



V.V.VANNIAPERUMAL COLLEGE FOR WOMEN

(Belonging to Virudhunagar Hindu Nadars)

An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai

Re-accredited with 'A' Grade (3rd Cycle) by NAAC

VIRUDHUNAGAR - 626 001

PEOs, POs, PSOs and COs

M.Sc. MATHEMATICS

Programme Educational Objectives (PEOs)

PEOs are broad statements that describe the career and professional achievements that the Programme is preparing the graduates to achieve within the first few years after graduation. PEOs are framed for each Programme and should be consistent with the Mission of the Institution.

Programme Outcomes (POs)

POs shall be based on Graduate Attributes (GAs) of the Programme. The GAs are the attributes expected of a graduate from a Programme in terms of knowledge, skills, attitude and values. The Graduate Attributes include Disciplinary Knowledge, Communication Skills, Critical Thinking, Problem Solving, Analytical Reasoning, Research Related Skills, Co-operation/Team Work, Scientific Reasoning, Reflective Thinking, Information/Digital Literacy, Multicultural Competence, Moral and Ethical Awareness/Reasoning, Leadership Qualities and Lifelong Learning.

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

- 1 Apply their in depth domain knowledge and practical skills in interdisciplinary fields for research-based endeavours, employment and entrepreneurship development.
(*Disciplinary Knowledge*)

- 2 Communicate proficiently and confidently with the ability to present complex ideas in a concise manner to assorted groups. (*Communication Skills*)
- 3 Identify, formulate and solve problems in a consistent and systematic way with updated skills using modern tools and techniques. (*Scientific Reasoning and Problem Solving*)
- 4 analyse the data, synthesise the findings and provide valid conclusion by critical evaluation of theories, policies and practices for the betterment of society. (*Critical Thinking and Analytical Reasoning*)
- 5 Explore and evaluate globally competent research methodologies to apply appropriately in interdisciplinary research; Develop and sustain the research capabilities to meet the emerging needs for the welfare of the society. (*Research Related Skills*)
- 6 Use ICT to mould themselves for lifelong learning activities to face career challenges in the changing environment. (*Digital Literacy, Self - directed and Lifelong Learning*)
- 7 Self-manage and function efficiently as a member or a leader in diverse teams in a multicultural society for nation building. (*Co-operation/Team Work and Multicultural Competence*)
- 8 Uphold the imbibed ethical and moral values in personal, professional and social life for sustainable environment. (*Moral and Ethical Awareness*)

Programme Educational Objectives (PEOs)

PEOs are broad statements that describe the career and professional achievements that the Programme is preparing the graduates to achieve within the first few years after graduation. PEOs are framed for each Programme and should be consistent with the Mission of the Institution.

The students will be able to

- become successful teachers in schools and Colleges, Bank officers, government officials, Statisticians and IT professionals.
- apply mathematical skills in analyzing and solving problems in real life situations.
- develop independent thinking for continuous learning and productive research contributions that would help in building a better nation

Key Components of Mission Statement	PEO1	PEO2	PEO3
Profound knowledge in Mathematics	✓	✓	✓
Logical reasoning and analytical Skills	✓	✓	✓
Focus on moral and ethical values	✓	-	✓
Passion for Research	-	-	✓

Programme Specific Outcomes (PSOs)

Based on the Programme Outcomes, Programme Specific Outcomes are framed for each PG Programme. Programme Specific Outcomes denote what the students would be able to do at the time of graduation. They are Programme - specific and it is mandatory that each PO should be mapped to the respective PSO.

On successful completion of M.Sc Programme, the students will be able to

PO 1: Disciplinary Knowledge

PSO 1.a: Apply the in-depth knowledge of theoretical concepts of mathematics in Research activities.

PSO 1.b: Apply the comprehensive knowledge and skill acquired in advanced mathematical courses to be employed in various sectors of the economy.

PO 2: Communication Skills

PSO 2: Communicate effectively on advanced mathematical concepts, comprehend and write reports and design documents of data to suit the needs of business concerns, institution or organization.

PO 3: Scientific Reasoning and Problem Solving

PSO 3: Apply the knowledge of advanced mathematics to formulate real life problems into mathematical models and find solution to the problems using appropriate mathematical techniques.

