

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA

A College with Potential for Excellence

NAAC Accredited & ISO 21001: 2018 Certified



PROGRAMME REGISTER: 2023-26

DEPARTMENT OF MATHEMATICS

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PROGRAMME OUTCOMES (POs)

2023-26

Students of all Undergraduate Programmes at the time of graduation will be able to possess

PO1: Essential Knowledge:

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

PO2: Creative, 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:

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: Motivated, Self-directed, and Life-long Learning:

Exhibit life-long skills; broad-based multiple career oriented general skills; self and field-based learning skills; digital skills; preparedness for living, learning and working in any environment.

PO5: Professionalism and Leadership Readiness:

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 and Effective Citizenship:

Exhibit social responsibility and compassionate commitment; Be sensitive to and demonstrate institution in matters of environment, gender and other social issues to promote an equitable society and sustainable development.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

2023-26

At the end of the programme students will be able to possess/exhibit:

PSO1: Quantitative Analysis:

Interpret principles, classifications, concepts, theories and mechanisms learnt.

PSO2: Practical and Analytical Skills:

Analyse hypotheses, procedures, properties, experimental facts and draw conclusions.

PSO3: Logical and Critical Thinking:

Apply knowledge and techniques in sample analysis, problem-solving, results, and production.

PSO4: Teamwork and Communication:

Develop communicative competence, creative and critical thinking, practical, technical and employability skills, social sensibility and responsibility.

Course Outcomes (COs)

2023-26

S.No.	Sem	Course Code	Course Title	Course Outcomes (COs)
1	I	23SCCCEA14	Essentials and Applications of Mathematical, Physical & Chemical Sciences	CO1: Apply mathematical principles to solve various problems across complex numbers, trigonometry, vectors, and statistical analysis involving data sets.
				CO2: Summarize key physics principles, including measurements, motion, thermodynamics, wave behaviour, electromagnetism, atomic structure, and theories of the universe.
				CO3: Outline the fundamental concepts of chemistry and their relevance in daily life.
				CO4: Elaborate the interconnectedness of math, physics and chemistry and explain how they predict phenomena in diverse contexts.
				CO5: Discuss about computer evolution, including the internet, network types and understand ethical issues in network security, cryptography, privacy and data protection.
2	I	23SCCCAS14	Advances in Mathematical Physical & Chemical Sciences	CO1: Identify the applications of mathematics in physics and chemistry to solve real-world problems.
				CO2: Explain renewable energy generation, storage, energy-efficient materials and recent advancements in nanotechnology, biophysics, medical physics, and materials science.
				CO3: Outline computer-aided drug design, Nano sensors, chemical biology, the impact of chemical pollutants on ecosystems and human health, and methods for dye removal using catalysis.
				CO4: Elaborate the interconnectedness of math, physics and chemistry and apply these principles to explain phenomena in diverse contexts.
				CO5: Summarize the advanced computer science topics, such as number systems, signals, error detection and correction, multiplexing, transmission media, and networking devices.
3	I	23SECAS12	Analytical Skills	CO1: Explain arithmetic and business computations and develop the associated skills.

				<p>CO2: Exhibit acquired skills and competencies in the related areas.</p> <p>CO3: Solve problems related to quantitative aptitude, data interpretation, logical and verbal reasoning.</p>
4	II	23MTCCDE24	Differential Equations	<p>CO1: Classify and solve analytically differential equations based on their order and degree.</p> <p>CO2: Apply appropriate method to solve differential equations of the first order and the first degree.</p> <p>CO3: Solve the first order and higher degree differential equations and identify a family of orthogonal trajectories for a family of curves.</p> <p>CO4: Apply suitable method to solve higher-order differential equations with constant coefficients.</p> <p>CO5: Apply suitable method to solve higher-order differential equations with variable coefficients.</p>
5	II	23MTCCAG24	Analytical Solid Geometry	<p>CO1: Distinguish the geometry of planes, lines, spheres and cones and describe their properties.</p> <p>CO2: Display concepts in planes and solve problems on planes.</p> <p>CO3: Describe concepts in lines and solve problems on lines.</p> <p>CO4: Demonstrate concepts in spheres and solve problems on spheres.</p> <p>CO5: Explain concepts in cones and solve problems on cones.</p>
6	III	23MTCCGT34	Group Theory	<p>CO1: Describe structure of a group, substructures and their basic properties.</p> <p>CO2: Analyse a group by the notion of a coset and apply Lagrange's theorem for finite groups.</p> <p>CO3: Explain properties and significance of normal subgroups.</p> <p>CO4: Analyse properties of group isomorphism to describe isomorphic groups and group homomorphism.</p> <p>CO5: Discuss permutation and cyclic groups and illustrate their characteristics.</p>
7	III	23MTCCNM34	Numerical Methods	<p>CO1: Employ calculus of finite differences and numerical methods to solve problems.</p>

