

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA

A College with Potential for Excellence

ISO 9001: 2015 Certified



PROGRAMME REGISTER

2017-2020

UG DEPARTMENT OF MATHEMATICS

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UG PROGRAMMES OFFERED

S.No.	Programme	Combination offered	Programme Code
1	B.Sc.	Mathematics, Physics, Chemistry (MPC)	301
2		Mathematics, Physics, Computer Science (MPCs)	303
3		Mathematics, Statistics, Computer Science (MSCs)	304
4		Mathematics, Electronics, Computer Science (MECs)	306
5		Mathematics, Chemistry, Computer Science (MCCs)	309
6	BA	Mathematics, Economics, Statistics (MES)	105

PROGRAMME OUTCOMES (POs)

2017-2020

At the end of the programme students will have:

PO1: Essential Knowledge:

Comprehensive discipline knowledge and understanding, the ability to engage with different schools of thought and to apply their knowledge in practice including in multi-disciplinary or multi-professional contexts.

PO2: Creative and critical thinking and problem solving abilities:

Be effective problem solvers, able to apply critical and evidence-based thinking to conceive innovative responses to future challenges.

PO3: Teamwork and communication skills:

Be able to convey ideas and information effectively to a range of audiences for a variety of purposes and contribute in a positive and collaborative manner to achieving common goals.

PO4: Digital capabilities:

Demonstrate preparedness for living, learning and working in a digital society.

PO5: Professionalism and leadership readiness:

Be able to engage in professional behaviour and have the potential to be entrepreneurial and take leadership roles in their chosen occupations and communities.

PO6: Intercultural and ethical competency:

Be responsible and effective global citizens whose personal values and practices are consistent with their roles as responsible members of society.

PO7: Self-awareness and emotional intelligence:

Be self-aware and reflective, flexible and resilient and act with integrity and take responsibility for their actions as empowered women.

PO8: Social responsibility:

Be sensitive to and demonstrate agency in matters of environment, gender and other social issues to promote an equitable society.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

2017-2020

At the end of the programme students will be able to:

PSO1: Interpret the principles, classifications, concepts, theories and mechanisms.

PSO2: Analyse hypothesis, procedures, properties, experimental facts and draw conclusions.

PSO3: Apply techniques in solving problems, results, sample analysis and production.

PSO4: Discuss the latest trends and applications pertinent to higher studies and employability.

PSO5: Exhibit communicative competence and apply skills in computers, creative and critical thinking, interpersonal relationships and managing emotions in real life situations.

Course Outcomes (COs)

2017-2020

S.No.	Sem	Course Code	Course Title	Course Outcomes (COs)
1	I	MATHC031	Differential Equations	CO1: Classify differential equations based on their order and degree and solve them analytically
				CO2: Apply appropriate method to solve differential equations of first order and first degree
				CO3: Apply the acquired knowledge to solve first order and higher degree differential equations
				CO4: Identify family of orthogonal trajectories for a family of curves
				CO5: Apply suitable method to solve higher order differential equations with constant and variable coefficients
2	II	MATHC032	Analytical Geometry	CO1: Distinguish the geometry of planes, lines, spheres, cones and cylinders and describe their properties
				CO2: Explain properties and concepts in 3D solid geometry and use them in real life situations
				CO3: Solve problems on planes, lines, spheres, cones, cylinders and conicoids by the acquired knowledge
				CO4: Apply vector methods to solve certain problems on planes and lines
				CO5: Analyse methods of solving problems on planes, lines and spheres and apply related method to solve them

S.No.	Sem	Course Code	Course Title	Course Outcomes (COs)
3	III	MATHC033	Real Analysis	CO1: Identify the nature of a sequence whether bounded, monotonic, convergent and divergent by employing relevant results
				CO2: Describe the nature of a series by applying suitable test of convergence
				CO3: Illustrate the significance of real number system, real valued and real variable functions, mean value theorems, fundamental theorem and applications
				CO4: Identify continuity of a function and type of discontinuity by applying acquired knowledge
				CO5: Categorize real valued and real variable functions as continuous, differentiable and integrable functions by applying learned principles and results
4	IV	MATHC034	Abstract Algebra	CO1: Demonstrate the structure of group, substructures, cyclic group and their properties
				CO2: Classify non abelian group of functions (permutations) and illustrate its characteristics
				CO3: Analyse properties of group isomorphism to describe the isomorphic groups and its generalization, group homomorphism
				CO4: Analyse a group by the notion of a coset and apply Lagrange's theorem for finite groups.
				CO5: Realize the importance of normal subgroup of a group to develop quotient group of it

12	III / IV	FCA008	Analytical Skills	CO1: Demonstrate arithmetic and business concepts and attain the associated skills
				CO2: Exhibit competency in the use of verbal reasoning
				CO3: Apply the skills and competencies acquired in the related areas
				CO4: Solve problems pertaining to quantitative ability, logical reasoning and verbal ability inside and outside the campus.