PO 4: Critical thinking and analytical reasoning

PSO 4.a: Apply the skill of logical and analytical reasoning in advanced mathematics to reach substantial conclusions in facing career challenges.

PSO 4.b: Employ advanced mathematical methods to various sectors considering the limits in scientific, technological, social, economical and environmental aspects.

PO 5: Research related Skills

PSO 5: Formulate need based mathematical research problems and apply appropriate research methodologies by exploring interdisciplinary research opportunities

PO 6: Digital Literacy, Self-directed Lifelong Learning

PSO 6: Engage in independent and lifelong learning in broad context of technological change.

PO 7: Cooperation/Team Work and Multi-cultural Competence

PSO 7: Demonstrate the knowledge of mathematics with team spirit in diverse environment to bring multicultural richness in mathematics.

PO 8: Moral and Ethical awareness

PSO 8: Apply ethical principles of mathematics and be committed to professional ethics and responsibilities.



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Semester I	GROUPS AND RINGS	Hours/Week: 6	
Core Course-1		Credits: 4	
Course Code 20PMTTC11		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, students will be able to

CO1: explain the fundamental concepts of abstract algebra. [K2]

CO2: apply the logical proof to characterize algebraic structures. [K3]

CO3: apply the theory to solve a variety of problems at an appropriate level of difficulty. [K3]

CO4: analyze the characteristics and equivalence criterions of various concepts of algebraic structures. [K4]

CO5: assess the algebraic structures by using advanced ideas in Groups and Rings. [K5]

Course Code 20PMTTC11	PO1		PO2	PO3	PO4		PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO2	PSO3	PSO 4.a	PSO 4.b	PSO5	PSO6	PSO7	PSO8
CO1	H	L	H	H	L	-	H	H	L	-
CO2	H	M	H	L	M	M	H	H	L	-
CO3	H	M	H	L	M	M	H	H	L	-
CO4	H	L	M	H	M	M	M	H	L	-
CO5	H	L	L	M	H	H	M	H	L	-



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Semester I	ANALYSIS	Hours/Week: 6	
Core Course-2		Credits: 4	
Course Code 20PMTTC12		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, students will be able to

CO1: explain the fundamental properties of real numbers. [K2]

CO2: identify the properties of metric space, sequences, series, continuity, uniform continuity and differentiation in real line. [K3]

CO3: apply the ratio test, root test and comparison test to determine the convergence of series. [K3]

CO4: analyze the characteristics and equivalence criteria of various concepts in the context of extended real number system. [K4]

CO5: establish various theorems, results and corollaries of real number system. [K5]

Course Code 20PMTTC12	PO1		PO2	PO3	PO4		PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO2	PSO3	PSO 4.a	PSO 4.b	PSO5	PSO6	PSO 7	PSO8
CO1	H	H	H	H	M	M	M	H	L	-
CO2	H	M	L	-	L	M	M	H	L	-
CO3	H	L	M	L	M	M	H	H	L	-
CO4	H	L	L	M	L	M	H	H	L	-
CO5	H	L	L	H	H	M	H	H	L	-



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Semester I	DIFFERENTIAL GEOMETRY	Hours/Week: 6	
Core Course-3		Credits: 4	
Course Code 20PMTC13		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, students will be able to

CO1: explain the concepts of space curves and their properties. [K2]

CO2: calculate the curvature and torsion of a curve. [K3]

CO3: apply properties of surfaces and geodesics in engineering field. [K3]

CO4: analyze properties of surfaces in different settings and helicoids. [K4]

CO5: assess curvature of curves and fundamental forms for different surfaces. [K5]

Course Code 20PMTC13	PO1		PO2	PO3	PO4		PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2	PSO 3	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7	PSO 8
CO1	H	L	M	H	L	-	M	M	L	-
CO2	H	M	M	L	M	-	M	H	L	-
CO3	M	-	L	L	M	M	M	L	L	-
CO4	H	L	H	H	M	M	H	M	L	-
CO5	L	L	H	M	H	M	H	M	L	-



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Semester I	MATHEMATICAL METHODS	Hours/Week: 6	
Core Course-4		Credits: 4	
Course Code 20PMTTC14		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, students will be able to

CO1: explain the concepts of Integral equations, boundary value problems and Fourier transform. [K2]

CO2: apply different transformation techniques in Integral equations and Fourier transforms. [K3]