				<p>CO2: Apply suitable interpolation technique for interpolation with equal and unequal intervals.</p> <p>CO3: Apply appropriate central difference formula for interpolation with equal intervals.</p> <p>CO4: Solve algebraic and transcendental equations using numerical methods.</p> <p>CO5: Apply method of least-squares to fit a curve through the given data.</p>
8	III	23MTCCLT34	Laplace Transforms	<p>CO1: Describe linear property of Laplace transform, recognizing functions of exponential order and class A.</p> <p>CO2: Apply shifting, initial and final value theorems, change of scale property, and compute Laplace transforms of derivatives.</p> <p>CO3: Evaluate Laplace transforms of integrals, Bessel and error functions, sine and cosine functions.</p> <p>CO4: Apply linear and change of scale properties, shifting theorems and compute inverse Laplace transforms.</p> <p>CO5: Evaluate inverse Laplace transforms of derivatives and integrals and utilize convolution and Heaviside's expansion theorems.</p>
9	III	23MTCCSF34	Special Functions	<p>CO1: Apply Beta and Gamma functions and evaluate certain definite integrals and explain properties of Chebyshev polynomials.</p> <p>CO2: Describe power series solutions of ordinary differential equations.</p> <p>CO3: Discuss Hermite polynomials and their properties.</p> <p>CO4: Explain Legendre polynomials and their properties.</p> <p>CO5: Express Bessel functions and their properties.</p>
10	III	23MDCBM32	Basic Mathematics	<p>CO1: Display types and algebra of sets, types of relations and surds, and basic properties of logarithms.</p> <p>CO2: Describe coordinate system, locus and different forms of straight line.</p> <p>CO3: Explain types and algebra of matrices and find inverse of a matrix.</p>

11	IV	23MTCCRT44	Ring Theory	CO1: Describe structure of a ring, types of rings, and their basic properties.
				CO2: Explain properties of subrings, ideals and their significance.
				CO3: Express the characteristics of principal ideal rings and quotient rings.
				CO4: Analyse properties of ring isomorphism to describe isomorphic rings and classify prime and maximal ideals.
				CO5: Discuss polynomials defined over a field and describe their characteristics.
12	IV	23MTCCRA44	Introduction to Real Analysis	CO1: Illustrate significance of real number system and describe the nature of a sequence by employing relevant results.
				CO2: Describe the nature of an infinite series by applying a suitable test for convergence.
				CO3: Identify continuity and type of discontinuity of a real valued and real variable function using learned principles.
				CO4: Discuss the derivability of a real valued and real variable function and use mean value theorems effectively.
				CO5: Discuss the integrability of a function, properties of integrable functions, and apply learned theorems.
13	IV	23MTCCIT44	Integral Transforms	CO1: Solve ordinary differential equations with constant and variable coefficients using Laplace transforms.
				CO2: Solve simultaneous differential and partial differential equations using Laplace transforms.
				CO3: Apply Laplace transforms to solve various integral equations and integral differential equations.
				CO4: Apply the concepts and linear, shifting, change of scale properties of Fourier transforms.
				CO5: Understand the relationship between Fourier and Laplace transforms, and solve problems related to finite Fourier transforms and their inversions.
14	V	23MTCCLA44	Linear Algebra	CO1: Outline the structure and properties of vector spaces and subspaces.
				CO2: Identify a basis for a finite dimensional vector space, subspace and quotient space.

