomes:

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	S	S	S	M	S	S
CO2	M	S	M	S	M	S	M	M	L	S
CO3	M	S	S	M	S	S	S	M	S	M
CO4	S	M	M	S	S	S	S	S	M	M
CO5	S	M	S	M	S	M	M	S	S	S

S- Strong; M-Medium; L–Low

Verified By

[E. MARAIATHAMBAL]

CONTROLLER OF EXAMINATIONS
Karuppannan Mariappan College (Autonomous)
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Approved By

[S. DEVI]

DEPARTMENT OF MATHEMATICS
Karuppannan Mariappan College
Chettiyar Palayam, Muthur
TIRUPUR - 638 105.

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
II	24P2MAC7	CORE VII	7	4	25	75	100
Course Title	PARTIAL DIFFERENTIAL EQUATIONS						

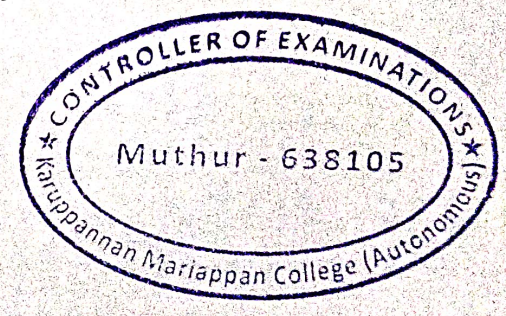
S.NO.	COURSE OBJECTIVES
1	To analyze the origin of partial differential equations and their solutions.
2	To learn different methods of solving first and second order PDE's.
3	To study the Elliptic, Parabolic and Hyperbolic differential equations and their solutions.
4	To develop the mathematical skills in the subject.
5	To enable the students to understand the application of PDE in science.

COURSE OUTCOMES (COs):

On the successful completion of the course, students will be able to

CO Number	Course Outcomes	Knowledge Level
CO1	Define curves and surfaces of the PDE.	K2
CO2	Prove compatible system for the given equations of PDE.	K3
CO3	Identify the type of partial differential equations	K3
CO4	Evaluate Laplace equation and analyze its applications	K4
CO5	Determine the D'Alembert solution of one-dimensional wave equation	K5

K1–Remember; **K2**–Understanding; **K3**–Apply; **K4**–Analyze; **K5**-Evaluate; **K6**-Create



SYLLABUS		
Unit	**Content**	**No.of Hours**
I	**First order Partial Differential Equations** Partial Differential Equation – Origin of First-order Partial Differential Equations-Cauchy's Problem for First-order Equations-Linear Equations of the First Order-Integral Surfaces Passing through a given curve-Non-Linear Partial Differential Equations- Cauchy's Method of Characteristics- Jacobi Method. **(Chapter-2 : Sections-2.1-2.5,2.7,2.8 & 2.13)**	21
II	**Partial Differential Equations of the Second order** The Orgin of Second-order Equations-Linear Partial Differential Equations with Constant Coefficients-Equations with Variable Coefficients-Separation of Variables –The Method of Integral Transforms-Non-Linear Equations of the Second order. **(Chapter-3 : Sections-3.1,3.4,3.5& 3.9-3.11)**	21
III	**Laplace's Equations** Elementary Solutions of Laplace's Equation-Families of Equipotential Surfaces-Boundary Value Problems-Separation of Variables-The Theory of Green's Function for Laplace's Equations. **(Chapter-4 : Sections-4.2-4.5 & 4.8)**	21
IV	**The Wave Equations** The Occurrence of the Wave Equation in Physics – Elementary Solutions of the One-dimensional Wave Equation –The Riemann - Voltera Solution of the One - dimensional Wave Equation-Vibrating Membranes of Application of the Calculus of Variations-Three-dimensional Problems- Green's Function for the Wave Equation. **(Chapter-5 : Sections - 5.1-5.7)**	21
V	**The Diffusion Equations** The Occurrence of the Diffusion Equation in Physics – Elementary Solutions of the Diffusion Equation-Separation of Variables-The Use of Integral Transforms-The Use of Green's Functions. **(Chapter-6 : Sections-6.1 & 6.3 - 6.6)**	21
	TOTAL	**105**

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S.NO.	TEXT BOOK:
1	J.N.Sharma and K.Singh,"**Partial Differential Equations for Engineers and Scientists**", Narosa publishing House, 2011

S.NO.	REFERENCE BOOKS:
1	M.D.Raisinghania, "**Advanced Differential Equations**",S.Chand and Company Ltd., New Delhi, 2001.
2	Sankara Rao,"**Introduction to Partial Differential Equations**", Prentice – Hall of India, New Delhi, 2nd Edition, 2006
3	I. N. Sneddon, "**Elements of Partial Differential Equations**", McGraw Hill International Book Company, New Delhi,1983.
4	Tyn Myint-U, **Partial Differential Equations of Mathematical Physics,** Elsevier Scientific Publishing Company, Netherland, 3rd Edition,1978
5	L.C. Evans, "**Partial Differential Equations**", AMS, 2003