CO3: solve various Integral equations by using the suitable method. [K3]

CO4: analyze the various Integral equations and Fourier transforms. [K4]

CO5: evaluate the given integral using Fourier transforms and boundary value problems using suitable method & Green's function. [K5]

Course Code 20PMTTC14	PO1		PO2	PO3	PO4		PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2	PSO 3	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7	PSO 8
CO1	H	-	H	H	H	H	H	M	-	M
CO2	H	L	-	H	H	H	H	M	L	M
CO3	H	-	M	H	H	H	H	M	L	M
CO4	H	-	M	H	H	H	H	M	L	M
CO5	H	L	-	H	H	H	H	M	-	M



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Semester I	NUMERICAL ANALYSIS	Hours/Week: 6	
DSEC-1		Credits: 4	
Course Code 20PMTE11		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, students will be able to

CO1: explain the basic principles in Numerical Methods. [K2]

CO2: apply numerical techniques to find the solution of the system of linear equations. [K3]

CO3: solve algebraic equations and ordinary differential equations. [K3]

CO4: analyze the rate of convergence of the root of the given equation using different iteration methods, solution of differential equations, numerical integration and the significance of difference operators in interpolation. [K4]

CO5: evaluate the approximate root of the given equation, the definite integral of complicated functions, Eigen values and Eigenvectors approximately. [K5]

Course Code 20PMTE11	PO1		PO2	PO3	PO4		PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2	PSO 3	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7	PSO 8
CO1	H	H	H	L	L	L	-	-	-	-
CO2	H	H	M	H	L	L	-	-	-	-
CO3	H	H	M	H	M	H	M	M	L	-
CO4	H	H	L	H	M	L	M	M	M	-
CO5	H	H	H	H	H	H	M	M	M	-



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Semester I	MODERN APPLIED ALGEBRA	Hours/Week: 6	
DSEC-1		Credits: 4	
Course Code 20PMTE12		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, students will be able to

CO1: explain the fundamental concept of binary devices and states. [K2]

CO2: apply the programming structure of ALGOL. [K3]

CO3: apply the knowledge gained in binary group codes to other fields. [K3]

CO4: analyze the procedure for deriving prime implicants, consensus taking,
Flip-flops. [K4]

CO5: evaluate the Boolean expression in minimized form. [K5]

Course Code 20PMTE12	PO1		PO2	PO3	PO4		PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2	PSO 3	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7	PSO 8
CO1	H	H	H	L	L	L	-	L	M	-
CO2	H	H	H	M	M	L	-	L	M	-
CO3	H	H	M	H	M	M	H	L	M	-
CO4	H	H	M	H	M	M	H	L	M	-
CO5	H	H	L	H	H	H	H	L	M	-



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Semester I	MECHANICS	Hours/Week: 6	
DSEC-1		Credits: 4	
Course Code 20PMTE13		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, students will be able to

CO1: explain the elementary principles of mechanics. [K2]

CO2: solve two body central force problems. [K3]

CO3: apply D'Alembert's principle and Lagrange's equations and Kepler's laws. in solving the problems. [K3]

CO4: analyze the Holonomic and non Holonomic systems. [K4]

CO5: evaluate the Hamilton equations of motion. [K5]

Course Code 20PMTE13	PO1		PO2	PO3	PO4		PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO2	PSO3	PSO 4.a	PSO 4.b	PSO5	PSO6	PSO7	PSO8
CO1	H	H	L	L	L	L	H	L	L	-
CO2	H	H	L	M	M	M	H	L	L	-
CO3	H	H	L	M	M	M	H	L	L	-
CO4	H	H	L	M	M	M	H	L	L	-
CO5	H	H	L	M	H	M	H	L	L	-



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Semester II	LINEAR ALGEBRA	Hours/Week: 6	
Core Course-5		Credits: 4	
Course Code 20PMTC21		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, students will be able to

CO1: explain vector spaces and their properties. [K2]

CO2: apply the acquired knowledge in linear algebra in various fields. [K3]

CO3: apply the properties of trace, transpose of matrices and determinants in proving theorems. [K3]

CO4: analyze the characteristics of various transformations, matrices and determinants. [K4]

CO5: establish various theorems and results in linear transformations, matrices and determinants. [K5]

