MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA

A College with Potential for Excellence

ISO 9001: 2015 Certified

PROGRAMME REGISTER

UG DEPARTMENT OF PHYSICS

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UG PROGRAMMES OFFERED

S.No.	Programme	Combination Offered	Programme Code
1	B.Sc.	Mathematics, Physics, Chemistry (MPC)	301
2	B.Sc.	Mathematics, Physics, Computer Science (MPCs)	303

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	PHYC039	PHYC039	**CO1:** Apply the knowledge of Gauss and Stoke's theorems in understanding the theory in other areas of physics.
				CO2: Describe the motion of Rockets, types of fuels used and its applications.
				CO3: Compute the Euler equations in mechanics of rigid bodies and the applications.
				CO4: Outline the concepts of Central forces, Kepler's laws and the basics of Global Positioning system.
				CO5: Summarize types Elastic constants of isotropic solids, their relations and applications.
				CO6: Validate the postulates of theory of relativity with the help of Michelson-Morley Experiment.
				CO7: Solve problems based on theoretical concepts in all units of this course.
2	II	PHYC041	**Waves and Oscillations**	**CO1:** Describe S.H.M of suspended bodies and its applications using superposition theorem.
				CO2: Interpret the damped and forced oscillators and their applications.
				CO3: Analyze sine wave, square wave, triangular wave, sawtooth wave using Fourier theorem.
				CO4: Outline the concepts of propagation of waves in strings and bars and their applications.
				CO5: Summarize the basics of Ultrasonics, their role in research and their applications.
				CO6: Solve problems based on theoretical concepts in all units of this course.

S.No.	Sem	Course Code	Course Title	Course Outcomes (COs)
3	III	PHYC043	Wave Optics	**CO1:** Relate different types of aberrations in lenses, their theory and minimizing techniques.
				CO2: Compare the facts, principles and ideas of the theory of interference and its applications.
				CO3: Distinguish between the concepts of Fraunhofer and Fresnel diffraction and their modern applications in life.
				CO4: Summarize the concepts of polarization, the polarized nature of light, specific rotation and applications.
				CO5: Outline characteristics, working principles of LASERS, Optical fibres and holography and their applications in daily life.
				CO6: Solve problems based on theoretical concepts in all units of this course.
4	IV	PHYC045	Thermodynamics and Radiation Physics	**CO1:** Explain the postulates of kinetic theory of gases and transport phenomena.
				CO2: Outline the fundamental ideas, laws of thermodynamics, Principle & working of Carnot's engine, reversible and irreversible processes, entropy of the universe and applications.
				CO3: Derive Maxwell's equations and their applications using thermodynamic potentials.
				CO4: Summarize the fundamentals of low temperature physics and their application.
				CO5: Discuss the postulates of Quantum theory of radiation and their applications.
				CO6: Solve problems based on theoretical concepts in all units of this course.
5	V	PHYC047	Electricity, Magnetism & Electronics	**CO1:** Apply Gauss's law to get relations connecting dielectric parameters and their applications.
				CO2: Derive expressions for magnetic field at a point due to current carrying conductors using Biot Savart Law.

				CO3: Distinguish self and mutual inductance phenomena and their applications.
				CO4: Compute Maxwell's electromagnetic wave equations and their role in communications.
				CO5: Summarize the basic concepts of semiconductors and digital electronics and their applications.
				CO6: Solve problems based on theoretical concepts in all units of this course.
6	V	PHYC048	**Modern Physics**	**CO1:** Apply the knowledge of vector atom model, Stern Gerlac experiment, Quantum numbers, coupling schemes, Zeeman effect, Raman effect and their applications in Atomic & Molecular Physics.
				CO2: Relate the applications of de Broglie concept of matter waves and Heisenberg's uncertainty Principle in Modern scientific fields.
				CO3: Compute the energies and wave functions of a particle in a one dimensional potential box of infinite height using Schrodinger wave equation.
				CO4: Summarize the general properties of nuclei and radioactivity decays in Nuclear Physics.
				CO5: Outline the basics of crystallography and study of structure of crystals using Bragg's law.
				CO6: Discuss the phenomenon of Superconductivity and its modern applications.
				CO7: Solve problems based on theoretical concepts in all units of this course.

7	VI	PHYC051	Analog and Digital Electronics	**CO1:** Analyze the concepts, construction, working, characteristics of FET and MOSFET and their applications.
				CO2: Summarize the basics of operational amplifiers (IC 741), its parameters and its practical applications in electronic circuits.
				CO3: Describe the internal architecture IC 555 Timer and its application as astable and monostable multivibrator.
				CO4: Compile simple logic operations and code conversions using combinational logic circuits.
				CO5: Outline the working of sequential logic circuits and conversion of Flip flops.
				CO6: Solve problems based on theoretical concepts in all units of this course.
8	VI	PHYC052	Introduction to Microprocessors and Microcontrollers	**CO1:** Summarize the Architecture of 8085 Microprocessor and write programs with the knowledge of instructions set.
				CO2: Explain the internal operation of 8051 Microcontroller and write simple programs using assembly language.
				CO3: Analyze the concept of Input and Output port structures and their operations of 8051.
				CO4: Discuss the basic concept of Timer and Counter Programming.
				CO5: Describe the structure, characteristics and programming of embedded systems.
				CO6: Outline integrated development environment of embedded system and the latest trends in embedded industry.
9	VI	PHYC053	Computational Methods and Programming	**CO1:** Describe the importance of Computer and Basic concepts of computer.
				CO2: Classify types of functions and types of input and output commands.