				<p>CO3: Analyze a linear transformation on a finite dimensional vector space and determine the dimension of range space and null space.</p> <p>CO4: Determine the eigenvalues and eigenvectors for a square matrix and apply Cayley-Hamilton theorem to solve problems.</p> <p>CO5: Apply concepts such as orthogonality, orthonormal basis and Gram-Schmidt orthogonalisation process.</p>
15	V	23MTCCVC54	Vector Calculus	<p>CO1: Evaluate double integrals and apply them to calculate surface areas and other physical quantities.</p> <p>CO2: Evaluate triple integrals and apply them to determine volumes and other physical quantities.</p> <p>CO3: Determine Gradient of a scalar function, Divergence and Curl of a vector function and apply their properties.</p> <p>CO4: Evaluate line, circulation, surface and volume integrals of scalar and vector functions.</p> <p>CO5: Explain the significance of Gauss, Green and Stoke theorems and apply them to evaluate complex integrals.</p>
16	V	23MTEC11FC54	Functions of Complex Variables	<p>CO1: Determine bilinear transformation under given condition and solve problems in complex analysis and geometry by applying bilinear transformation.</p> <p>CO2: Explain key topological concepts such as open and closed sets, neighbourhoods, continuity, compactness, and connectivity in the complex plane.</p> <p>CO3: Analyze and evaluate properties of analytic functions, including their differentiability and implications in the complex domain.</p> <p>CO4: Solve problems involving the inverse of analytic functions and assess the convergence of infinite series in complex analysis.</p> <p>CO5: Discuss the power series representations and the analytic character of elementary complex functions.</p>
17	V	23MTEC12NM54	Advanced Numerical Methods	<p>CO1: Find derivative of a tabulated function using suitable numerical method and compute the error.</p> <p>CO2: Evaluate integral of a tabulated function using suitable numerical method and compute the error.</p> <p>CO3: Apply direct numerical methods to solve simultaneous linear system of equations.</p>

				<p>CO4: Utilize iterative numerical methods to solve simultaneous linear system of equations.</p> <p>CO5: Solve 1st order and 1st degree initial value problems applying appropriate numerical method and compute errors.</p>
18	V	23MTEC21NT 54	Number Theory	<p>CO1: Discuss properties of integers, elements of number theory, fundamental theorem of arithmetic and solve problems using the Euclidean algorithm.</p> <p>CO2: Analyze and compute arithmetical functions and apply Dirichlet multiplication and Mobious inversion formula.</p> <p>CO3: Apply techniques such as Euler summation and Dirichlet product to evaluate averages and asymptotic behaviour of arithmetical functions.</p> <p>CO4: Solve congruences and apply Euler, Fermat, Lagrange and the Chinese remainder theorems in problem-solving.</p> <p>CO5: Evaluate Legendre symbols, quadratic residues and apply the quadratic reciprocity law and Gauss sums in problem-solving.</p>
19	V	23MTEC22MS 54	Mathematical Statistics	<p>CO1: Explain the fundamental principles of probability and their use in constructing probability distributions.</p> <p>CO2: Summarize random variables and various discrete and continuous probability distributions, including their properties and applications.</p> <p>CO3: Recall the expectation and distribution of two random variables and apply multivariate distributions to solve problems involving multiple random variables.</p> <p>CO4: Analyze and interpret the properties of binomial, poisson, geometric, multinomial and hypergeometric distributions.</p> <p>CO5: Utilize the normal distribution for approximations, statistical inference, and solving practical problems in statistics.</p>

Mapping of COs with PSOs & POs

S.No.	Sem	Course Code	Course Title	COs	PSOs	POs
1	I	23SCCCEA14	Essentials and Applications of Mathematical, Physical & Chemical Sciences	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO4	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO5	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
2	I	23SCCCAS14	Advances in Mathematical Physical & Chemical Sciences	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO4	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO5	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
3	I	23SECAS12	Analytical Skills	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
4	II	23MTCCDE24	Differential Equations	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO4	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO5	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
5	II	23MTCCAG24	Analytical Solid Geometry	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO4	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO5	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
6	III	23MTCCGT34	Group Theory	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4