Course Code 20PMTC21	PO1		PO2	PO3	PO4		PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2	PSO 3	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7	PSO 8
CO1	H	H	M	H	H	H	H	H	M	-
CO2	H	H	H	H	H	H	H	H	M	-
CO3	H	H	M	H	H	H	H	H	H	-
CO4	H	H	H	H	H	H	H	H	H	-
CO5	H	H	M	H	H	H	H	H	M	-



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Semester II	REAL ANALYSIS II	Hours/Week: 6	
Core Course-6		Credits: 4	
Course Code 20PMTC22		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, students will be able to

CO1: explain the concept of the Riemann integrability, sequences and series, some special functions and functions of several variables. [K2]

CO2: apply the integral theory to prove results about specific classes of functions. [K3]

CO3: determine the convergence, uniform convergence of sequence of functions. [K3]

CO4: analyze the characteristics and equivalence criterions of various concepts of real and complex field. [K4]

CO5: evaluate Riemann integration, test the convergence of the sequences and series of functions and prove theorems in functions of several variables. [K5]

Course Code 20PMTC22	PO1		PO2	PO3	PO4		PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO2	PSO3	PSO 4.a	PSO 4.b	PSO5	PSO6	PSO7	PSO8
CO1	H	H	M	M	M	-	-	H	M	L
CO2	H	H	M	M	M	-	-	H	M	L
CO3	H	H	M	M	M	-	-	H	M	L
CO4	H	H	M	M	M	-	-	H	M	L
CO5	H	H	-	M	M	-	-	H	M	-



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Semester II	DIFFERENTIAL EQUATIONS	Hours/Week: 6	
Core Course-7		Credits: 4	
Course Code 20PMTC23		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, students will be able to

CO1: explain the fundamental concepts of linear and nonlinear differential equations. [K2]

CO2: solve problems of Ordinary Differential Equations and Partial Differential Equations arising in various fields. [K3]

CO3: apply various computational techniques to obtain the solution of Ordinary Differential Equations and Partial Differential Equations. [K3]

CO4: analyze Ordinary Differential Equations & Partial Differential Equations of various types, their solutions and fundamental concepts about their existence and uniqueness. [K4]

CO5: evaluate the first order linear and nonlinear Differential Equations by using various methods. [K5]

Course Code 20PMTC23	PO1		PO2	PO3	PO4		PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2	PSO 3	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7	PSO 8
CO1	H	H	H	L	L	M	L	M	L	-
CO2	H	H	M	M	H	M	H	M	L	-
CO3	H	H	H	H	H	M	H	M	L	-
CO4	H	H	M	H	H	M	H	M	L	-
CO5	H	H	M	M	H	H	H	H	L	-



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Semester II	MATHEMATICAL STATISTICS	Hours/Week: 6	
Core Course-8		Credits: 4	
Course Code 20PMTTC24		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, students will be able to

CO1: explain the fundamentals and properties of probability, random variable, expectations and distribution functions. [K2]

CO2: solve various problems in special distributions, random variables and multivariate random variables. [K3]

CO3: apply various computational techniques to solve problems in multivariate distributions. [K3]

CO4: analyze the statistical data using appropriate probability distributions, limiting distributions and transformation of variables. [K4]

CO5: evaluate various types of probability density function for both continuous and discrete random variables and the parameters in various distributions. [K5]

Course Code 20PMTTC24	PO1		PO2	PO3	PO4		PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO2	PSO3	PSO 4.a	PSO 4.b	PSO5	PSO6	PSO7	PSO8
CO1	H	H	H	L	L	M	L	M	L	-
CO2	H	H	M	M	H	M	H	M	L	-
CO3	H	H	H	H	H	M	H	M	L	-
CO4	H	H	M	H	H	M	H	M	L	-
CO5	H	H	M	M	H	H	H	H	L	-



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Semester II	FUZZY ALGEBRA	Hours/Week: 6	
DSEC -2		Credits: 4	
Course Code 20PMTE21		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, students will be able to

CO1: explain the basic concepts of Fuzzy sets, relations, groups, Sylow groups and ideals.[K2]

CO2: apply the acquired knowledge in Fuzzy sets in proving theorems and solving problems.K3]

CO3: illustrate fuzzy relations, binary fuzzy relations, fuzzy equivalence relations, groups, Sylow groups and ideals. [K3]