S.No.	Sem	Course Code	Course Title	Course Outcomes (COs)
5	V	MATHC035	Ring Theory & Vector Calculus	CO1: Classify the algebraic systems equipped with one and two binary operations and explain their properties.
				CO2: Illustrate different types of rings, fundamentals, substructures, ring isomorphism and their properties
				CO3: Solve problems on gradient of a scalar function, divergent and curl of a vector function by applying their properties
				CO4: Evaluate line, circulation, surface & volume integrals of scalar and vector functions.
				CO5: Understand the significance of Gauss, Green and Stoke theorems and apply them to evaluate certain integrals
6	V	MATHC036	Linear Algebra	CO1: Describe the algebraic systems vector space, subspace and inner product space and their properties
				CO2: Demonstrate a basis for a finite dimensional vector space and an orthonormal basis for a finite dimensional inner product space
				CO3: Analyse a linear transformation on a finite dimensional vector space and describe the dimension of range space and null space
				CO4: Apply suitable technique to find rank of a matrix and solve the system of linear equations
				CO5: Determine the eigen values and Eigen vectors for a square matrix and apply suitable method to find the inverse of it

S.No.	Sem	Course Code	Course Title	Course Outcomes (COs)
7	VI	MATHC038	Numerical Analysis	CO1: Demonstrate the approximations and errors in numerical computations
				CO2: Realize the significance of numerical methods and employ suitable method to solve algebraic and transcendental equations
				CO3: Compute the pth root of a number using numerical methods
				CO4: Determine a polynomial which fits the given data and entry for a given argument using suitable interpolation formula with equal and unequal intervals
				CO5: Determine argument for a given entry using suitable inverse interpolation formula
8	VI	MATHC039	Number Theory	CO1: Realize the significance of number theory, properties of integers, fundamental theorem of arithmetic and applications.
				CO2: Apply division and Euclidean algorithms to solve linear Diophantine equations
				CO3: Solve linear congruences and demonstrate the applications of Chinese remainder theorem, Fermat, Wilson and Euler's theorems
				CO4: Study the divisors of an integer by using number-theoretic functions
				CO5: Solve quadratic congruences and determine quadratic residues using Euler's criterion
				CO6: Evaluate Legendre symbol using Gauss lemma and quadratic reciprocity law
9	VI	MATHC040	Integral Transforms	CO1: Apply Laplace transforms to solve ordinary differential equations with constant and variable coefficients
				CO2: Employ Laplace transforms to solve simultaneous and partial differential equations with boundary conditions

				<p>CO3: Apply Laplace transforms to solve different integral equations and realize the significance of Laplace transforms</p>
				<p>CO4: Recognize the importance of Fourier transforms and their properties</p>
				<p>CO5: Determine Fourier transforms, finite Fourier Sine and Cosine transforms of functions</p>
10	VI	MATHC041	Advanced Numerical Analysis	<p>CO1: Identify the significance of numerical methods and apply the least square method to determine the curve which fits the data</p>
				<p>CO2: Evaluate the derivative of a tabulated function using suitable interpolation formula</p>
				<p>CO3: Evaluate the integral of a tabulated function using suitable numerical integration rule and compute error by comparing with the exact value</p>
				<p>CO4: Apply suitable direct or iterative method to solve system of 'n' linear equations in 'n' unknowns</p>
				<p>CO5: Apply the appropriate method to solve 1st order and 1st degree initial value problems and compute the error by comparing with analytical method</p>
11	VI	MATHC042	Graph Theory	<p>CO1: Demonstrate a graph, type of graph, subgraph, graph isomorphism and discuss their properties</p>
				<p>CO2: Analyse a graph and digraph by describing them in matrix form</p>
				<p>CO3: Describe a connected graph, its components, blocks and demonstrate its characteristics</p>
				<p>CO4: Identify the nature of connectivity and discuss the relation between local and global properties</p>
				<p>CO5: Realize the significance of trees, their characterizations and applications</p>
				<p>CO6: Illustrate digraph, connection between digraphs and matrices and tournaments by the acquired knowledge</p>

Mapping of COs with PSOs

S.No.	Sem	Course Code	Course Title	COs	PSOs
1	I	MATC031	Differential Equations	CO1	PSO1, PSO3
				CO2	PSO1, PSO3
				CO3	PSO1, PSO3
				CO4	PSO1, PSO3
				CO5	PSO1, PSO3
2	II	MATC032	Analytical Geometry	CO1	PSO1, PSO3
				CO2	PSO1, PSO3
				CO3	PSO1, PSO3
				CO4	PSO1, PSO3
				CO5	PSO1, PSO3
3	III	MATC033	Real Analysis	CO1	PSO1, PSO2, PSO3
				CO2	PSO1, PSO2, PSO3
				CO3	PSO1, PSO2, PSO3
				CO4	PSO1, PSO2, PSO3
				CO5	PSO1, PSO2
4	IV	MATC034	Abstract Algebra	CO1	PSO1, PSO2, PSO3
				CO2	PSO1, PSO2
				CO3	PSO1, PSO2
				CO4	PSO1, PSO2
				CO5	PSO1, PSO2, PSO3
5	V	MATC035	Ring Theory & Vector Calculus	CO1	PSO1, PSO2, PSO3
				CO2	PSO1, PSO3
				CO3	PSO1, PSO3
				CO4	PSO1, PSO3
				CO5	PSO1, PSO2, PSO3