S.NO.	E - REFERENCES :
1	https://www.elsevier.com/books/Mathematicalphysics...partial-differential-equation/.
2	https://www.cncpress.com/Mathematics/Mathematics for physics

Mapping Course Outcomes with Programme Outcomes:

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	M	M	L	M	S	S	M	S	S
CO2	M	M	S	M	S	S	M	M	L	S
CO3	L	S	M	S	S	S	S	M	S	M
CO4	M	S	M	S	S	S	S	S	M	M
CO5	M	S	M	S	S	M	M	S	S	S

S-Strong; M-Medium; L-Low

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[D. SAJIREKHA]

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[S. DEVI]

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Muthur - 638105

DEPARTMENT OF MATHEMATICS
Karuppannan Mariappan College
Chettiyar Palayam, Muthur
TIRUPUR - 638 105.

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
II	24P2MA8	CORE –VIII	6	4	25	75	100
Course Title	GRAPH THEORY						

S.NO.	COURSE OBJECTIVES
1	To acquire basic knowledge in the field of Graph Theory and to expose the concept of graphs and sub graphs.
2	To equip adequate understanding the properties of Trees and connectivity of graphs.
3	To construct simple mathematical proofs in graph coloring and possess the ability to verify them by graphically
4	To emphasizes various approaches that has proved fruitful in modern graph theory
5	To apply abstract ideas and rigorous methods of graph theory to solve practical problems in various fields

COURSE OUTCOMES(COs):

On the successful completion of the course, students will be able to

CO Number	Course Outcomes	Knowledge Level
CO1	Describe fundamental properties of graphs and familiar with basic proof techniques.	K1, K3
CO2	Understanding connectivity of a graph and their uses in Reliable Communication Networks.	K2
CO3	Apply the Euler's theorem and Hamilton' theorem to assignment problems in the context of graph theory and interconnected to various fields in sciences.	K3
CO4	Evaluate chromatic number and prove theorems related to graph colourings.	K4, K6
CO5	Demonstrate the concepts of colouring and to apply in day-to-day life	K5

K1–Remember; K2–Understanding; K3–Apply; K4–Analyze; K5-Evaluate; K6-Create

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SYLLABUS

Unit	Content	No.of Hours
I	**Graphs and Subgraphs:** Graphs and simple graphs – Graph isomorphism – Incidence and Adjacency Matrices– Subgraphs – Vertex degrees – Paths and connection – Cycles – Application – The shortest path problem. **(Chapter 1 : Sections 1.1 to 1.8)**	18
II	**Trees and Connectivity:** Trees – Cut edges and bonds – Cut vertices – Cayley's formula - Application – Connector problem – Connectivity – Blocks – Application – Reliable Communication Networks. **(Chapter 2 : Sections 2.1 to 2.5)** **(Chapter 3 : Sections 3.1 to 3.3)**	18
III	**Euler Tours and Matchings:** Euler Tours – Hamilton cycles – Application – Chinese Postman Problem – Traveling salesman problem - Matchings – Matching and coverings in Bipartite Graphs – Perfect Matchings. **(Chapter 4 : Sections 4.1 to 4.4)** **(Chapter 5 : Sections 5.1 to 5.3)**	18
IV	**Edge Colouring and Independent sets:** Edge Colouring – Edge Chromatic Number – Vizings Theorem – Application – Timetabling Problem – Independents sets – Ramsey's Theorem. **(Chapter 6 : Sections 6.1 to 6.3)** **(Chapter 7 : Sections 7.1, 7.2)**	18
V	**Vertex Colouring** Vertex Colourings – Chromatic Number – Brook Theorem – Hajos conjecture – Chromatic Polynomials – Girth and Chromatic Number. **(Chapter 8 : Sections 8.1 to 8.5)**	18
	TOTAL	90

S.NO.	TEXT BOOK:
1	J.A.Bondy and U.S.R.Murty, **"Graph Theory with Applications"**, American Elsevier Publishing Company Inc., New York, 5th Edition, 1976. **Unit I -V**

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S.NO.	REFERENCE BOOKS:
1	Harary F , **"Graph Theory"**, Addison –Wesley , Reading Mass, 1969
2	M.Murugan, **"Graph Theory and Algorithms"**, Muthali Publishing House, Chennai, 2nd Edition, 2018.
3	K.R.Parthasarathy, **"Basic Graph Theory"**, Tata McGraw Hill, New Delhi,1994.
4	Narasing Deo,**"Graph Theory with Application to Engineering and Computer Science"**, Prentice Hall of India, New Delhi. 2003.
5	L. R. Foulds, **"Graph Theory Application"**, Narosa Publ. House, Chennai, 1933

S.NO.	E - REFERENCES :
1	https://nptel.ac.in/courses/106108054/
2	https://nptel.ac.in/courses/106108054/16
3	http://www.freebookcentre.net/maths–books–download/Graph–Theory–Lecture–Notes–by–NPTEL.html
4	http://www.freebookcentre.net/maths–books–download/Graph–Theory–and–Applications.html

Mapping Course Outcomes with Programme Outcomes:

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	L	S	S	M	S	S
CO2	S	S	M	M	S	S	M	M	L	S
CO3	M	M	S	L	L	S	S	M	S	M
CO4	L	M	M	M	S	S	S	S	M	M
CO5	S	S	M	M	S	M	S	S	S	S

S-Strong; M-Medium; L-Low

E. Mary
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[E. MARIAMTHAMBAL]

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DEPARTMENT OF MATHEMATICS
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TIRUPUR - 638 105.