CO4: analyze the concepts of fuzzy sets, relations groups and ideals in various algebraic structures. [K4]

CO5: assess the algebraic structures by using advanced ideas in Fuzzy algebra. [K5]

Course Code 20PMTE21	PO1		PO2	PO3	PO4		PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO2	PSO3	PSO 4.a	PSO 4.b	PSO5	PSO6	PSO7	PSO8
CO1	H	H	L	M	M	M	L	L	L	-
CO2	H	H	L	L	M	L	L	L	L	-
CO3	H	H	L	L	M	L	L	L	L	-
CO4	H	H	L	M	M	M	L	L	L	-
CO5	H	H	L	M	M	L	L	L	L	-



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Semester II	ADVANCED CALCULUS	Hours/Week: 6	
DSEC-2		Credits: 4	
Course Code 20PMTE22		Internal 25	External 75

COURSE OUTCOMES

On completion of the course, students will be able to

CO1: explain the basic idea of differentiation of transforms. [K2]

CO2: solve the problems in Differential Geometry and Vector Calculus. [K3]

CO3: apply the theorems of Green, Gauss and Stoke's in solving problems. [K3]

CO4: analyze implicit function theorem. [K4]

CO5: evaluate integrals over curves and surfaces. [K5]

Course Code 20PMTE22	PO1		PO2	PO3	PO4		PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2	PSO 3	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7	PSO 8
CO1	H	H	H	L	L	M	L	M	L	-
CO2	H	H	M	M	H	M	H	M	L	-
CO3	H	H	H	H	H	M	H	M	L	-
CO4	H	H	M	H	H	M	H	M	L	-
CO5	H	H	M	M	H	H	H	H	L	-



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Semester II	THEORY OF COMPUTATIONS	Hours/Week: 6	
DSEC-2		Credits: 4	
Course Code 20PMTE23		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, students will be able to

CO1: explain the concepts in automata theory and theory of computation. [K2]

CO2: apply grammars to produce strings from a specific language. [K3]

CO3: determine the decidability and intractability of computational problems. [K3]

CO4: analyze different formal language classes and their relationships. [K4]

CO5: establish theorems in automata theory using its properties. [K5]

Course Code 20PMTE23	PO1		PO2	PO3	PO4		PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2	PSO 3	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7	PSO 8
CO1	H	H	L	L	L	L	H	L	L	-
CO2	H	H	L	M	M	M	H	L	L	-
CO3	H	H	L	M	M	M	H	L	L	-
CO4	H	H	L	M	M	M	H	L	L	-
CO5	H	H	L	M	H	M	H	L	L	-



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Semester III	MEASURE THEORY	Hours/Week: 6	
Core Course-9		Credits: 5	
Course Code 20PMT31		Internal 40	External 60

COURSEOUTCOMES

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

CO1: explain the basic concepts in measure theory and integration theory. [K2]

CO2: apply the knowledge gained from concrete cases to a general situation by means of going to general measure from Lebesgue measure. [K3]

CO3: prove theorems and determine solutions to problems in measure theory. [K3]

CO4: analyse the properties of measurable functions, Lebesgue integrable functions, functions of bounded variations and absolutely continuous functions. [K4]

CO5: characterize measurable functions and integrable functions. [K5]

Course Code 20PMT31	PO1		PO2	PO3	PO4		PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2	PSO 3	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7	PSO 8
CO1	H	H	H	H	L	-	H	H	M	-
CO2	H	H	H	M	L	-	H	H	L	-
CO3	H	H	M	H	M	L	H	H	H	-
CO4	H	H	M	M	L	L	M	H	M	-
CO5	H	H	L	M	H	-	M	H	-	-



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VIRUDHUNAGAR - 626 001

Semester III	COMPLEX ANALYSIS	Hours/Week: 6	
Core Course-10		Credits: 5	
Course Code 20PMTTC32		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, students will be able to

CO1: explain the fundamental concepts in Complex Analysis. [K2]

CO2: apply the techniques in Complex Analysis to various domains. [K3]

CO3: determine the solutions to problems in definite integrals and infinite series using suitable method. [K3]

CO4: analyze properties of sequences and series of complex functions, meromorphic, harmonic and entire functions. [K4]