6	V	MATCO36	Linear Algebra	CO1	PSO1, PSO2, PSO3
				CO2	PSO1, PSO2, PSO3
				CO3	PSO1, PSO2, PSO3
				CO4	PSO1, PSO2, PSO3
				CO5	PSO1, PSO2, PSO3
7	VI	MATC038	Numerical Analysis	CO1	PSO1, PSO3, PSO4
				CO2	PSO1, PSO3, PSO4
				CO3	PSO1, PSO3, PSO4
				CO4	PSO1, PSO3, PSO4
				CO5	PSO1, PSO3, PSO4
8	VI	MATC039	Number Theory	CO1	PSO1, PSO3, PSO4
				CO2	PSO1, PSO3, PSO4
				CO3	PSO1, PSO3, PSO4
				CO4	PSO1, PSO3, PSO4
				CO5	PSO1, PSO3, PSO4
				CO6	PSO1, PSO3, PSO4
9	VI	MATC040	Integral Transforms	CO1	PSO1, PSO3, PSO4
				CO2	PSO1, PSO3, PSO4
				CO3	PSO1, PSO3, PSO4
				CO4	PSO1, PSO3, PSO4
				CO5	PSO1, PSO3, PSO4

10	VI	MATC041	Advanced Numerical Analysis	CO1	PSO1, PSO3, PSO4
				CO2	PSO1, PSO3, PSO4
				CO3	PSO1, PSO3, PSO4
				CO4	PSO1, PSO3, PSO4
				CO5	PSO1, PSO3, PSO4
11	VI	MATC042	Graph Theory	CO1	PSO1, PSO2, PSO4
				CO2	PSO1, PSO2, PSO4
				CO3	PSO1, PSO2, PSO4
				CO4	PSO1, PSO2, PSO4
				CO5	PSO1, PSO2, PSO4
				CO6	PSO1, PSO2, PSO4

12	III / IV	FCA008	Analytical Skills	CO1	PSO3, PSO5
				CO2	PSO3, PSO5
				CO3	PSO3, PSO5
				CO4	PSO3, PSO5

Mapping of Courses with PSOs

Course	PSO1	PSO2	PSO3	PSO4	PSO5
MATHC031 DE	✓		✓		
MATHC032 AG	✓		✓		
MATHC033 RA	✓	✓	✓		
MATHC034 AA	✓	✓	✓		
MATHC035 RVC	✓	✓	✓		
MATHC036 LA	✓	✓	✓		
MATHC038 NA	✓		✓	✓	
MATHC039 NT	✓		✓	✓	
MATHC040 IT	✓		✓	✓	
MATHC041 ANA	✓		✓	✓	
MATHC042 GT	✓	✓		✓	
FCA008 AS			✓		✓

Mapping of PSOs with POs

PSOs	PO1 Essential Knowledge	PO2 Creative and critical thinking and problem solving abilities	PO3 Teamwork and communication skills	PO4 Digital capabilities	PO5 Professionalism and leadership readiness	PO6 Intercultural and ethical competency	PO7 Self-awareness and emotional intelligence	PO8 Social Responsibility
PSO1	✓	✓						✓
PSO2	✓	✓						✓
PSO3	✓	✓		✓				✓
PSO4	✓	✓	✓	✓	✓		✓	✓
PSO5	✓	✓	✓	✓	✓	✓	✓	✓

Mapping of Courses with POs

Course	PO1 Essential Knowledge	PO2 Creative and critical thinking and problem solving abilities	PO3 Teamwork and communication skills	PO4 Digital capabilities	PO5 Professionalism and leadership readiness	PO6 Intercultural and ethical competency	PO7 Self- awareness and emotional intelligence	PO8 Social Responsibility
MATH C031	✓	✓		✓				✓
MATH C032	✓	✓		✓				✓
MATH C033	✓	✓		✓				✓
MATH C034	✓	✓		✓				✓
MATH C035	✓	✓		✓				✓
MATH C036	✓	✓		✓				✓
MATH C038	✓	✓	✓	✓	✓		✓	✓
MATH C039	✓	✓	✓	✓	✓		✓	✓
MATH C040	✓	✓	✓	✓	✓		✓	✓
MATH C041	✓	✓	✓	✓	✓		✓	✓
MATH C042	✓	✓	✓	✓	✓		✓	✓
FCA 008	✓	✓	✓	✓	✓	✓	✓	✓