				CO4	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO5	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
7	III	23MTCCNM34	Numerical Methods	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO4	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO5	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
8	III	23MTCCLT34	Laplace Transforms	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO4	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO5	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
9	III	23MTCCSF34	Special Functions	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO4	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO5	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
10	III	23MDCBM32	Basic Mathematics	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
11	IV	23MTCCRT44	Ring Theory	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO4	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO5	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
12	IV	23MTCCRA44	Introduction to Real Analysis	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4

				CO4	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO5	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
13	IV	23MTCCIT44	Integral Transforms	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO4	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO5	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
14	V	23MTCCLA44	Linear Algebra	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO7
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO7
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO7
				CO4	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO7
				CO5	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO7
15	V	23MTCCVC54	Vector Calculus	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO7
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO7
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO7
				CO4	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO7
				CO5	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO7
16	V	23MTEC11FC54	Functions of Complex Variables	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO7
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO7
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO7
				CO4	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO7

				CO5	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO7
17	V	23MTEC12NM54	Advanced Numerical Methods	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO7
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO7
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO7
				CO4	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO7
				CO5	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO7
18	V	23MTEC21NT54	Number Theory	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO7
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO7
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO7
				CO4	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO7
				CO5	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO7
19	V	23MTEC22MS54	Mathematical Statistics	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO7
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO7
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO7
				CO4	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO7
				CO5	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO7

Mapping of Courses with PSOs

Course Title	PSO1 Quantitative Analysis	PSO2 Practical and Analytical Skills	PSO3 Logical, Critical Thinking	PSO4 Teamwork and Communication
Essentials and Applications of Mathematical, Physical & Chemical Sciences (EA)	✓	✓	✓	✓
Advances in Mathematical Physical & Chemical Sciences (AS)	✓	✓	✓	✓
Analytical Skills (AS)	✓	✓	✓	✓
Differential Equations (DE)	✓	✓	✓	✓
Analytical Solid Geometry (AG)	✓	✓	✓	✓
Group Theory (GT)	✓	✓	✓	✓
Numerical Methods (NM)	✓	✓	✓	✓
Laplace Transforms (LT)	✓	✓	✓	✓
Special Functions (SF)	✓	✓	✓	✓
Basic Mathematics (BM)	✓	✓	✓	✓
Ring Theory (RT)	✓	✓	✓	✓
Introduction to Real Analysis (RA)	✓	✓	✓	✓
Integral Transforms (IT)	✓	✓	✓	✓
Linear Algebra (IA)	✓	✓	✓	✓
Vector Calculus (VC)	✓	✓	✓	✓
Functions of Complex Variables (FC)	✓	✓	✓	✓
Advanced Numerical Methods (NM)	✓	✓	✓	✓
Number Theory (NT)	✓	✓	✓	✓
Mathematical Statistics (MS)	✓	✓	✓	✓

Mapping of Courses with POs

Course	PO1 Essential Knowledge	PO2 Creative, Critical thinking and Problem-solving abilities	PO3 Teamwork and Communication skills	PO4 Motivated, Self-directed and Life-long Learning	PO5 Professionalism and Leadership Readiness	PO6 Intercultural and Ethical Competency	PO7 Self-awareness and Emotional Intelligence	PO8 Social Responsibility and Effective Citizenship
EA	✓	✓	✓	✓				
AS	✓	✓	✓	✓				
AS	✓	✓	✓	✓				
DE	✓	✓	✓	✓				
AG	✓	✓	✓	✓				
GT	✓	✓	✓	✓				
NM	✓	✓	✓	✓				
LT	✓	✓	✓	✓				
SF	✓	✓	✓	✓				
BM	✓	✓	✓	✓				
RT	✓	✓	✓	✓				
RA	✓	✓	✓	✓				
IT	✓	✓	✓	✓				
LA	✓	✓	✓	✓	✓		✓	
VC	✓	✓	✓	✓	✓		✓	
FC	✓	✓	✓	✓	✓		✓	
NM	✓	✓	✓	✓	✓		✓	
NT	✓	✓	✓	✓	✓		✓	
MS	✓	✓	✓	✓	✓		✓	