CO5: evaluate zeros, poles, residues, line integrals, complex contour integrals of complex functions. [K5]

Course Code 20PMTTC32	PO1		PO2	PO3	PO4		PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2	PSO 3	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7	PSO 8
CO1	H	H	M	L	L	-	H	L	L	-
CO2	H	H	M	L	M	-	H	L	L	-
CO3	H	H	M	L	M	-	H	L	L	-
CO4	H	H	M	L	M	L	H	L	L	-
CO5	H	H	M	L	M	-	H	L	L	-



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VIRUDHUNAGAR - 626 001

Semester III	OPERATIONS RESEARCH	Hours/Week: 6	
Core Course-11		Credits: 5	
Course Code 20PMTTC33		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, students will be able to

CO1: explain the basic concepts of network models, queuing models, classical optimization theory and nonlinear programming algorithms. [K2]

CO2: apply Operations Research techniques to find solutions to real life problems. [K3]

CO3: solve the given problem in network and queuing models, constrained, unconstrained linear and nonlinear problems. [K3]

CO4: analyze various techniques, methods and algorithms in obtaining optimum solution to the problems. [K4]

CO5: evaluate the problems in network and queuing models constrained, unconstrained linear and nonlinear problems. [K5]

Course Code 20PMTTC33	PO1		PO2	PO3	PO4		PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2	PSO 3	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7	PSO 8
CO1	H	H	L	H	L	L	H	M	M	-
CO2	H	H	L	M	L	M	H	M	L	-
CO3	H	H	M	M	L	M	H	M	L	-
CO4	H	H	L	H	L	L	H	M	L	-
CO5	H	H	L	M	L	L	H	M	L	-



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VIRUDHUNAGAR - 626 001

Semester III	TOPOLOGY	Hours/Week: 6	
Core Course-12		Credits: 5	
Course Code 20PMTTC34		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, students will be able to

CO1: explain the fundamental concepts of topological spaces. [K2]

CO2: determine the topological spaces and their properties in terms of continuous functions, connectedness, compactness, countability and separation axioms.[K3]

CO3: solve the problems in topological spaces with its properties and check the continuity of functions on a topological space.[K3]

CO4: analyze the topological spaces which are connected, compact, Hausdorff, regular or normal and prove theorems related to it.[K4]

CO5: assess the theorems and lemmas in topological spaces.[K5]

Course Code 20PMTTC34	PO1		PO2	PO3	PO4		PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2	PSO 3	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7	PSO 8
CO1	H	H	L	M	H	M	M	M	L	-
CO2	H	H	L	M	H	M	M	M	L	-
CO3	H	H	M	M	M	L	L	M	L	-
CO4	H	H	M	M	M	L	L	M	L	-
CO5	M	M	L	M	L	L	L	M	L	-



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Semester III	PRACTICE FOR CSIR / NET – GENERAL PAPER	Hours/Week:1	
Course Code		Credits: 1	
20PGOL32		Internal 100	External -

COURSE OUTCOMES

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

- CO1 : explain various concepts related to numbers, quantitative comparison, monetary problems and logical reasoning. [K2]
- CO2 : apply the analytical skills and logical reasoning in solving problems related to competitive examinations. [K3]
- CO3 : solve typical problems, geometrical type problems, daily life problems in a effective manner. [K3]
- CO4 : analyze the techniques used in solving complicated real life problems. [K4]
- CO5 : interpret the data using logical reasoning and observational ability. [K5]

Course Code 20PGOL32	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	H	H	M	M	-	M	-	-
CO2	H	H	H	H	-	M	-	-
CO3	H	H	H	H	-	H	-	-
CO4	H	M	H	H	-	H	-	-
CO5	H	M	H	H	-	H	-	-



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VIRUDHUNAGAR - 626 001

Semester III	SET/NET PREPARATION FOR ALGEBRA AND ANALYSIS	Hours/Week: -	
SELF STUDY PAPER		Credits: 2	
Course Code 20PMT031		Internal 100	External -

COURSE OUTCOMES

On completion of the course, students will be able to

CO1: explain the basic concepts in algebra and analysis. [K2]

CO2: apply the shortcut methods to get the results in an easy way. [K3]

CO3: analyze the techniques used in solving complicated problems and enrich their research levels. [K4]

CO4: select appropriate methods for solving various types of problems. [K4]