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Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
II	24P2MAE2/02	ELECTIVE II	4	4	25	75	100
Course Title		FUZZY LOGIC AND FUZZY SETS					

S.NO.	COURSE OBJECTIVES
1	To focus on conceptual understanding.
2	The objective of this course is to introduce the basic ideas of Fuzzy Sets, Fuzzy sets versus crisp sets, methods of contracting fuzzy sets.
3	To know the mapping of fuzzy sets by a function and also use α – level sets.
4	To learn the fuzzy operations and fuzzy arithmetic operations
5	To gain knowledge in constructing fuzzy sets

COURSE OUTCOMES(COs)

On the successful completion of the course, students will be able to

CO Number	Course Outcomes	Knowledge Level
CO1	Distinguish between the crisp set and fuzzy set concepts.	K1
CO2	Draw a parallelism between crisp set operations and fuzzy set operations through the use of characteristic and membership functions, respectively.	K2
CO3	Define fuzzy sets using linguistic words and represent these sets by membership functions.	K1, K6
CO4	Know how to perform mapping of fuzzy sets by a function and also use α – level sets in such instances.	K3, K5
CO5	Become aware of the use of fuzzy inference systems in the design of intelligent or humanistic systems.	K4

K1–Remember; K2–Understanding; K3–Apply; K4–Analyze; K5-Evaluate; K6-Create

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SYLLABUS

Unit	Content	No.of Hours
I	**Fuzzy sets :** Fuzzy sets – Basic types – basic concepts – Characteristics- Significance of the paradigm shift - Additional properties of α-cuts. **(Chapter 1 & 2 – Sections : 1.3-1.5, 2.1)**	15
II	**Fuzzy sets versus crisp sets :** Representation of Fuzzy sets- Extension principle of Fuzzy sets – Operation on Fuzzy Sets – Types of operation – Fuzzy complements. **(Chapter 2 & 3 – Sections : 2.2, 2.3, 3.1, 3.2)**	15
III	**Operations on Fuzzy sets:** Fuzzy intersection – t-norms, Fuzzy unions – t conorms- Combinations of operations – Aggregation operations. **(Chapter 3 – Sections: 3.3-3.6)**	15
IV	**Fuzzy Arithmetic:** Fuzzy numbers – Linguistic variables – Arithmetic operation on intervals – Lattice of Fuzzy numbers. **(Chapter 4 – Sections : 4.1-4.4)**	15
V	**Constructing Fuzzy Sets:** Methods of construction: an overview – direct methods with one expert – direct method with multiple experts – indirect method with multiple experts and one expert- Construction from sample data. **(Chapter 10 – Sections:10.1-10.7)**	15
	TOTAL	**75**

S.NO.	TEXT BOOK:
1	G. J. Klir and Bo Yuan, "**Fuzzy Sets and Fuzzy Logic: Theory and Applications**", Prentice Hall of India Ltd, New Delhi, 2005. **Unit I - V**

S.NO.	REFERENCE BOOKS:
1	H.J. Zimmermann, "**Fuzzy Set Theory and its Applications**", Allied Publishers, Chennai, 1996.
2	George J. Klir, Tina Folger A.,"**Fuzzy Sets, Uncertainty and information**", Prentice – Hall of India Private Limited , 2006.
3	V. Novak, "**Fuzzy Sets and Their Applications**", Adam Hilger, Bristol, 1969.
4	A.K. Bhargava, "**Fuzzy Set Theory, Fuzzy Logic and their Applications**", published by S. Chand Pvt. Limited, 2013
5	K.Pundir and R. Pundir, "**Fuzzy Sets and their Applications**", published by A.Pragati edition, 2012.

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S.NO.	E - REFERENCES :
1	https://www.javatpoint.com/fuzzy-logic
2	https://www.geeksforgeeks.org/fuzzy-logic-introduction/
3	https://onlinecourses.nptel.ac.in

Mapping Course Outcomes with Programme Outcomes:

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	L	M	S	S	M	S	S
CO2	M	S	S	L	S	S	M	M	L	S
CO3	S	S	S	M	S	S	S	M	S	M
CO4	M	S	M	L	S	S	S	S	M	M
CO5	S	M	S	M	M	M	M	S	S	S

S-Strong; M-Medium; L -Low

Verified By

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