				CO3: Demonstrate the knowledge of computer programming language concepts.
				CO4: Summarize the techniques of finding roots of equations, solving systems of linear algebraic equations.
				CO5: Create programs for Numerical methods and programming.
10	VI	PHYC054	**Electronic Instrumentation**	**CO1:** Summarize static parameters of an instrument and types of errors that occur during measurements.
				CO2: Describe the capabilities and limitations of test instruments and measurement practices in terms of validity and accuracy.
				CO3: Relate principles involved in the determination of basic electrical parameters using multimeters and CRO.
				CO4: Outline the principle and functioning of transformers and their applications in electronic circuits and electrical power transfer systems in daily life.
				CO5: Determine the values of L, C and R using Wheatstone, De-Sauty's and Anderson's bridges.
				CO6: Solve problems based on theoretical concepts in all units of this course.

Mapping of COs with PSOs

S.No.	Semester	Course Code	Course Title	COs	PSOs
1	I	PHYC039	Mechanics and Properties of Matter	CO1	PSO1, PSO3
				CO2	PSO1, PSO3, PSO4
				CO3	PSO1, PSO3
				CO4	PSO1, PSO3, PSO4
				CO5	PSO1, PSO2, PSO3
				CO6	PSO1, PSO2, PSO3
				CO7	PSO1, PSO3
2	II	PHYC041	Waves and Oscillations	CO1	PSO1, PSO2, PSO3
				CO2	PSO1, PSO2, PSO3
				CO3	PSO1, PSO2, PSO3
				CO4	PSO1, PSO2, PSO3
				CO5	PSO1, PSO2, PSO3, PSO4
				CO6	PSO3
3	III	PHYC043	Wave Optics	CO1	PSO1, PSO2, PSO3
				CO2	PSO1, PSO2, PSO3
				CO3	PSO1, PSO2, PSO3
				CO4	PSO1, PSO2, PSO3
				CO5	PSO1, PSO2, PSO3, PSO4

				CO6	PSO3
4	IV	PHYC045	**Thermodynamics and Radiation Physics**	CO1	PSO1, PSO2, PSO3
				CO2	PSO1, PSO2, PSO3
				CO3	PSO1, PSO2, PSO3
				CO4	PSO1, PSO2, PSO3, PSO4
				CO5	PSO1, PSO2, PSO3, PSO4
				CO6	PSO3
5	V	PHYC047	**Electricity, Magnetism& Electronics**	CO1	PSO1, PSO3
				CO2	PSO1, PSO2, PSO3
				CO3	PSO1, PSO2, PSO3
				CO4	PSO1, PSO2, PSO3
				CO5	PSO1, PSO2, PSO3
				CO6	PSO3
6	VI	PHYC048	**Modern Physics**	CO1	PSO1, PSO2, PSO3, PSO4
				CO2	PSO1, PSO2, PSO3
				CO3	PSO1, PSO2, PSO3
				CO4	PSO1, PSO2, PSO3
				CO5	PSO1, PSO2, PSO3
				CO6	PSO1, PSO2, PSO3
				CO7	PSO3
7	VI	PHYC051	**Analog and Digital Electronics**	CO1	PSO1, PSO2, PSO3
				CO2	PSO1, PSO2, PSO3
				CO3	PSO1, PSO2, PSO3

				CO4	PSO1, PSO2, PSO3
				CO5	PSO1, PSO2, PSO3
				CO6	PSO1, PSO2, PSO3
8	VI	PHYC052	**Introduction to Microprocessors and Microcontrollers**	CO1	PSO1, PSO2, PSO3
				CO2	PSO1, PSO2, PSO3
				CO3	PSO1, PSO2, PSO3
				CO4	PSO1, PSO2, PSO3
				CO5	PSO1, PSO2, PSO3
				CO6	PSO1, PSO2, PSO3, PSO4
9	VI	PHYC053	**Computational Methods and Programming**	CO1	PSO1, PSO2
				CO2	PSO1, PSO3
				CO3	PSO3, PSO4
				CO4	PSO1, PSO4
				CO5	PSO2, PSO4
10	VI	PHYC054	**Electronic Instrumentation**	CO1	PSO1, PSO2, PSO3
				CO2	PSO1, PSO2, PSO3
				CO3	PSO1, PSO2, PSO3
				CO4	PSO1, PSO2, PSO3
				CO5	PSO1, PSO2, PSO3
				CO6	PSO1, PSO2, PSO3

Mapping of Courses with PSOs

Course	PSO1	PSO2	PSO3	PSO4	PSO5
PHYC039	✓	✓	✓	✓	
PHYC041	✓	✓	✓		
PHYC043	✓	✓	✓	✓	
PHYC045	✓	✓	✓		
PHYC047	✓	✓	✓		✓
PHYC048	✓	✓	✓	✓	✓
PHYC051	✓	✓	✓	✓	✓
PHYC052	✓	✓	✓	✓	✓
PHYC053	✓	✓	✓	✓	✓
PHYC054	✓	✓	✓	✓	

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
PHYC039	✓	✓		✓				✓
PHYC041	✓	✓		✓				✓
PHYC043	✓	✓		✓				✓
PHYC045	✓	✓		✓				✓
PHYC047	✓	✓	✓	✓	✓			✓
PHYC048	✓	✓	✓	✓	✓			✓
PHYC051	✓	✓	✓	✓	✓		✓	✓
PHYC052	✓	✓	✓	✓	✓		✓	✓
PHYC053	✓	✓	✓	✓	✓		✓	✓
PHYC054	✓	✓	✓	✓	✓		✓	✓