CO5: evaluate the problems at a higher level by identifying the key words. [K5]

Course Code 20PMT031	PO1		PO2	PO3	PO4		PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2	PSO 3	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7	PSO 8
CO1	H	H	H	H	H	L	-	M	L	-
CO2	H	H	M	L	H	L	-	H	L	-
CO3	H	H	H	L	H	L	M	H	L	-
CO4	H	H	H	L	M	L	-	H	L	-
CO5	H	H	M	H	H	L	M	H	L	-



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Semester III	MATHEMATICS FOR COMPETITIVE EXAMINATIONS	Hours/Week: 5	
NMEC		Credits: 4	
Course Code 20PMTN31		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, students will be able to

CO1: retrieve the basic arithmetic for mental calculations. [K1]

CO2: Explain the basic concepts in arithmetic and diagrammatic representation of the data. [K2]

CO3: apply their analytical ability and computational skills in solving problems. [K3]

CO4: analyze problems in various competitive examinations in effective manner. [K4]

CO5: develop their analytical and critical thinking. [K5]

Course Code 20PMTN31	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	H	M	H	H	H	H	M	-
CO2	H	M	H	M	M	H	M	-
CO3	H	L	H	H	H	H	M	L
CO4	H	L	H	H	H	H	M	L
CO5	H	L	H	H	H	H	M	L



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VIRUDHUNAGAR - 626 001

Semester IV	FIELD THEORY	Hours/Week: 6	
Core Course-13		Credits: 5	
Course Code 20PMTTC41		Internal 40	External 60

COURSE OUTCOMES

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

CO1: explain the fundamental concepts and properties in Galoi's theory, finite fields and extension fields. [K2]

CO2: apply the basic ideas in proving theorems and lemmas in field theory. [K3]

CO3: solve the problems using the techniques in field theory. [K3]

CO4: analyze the relationship between different fields, roots of the polynomials and its Galoi's group, the adjoint operation in the real quaternions and the theorem of Frobenius. [K4]

CO5: assess the proofs of the statements in finite fields, extension fields, division ring and division ring of real quaternions. [K5]

Course Code 20PMTTC41	PO1		PO2	PO3	PO4		PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2	PSO 3	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7	PSO 8
CO1	H	H	L	H	H	M	M	M	L	-
CO2	H	H	L	H	H	M	M	M	L	-
CO3	H	H	M	H	H	M	M	M	L	-
CO4	H	H	M	M	M	L	L	M	-	-
CO5	H	H	L	M	M	L	L	M	-	-



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Semester IV	FUNCTIONAL ANALYSIS	Hours/Week: 6	
Core Course-14		Credits: 5	
Course Code 20PMT C42		Internal 40	External 60

COURSE OUTCOMES

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

CO1: explain the basic concepts in normed spaces, Banach spaces, spectrum of a bounded operator. [K2]

CO2: apply techniques in Functional analysis to determine solutions to problems in Other fields. [K3]

CO3: prove theorems in normed spaces, Banach spaces, spaces of bounded variation. [K3]

CO4: analyse the properties of various functions, normed spaces, Banach spaces, Bounded operator. [K4]

CO5: justify the proof of statements in normed spaces, Banach spaces, functions of bounded variation. [K5]

Course Code 20PMT C42	PO1		PO2	PO3	PO4		PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2	PSO 3	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7	PSO 8
CO1	H	H	H	H	L	-	H	H	M	-
CO2	H	M	M	M	L	-	M	H	L	-
CO3	H	M	H	H	M	L	M	H	H	-
CO4	H	L	M	M	L	L	M	H	H	-
CO5	H	L	L	M	H	-	L	H	L	-



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Semester IV	NUMBER THEORY AND CRYPTOGRAPHY	Hours/Week: 6	
Core Course-15		Credits: 5	
Course Code 20PMTTC43		Internal 40	External 60

COURSE OUTCOMES

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

CO1: explain several basic concepts in Number Theory. [K2]

CO2: apply acquired skills in context of theory of numbers to encrypt and decrypt a message using public key cryptography. [K3]

CO3: prove results using arithmetical functions, various transformations for encryption and decryption. [K3]

CO4: analyze the various concepts related to theory of numbers. [K4]

CO5: justify the results in number theory. [K5]

Course Code 20PMTTC43	PO1		PO2	PO3	PO4		PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2	PSO 3	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7	PSO 8
CO1	H	H	L	L	L	L	H	L	L	-
CO2	H	H	L	M	M	M	H	L	L	-
CO3	H	H	L	M	M	M	M	L	L	-
CO4	H	H	L	M	M	M	H	L	L	-
CO5	H	H	L	M	H	M	M	L	L	-



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Semester IV	GRAPH THEORY	Hours/Week: 6	
Core Course-16		Credits: 5	
Course Code 20PMTC44		Internal 40	External 60

COURSE OUTCOMES

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

CO1: explain the basic concepts in Graph Theory. [K2]

CO2: solve problems by identifying the properties in graph structures. [K3]

CO3: apply the graph theoretical concepts in graph structures. [K3]

CO4: analyze the various parameters in graph structures. [K4]

CO5: assessthe results in Graph Theory to graph structures. [K5]

Course Code 20PMTC44	PO1		PO2	PO3	PO4		PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2	PSO 3	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7	PSO 8
CO1	H	H	L	L	L	L	H	L	L	-
CO2	H	H	L	M	M	M	H	L	L	-
CO3	H	H	L	M	M	M	H	L	L	-
CO4	H	H	L	M	M	M	H	L	L	-
CO5	H	H	L	M	M	M	H	L	L	-



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Semester IV	GRAPH THEORY	Hours/Week: 6	
Core Course-16		Credits: 5	
Course Code 20PMTTC44N		Internal 40	External 60

COURSE OUTCOMES

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

CO1: explain the basic concepts in Graph Theory. [K2]

CO2: solve problems by identifying the properties in graph structures. [K3]

CO3: apply the graph theoretical concepts in graph structures. [K3]

CO4: analyze the various parameters in graph structures. [K4]

CO5: assess the results in Graph theory to graph structures. [K5]

Course Code 20PMTTC44N	PO1		PO2	PO3	PO4		PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2	PSO 3	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7	PSO 8
CO1	H	H	L	L	L	L	L	L	-	H
CO2	H	H	L	M	M	M	L	L	-	H
CO3	H	H	L	M	M	M	L	L	-	H
CO4	H	H	L	M	M	M	L	L	-	H
CO5	H	H	L	M	M	M	L	L	-	H



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Semester IV	PROJECT	Hours/Week: 6	
Course Code 20PMTTC41PR		Credits: 5	
		Internal 40	External 60

COURSE OUTCOMES

On completion of the project, the students will be able to

CO1: use literature review to carry out the project work. [K3]

CO2: apply the theoretical knowledge to formulate the real life problems. [K3]

CO3: execute the project work in abstract and applied Mathematics. [K3]

CO4: analyze the existing results and frame new concepts with illustrations. [K4]

CO5: assess the project to meet the challenges at society level. [K5]

Course Code 20PMTTC41PR	PO1		PO2	PO3	PO4		PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2	PSO 3	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7	PSO 8
CO1	H	H	H	H	H	H	H	M	H	M
CO2	H	H	H	H	H	H	H	M	H	M
CO3	H	H	H	H	H	H	H	M	H	M
CO4	H	H	H	H	H	H	H	M	H	M
CO5	H	H	H	H	H	H	H	M	H	M



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Semester IV	PROJECT – RESEARCH METHODOLOGY & ETHICS	Hours/Week: 6	
Core Course - 17		Credits: 5	
Course Code 22PMTTC41PR		Internal 60	External 40

COURSE OUTCOMES

On completion of the project, the students will be able to

CO1: use literature review to carry out the project work. [K3]

CO2: apply the theoretical knowledge to formulate the research problem with research ethics.
[K3]

CO3: execute the research project with ethical consideration. [K3]

CO4: analyze the research methods to carry out research work. [K4]

CO5: assess the plagiarism detection software. [K5]

Course Code 22PMTTC41PR	PO1		PO2	PO3	PO4		PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2	PSO 3	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7	PSO 8
CO1	H	H	H	H	H	H	H	M	H	M
CO2	H	H	H	H	H	H	H	M	H	M
CO3	H	H	H	H	H	H	H	M	H	M
CO4	H	H	H	H	H	H	H	M	H	M
CO5	H	H	H	H	H	H	H	M	H	M